DAYTONA BEACH INTERNATIONAL AIRPORT

MASTER PLAN UPDATE

September 2020

FINAL




DAYTONA BEACH
INTERNATIONAL AIRPORT

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Appendix 1 – Stormwater Master Plan (Abridged)

Appendix 2 – South Development Area Market Assessment

1. INTRODUCTION

1.1. INTRODUCTION

This document is a Master Plan Update for the Daytona Beach International Airport (Airport or DAB). This Master Plan Update replaced DAB's previous Airport Master Plan, which was approved in 2003. Since then, there were substantial changes in the aviation industry, the economy, and the local population that affected the Airport, the City of Daytona Beach, and Volusia County. The Airport experienced significant growth throughout the last several years in pilot training operations with the presence of Embry-Riddle Aeronautical University (ERAU). DAB also experiences annual spikes in activity during major events at the Daytona Beach International speedway, partially located on Airport property. As such, a Master Plan Update was necessary to ensure the Airport accounted for, and is prepared for, future growth.

1.2. PURPOSE OF THE MASTER PLAN

An Airport Master Plan is a comprehensive study that describes the short-, intermediate-, and long-term development plans for an airport and ensures that regional aviation needs are met in a feasible and fiscally responsible manner. The purpose of this Airport Master Plan Update was to provide Volusia County a means to establish a long-range development strategy for sustained, responsible growth of the Airport through the 20-year planning period. The Master Plan Update focused on optimizing operations and providing flexible options for growth while identifying areas suitable for new facilities.

The Master Plan Update improvements should satisfy projected aviation demand, ensure the safety of Airport operations, and be compatible with the environment and other community development plans. Above all else, the Master Plan must be technically sound, practical, and economically and fiscally feasible.

Specifically, the purpose of the Master Plan Update was to:

- Provide the forum to connect the Airport to stakeholders, tenants, the local community, and government agencies to discuss objectives and goals;
- Identify issues and goals in tangent with the needs of the community relative to the Airport and generate a strategy to meet future aviation demand;
- Develop aviation demand forecasts that anticipate future growth in activity and needs for DAB;
- Establish key milestones of Airport development, supported by the forecasted aviation demand and justification for implementation;
- Anticipate the probable costs required over the life of the study and ensure the program is financially viable; and
- Generate a phased development plan that will meet the Airport's needs while considering safety, environmental concerns, and financial feasibility.

For eligibility of Federal Aviation Administration (FAA) Airport Improvement Program (AIP) funding, the FAA recommends that airport sponsors update their Master Plans periodically (approximately every 5 to 10 years or in response to significant changes) to document existing and future operational capabilities, demonstrate compliance with FAA airport design criteria, and incorporate changes to existing and proposed facilities. As part of this Master Plan Update, a new Airport Layout Plan (ALP) — a technical document set that depicts both existing facilities and planned development for an airport — was also created and approved by the FAA.

The master planning process involves collecting readily available data, forecasting future aviation demand, determining facility requirements, studying various alternatives, and developing future plans and schedules. The process took into consideration the needs and concerns of Volusia County, the City Daytona Beach, DAB's tenants and users, and the general public.

This Master Plan Update was prepared in accordance with FAA Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*; FAA AC 150/5300-13A, Change 1, *Airport Design*; and other FAA design standards and planning criteria. Specific elements of this technical report are described in the following sections.

1.2.1. INVENTORY OF EXISTING CONDITIONS

The Airport inventory organized and quantified information and data about the existing Airport facilities, including the airfield, terminal area, Airport access areas, Fixed Base Operators (FBOs) and general aviation (GA) facilities, ERAU facilities, land holdings, support facilities, environmental data, and utility systems. The inventory also collected information related to the city of Daytona Beach, such as population changes, employment and income trends, off-Airport land use, and land use controls. The inventory data acted as the foundation for subsequent sections of the Master Plan Update.

1.2.2. AVIATION FORECASTS

To create plans for future needs at the short-, intermediate-, and long-term planning intervals it was necessary to forecast and project anticipated Airport activity. The development of the forecast for DAB provided forecasted figures for the levels of aircraft operations and the types of aircraft that may be operating at the Airport. The forecasts were developed using various mathematical, market share, and trend-related projection techniques to estimate the future number of based aircraft, the fleet mix, and total operations that the Airport should plan for. The forecast chapter is one of two elements of the Master Plan that the FAA approves.

1.2.3. DEMAND/CAPACITY ANALYSIS AND FACILITY REQUIREMENTS

Airfield capacity identifies the upper limit of airfield operations a runway and taxiway system can accommodate. The airfield capacity of the Airport was evaluated on both an hourly basis and on an annual basis. Generally, as an airport nears its capacity, the airport sponsor should consider planning airfield improvements to meet the demand that the capacity requires. When an airport has reached 80 percent of its capacity, actual construction of improvements should be considered. The facility requirements analysis was a comparison between the existing airfield facilities and the future needs, based on the forecasted activity levels. The comparison was used to identify deficiencies or excess capacity of an airport area or facility. The facility requirements analysis presented future demand in terms of additional square feet, linear feet, acreage, or other appropriate measures. The final analysis provided the Airport with a list of objectives the Airport should try to provide, if feasible.

1.2.4. ALTERNATIVES ANALYSIS

The alternatives analysis portion of the Master Plan Update drew from the Forecast and Facility Requirements chapters to identify alternatives to meet the needs of the Airport. The individual alternatives in the analysis can range from minor alternatives to major airfield reconfigurations, including changes to property and existing facilities. The Preferred Alternative was derived from combining multiple individual alternatives to meet the facility requirements Airport-wide.

1.2.5. IMPLEMENTATION AND FINANCIAL PLAN

An implementation plan as created in conjunction with a financial plan as a tool for local decision-makers to determine an approach for future development. The facility requirements chapter identified the needs of the Airport and the alternatives chapter presents the most viable solution to the needs. The financial plan quantified the items eligible for Federal and State funding, as well as projects requiring local or private sources for funds. The implementation plan incorporated the financial plan and recommended alternatives to provide a guide for developing future facilities throughout the planning horizon.

1.2.6. ENVIRONMENTAL OVERVIEW

The environmental overview identified potential environmental effects associated with the implementation of the Recommended Development Plan. The chapter identified environmental impacts to multiple categories, some of which include air, water, and noise quality. The chapter also presented the updated noise contours developed from approved aviation activity forecast.

1.2.7. AIRPORT LAYOUT PLAN DRAWING SET

The Airport Layout Plan (ALP) was a set of drawings connected to the development of the Master Plan Update for DAB and depicted the existing Airport conditions and the proposed changes to the Airport over the 20-year planning horizon. The sheet set was developed using Computer Aided Design (CAD) software to achieve a high level of planning accuracy. The ALP was the second component of the Master Plan that required FAA approval.

1.3. PLANNING HORIZON

This Master Plan Update covers a planning period of 20 years. The planning period is divided into three terms: short-term (upcoming 5 years), intermediate-term (6 to 10 years), and long-term (11 to 20 years). The intermediate- and long-term planning periods are typically considered strategic in nature and help to ensure that short-term actions are consistent with longer-term development needs.

2. INVENTORY OF EXISTING CONDITIONS

2.1. AIRPORT HISTORY

The Airport began as a sand runway along Daytona Beach and was utilized for guest entertainment at the area hotels from daredevil pilots[1]. Over time, the entertainment source turned into a focus of service when a Pitcairn Airwing started regular airmail delivery service to the area; Daytona Beach is also noted as the location for the first twin-engine aircraft flight. In 1928, the City of Daytona Beach officially relocated the Airport from the beach to Bethune Point, located along the Halifax River. Two years later, in 1930, the City of Daytona Beach relocated the Airport once again to its present location. The Airport used wooden surfboards as signage and coquina rock for the runway surface.

During World War II, the U.S. Navy used the Airport for pilot training. In 1946, the City of Daytona Beach regained ownership of the Airport, which coincided with a cultural shift from rail to air travel as a preferred mode of transportation. The year 1952 marked the beginning of construction on the first terminal and hangars at the Airport. During the 1950s, passenger and cargo service rose to over 6,000 aircraft per week, and included flights from Eastern, National, and governmental airlines.

In 1958, the Airport received funding from a Federal aid program that allowed for a new terminal and hangars at the Airport. The terminal modernization included a restaurant, bar, gift shop, and barbershop; the terminal also made Daytona Beach Airport one of the most modern and safest airports in Florida. In 1969, Volusia County began managing Airport operations and was renamed Daytona Beach Regional Airport. In 1992, the Airport officially became Daytona Beach International Airport and an International Terminal was added, along with an extended runway to 10,500 feet to accommodate larger aircraft.

2.2. REGIONAL SETTING

Daytona Beach International Airport is operated by Volusia County. The day-to-day operations of the Airport are overseen by the Director of Aviation and Economic Resources. Other departments that assist with the operations of the Airport include: Administration, Business Development and Marketing, Law Enforcement, Fire, Operations, Security, and Facilities.

The National Plan of Integrated Airport Systems (NPIAS) defines DAB as a non-hub commercial service airport located in the Central Florida region, 3.5 miles west of downtown Daytona Beach, Florida. The Airport is currently served by three major air carriers: Delta Air Lines (Delta), JetBlue Airways (JetBlue), and American Airlines (American). The Airport served over 707,413 passengers in 2016[2], with 356,006 annual enplanements and 351,407 annual deplanements.

The Airport is located on approximately 1,955 acres of land in the eastern portion of Volusia County. DAB also supports corporate/general aviation, flight training, air cargo, and ERAU flight school operations. **Table 2.1** shows the airports within the vicinity of DAB. **Exhibits 2.1** and **2.2** show the Airport location map and the Airport vicinity map, respectively.

[1] http://www.flydaytonafirst.com/about-dab/historical-information.stml
[2] Daytona Beach International Airport Air Carrier Activity Report

Airport Code	Airport Name	Distance from DAB (miles)	Public Airport
7FL6	Spruce Creek Airport	7	No
OMN	Ormond Beach Municipal Airport	8	Yes
EVB	New Smyrna Beach Municipal Airport	9	Yes
DED	DeLand Municipal Airport – Sidney H Taylor Field	14	Yes
X50	Massey Ranch Airpark	14	Yes
FIN	Flagler Executive Airport	19	Yes
2J8	Pierson Municipal Airport	25	Yes
SFB	Orlando Sanford International Airport	30	Yes

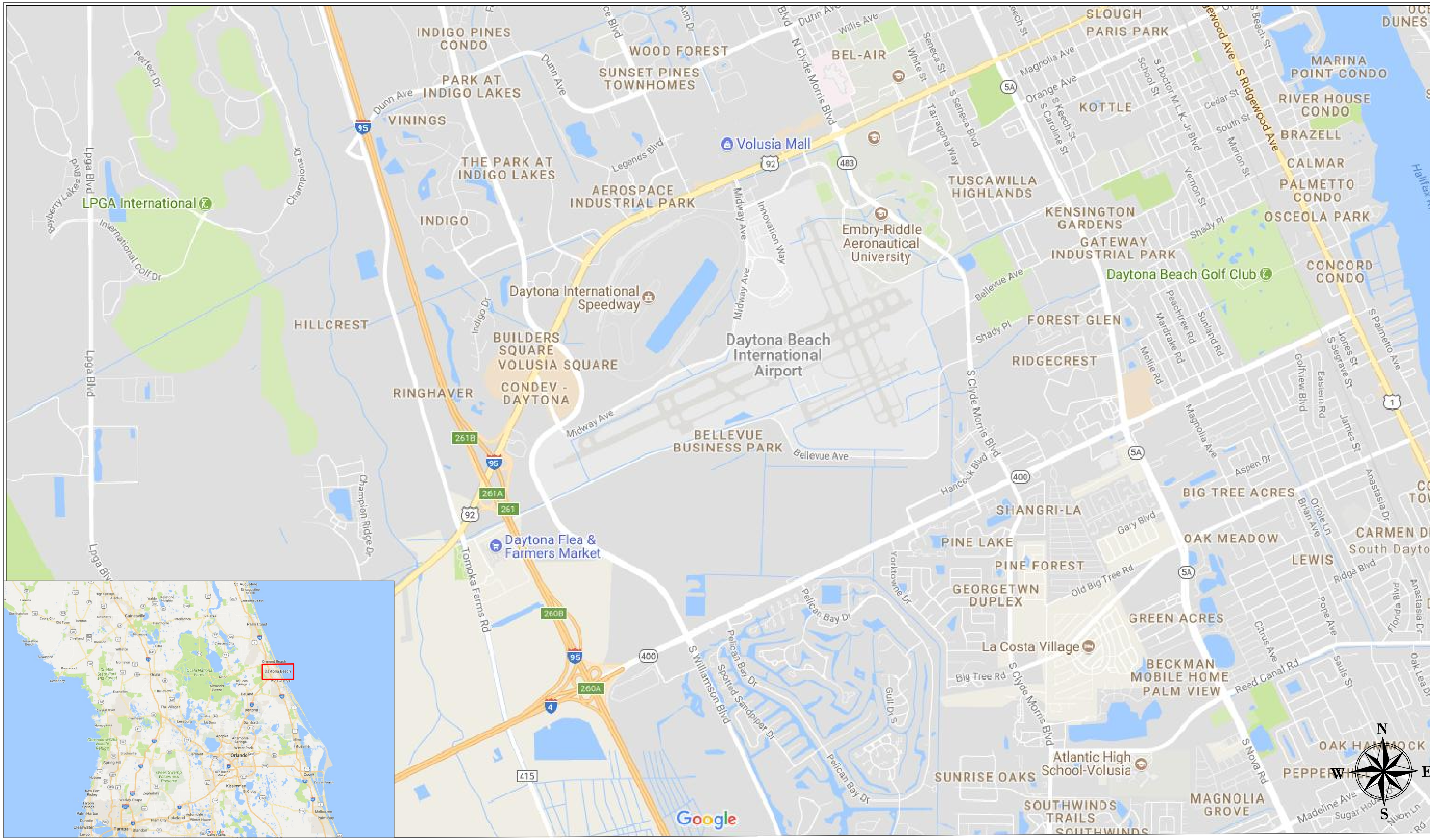
Table 2.1 - Airports Within the Vicinity of DAB

Source: Airnav KDAB Daytona Beach International Airport, May 25, 2017.

2.3. PREVIOUS PLANNING STUDIES

Background information for the Inventory of Existing Conditions was provided by the following sources:

- *Daytona Beach International Airport Master Plan Update,* 2003, HNTB Corporation;
- *Airport Air Service Profile, Daytona Beach International Airport,* 2012, Kimley-Horn and Associates, Inc.;
- *Statewide Airfield Pavement Management Program, Daytona Beach International Airport (DAB),* 2015, Kimley-Horn and Associates, Inc.;
- *Volusia County Comprehensive Plan,* 2016, Volusia County; and
- *Intermodal Transit Station Study (ITSS),* Florida Department of Transportation (FDOT), 2013.



Source: google.com/maps

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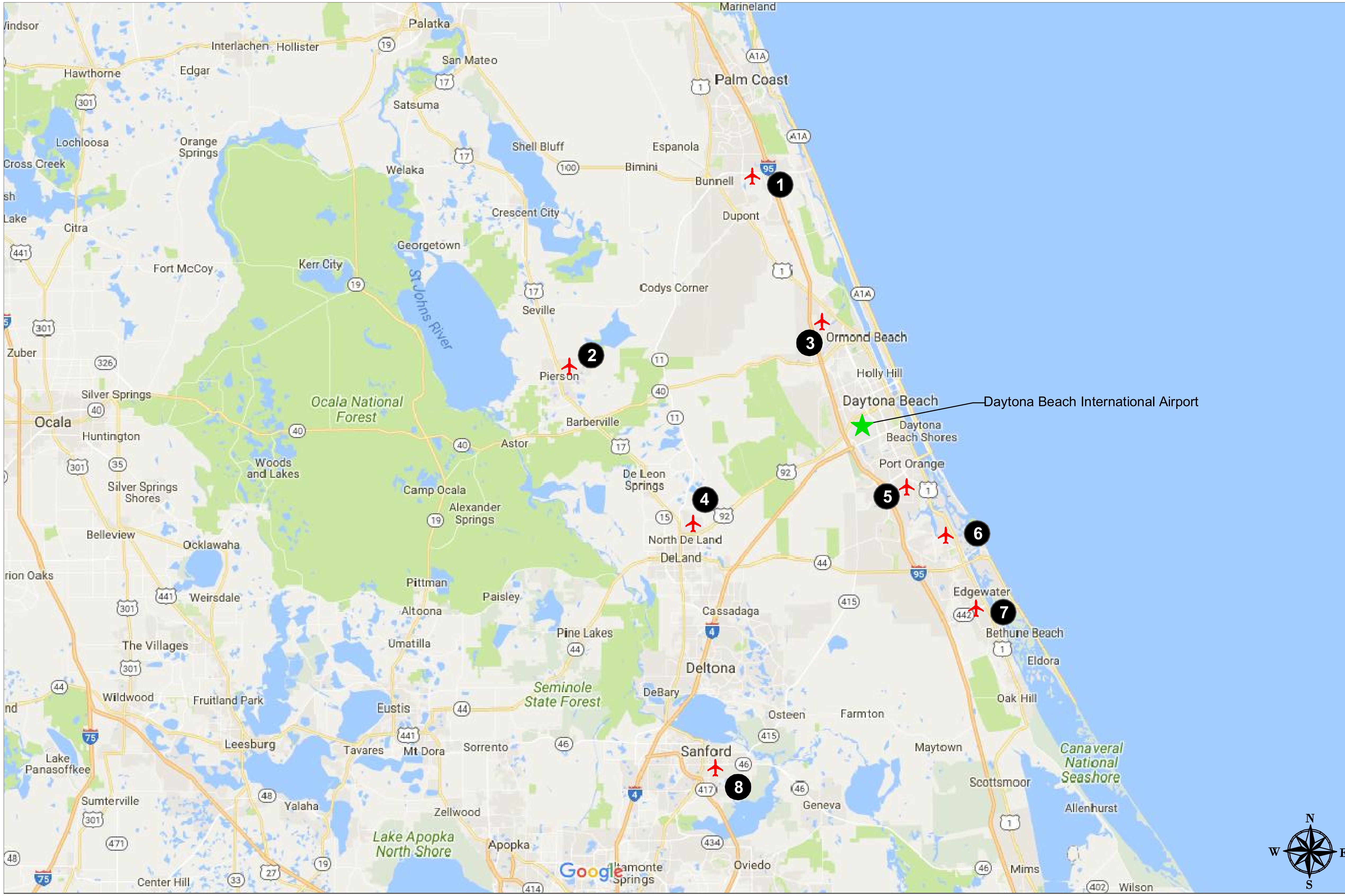
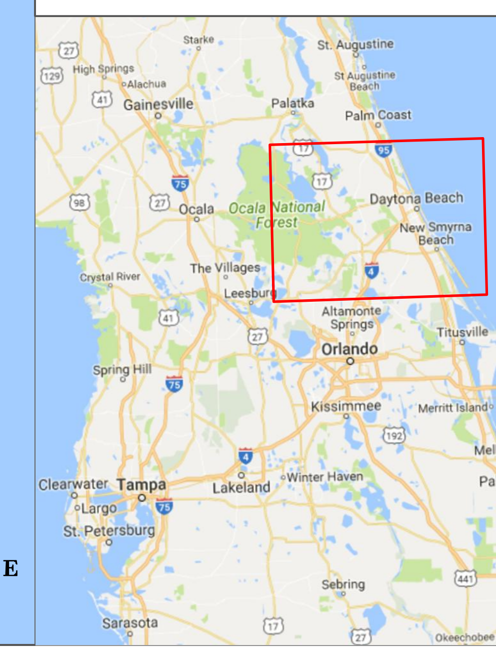
Exhibit 2.1

Airport Location Map





Airports Within 25nm Vicinity

1	Flagler Executive Airport
2	Ormond Beach Municipal Airport
3	Pierson Municipal Airport
4	De Land Municipal Airport
5	Spruce Creek Airport
6	New Smyrna Beach Municipal Airport
7	Massey Ranch Airpark
8	Orlando Sanford International Airport

Source: googlemaps.com

Not to Scale

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Exhibit 2.2

Airport Vicinity Map

2.4. AIRSPACE AND AIRFIELD

The airfield facilities at the Airport include the runways, taxiways, apron areas, Airport lighting, and navigational aids (NAVAIDs). The following sections provide descriptions of the weather, the airfield facilities, and the surrounding airspace.

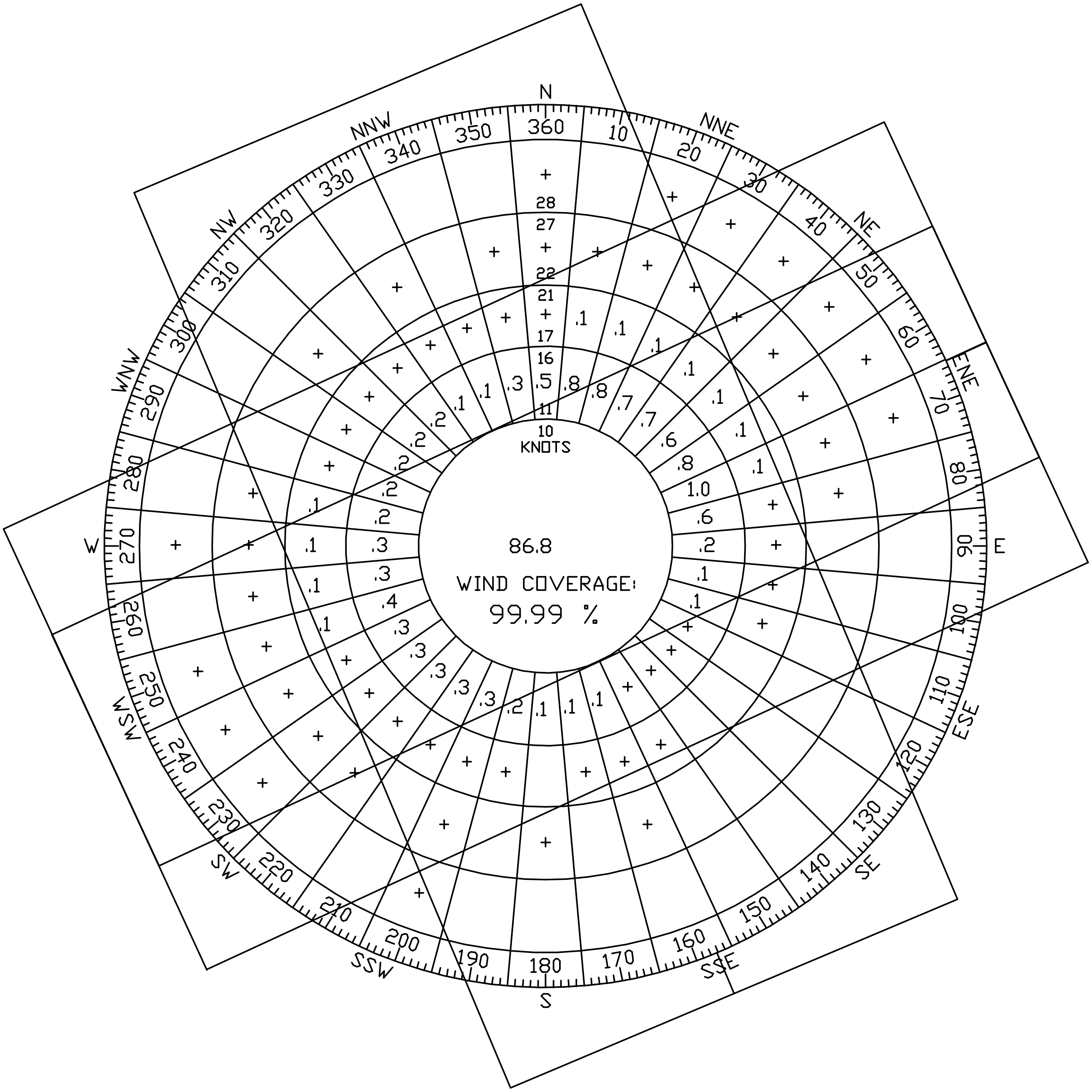
2.4.1. METEOROLOGICAL CONDITIONS

Climate conditions at an Airport greatly impact Airport planning and development at an Airport. Temperatures can impact runway length requirements, aircraft operations, and necessary facilities. According to the National Climatic Data Center, the annual mean temperature at DAB is 70.9 degrees. The average annual high temperature is 80.0 degrees and the average low temperature is 61.5 degrees. July and August represent hottest month averages of 90.0 degrees. Average annual rainfall for the region is 49.71 inches, with rainfall ranging from a low of 2.17 inches in April to a high of 6.97 inches in September. In the East-Central Florida region where the Airport is located, it is typically sunny, with thunderstorms common in the afternoons during summer months.

2.4.1.1. Prevailing Wind Conditions

The direction and velocity of prevailing winds, as well as cloud ceiling and visibility conditions directly influence runway use, air traffic control rules, and airfield capacity. All aircraft have limits as to the maximum allowable cross wind (wind perpendicular to the direction of flight) they can safely accommodate when landing and taking off. The wind's direction and velocity determine the magnitude of the crosswind components relative to a particular runway and can influence runway utilization.

For planning purposes, the FAA stipulates when a runway orientation provides less than 95 percent wind coverage, a crosswind runway should be considered. Daytona Beach International Airport's three runways (7R/25L, 7L/25R, and 16/34) provide 99.99 percent wind coverage for a crosswind component up to 10.5 knots. This provides sufficient coverage to both smaller general aviation aircraft as well as larger corporate and commercial aircraft. Wind rose data summarizes wind speed and direction for the various cloud ceiling/visibility conditions, such as good weather Visual Meteorological Conditions (VMC), poor weather Instrument Meteorological Conditions (IMC) conditions, and All-Weather conditions. **Exhibit 2.3** shows the All-Weather wind rose for the Airport.



Source: FAA AGIS Wind Analysis Tool

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Exhibit 2.3

Wind Rose - All Weather

2.4.2. AIRSPACE

The Master Plan Update takes into consideration the ability of the local airspace to accommodate anticipated demand and traffic patterns at the Airport. In addition to this, potential changes in Airport facilities, the effects that they in turn may have on airspace, and procedures that govern the operation and control of aircraft within the area are taken into consideration. The FAA facilities and operations that control the airspace surrounding DAB are also described.

2.4.2.1. Airspace in Vicinity of DAB

The airspace within the vicinity of the Airport has restrictions based on the type of flight activity. There are alert areas, which are areas of airspace with high volumes of pilot training or where unusual aeronautical activity occurs, south and west of the DAB Class C airspace. The alert areas surrounding the Airport are utilized for flight training by the various flight schools located on Airport property.

Patrick Air Force Base is located 70 miles southeast of DAB and is incorporated into the Terminal Radar Approach Control (TRACON) area of control for the Airport. National Aeronautics and Space Administration's (NASA) Kennedy Space Center Class B airspace is located south of the Airport and restricted airspace is also located to the west, over the Ocala National Forest. **Exhibit 2.4** shows the airspace for the Airport.

2.4.2.2. Airport Traffic Control Tower

The Airport Traffic Control Tower (ATCT) at DAB provides aircraft with clearances to land and/or take off from DAB, as well as handling aircraft ground operations in the movement areas of the airfield. The airspace surrounding the Airport is designated as Class C airspace; Class C airspace extends from the airfield surface to a height of 4,000 feet above the airfield. Class C airspace is shaped like an upside-down wedding cake that has an inner radius of five nautical miles and an upper surface from 1,200 feet Mean Sea Level (MSL) and above of ten nautical miles.

Aircraft operating under Instrument Flight Rules (IFR) that are generally within a 45 to 60 nautical mile radius around Daytona Beach, between ground level and 15,000 feet MSL, are under the control of Daytona Beach TRACON, which is located at the base of the DAB ATCT. TRACON controllers typically provide guidance and separation for arriving and departing aircraft during initial departure and approach.

2.4.2.3. Air Route Traffic Control Center Airspace (ARTCC)

Air Route Traffic Control Centers (ARTCCs) provide air traffic control services to aircraft operating on IFR flight plans in controlled airspace generally between departing and arriving airports. During certain circumstances, services are also provided to VFR flight plans. En-route aircraft transitioning to and from DAB are controlled by the Jacksonville ARTCC located in Hilliard, Florida. The Jacksonville ARTCC is one of 20 domestic en-route air traffic control centers. Jacksonville Center is responsible for approximately 160,000 square miles of airspace that covers Alabama, Georgia, Florida, North Carolina, and South Carolina. The northeastern boundary is close to Wilmington, North Carolina, the western boundary is near Mobile, Alabama, and the southern boundary is north of Orlando, Florida. This ARTCC is also responsible for portions of the Atlantic Ocean and Gulf of Mexico.

Not to be used for air navigation.

Source: www.faa.gov/

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Exhibit 2.4

Airport Airspace Map

2.4.3. RUNWAYS

For use in determining the adequacy of the existing Airport runway system, the FAA utilizes an Airport Reference Code (ARC), which is defined in FAA AC 150/5300-13A, *Airport Design*, to determine the critical aircraft that must be accommodated on a runway. The ARC shows the designation of an Airport's highest Runway Design Code (RDC), minus the third component of visibility. The ARC is composed of the Aircraft Approach Category (AAC) and the Airplane Design Group (ADG); the AAC is related to an aircraft's approach speed and the ADG is correlated to the aircraft's wingspan and tail height. The ARC is based on the largest aircraft with at least 500 annual operations at the Airport.

The third component of the RDC, approach visibility, refers to the visibility minimums expressed by Runway Visual Rules (RVR) values in feet. The RDC is used to determine the building standards for a specific runway. The ARC is D-IV for Runway 7L/25R, D-IV for Runway 16/34, and B-I Utility for Runway 7R/25L. The AAC, ADG, and Visibility components are shown below in **Tables 2.2, 2.3, and 2.4**, respectively.

Table 2.2 - Aircraft Approach Category

AAC	Approach Speed
A	Less than 91 knots
B	91 knots or more, but less than 121 knots
C	121 knots or more, but less than 141 knots
D	141 knots or more, but less than 166 knots
E	166 knots of more

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

Table 2.3 - Airpl ane Design Group

Group	Wingspan	Tail Height
I	Less than 49 feet	Less than 20 feet
II	49 feet or more, but less than 79 feet	20 feet or more, but less than 30 feet
III	79 feet or more, but less than 118 feet	30 feet or more, but less than 45 feet
IV	118 feet or more, but less than 171 feet	45 feet or more, but less than 60 feet
V	171 feet or more, but less than 214 feet	60 feet or more, but less than 66 feet
VI	214 feet or more, but less than 262 feet	66 feet or more, but less than 80 feet

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

Table 2.4 - Visibility Minimums

RVR (ft)	Instrument Flight Visibility Category (statute mile)
5000	Not lower than 1 mile
4000	Lower than 1 mile, but not lower than ¾ mile
2400	Lower than ¾ mile, but not lower than ½ mile
1600	Lower than ½ mile, but not lower than ¼ mile
1200	Lower than ¼ mile

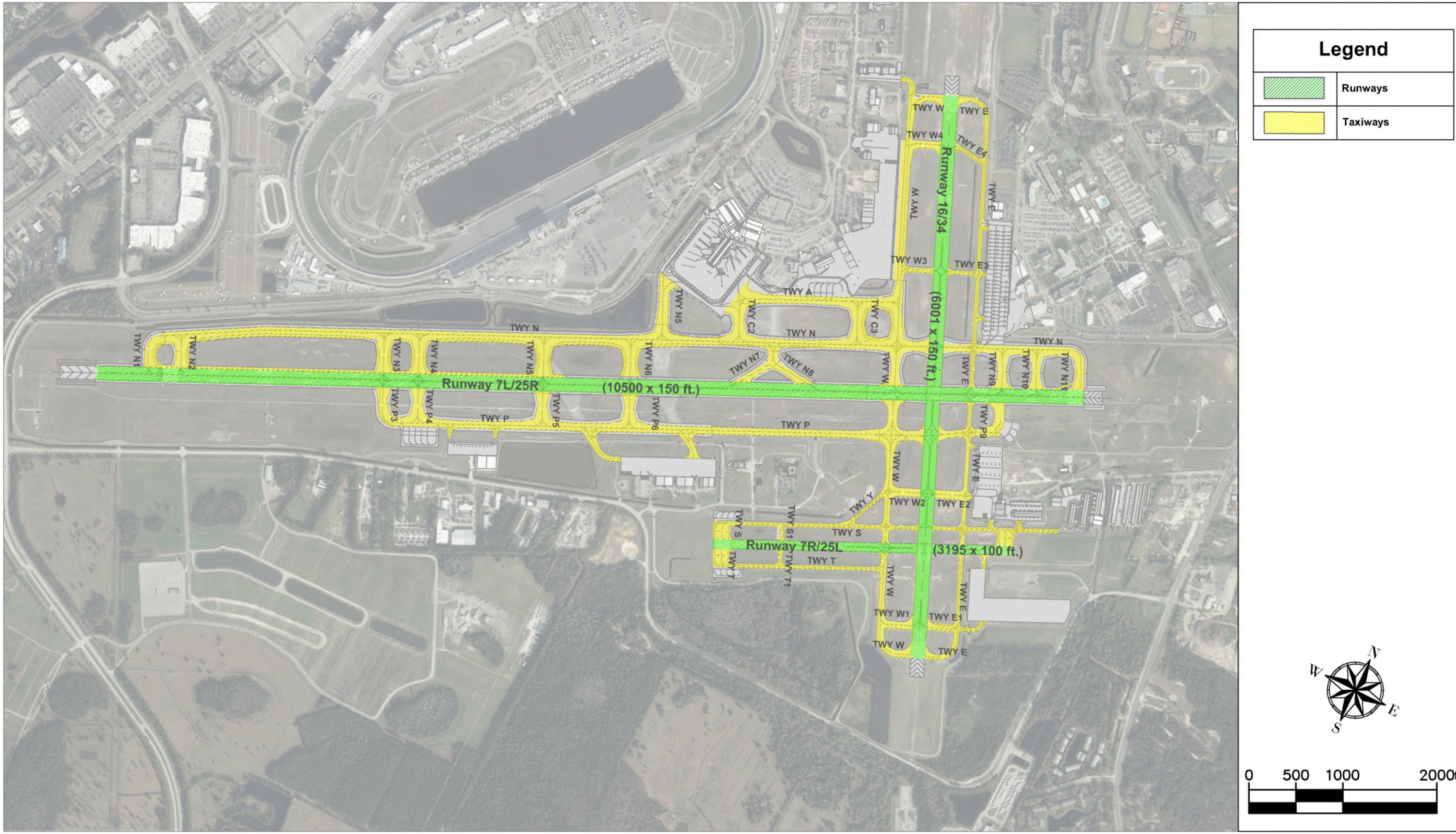
Source: FAA Advisory Circular 150/5300-13A, Change 1, Airport Design.

The Airport has an existing configuration of one asphalt-concrete runway and two asphalt runways. Runways 7L/25R and 16/34 are 150-feet wide and Runway 7R/25L is 100-feet wide. Parallel Runways 7L/25R and 7R/25L are oriented in an east/west direction and Runway 16/34 is oriented in a north/south direction. **Table 2.5** summarizes the physical characteristics of the runways at the Airport. **Exhibit 2.5** shows the existing DAB airfield facilities.

Table 2.5 - Existing Runway Data

	Runway 7L/25R	Runway 16/34	Runway 7R/25L
Length (feet)	10,500	6,001	3,195
Width (feet)	150	150	100
Displaced Threshold (feet)	690/0	0/0	0/0
Effective Runway Gradient (%)	0.1/0.1	0.1/0.1	0.1/0.1
Runway Surface Type	Asphalt-Concrete	Asphalt	Asphalt
Runway Condition	Good	Fair	Poor
Runway Markings	Precision/Precision	NonPrec/NonPrec	NonPrec/NonPrec
Runway Lighting	HIRL	MIRL, REIL	MIRL, REIL
Touchdown Zone Lighting	Yes/No	No/No	No/No
Instrument Approaches	ILS,RNAV / ILS,RNAV	RNAV / RNAV	RNAV / RNAV
Approach Lighting	MALSR /MALSR	--/--	--/--
Visual Glide Slope Indicator	--/PAPI-4	PAPI-4/PAPI-4	--/--
Aircraft Approach Category	D	D	B
Airplane Design Group	IV	IV	I Small
Visibility Minimums	¾ Mile / ½ Mile	1 mile/ 1 mile	1 mile/ 1 mile
Load Bearing Capacity (pounds)			
Single Wheel	120,000	120,000	24,000
Dual Wheel	224,000	225,000	38,500
Two Dual Wheels in Tandem	402,000	385,000	--
Two Dual Wheels in Tandem/Two Dual Wheels in Double Tandem	915,000	892,000	--
Declared Distances			
Takeoff Run Available (TORA)	10,500/10,500	6,001/6,001	3,195/3,195
Takeoff Distance Available (TODA)	10,500/10,500	6,001/6,001	3,195/3,195
Accelerate Stop Distance Available (ASDA)	10,500/10,293	5,969/6,001	3,195/3,195
Landing Distance Available (LDA)	9,810/10,293	5,969/6,001	3,195/3,195

Source: FAA Airport Master Record 5010 DAB June 18, 2020.



DAYTONA BEACH INTERNATIONAL AIRPORT

Exhibit 2.5

Existing Airfield Facilities

2.4.3.1. Runway 7L/25R

Runway 7L/25R is the longest runway at the Airport as well as the primary runway. It measures 10,500 feet long by 150 feet wide and is composed of asphalt-concrete with a grooved surface. The pavement for Runway 7L/25R is listed as being in Good condition[3]. Most departures occur at the Runway 7L end.

2.4.3.2. Runway 16/34

Runway 16/34 is a crosswind runway measuring 6,001 feet long by 150 feet wide. The runway is composed of asphalt pavement and has a grooved surface. The pavement for the runway is listed as being in Fair condition[4]. Runway 16/34 is not as highly utilized as the parallel Runways 7L/25R and 7R/25L, with approximately 10 percent of overall operations occurring on Runway 16/34.

2.4.3.3. Runway 7R/25L

Runway 7R/25L is a parallel runway at the Airport that is 3,195 feet long and 100 feet wide. The runway is composed of asphalt pavement. The FAA Master Record lists the pavement strength of Runway 7R/25L as having the capability to support single wheel operations of 24,000 pounds and dual wheel operations of 38,500 pounds.[5] The pavement for Runway 7R/25L is listed as being in Poor condition.[6] This runway is primarily used for “touch-and-go” pattern traffic.

2.4.4. TAXIWAYS

The runway system at the Airport is served by a system of taxiways that provide access between the runways and aircraft apron areas. Taxiways allow for controlled and organized movement between areas of the airfield, including the runways, terminal area, cargo area, general aviation facilities, and other parking areas located on the airfield.

As shown on the Airport Diagram, there is a published FAA hotspot located at the intersection of Taxiways S and W in the southern portion of the airfield. Hotspots are defined by the FAA as locations on an airport movement area that have a history of potential risk of collision or runway incursion, making it necessary for increased attention by pilots and drivers operating there. The taxiway system at the Airport is made up of asphalt-concrete pavement. It is noted that there are several taxiway portions that are listed in Poor or Very Poor condition.[7]

2.4.5. APRON AREAS

Aprons are typically located in the non-movement area of an airport, adjacent to terminal and/or hangar areas. Aprons are utilized for accommodating aircraft during loading and unloading of passengers or cargo. Additional actions that occur on the apron include fueling, maintenance, and short- or long-term parking. **Exhibit 2.6** depicts the existing apron areas at the Airport.

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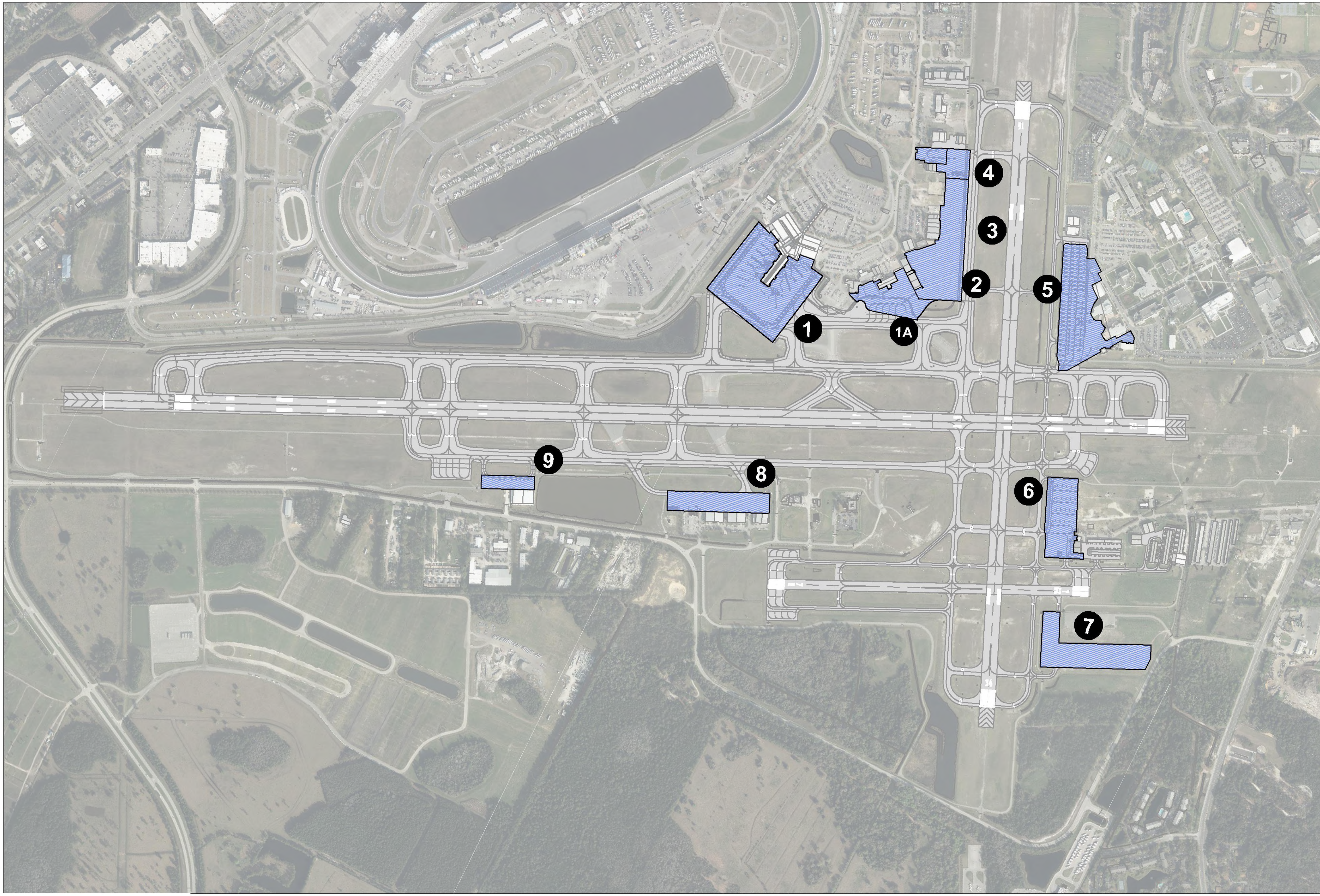
[3] Pavement Evaluation Report – Daytona Beach International Airport June 2015.

[4] Pavement Evaluation Report – Daytona Beach International Airport June 2015.

[5] FAA Airport Master Record, DAB, July 20, 2017.

[6] Pavement Evaluation Report – Daytona Beach International Airport June 2015.

[7] Pavement Evaluation Report – Daytona Beach International Airport June 2015.



Legend

1	Daytona Beach International Airport - Domestic Terminal
1A	Daytona Beach International Airport - International Terminal
2	Sheltair - Jet Center
3	Phoenix East Aviation
4	NASCAR Aviation
5	Embry-Riddle Aeronautical University
6	ATP - Jet Center
7	Southeast Ramp
8	Yelvington Aviation Management
9	Brown and Brown

0 500 1000 2000ft.

DAYTONA BEACH INTERNATIONAL AIRPORT

Exhibit 2.6

Existing Facilities - Aprons

2.4.5.1. Terminal Apron

The terminal apron is located in the central portion of the airfield and has six aircraft parking positions that are located around the terminal concourse and connected to the terminal with jet bridges. The terminal apron is constructed of Portland Cement Concrete (PCC) and is in Good condition.[6] It can be accessed via taxiway connectors A1, A2, and N5. The terminal apron is approximately 643,000 square feet.

The international and customs terminal apron is constructed of asphalt-concrete pavement and is in Serious condition.[6] It can be accessed via taxiway connectors A and A1. The terminal apron has one gate with a jet bridge that is not currently utilized. The approximate size of the international and customs terminal apron is 199,665 square feet.

2.4.5.2. General Aviation Aprons

GA apron areas are located throughout the airfield on Airport property. Many of the GA aprons are located with FBOs, which are described in greater detail in a subsequent section. Parking for based and itinerant general aviation aircraft is found at Sheltair, ATP – Jet Center, Yelvington Jet Aviation, Inc., and an additional Airport-owned ramp area found on the southeast portion of the airfield utilized for light general aviation use. **Table 2.6** summarizes the GA apron areas located at the Airport.

Table 2.6 - General Aviation Apron Areas

	Area (Square Feet)	Pavement Condition
Sheltair	421,454	Very Poor
ATP – Jet Center	246,058	Poor
Yelvington Jet Aviation, Inc.	199,740	Satisfactory/Fair
Airport-Owned	312,896	Fair

Sources: Kimley-Horn analysis, Pavement Evaluation Report - Daytona Beach International Airport, June 2015.

2.4.6. FENCES AND SECURITY GATES

As required for compliance with Title 14 Code of Federal Regulations (CFR) Part 139, *Airport Certification*, DAB has an airfield enclosed by an eight-foot chain-link fence. The purpose of the fence is to prevent unauthorized access to the Airport property by persons, animals, or non-Airport authorized vehicles. Signs are also posted on all gates and at regular intervals around the perimeter.

Access to the Air Operations Area (AOA) is provided through controlled access points located along the perimeter fence and within certain facilities that provide access to the AOA. Through coordination with the TSA, Volusia County maintains the development, installation, and maintenance of access facilities at the Airport. Tenants with AOA access are tasked with monitoring/controlling airfield access within their leasehold. These facilities include FBO/GA, cargo, aircraft maintenance, ground service maintenance equipment, and other support facilities.

2.4.7. NAVIGATIONAL AIDS

2.4.7.1. Lighting

The Airport's three runways are lighted to identify the edge of usable pavement and to indicate how much runway length is remaining. The runway lighting systems are categorized by the brightness, or intensity, of light produced. Runway 7L/25R is equipped with High-Intensity Runway Lights (HIRL) and Runways

7R/25L and 16/34 are equipped with Medium-Intensity Runway Lights (MIRL). As an additional visual aid, Runways 7L/25R and 16/34 are equipped with Runway End Identifier Lights (REILs), which consists of a pair of synchronized flashing lights on either side of the runway threshold.

Runway 7L/25R is also equipped is a Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR). This system helps pilots transition from instrument flight to visual flight for landings when approach visibility minimums are reduced due to adverse weather conditions.

The taxiways at DAB are equipped with Medium Intensity Taxiway Edge Lighting (MITL) and are blue in color.

A rotating beacon indicates the Airport location at night or in adverse weather conditions. The rotating beacon is located to the northeast of the international passenger terminal, just north of the Sheltair facility. The optical rotating beacon system projects two beams of light, one green and one white, 180 degrees apart. The beacon is continuously operating during the nighttime hours and when the airfield is operating under IFR conditions.

2.4.7.2. Markings

Runway pavements are marked according to the runway's designation as precision, non-precision, or visual runway. Runway 7L/25R is marked as a precision instrument runway, while both Runways 7R/25L and Runway 16/34 are marked as non-precision runways.

All taxiways at DAB have visible taxiway centerline stripes with hold-short lines located at the required locations. These markings ensure that aircraft taxi along designated passageways for proper wingtip clearance and to warn of the areas protected for runway operations.

2.4.7.3. Navigational Aids

In addition to the lighting system and markings previously discussed, runways are generally equipped with other navigational aids to assist pilots in takeoff and landing procedures. Some indicate weather conditions, while others give either visual or instrument course guidance.

Precision Approach Path Indicators

Precision Approach Path Indicator lights (PAPI) provide pilots with the visual descent guidance information during an approach to a runway. These navigational aids are typically visible from five miles during the day and up to 20 miles or more at night. Each PAPI unit installed at the Airport consists of a grouping of four lights. Only Runways 16, 25R, and 34 have PAPI installations.

Very High Frequency Omnidirectional Range Tactical Air Navigation

The Very High Frequency Omnidirectional Range Tactical Air Navigation (VORTAC) facility that is utilized for DAB is located in Ormond Beach, Florida. It is identified on aeronautical charts as OMN and is used to provide support approach capabilities at the Airport. The VOR is also used for terminal and en-route navigation purposes. This is a ground-based system that transmits very high frequency navigation signals to help pilots identify their location relative to the Airport. Pilots, if their aircraft are properly equipped with Distance Measuring Equipment (DME), can also determine their distance to or from the VOR as various radials are flown. The Tactical Area Navigational Aid (TACAN) portion of the VORTAC is used by military pilots. This system provides air navigation assistance by indicating bearing and distance to the navigational aid on a different radio frequency.

Global Positioning Satellite System

The other type of non-precision instrument approach at DAB uses Global Positioning System (GPS), a navigation system that consists of a network of satellites. Instrument approach procedures for all runways at DAB that have been implemented utilize GPS satellites and are referred to as Area Navigation (RNAV) approaches.

Instrument Landing Systems

Both ends of Runway 7L/25R are equipped for Instrument Landing System (ILS) approaches. The purpose of an ILS is to provide a method of precision instrument navigation to a point just beyond the approach end of the runway. Components of the ILS include the Localizer (LOC) antenna and the Glideslope (GS) antenna. The LOC antenna is used to establish and maintain an aircraft's horizontal position until visual contact confirms the runway alignment and location. The LOC antenna is usually located on the extended runway centerline, outside of the Runway Safety Area (RSA). The GS antenna is used to establish and maintain the aircraft's descent rate until visual contact confirms the runway alignment and location.

Automated Surface Observing System

The Automated Surface Observing System (ASOS) measures atmospheric indicators such as cloud cover, ceiling, visibility, wind speed and direction, temperature, dew point, precipitation accumulation, icing, sea level pressure, and detects lightning. ASOS equipment is generally installed in a location that best represents the meteorological conditions affecting operations; the DAB ASOS is located south of Runway 7L/25R, near the glideslope antenna for the Runway 7L ILS approach.

Runway Visual Range

Runway Visual Range (RVR) measures the atmospheric transmissivity along runways and translates that value to aircraft users. RVRs serve to support increased landing capacity at existing airports, as well as for ILS installations. Sensor units are found in the runway environment. DAB has an RVR installation on Runway 7L/25R.

2.4.7.4. Signage

Airfield signage assists pilots in identifying their location on the airfield and in reaching their desired location. Illuminated signs also provide navigation guidance at night and in adverse weather conditions. DAB is equipped with signage that complies with FAA AC 150/5340-18G, *Standards for Airport Sign Systems*. This advisory circular contains the FAA standards for the siting and installation of signs on airport runways and taxiways.

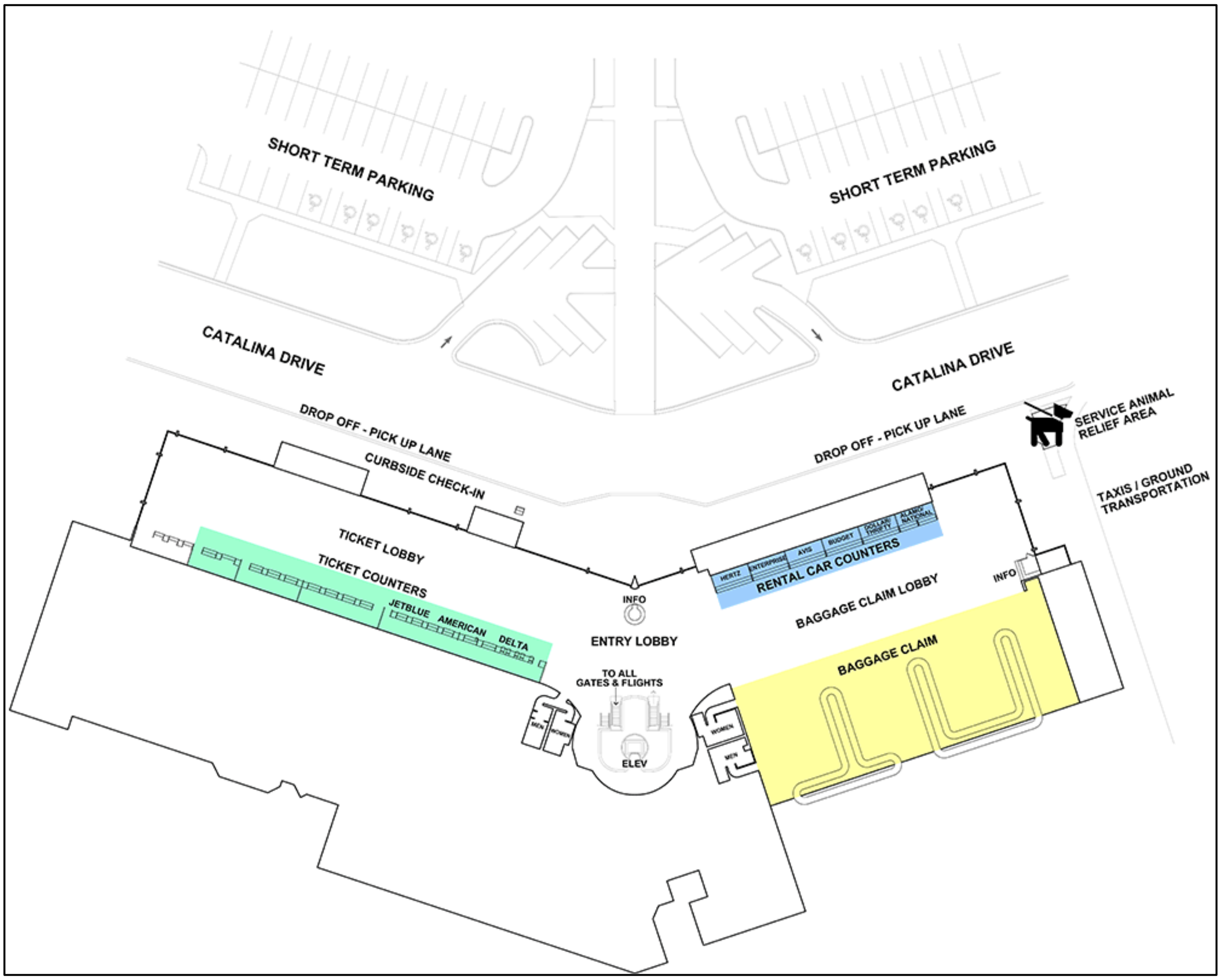
2.5. TERMINAL FACILITIES

Construction for the first DAB passenger terminal began in 1952, this terminal was replaced with a new, modern terminal with a restaurant, bar, gift shop, and barber shop in 1958. The 1958 terminal was replaced in 1983 with the three-story DAB commercial service domestic passenger terminal, which was remodeled in 1992; international facilities were added in an adjacent building.

2.5.1. TICKETING AND BAGGAGE CLAIM LEVEL

The lowest level of the terminal is the Ticketing and Baggage Claim Level, which is closest to, and level with, the terminal curb. The ticketing and baggage claim level of the terminal contains functions such as the airline ticketing counters, airline ticket offices, baggage screening area, baggage make-up area, baggage claim facilities, rental car service counters, and support facilities including landside concessions, Airport meeting rooms, restrooms, escalators, stairs, and elevator to the next level - the Concourse Level. **Exhibit 2.7** shows a diagram of the Ticketing and Baggage Claim Level. **Table 2.7** shows the Ticketing and Baggage Claim Level Space Allocations.

Exhibit 2.7 - Ticketing and Baggage Claim Level Diagram



Source: www.flydaytonafirst.com*, accessed August 9, 2017.*

Table 2.7 - Ticketing and Baggage Claim Level Space Allocations	Subtotals (sq ft)	Total Area (sq ft)
Leasable Area		
Airline Common Use		27,195
Baggage Claim Area	9,524	
Tug Drive and Baggage Input	12,380	
Baggage Make-up Areas	5,291	
Airline Ticket Offices		7,403
Delta	1,650	
American and JetBlue	1,424	
Vacant	4,329	
Airline Ticket Counters and Queue (No. of Positions)		8,068
Delta (4 counters/bag drops, 6 kiosks, and 2 bag wells)	1,271	
American (4 counters, 2 kiosks, and 2 bag wells)	1,046	
JetBlue (4 counters, 2 kiosks, 2 bag wells)	772	
The Airline Academy/ vacant (22 counters, 11 bag wells)	4,979	
Airline Operations Spaces		9,339
Delta	4,459	
American	0	
JetBlue	261	
Vacant	4,619	
Airline Baggage Service Offices		1,278
Delta	220	
Leased to Others Not Airlines	1,058	
Vacant	0	
Concessions		6,443
Vehicle Displays	351	
Vending Spaces	145	
Embry-Riddle Kiosk	63	
Rental Car Counters, Queueing, and Offices	3,843	
Ground Transportation	252	
Concessions Common Support	1,789	
Government Agencies - Exclusive Use TSA (Baggage Screening)		15,210
Total Leasable Area		74,936
Non-Leasable Area		
Public Space and Circulation		19,759
Public Use Restrooms	1,295	
Circulation and Waiting	18,464	
Airport Offices, Janitors' Closets, Storage, and Conference		21,891
Support Space, Mechanical, and Electrical		7,005
Total Non-leasable Area		**48,655**
Total Ticketing and Baggage Claim Level Area		**123,591**

Source: AVCON, INC.

2.5.1.1. Check-In Hall

There are 35 check-in counters in the Check-In Hall, as well as 22 baggage wells. Each individual check-in desk measures approximately four feet in width; each baggage well measures approximately two feet in width. In addition, all three current airlines have installed free-standing kiosks in front to their check-in counters, with the following distribution across the airlines:

- Delta: Four check-in counters/baggage drops, six kiosks, and six baggage wells
- American: Four check-in counters, two kiosks, and two baggage wells
- JetBlue: Three check-in counters, two kiosks, and three baggage wells
- The Airline Academy/Vacant: 22 check-in counters and 11 baggage wells

The Airline Academy is a training facility for flight attendants, airline customer service, and aircraft dispatch, which periodically trains from the check-in counters and other areas of the Airport. When the Airline Academy is not training from the check-in counters, the counters are vacant.

The area in front of the check-in desks available for either the free-standing kiosks or passenger queuing measures approximately 196 feet in width and there are five breaks in the check-in desk frontage to allow access to the airline ticket offices. There is no clear demarcation line in front of the check-in counters to indicate where the queuing area ends, and the circulation and seating areas located along the outer wall begin. For the purposes of this study, it was assumed that the seating area is ten feet deep and the circulation area between the check-in queuing and the waiting area is also ten feet deep. This would result in a queuing area of approximately 20 feet in depth. This results in approximately 4,900 square feet for queuing in front of all check-in counters.

There is approximately seven feet between the back edge of the check-in desks to the back wall. Within this area are six take-away baggage belts, the width of which take up about four feet of the space. The remaining three feet of width is that in which the check-in agents work; the back of counter total area encompasses approximately 1,380 square feet. There is a conveyor system with four belts that would allow for curbside check-in. Currently, none of the airlines offer this service.

2.5.1.2. Airline Ticket Offices

There is approximately 7,403 square feet of airline ticket offices currently available. Of that, Delta leases approximately 1,650 square feet and American and JetBlue share approximately 1,424 square feet, leaving approximately 4,329 square feet available.

2.5.1.3. Checked Baggage Screening

Checked baggage screening takes place behind and south of the airline ticket offices. The checked baggage screening area encompasses approximately 15,210 square feet. Within this space are three Reveal CT80 DR scanners. Each scanner is rated at scanning approximately 600 bags per hour. The various conveyors that bring the baggage to each of the scanners, take the cleared baggage to the baggage make-up area and the questioned baggage for additional screening take up the remainder of the checked baggage screening area.

2.5.1.4. Baggage Make-Up

The baggage make-up area is behind and southwest of the baggage screening area. The baggage make-up facility is made up of a single, flat baggage carousel alongside of which the airlines park baggage carts. The facility is covered and closed to the elements on three sides. The fourth side is open to allow access to the carousel by the baggage carts. JetBlue and American use one of the long sides of the carousel and Delta uses the other long side. This area encompasses approximately 5,291 square feet.

2.5.1.5. Baggage Claim Input

Baggage claim input is the airside conveyors that take the baggage from the baggage carts to the baggage claim devices. As there are two baggage claim devices, there are two baggage input belts. The input presentation length of each belt is approximately 45 feet.

2.5.1.6. Baggage Claim

There are two flat plate baggage claim devices. Baggage Claim One has a presentation length of approximately 120 feet and is formed in the shape of a “T.” Baggage Claim Two has a presentation length of approximately 195 feet and is formed in the shape of a “U.” Both baggage claims are located along the southern wall of the baggage claim area of the terminal. The oversized baggage slide is approximately five feet in width and four feet in depth and is located between the two baggage claim devices. The total area of baggage claim is approximately 9,524 square feet.

2.5.1.7. Rental Car Offices and Counters

There are eight rental car companies currently operating on Airport. These companies are:

- Alamo;
- Avis;
- Budget;
- Dollar;
- Enterprise;
- Hertz;
- Thrifty; and
- National.

Each of these companies has an office and associated counter located in the passenger terminal across the baggage claim lobby from the baggage claim carousels. There are approximately 3,843 square feet associated with these offices, counter area, and passenger queueing space.

2.5.1.8. Ticketing and Baggage Claim Level Concessions

There are several concessions on the Ticketing and Baggage Claim level of the terminal. These range from vending machines, to small floor areas where various vehicles are displayed, to a booth for ERAU.

There are two areas for vending machines on the west wall of baggage claim. The first area hosts a Coca-Cola vending machine. The second area contains a Seattle’s Best Coffee machine and a candy/snack machine. The third area is in an alcove off the entry lobby, which currently contains an ice-cream novelty machine and another Coca-Cola machine.

A second type of concession prevalent on the Ticketing and Baggage Claim level is the display of various types of vehicles. At the time of the survey for this report, there was a NASCAR vehicle displayed at the far western portion of the ticketing hall, the display of a three-wheeled vehicle by Campagna, the display of a three-wheeled motorbike by Spanos, and the display of a Harley Davidson dealership.

There is also a kiosk adjacent to, and west of, the main entrance doors to the terminal that is leased by ERAU. It is assumed that this kiosk is manned on occasion, although it was empty at the time of the survey.

A dock and common concession area is located on the southwest corner of the building. This area allows trucks to access the terminal and off-load products. The common area allows for the temporary storage of the products and goods, the breaking down of larger packages, as well as access to garbage facilities.

2.5.1.9. Airport Offices, Operations, Janitor's Closets, Storage, and Conference Rooms

There are also several Airport offices, janitor's closets, storage, and conference rooms located on the Ticketing and Baggage Claim level. The offices house the Projects and Maintenance offices, as well as the offices of the Airport Operations. The janitor's closets are co-located with the public restrooms.

In addition to the Airport Operations offices located south of the transportation core, there are additional Airport Operational areas located underneath the Concourse. These are largely the facility's engineering offices and the engineering print room.

The total square foot area of these spaces measures approximately 21,891 square feet.

2.5.1.10. Public Restrooms

There are two sets of public restrooms on the Ticketing and Baggage Claim level. The first set is accessed from the Baggage Claim area. The women's and men's restrooms have seven fixtures each.

The second set of restrooms is located west of the elevator, stair, and escalator core and is accessed from the entry lobby. These restrooms contain three fixtures apiece.

2.5.1.11. Elevators, Escalators, and Stairs

On the south side of the entry lobby of the terminal are two escalators, two staircases, and one elevator that access the second level of the terminal, Concourse.

2.5.1.12. Airline Operations

Underneath the Concourse are spaces intended for airline operations. At the time of the survey, only two of these areas were leased; one to Delta and the other to JetBlue. The Delta area is located directly below Gate 2 and measures approximately 4,459 square feet. The JetBlue area measures approximately 261 square feet and is located below Gate 6.

There are other areas located below the Concourse that were designed for airline operations. These areas are currently vacant and measure approximately 4,619 square feet.

2.5.1.13. Mechanical and Electrical Equipment and Stores

Mechanical and electrical equipment rooms, as well as spare part stores and general storage also make up several areas on the Ticketing and Baggage Claim level. In addition to the mechanical and electrical rooms, there are also rooms for the fire pump, telephone, the public-address system, communications, etc. These areas make up approximately 7,005 square feet of the terminal building.

2.5.1.14. Public Circulation and Seating

Within the terminal, there is considerable space for the circulation of passengers. There are also areas where passengers can sit, rest, or wait. These areas include the entry lobby, the baggage claim lobby, and the waiting and circulation in the ticketing lobby. These spaces are generally considered to be non-leasable area as they are there for the convenience of the passengers. This area also includes the elevator, escalators, and stairs previously addressed. On the Ticketing and Baggage Claim level, the circulation and seating of passengers amounts to approximately 18,464 square feet.

2.5.2. CONCOURSE LEVEL LANDSIDE

The Concourse level has been divided into two areas, landside and airside, with the passenger security screening checkpoint being the demarcation point. The landside portion consists of public circulation and seating, concessions, public restrooms, mechanical/electrical rooms, passenger screening and queuing, and offices for Airport badging and Volusia County Economic Development. **Table 2.8** shows the space allocations for the various landside areas on the Concourse level. **Exhibit 2.8** shows the basic layout of the terminal Concourse level, landside area, except for the mechanical and electrical areas.

Table 2.8 - Concourse Level Landside Space Allocations

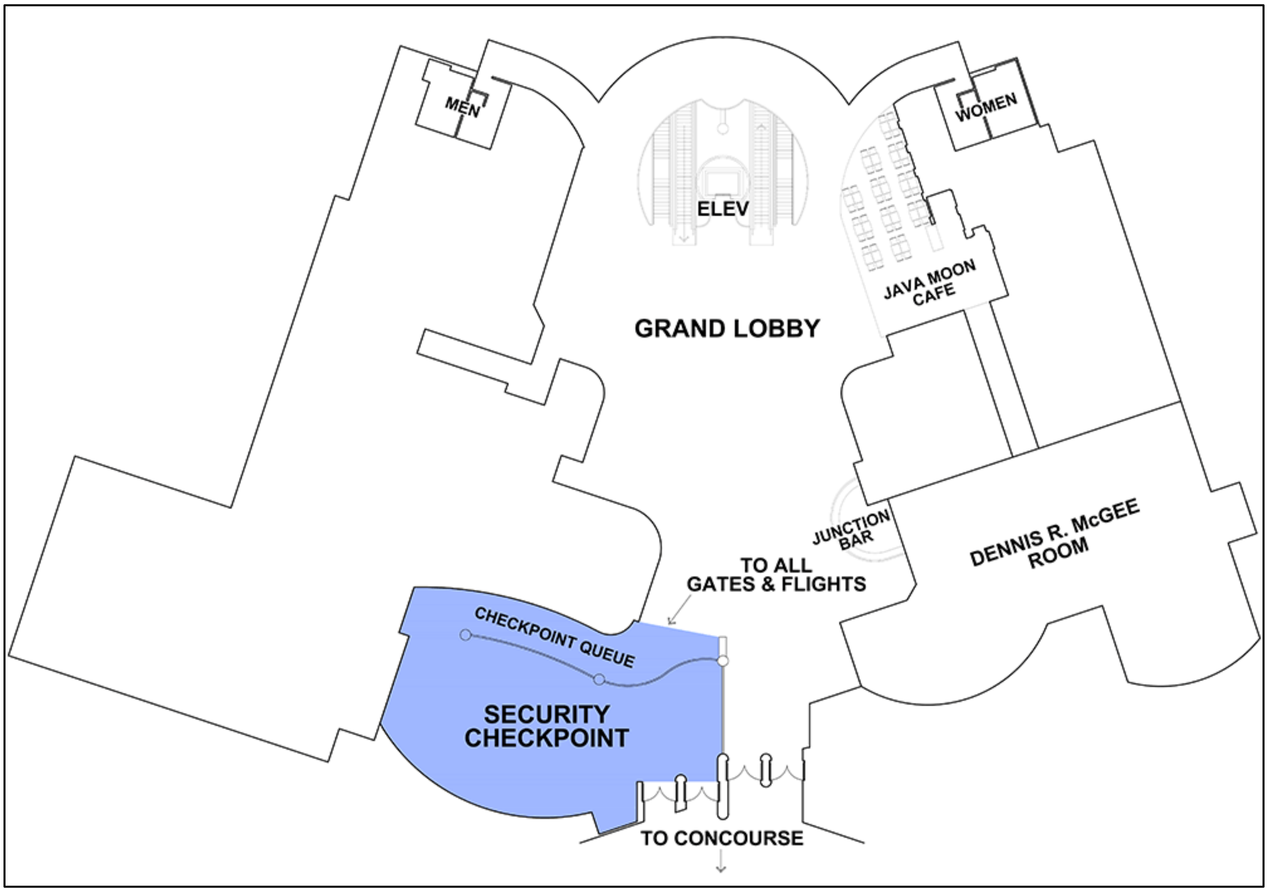
	Subtotal (sq ft)	Total Area (sq ft)
Landside Leasable Area		
Concessions Landside		11,979
Java Moon Café	1,191	
The Junction	748	
Concessions Common Use	3,479	
Dennis R. McGee Room	4,123	
Vacant	2,438	
Government Agencies Allocated to TSA (Passenger Security Checkpoint)		3,182
Airline Shared Use Space - Security Checkpoint Queue		1,229
Tenant/Other Exclusive (Volusia County Economic Development)		2,090
Total Leasable Area		**18,480**
Landside Non-Leasable Area		
Public Spaces and Circulation		9,955
Public Restrooms Landside	633	
Circulation and Waiting	9,322	
Airport Use - Mechanical, Electrical, Meeting Rooms, Badging and Storage		13,066
Total Non-Leasable Area		**23,021**
Total Concourse Level Landside Area		**41,501**

Source: AVCON, INC.

2.5.2.1. Elevators, Escalators, and Stairs

There are two public escalators, two stairs, and one elevator that allow passengers to conveniently travel between the Ticketing and Baggage Claim level and the Concourse level. These conveyances carry the passengers to the center of the Grand Lobby on the Concourse level.

Exhibit 2.8 - Concourse Level Landside Diagram



Source: www.flydaytonafirst.com*, accessed on August 9, 2017.*

2.5.2.2. Concourse Level Landside Concessions

Adjacent to the Grand Lobby are two concession areas. The first is the Java Moon Café and the second is The Junction. There is additional area available for concessions; however, this area is currently vacant. There is an area of kitchens, refrigerators, storage, and offices that is used jointly by the concessions.

The Java Moon Café is a coffee and pastry store that also sells sandwiches, salads, candy, snacks, and a small number of other sundries. The area of Java Moon Café is approximately 1,191 square feet, including seating.

The Junction is also located off the Grand Lobby. It is a full-service bar with a small seating area and is approximately 748 square feet.

2.5.2.3. The Dennis R. McGee Room

The Dennis R. McGee Room is a banquet area leased to the Airport's concessionaire, Faber. It is named after Dennis R. McGee, Daytona Beach International Airport Director from 1985 through 2010. The series of rooms has immediate access to the Airport's kitchens and has approximately 4,123 square feet available.

2.5.2.4. Public Landside Restrooms

Public restrooms for the landside Concourse level are located to the north and on either side of the Grand Lobby. Each facility measures approximately 316 square feet. The women's restroom has seven toilets and the men's room has four urinals and three toilets.

2.5.2.5. Airport Badging

The Airport badging office is located on the landside portion of the Concourse level. This office is responsible for fingerprinting and taking photos of all Airport badge applicants.

2.5.2.6. Offices of Volusia County Economic Development

The offices of Volusia County Economic Development are also housed on the landside of the Concourse. This area is leased from the Airport and measures approximately 2,090 square feet.

2.5.2.7. Passenger Security Screening Checkpoint and Queueing

The passenger security screening checkpoint is the demarcation between airside and landside on the Concourse level of the terminal. The passenger security screening checkpoint and exit lane area measures approximately 3,182 square feet. It has two baggage screening devices with rollers, a magnetometer, and a full body-scanner. The passenger security screening checkpoint queue is located just prior to the screening area and measures approximately 1,229 square feet.

2.5.3. CONCOURSE LEVEL AIRSIDE

The airside area of the Concourse level has six gates, four of which are currently occupied by the three airlines. Each gate has a departure lounge. There are also four concessions located beyond security. In addition, there are public restrooms, an Airport meeting room, and offices for the Transportation Security Administration (TSA). The space allocation for each of these areas is enumerated in **Table 2.9** and a diagram of the area, less the TSA offices, is shown in **Exhibit 2.9**.

2.5.3.1. Aircraft Gates

As shown in **Exhibit 2.9**, there are six gates on the airside Concourse. Delta is currently leasing Gates 2 and 4, JetBlue is leasing Gate 6, and American is leasing Gate 3. Gates 1 and 5 are currently vacant.

2.5.3.2. Departure Lounges

The departure lounges are located on either side of the Concourse. The Delta departure lounges have approximately 5,053 square feet, the JetBlue departure lounge has approximately 2,311 square feet, the American departure lounge has approximately 1,856 square feet, and the two vacant departure lounges total approximately 4,192 square feet.

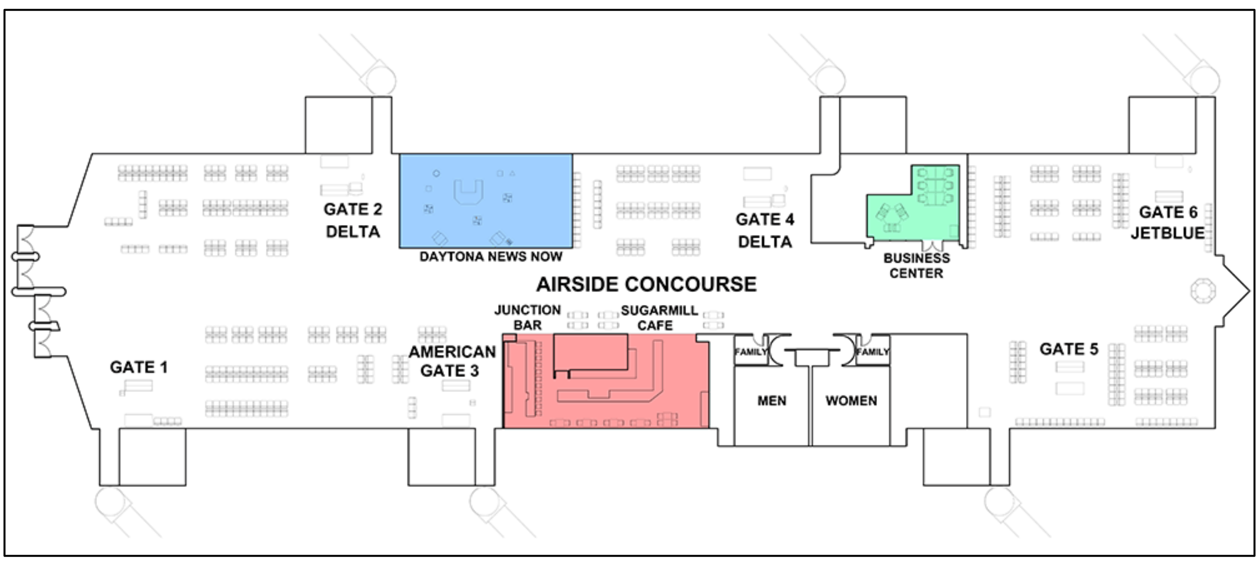
2.5.3.3. Airside Concessions

There are four concessions on the airside Concourse level. They are the Daytona News Now, a news and sundry shop; The Junction Daytona Beach, a full-service bar; the Sugar Mill Cafè; and the Business Center.

Table 2.9 - Concourse Level Airside Space Allocations		
	Subtotals (sq ft)	Total Area (sq ft)
Airside Leasable Area		
Airline Departure Lounges (Number)		13,412
Delta (2)	5,053	
American (1)	1,856	
JetBlue (1)	2,311	
Vacant (2)	4,192	
Concessions Airside		3,861
Daytona News Now	1,412	
The Junction Daytona Beach	346	
Sugar Mill Café	1,630	
Business Center	473	
Government Agencies - Exclusive Use (TSA offices)		4,665
Total Leasable Area		21,938
Airside Non-Leasable Area		
Public Spaces and Circulation		11,536
Public Restrooms Airside	1,449	
Circulation	6,731	
Airport-Use	2,720	
Mechanical-Electrical	636	
Total Non-Leasable Area		11,536
Total Concourse Level Airside Area		**33,474**

Source: AVCON, INC.

Exhibit 2.9 - Airside Concourse Layout Diagram



Source: www.flydaytonafirst.com, *accessed August 9, 2017.*

2.5.3.4. Airside Public Restrooms

There is one set of public restrooms on the airside Concourse level. There are seven toilets and ten urinals in the men's restroom and there are twelve toilets in the women's restroom. In addition, there are two family style restrooms, each with one toilet. Together, these restrooms total approximately 1,449 square feet.

2.5.3.5. TSA Offices

The TSA offices are located immediately adjacent to the passenger security screening checkpoint. There are eight offices, one conference room, two copy rooms, four cubicle areas, restrooms, and a break area for a total of approximately 4,665 square feet.

2.5.3.6. Airport Meeting Rooms

There is one Airport meeting room located on the airside Concourse area, adjacent to Gate 5, called the Catalina Room. This area measures approximately 468 square feet.

2.5.3.7. Mechanical and Electrical Equipment and Stores

The square foot area of the airside Concourse level is rounded out by a variety of mechanical and electrical rooms. The total area of these spaces is approximately 636 square feet.

2.5.4. AIRPORT ADMINISTRATIVE OFFICES LEVEL

The Airport administrative offices are located on a third level, situated above the passenger security screening checkpoint. The offices are accessed by stairs and an elevator. The total area of this level is approximately 5,027 square feet and is largely made up of the Airport administrative offices, some mechanical and electrical spaces, and a small amount of public circulation and waiting as shown in **Table 2.10**.

Table 2.10 - Office Level Space Allocations

	Total Square Foot Areas
Non-Leasable Area	
Airport Use - Administrative Offices	4,514
Public Spaces - Circulation and Waiting	432
Airport Use - Mechanical, Electrical, Etc.	81
Total Office Level Areas	5,027

Source: AVCON, INC.

2.5.5. DOMESTIC TERMINAL INVENTORY SUMMARY

Overall, the commercial service passenger terminal has approximately 203,593 square feet of area situated between three levels. Of this amount, 115,354 is a leasable area and 88,239 square feet is non-leasable area dedicated to Airport Administration, mechanical, electrical, and other utility spaces, as well as the general circulation spaces within the terminal, as shown in **Table 2.11**.

Table 2.11 - Summary Allocation of Terminal Spaces			
	Subtotals (sq ft)	Total Area (sq ft)	Percentage
Leasable Area		115,354	57%
Ticketing and Baggage Claim Level	74,936		
Concourse Level	40,418		
Offices Level	0		
Non-Leasable Area		88,239	43%
Ticket and Baggage Claim Level	48,655		
Concourse Level	34,557		
Office Level	5,027		
TOTAL TERMINAL BUILDING AREA		**203,593**	
Source: AVCON, INC.			

2.5.6. INTERNATIONAL TERMINAL

The DAB International Terminal facility was previously utilized as the main terminal of the Airport. The construction of the new domestic terminal lead to the old terminal being renovated to serve multiple tenants, including the U.S. Customs and Border Protection, University of Central Florida Business Incubator, and the Florida NextGen Test Bed.

2.5.6.1. U.S. Customs and Border Protection

The DAB International Terminal hosts the United States Customs and Border Protection (CBP). The facility provides a space where the CBP enforces the import and export laws and regulations of the U.S. Federal government. This port is designated as a Class A Port of entry for all foreign visitors.

CBP staff also provide immigration clearing services to general aviation and corporate aircraft arriving at DAB into the various FBOs. During tenant interviews, a noted challenge for international general aviation arrivals is CBP availability during non-standard hours. Several tenants indicated it is occasionally necessary to pre-clear customs and immigration at other international airports before arriving at DAB.

2.5.6.2. Volusia County Business Incubator Powered by UCF Business Incubation Program (BIP)

The Volusia County Business Incubator, powered by UCF BIP, was opened July 2011 through a partnership of the County of Volusia, the UCF Research Foundation, and the Florida High Tech Corridor Council. The Volusia County Business Incubator is 10,032 square feet and was established to assist the success of entrepreneurs and high growth start-up firms in Volusia County.

2.5.6.3. Florida NextGen Test Bed

The Florida Next Generation Air Transportation System (NextGen) Test Bed is located in the International Terminal at DAB. The Test Bed was established in 2011 by the FAA as an initiative to develop NextGen research. The FAA has contracted ERAU to operate the facility. The facility includes a 5,000-square foot Integration Suite and a 5,000-square foot Demonstration Suite. The Integration Suite is used to carry out development, testing, and integration efforts, while the Demonstration Suite is used to conduct demonstrations of operational capabilities deployed in the Test Bed.

2.6. ACCESS, CIRCULATION, AND PARKING

2.6.1. REGIONAL TRANSPORTATION PLANS

The Volusia County Comprehensive Plan, November 3, 2016, was created by the Volusia County Comprehensive Planning Municipal Committee. The plan is utilized to provide guidance for the physical growth of the county. The plan ensures the development of plans and programs conforms with the policies and regulations of the county.

The Comprehensive Plan outlines the growth of the county. Included in these outlines are improvements to major roadways such as Interstate 95 (I-95) and Interstate 4 (I-4). Also included are plans for expansions to transit route systems and a higher frequency of public bus services. Another project proposed for the Volusia County area includes a four-county-wide commuter rail transit project with details that can be referenced in the Comprehensive Plan. The Comprehensive Plan also proposes the extension of Dunn Avenue continuing southwest and connecting at I-4 after the intersection of Dunn Avenue and North Williamson Boulevard. Dunn Avenue is located north of the Airport and the extension will continue northwest of the Airport. The plan states that even with the expansions to roadways, congestion levels are expected to be greater by 2025 as not all roads will be improved due to cost and physical or policy constraints.

There is a proposed expansion that is closely related to the Future Land Use elements of the Comprehensive Plan. The proposed changes in zoning around the airfield includes areas south of the Airport, east of the Airport, and northwest of both the Airport and the Daytona International Speedway. The areas south of the Airport are proposed to be converted to Mixed-Use Medium and Commercial Amusement zones. The areas to the east of the airfield include conversions to Schools and Conservation zones. The areas to the northwest of the Airfield include the conversion to Commercial Mixed-Use zones.

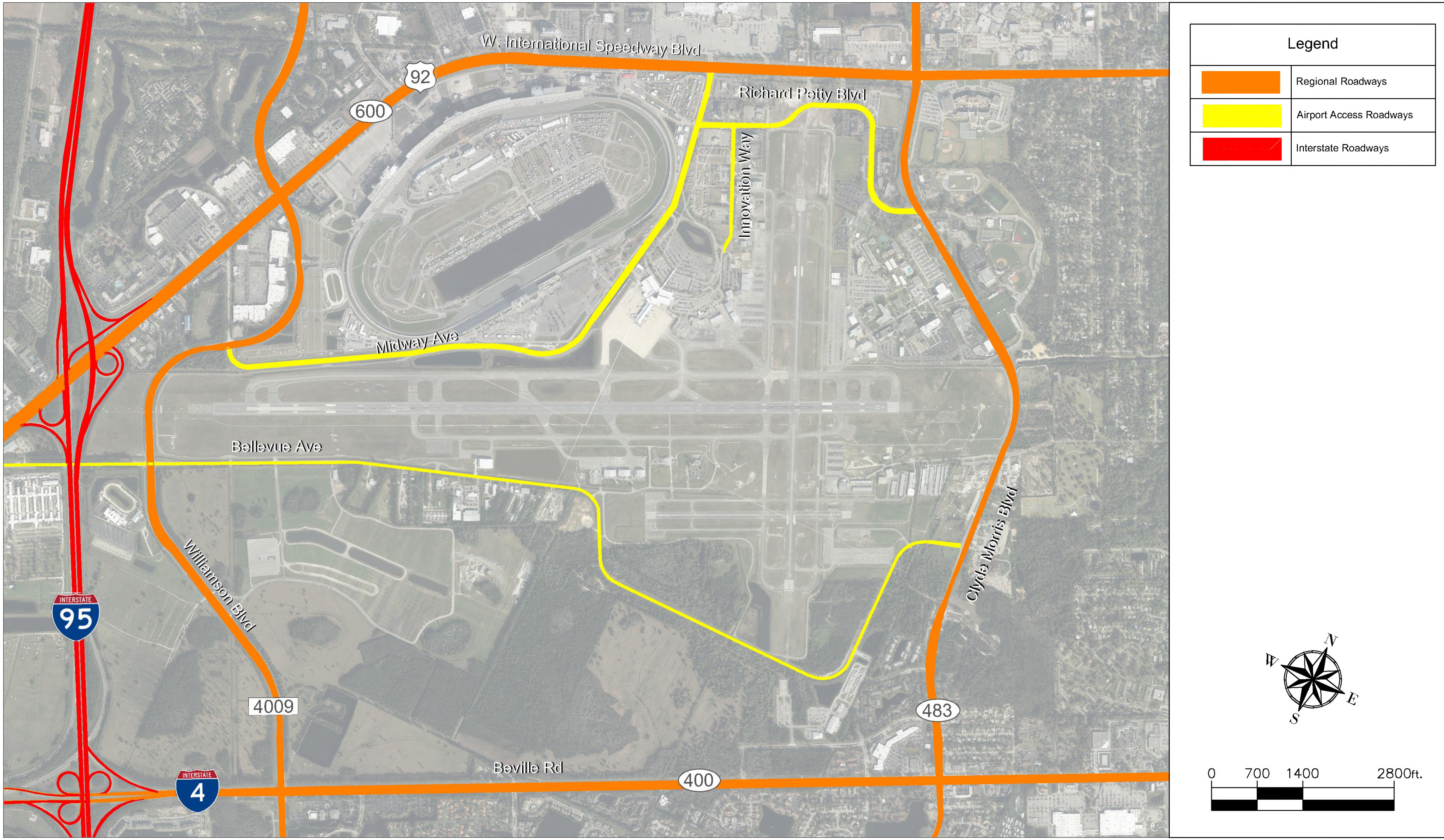
The Intermodal Transit Station Study (ITSS) was created to support the development of an integrated multimodal transportation system that is economically efficient and safely moves people and goods in an energy-efficient manner. As part of the ITSS, and to assist in congestion management, the U.S. Highway 92 / International Speedway Boulevard (ISB) Corridor Master Management Plan Study was developed to study from Interstate 4 (I-4) to State Road (SR) A1A (Atlantic Avenue). The purpose of the study was to guide and coordinate Florida Department of Transportation (FDOT) safety and enhance transit, congestion management, and economic development investments along U.S. Highway 92.

2.6.2. REGIONAL ROADWAYS

Regional roadways include freeways, highways, and arterial roadways that provide access to the Airport carrying Airport-related traffic but are principally used for non-Airport related purposes. These roadways may contain high traffic volumes, as they serve densely populated urban areas and carry a large number of passenger trips. **Exhibit 2.10** illustrates the access roadways, including the identification of regional roadways near the Airport. The major regional roadways are summarized in the subsequent sections.

2.6.2.1. West International Speedway Boulevard/U.S. Highway 92

West International Speedway Boulevard is an eight-lane east-west oriented highway located to the north of the Airport. It connects west of the Airport to I-95. West International Speedway Boulevard continues westbound where it becomes U.S. Highway 92 and terminates in Deland, Florida. It stretches eastward until it terminates at the intersection of West International Speedway Boulevard and Highway A1A.



DAYTONA BEACH INTERNATIONAL AIRPORT

Exhibit 2.10

Roadway Access

2.6.2.2. Williamson Boulevard

Williamson Boulevard is a four-lane, north-south oriented highway located to the west of the Airport. It stretches southbound until it terminates at the intersection of South Williamson Boulevard and Pioneer Trail in Samsula-Spruce Creek, Florida. It stretches north until it terminates at the intersection of N. Williamson Boulevard and W. Granada Boulevard in Ormond, Florida.

2.6.2.3. Interstate 95 (I-95)

Interstate 95 (I-95) is a ten-lane, north-south oriented interstate freeway that is located west of the Airport. The Airport is connected to I-95 via West International Speedway Boulevard. The interstate runs southbound to Miami and northbound parallel to the Atlantic Ocean on the entire eastern side of the United States, continuing into Canada.

2.6.3. AIRPORT ACCESS ROADWAYS

The Airport Access Roadway System serves as the landside interface between the regional roadway system and the Airport's terminal curbfront facilities. As shown in **Exhibit 2.10,** the public Airport access roadways provide access to the terminal facilities, rental car lot, public and employee parking areas, commercial vehicle holdings areas, and Airport support/ancillary facilities. Summarized below are the Airport access roadway's characteristics.

2.6.3.1. Midway Avenue

Midway Avenue is a four-lane, divided arterial road that provides primary access to Daytona Beach International Airport. It runs in a north-south orientation, curves into an east-west orientation, and is located west of the Airport terminal. It provides access to Catalina Drive, which leads to parking lots, rental car lots, and the passenger terminal area of the Airport. Midway Avenue also provides access to the regional roadway system and connects to West International Speedway Boulevard to the north of the terminal area, and connects with South Williamson Boulevard to the west of the terminal area.

2.6.3.2. Catalina Drive/Innovation Way

Catalina Drive/Innovation Way is a three-lane road located north of the Airport terminal that provides access from Midway Avenue to the passenger terminal area and curves in a circular fashion. Catalina Drive has one-way traffic flow approaching from the north leading south towards the terminal, once past the terminal drop-off area, the road becomes Innovation Way. Catalina Drive provides access to both long-term and short-term parking. Innovation way provides two exit options both leading to Midway Avenue. One exit option is at the intersection of Midway Avenue and Catalina Drive, while the second option merges onto Midway Avenue heading northbound. Terminal Way loops around and provides access back onto Catalina Drive. Innovation Way also provides access to the rental car parking facilities.

2.6.3.3. Bellevue Avenue

Bellevue Avenue is a two-lane road that will be an access road for the proposed future commercial development to the south of the Airport. It runs in an east-west orientation located south of the airfield and runs parallel with Runway 7L/25R from the intersection of Bellevue Avenue and South Williamson Boulevard. It then curves southeast, wrapping around Runways 7R/25L and 16/34, connecting at the intersection of Bellevue Avenue and South Clyde Morris Road.

2.6.4. CURBFRONT and GROUND TRANSPORTATION

The terminal has a single-level curbfront roadway that provides access to the check-in (departure) area and the baggage claim (arrivals) area. This curbfront provides access to several travel modes, including both commercial and private vehicles. This section summarizes the travel modes that currently utilize the curbfront and the characteristics of the curbfront roadways.

2.6.4.1. Travel Modes

Passengers and visitors can utilize different modes of travel that include personal automobile, taxi/limousine services, Transportation Network Companies (TNCs), shuttle services, and bus service. The public transit bus service is provided by Votran, the Volusia Transit System, and provides transportation seven days a week throughout Volusia County. Passengers can to be dropped off curbside or may park their vehicle in a short- or long-term parking lot.

2.6.4.2. Curbfront Roadway

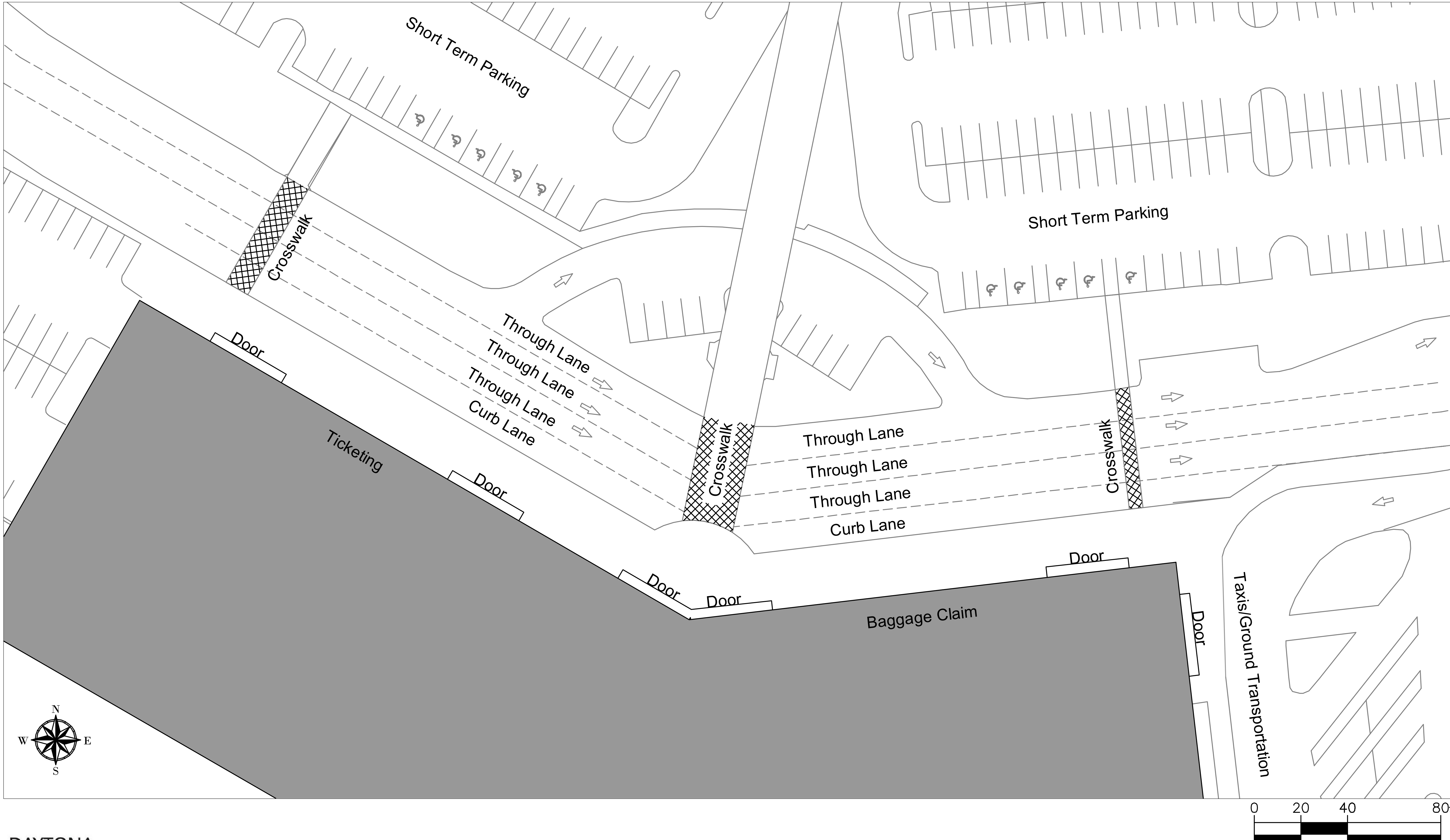
The terminal curbfront consists of a four-lane roadway. The single-level curbfront extends the entire northern side of the passenger terminal building. A graphic of the terminal curbfront is provided in **Exhibit 2.11**. The four-lane curbfront is immediately adjacent to the terminal and is utilized by private vehicles, TNCs, and taxis for loading and unloading. The outer three lanes are utilized for through traffic, while the innermost lane is generally designated for loading and unloading. Vehicle unloading for departing passengers is located on the west side of the middle crosswalk, while loading of arriving passengers is located at the east side of the middle crosswalk.

2.6.4.3. Terminal Access

Primary access to the terminal is provided in three locations. There are three sets of terminal doors that provide access from the curbfront directly to and from the check-in/baggage claim areas. There are also crosswalks that lead from the short-term/long-term parking from the north and rental car parking from the east to the main terminal. The terminal contains airline ticketing on the west side of the terminal and baggage claim and car rentals on the east side of the terminal.

2.6.4.4. Recirculation Patterns

Traffic that is re-entering the terminal entrance after traveling past the curbfront must travel east, past the terminal area, follow Innovation Way northbound, then take the left-turn lane to merge onto Catalina Drive and proceed southbound back to the terminal area. Appropriate signage is displayed to ensure drivers continue on Innovation Way leading back into Catalina Drive.



DAYTONA BEACH INTERNATIONAL AIRPORT

Exhibit 2.11

Terminal Curbfront

2.7. TAXI AND GROUND TRANSPORTATION

Taxi and ground transportation services are available to passengers utilizing the Airport. Taxi, shuttle, and public transit services are available at the terminal curbfront and are located on the east side of the terminal area. TNCs such as Uber and Lyft may also pick up and drop off at DAB.

2.7.1. TAXI SERVICES

There are currently eight different taxi services available at DAB. Passengers can access the taxi services at the designated taxi pick-up location on the east side of the passenger terminal, outside the baggage claim area.

2.7.2. SHUTTLE SERVICES

There are currently four different shuttle services available to DAB passengers. The shuttle services can be accessed on request at the designated pick-up area located on the east side of the terminal, outside the baggage claim area. The shuttle services available are Do Shuttle, Daytona Shuttle, Kings Transportation Shuttle, and Palm Coast Transportation.

2.7.3. PUBLIC TRANSIT

The public transit currently available at DAB is provided by Votran Transit System, which offers transportation to various locations throughout Volusia County. The bus stops at the terminal every hour and half hour at the designated pickup/drop-off location on the east side of the terminal, just outside the baggage claim area.

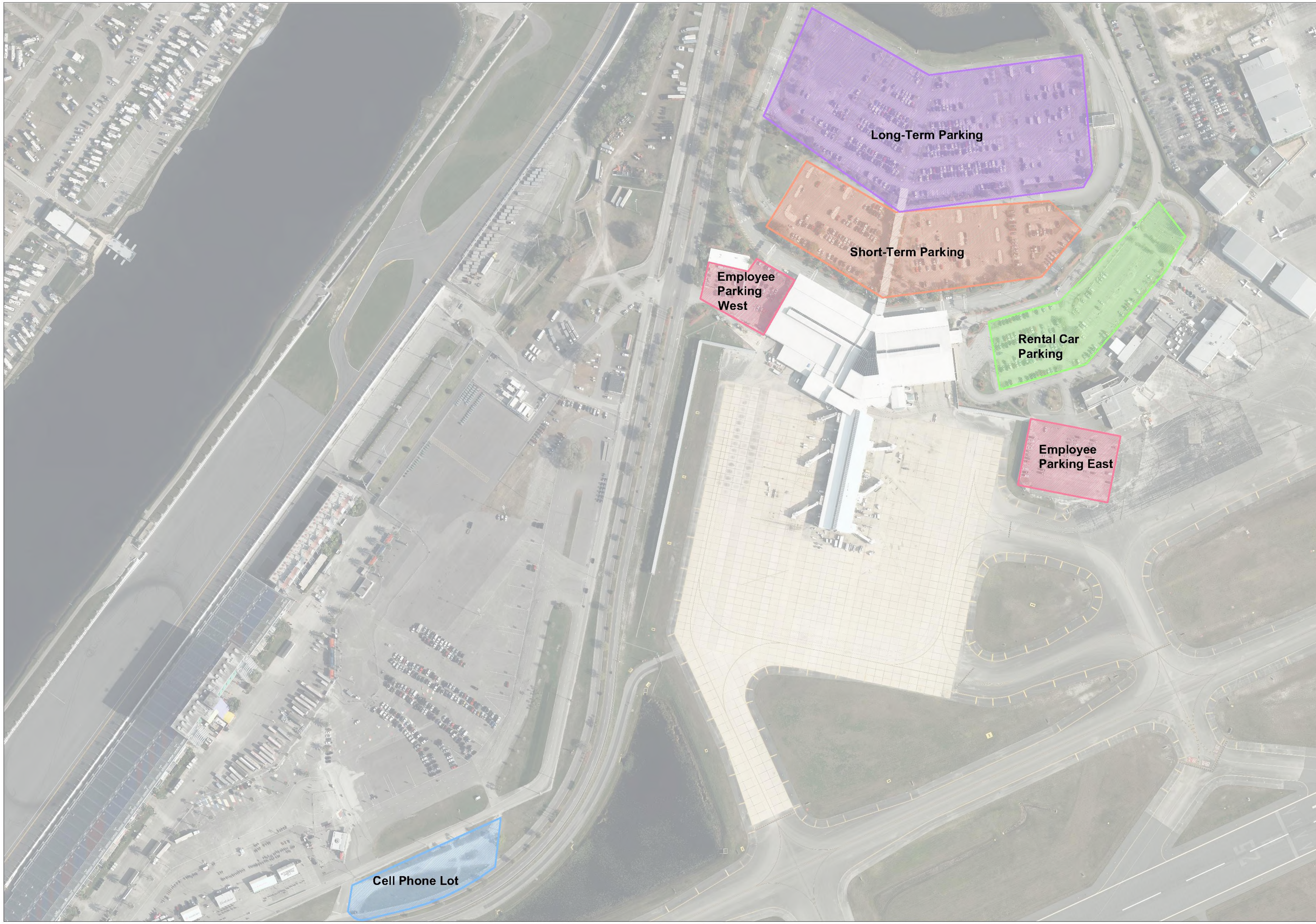
2.8. AIRPORT PARKING FACILITIES

DAB offers several options for parking at the Airport, including short- and long-term parking, the cell phone lot, employee parking, and rental car parking. **Table 2.12** summarizes the parking spaces available for each type of parking and **Exhibit 2.12** summarizes the on-Airport parking areas.

Table 2.12 - Airport Parking

Parking Type	Approximate Number of Spaces
Long-Term	500
Short-Term	400
Cell Phone Lot	Grass Lot
Employee	187
Rental Car	200
TOTAL SPACES	**1,287**

Source: Kimley-Horn.



Legend

	Long-Term Parking	500 Spaces
	Short-Term Parking	400 Spaces
	Rental Car Ready/Return Parking	200 Spaces
	Cell Phone Lot	Grass Lot
	Employee Parking	187 Spaces

N W E S

0 150 300 600 ft.

DAYTONA BEACH INTERNATIONAL AIRPORT

Exhibit 2.12

Parking Facilities

2.8.1. SHORT-TERM PARKING

Short-term parking is offered in the lot north of the Airport terminal in close proximity to the passenger terminal. There are approximately 400 short-term parking spaces. Access is provided by a two-lane entry plaza located west of the parking lot and by a single-lane entryway to the south of the parking lot after the passenger drop off area of the Airport terminal. Both entries are accessible through the main terminal roadway.

2.8.2. LONG-TERM PARKING

Long-term parking is offered in the lot north of both the Airport terminal and the short-term parking lot near the passenger terminal. There are approximately 500 long-term parking spaces provided. Access is provided by a two-lane entry plaza located to the west of the long-term parking lot.

2.8.3. CELL PHONE LOT

The cell phone lot for DAB is located to the southwest of the Airport terminal, adjacent to the parking lot for Daytona International Speedway. The cell phone lot is accessible via Midway Avenue. The lot is comprised of an unpaved-gravel road and two large expanses of grass made available for vehicle parking. The cell phone lot is designated by Airport signage indicating the right-turn into the entrance of the parking lot.

2.8.4. EMPLOYEE PARKING

There are currently two separate employee parking lots at DAB. The larger of the two is located to the east of the passenger terminal and has approximately 150 parking spaces. The smaller employee parking lot is west of the passenger terminal, and has approximately 37 parking spaces. Employee parking lots are denotated by Airport signage before the entrance to the parking areas.

2.9. RENTAL CAR FACILITIES

The rental car facilities located at the Airport consist of eight rental car agencies with counter operations located within the main passenger terminal. The rental car agencies are owned and operated by four separate companies: Avis/Budget Group (Avis and Budget), Dollar/Thrifty Auto Group (Dollar and Thrifty), Enterprise Holdings, Inc. (Alamo, Enterprise, and National), and the Hertz Company (Hertz). These companies provide rental car services through their customer counters on the lower level of the terminal building. Passengers accessing the rental car spaces from the terminal travel under a covered walkway to the rental car lot.

Except for Hertz, each rental car agency has onsite rental car maintenance facilities, which are located along Innovation Way and provide a short distance between the rental car parking lot and the maintenance facilities. These facilities, known as Quick-Turn-Around (QTA), utilize car jockeys that return the used cars to the facilities, where they are fueled, cleaned, vacuumed, given any necessary maintenance, and then returned for future customer use.

Rental car operators indicated that their space and capacity is adequate during normal operations, but during heavy peak events, such as the Daytona 500 and other peak local events, the lack of a dedicated ready/return space is a challenge. Currently, rental car customers return their vehicle and walk into the terminal to complete their transaction at the rental car counter.

2.9.1. RENTAL CAR PARKING

Table 2.13 lists the rental car parking allocation found at the Airport. There are currently 200 rental car spaces in the parking lot east of the terminal.

Table 2.13 - Rental Car Parking Allocation

Rental Car Company	Parking Space Allocation		
	Front	Back	Total
Hertz	18	23	41
National	20	-	20
Avis/Budget	35	38	73
Dollar/Thrifty	19	0	19
Enterprise	15	10	25
Alamo	-	22	22
TOTAL PARKING SPACES	107	93	200

Source: Kimley-Horn.

2.10. EMBRY-RIDDLE AERONAUTICAL UNIVERSITY

A large portion of flight traffic at DAB is from ERAU flight training operations, the Airport's largest flight training school and part of a major university system. The main campuses are located in Daytona Beach, Florida and Prescott, Arizona. **Table 2.14** summarizes the ERAU fleet mix. Based aircraft at the Airport utilize tie-down parking on the 304,600 square foot ramp area (79 parking positions) that has taxiway access to the airfield via Taxiways R1, R2, R3, and R4. There is also an additional 24,800 square feet of apron area (four parking positions) located adjacent to the main apron area. ERAU has several aircraft maintenance hangars that are located at the Airport. The fleet maintenance hangar is located adjacent to the Flight Operations Center and the apron area and can be reached from the airfield most directly via Taxiway R3.

Table 2.14 - Embry-Riddle Aeronautical University Fleet

Aircraft Type	Number of Aircraft
Cessna 172	44 (2 reserved for flying club)
Piper Arrow	7
Diamond DA42-L360	10
Super Decathlon	1
Maule	2 (reserved for flying club)
Total Aircraft	**64**

Source: Embry-Riddle Aeronautical University Website, daytonabeach.erau.edu.

Other ERAU facilities located within close proximity to the airfield include an 8,200-square foot hangar that is located south of the Flight Operations Center and is utilized for aviation maintenance training. Adjacent to this are two small buildings that are used for turbine and engine testing. Also located in the vicinity is the Emil Buehler Aviation Maintenance Science Building and the Flight Operations Center used for student pilot training. A shuttle is used to transport student pilots from the Flight Operations Center to the flight line for training.

On an average day, there are approximately 280 ERAU flights, split into flight blocks of 2.5 hours. Most flight training activity occurs on Runway 7R/25L, with up to eight aircraft in the traffic pattern during peak times. It was noted that nearby restricted airspace and airfield capacity are potential limiting factors to the continued growth of the flight training program.

2.10.1. JOHN MICA ENGINEERING AND AEROSPACE INNOVATION COMPLEX (MICAPLEX)

In 2017, the John Mica Engineering and Aerospace Innovation Complex (MicaPlex) at the Embry-Riddle Research Park opened.[8] The MicaPlex allows businesses and the University to collaborate to develop, refine, and bring new products and technological services to the market. Tenants of the facility will include technology-focused startups, established companies that will assist tenant partners, University faculty, and students from ERAU. Lab equipment is provided at the facility, as well as a subsonic wind tunnel. The MicaPlex is located on the east side of the Airport along Clyde Morris Boulevard.

2.11. FIXED BASE OPERATOR AND GENERAL AVIATION FACILITIES

GA refers to facilities and operations of all aviation users other than scheduled commercial service and military operations. Typical GA facilities include conventional hangars, T-hangars, and aircraft tiedown spaces. Most aviation activity at DAB is GA operations and flight training. FBO and GA facilities are depicted in **Exhibits 2.13** and **2.14**.

2.11.1. PHOENIX EAST AVIATION INC.

Phoenix East Aviation, Inc. (PEA) is located to the west of Runway 16/34 and east of the passenger terminal short-term and long-term parking lots. PEA is an approved FAA Part 61 and Part 141 flight school that employs a staff of over 50 instructors from their facilities. The flight school operates out of a single 24,000-square foot hangar, while also utilizing apron space that contains 30 tiedown parking spaces.

2.11.2. FIXED BASE OPERATORS

FBOs provide several aviation services to airport tenants and users including fuel sales, hangar and tiedown leasing, aircraft support services, oxygen supply, aircraft maintenance, and ground transportation. In addition, they provide flight crew and passenger amenities, such as waiting areas, conference areas, sleep rooms, and flight planning areas.

There are currently three FBOs located at the Airport: Airline Transport Professionals (ATP) - Jet Center; Sheltair; and Yelvington Jet Aviation, Inc.

2.11.2.1. Airline Transport Professionals (ATP) - Jet Center

ATP - Jet Center is located on the eastern side of the Airport between Runways 7L/25R and 7R/25L. ATP - Jet Center has been open at DAB since October 2009 and provides line services such as full-service fueling of Jet A and 100LL, self-service fueling of 100LL, Jet A Single-Point truck and Dual/Over-wing truck, battery ground power, jet start, ramp tiedowns, and corporate and T-hangar parking rentals.

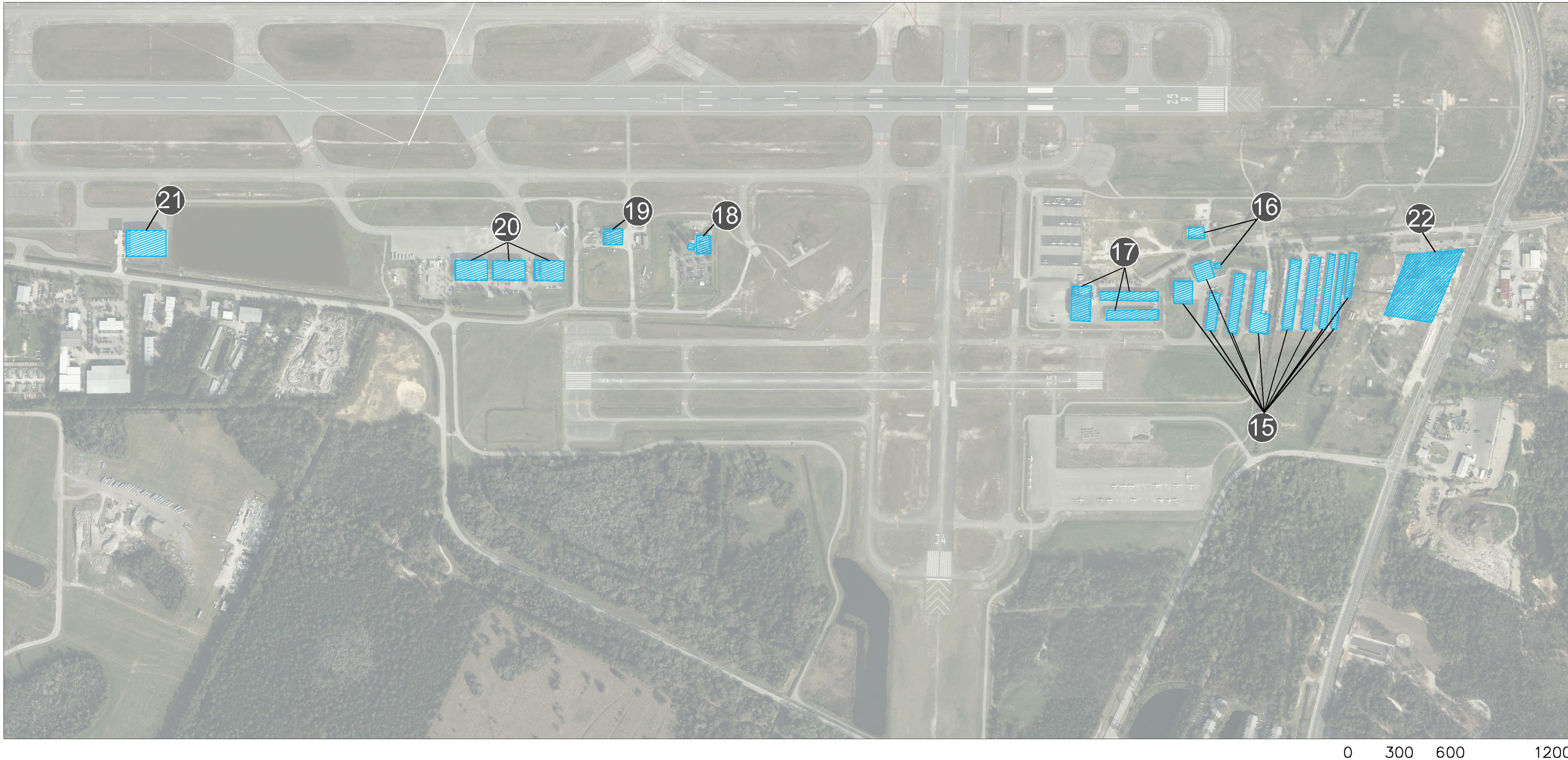
[8] Embry-Riddle Aeronautical University Website, https://erau.edu/micaplex

Existing Buildings	
1	Budget Rental Car - Maintenance Facilities
2	Dollar Rental Car - Maintenance Facilities
3	Sheltair Fuel Farm
4	Enterprise Rental Car - Maintenance Facilities
5	Sheltair
6	Vacant
7	Airport Maintenance/ Vacant
8	Avis Rental Car - Maintenance Facilities
9	NASCAR Aviation
10	Sheltair
11	International Terminal
12	Passenger Terminal
13	Terminal Utilities Facilities
14	Embry Riddle Aeronautical University

DAYTONA BEACH
INTERNATIONAL AIRPORT

Exhibit 2.13

Existing Buildings - North



Existing Buildings	
15	Commonwealth Aviation
16	FAA Support Facilities
17	Air Transportation Professionals (ATP) - Jet Center
18	Airport Traffic Control Tower (ATCT)
19	Aircraft Rescue and Firefighting
20	Yelvington Jet Aviation, Inc.
21	Brown and Brown
22	Embry-Riddle MicaPlex

DAYTONA BEACH INTERNATIONAL AIRPORT

Exhibit 2.14

Existing Buildings - South

The FBO also provides a pilot lounge, Internet access, computerized weather, and flight planning/briefing rooms. ATP - Jet Center also operates as a flight training school with fully licensed instructors for various type ratings and time-building. ATP - Jet Center utilizes most of its space for flight training but also caters to corporate aircraft. The parking lot adjacent to hangar space provides a total of 47 vehicle parking spaces.

2.11.2.2. Sheltair

Sheltair has two locations at DAB airfield. Their north apron space is located northwest of the end of Runway 16 and includes three hangars and a fuel farm. The south apron space is located between the Airport terminal parking and Runway 16/34, north of Runway 7L/25R. The FBO provides the following services and amenities: full service fueling of 100 LL; full-service Jet A fueling; crew cars; shuttle service; rental car services; ground support; interior aircraft cleaning; catering; cafeteria; weather/flight planning room; and a pilot’s lounge. The parking lot adjacent to the north hangar space provides a total of 28 parking spaces; the south hangar space provides 183 vehicle parking spaces.

2.11.2.3. Yelvington Jet Aviation, Inc.

Yelvington Jet Aviation, Inc. is located on the southern side of the Airport between Runways 7L/25R and 7R/25L, west of Runway 16/34. Yelvington Jet Aviation operates out of three hangars and provides the following services and amenities: full-service fueling of 100LL; full-service Jet A fueling; Ground Power Units (GPUs); Lavatory (LAV) servicing; light maintenance; annuals on various aircraft; overnight and permanent hangar facilities; crew cars; shuttle service; rental car access; pilot’s lounge with access to planning/weather tools; kitchen; and conference rooms. Yelvington Jet Aviation, Inc. sees a high amount of air traffic from the Bahamas utilizing piston/reciprocating engine aircraft. The parking lot adjacent to the hangar spaces provides 151 vehicle parking spaces.

2.11.3. CORPORATE AVIATION OPERATORS

2.11.3.1. Brown and Brown

Brown and Brown’s facility is located on the southwestern side of the Airport between Runways 7L/25R and 7R/25L, and west of runway 16/34. Brown and Brown operates out of one hangar to the south of Runway 7L/25R and one apron space north of their hangar.

2.11.3.2. NASCAR

NASCAR’s three corporate hangars are located in the central portion of the airfield, north of Sheltair, located between the passenger terminal long-term parking lot and Runway 16/34.

2.11.4. AIRCRAFT MAINTENANCE

Daytona Aircraft Services, located within the Sheltair leasehold, is an FAA Part 145 Aircraft Maintenance and Repair Facility that provides complete turbine and piston aircraft maintenance and repair services. They are a factory authorized aircraft maintenance and repair facility for Cessna, Piper, Mooney, Diamond, and Beechcraft aircraft, and services over 400 aircraft a year.

2.11.5. NON-AERONAUTICAL TENANTS

The Daytona International Speedway is a racetrack located in the northwest portion of the Airport property that hosts annual events, boosting travel into Daytona at peak times throughout the year.[9] The Speedway was built in 1959 and has a capacity of 101,000 seats. The Speedway is located on 480 acres of leased Airport property and is owned and operated by the International Speedway Corporation.

Daytona International Speedway hosts major events each year, including NASCAR's most prestigious race, The Daytona 500, along with Rolex 24 and BMW Endurance Challenge. The Speedway includes four different racetracks: the primary highspeed tri-oval (2.5 miles), the sports car course (3.56 miles), motorcycle course (2.95 miles), and the karting and motorcycle flat track (1,320 feet).

In February 2017, the Motorsports Hall of Fame of America relocated to the Daytona International Speedway from its location at the Detroit Science Center. The museum currently hosts over forty motorsports-related vehicles with exhibits and displays of racing personalities, vehicles, and memorabilia, and is open to the public year-round.

2.12. CARGO FACILITIES

The Airport-owned air cargo facility is located adjacent to the Runway 16 approach end and is shared with the Airport maintenance facilities. The air cargo facility is approximately 3,000 square feet. Delta Air Cargo leases the facility and utilizes it for storing and preparing belly cargo. The cargo facility has direct access to Innovation Way and allows for vehicles to access the hangar for cargo and freight purposes.

2.13. AIRLINE AND AIRPORT SUPPORT FACILITIES

This section describes the existing airlines and Airport support facilities and summarizes their ability to accommodate their intended functions and meet user demand over the course of the planning horizon.

2.13.1. AIRCRAFT RESCUE AND FIREFIGHTING

The Aircraft Rescue and Firefighting (ARFF) station is located south of the terminal complex, midfield, between Runways 7L/25R and 7R/25L, to the west of Runway 16/34. This location is consistent with the FAA ARFF siting criteria that includes providing immediate access to the airfield, non-interference with the ATCT's line of sight, adherence to the Building Restriction Line (BRL), and meeting requirements for emergency response time. As detailed in Part 139, the first ARFF response vehicle must be able to maneuver to the midpoint of any runway within three minutes.

The station is ARFF index C, staffed 24 hours a day. If one vehicle is out of service for more than 48 hours and a replacement is not available, the Airport reduces the ARFF index level as needed.

The ARFF station includes four vehicles:

- Oshkosh Striker 3000 that has the capacity for 3,000 gallons of water, 420 gallons of 3 percent Aqueous Film Forming Foam (AFFF), and a 500 pound Dry-Chemical System with 450 pounds of Purple K;
- Oshkosh Striker 1500 that has the capacity for 1,500 gallons of water, 210 gallons of 3 percent AFFF foam, and a 500 pound Dry-Chemical System with 450 pounds of Purple K;

[9] Daytona International Speedway Website, daytonainternationalspeedway.com

- E-ONE ARFF Vehicle that has the capacity for 1,500 gallons of water and 200 gallons of 3 percent AFFF foam; and
- E-ONE ARFF Vehicle that has the capacity for 1,500 gallons of water, 200 gallons of 3 percent AFFF foam, and a 500 pound Dry-Chemical System with 450 pounds of Purple K.

The ARFF station was completed in 2017 and is a14,055-square foot, single-story, facility with four bays.

2.13.2. AIRPORT MAINTENANCE FACILITIES

The Airport maintenance facility shares utilization with Airport cargo facilities and is approximately 16,170 square feet. The aircraft maintenance apron is approximately 13,200 square feet and houses Airport maintenance equipment and provides parking for Airport maintenance vehicles. The hangar has direct access to Innovation Way and allows for trucks to access the loading docks for the hangar from this direction.

2.13.3. FUEL STORAGE

Sheltair has a fueling contract with the Airport to provide fueling services to the commercial carriers that operate at the Airport, via trucking fuel to the passenger terminal area. The fuel farm also serves the Airport-owned automotive vehicles that operate at the Airport. Sheltair’s fuel farm, located in the northwest portion of the airfield, has the following fuel tanks: two 50,000-gallon Jet A fuel tanks, two 20,000 gallon Av-Gas fuel tanks, one 20,000 gallon Jet A fuel tank, and one 8,000 gallon Mo-Gas fuel tank.

ATP - Jet Center services commercial aircraft that operate at the Airport and has a fueling contract with Air America, in addition, they fuel most of the General Aviation, itinerant, and corporate traffic. The fueling facility has the capacity for 10,000 gallons of Av-Gas and 10,000 gallons of Jet A fuel; there are also fueling trucks with the capacity to store 1,200 gallons of Av-Gas and 3,000 gallons of Jet A fuel.

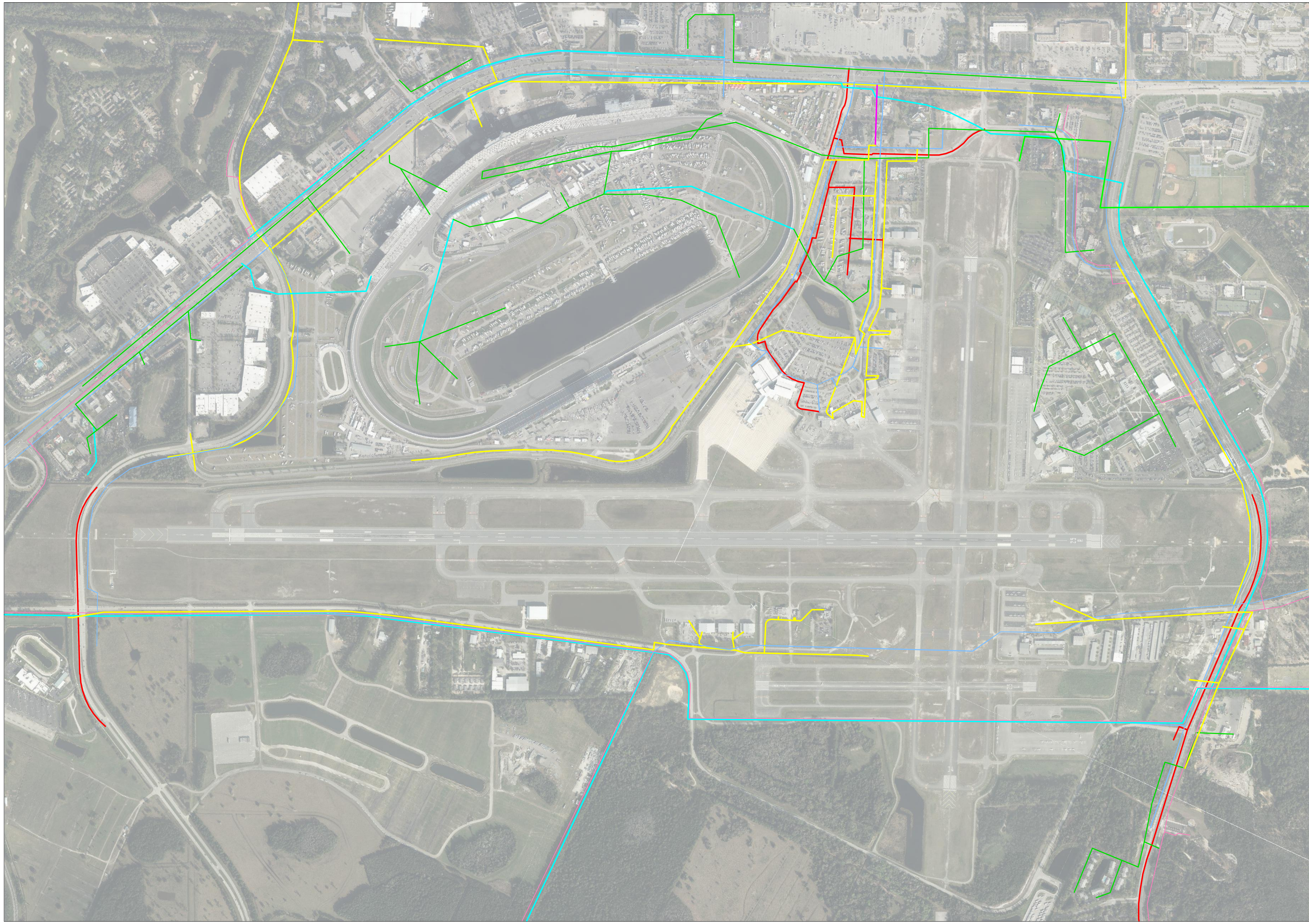
Yelvington Jet Aviation, Inc. has a fueling facility with tanks that have the capacity to store 17,000 gallons of Av-Gas and 24,000 gallons of Jet A fuel. There are also fueling trucks with the capacity to hold 1,950 gallons of Av-Gas and 12,000 gallons of Jet A fuel.

2.13.4. FEDERAL AVIATION ADMINISTRATION FACILITIES

The DAB Airport Traffic Control Tower (ATCT) provides aircraft with clearances to land and/or take off from DAB, as well as handling aircraft ground operations within movement areas of the airfield. The ATCT is located between Runways 7L/25R and 7R/25L, west of Runway 16/34. The north end of Taxiway W, after its extension, was declared a non-movement area as it had an obstructed view. Other than the north end of Taxiway W, the ATCT does not have any line of sight issues and all runways and taxiways can be seen from the tower, as well as the approach and departure paths.

2.14. AIRPORT UTILITIES

The are several municipal utility systems that service DAB and are provided by various providers and entities. The approximate locations of these utilities are depicted on **Exhibit 2.15**. The utility systems for electric, water mains, sanitary force mains, well mains, reuse water, and natural gas are described below. Storm sewer and drainage utilities are described in the Storm Water Master Plan (see Appendix 1). Water utilities, including force mains, reuse, and sanitary are provided by the City of Daytona Beach. Electric utilities are provided by Florida Power and Light. Natural gas is provided by TECO Peoples Gas.



Legend

(yellow line)	Electric Lines
(red line)	Gas Lines
(blue line)	Water Mains
(cyan line)	Sanitary Force Mains
(green line)	Sanitary Gravity Mains
(green line)	Well Lines
(pink line)	Reuse Watermains

NOTE: THIS EXHIBIT IS FOR INFORMATIONAL PURPOSES ONLY. THE LOCATIONS DEPICTED HAVE NOT BEEN FIELD VERIFIED

N W E S

GRAPHIC SCALE IN FEET
0 600 1200 2400

DAYTONA BEACH INTERNATIONAL AIRPORT

Exhibit 2.15

Existing Facilities - Utilities

Further investigation of utilities was conducted in ensuing states of this Master Plan Update as part of the demand and capacity analysis.

2.15. EXISTING ENVIRONMENTAL CONDITIONS

The resources evaluated in this environmental overview include biotic communities, future land use, endangered and threatened species, hazardous materials, historic and archaeological resources, floodplains, and Section 4(f) resources including parks and wildlife refuges, surface waters, and wetlands. The project study area for this review includes areas within the existing Airport property.

The methodology for this assessment included a review of the following resources:

- Florida Natural Areas Inventory (FNAI) Biodiversity Matrix (http://www.fnai.org/biointro.cfm);
- Various Geographic Information System (GIS) data layers from the U.S. Fish and Wildlife Service (USFWS), U.S. Geological Survey, Florida Fish and Wildlife Conservation Commission (FWC) [(http://legacy.myfwc.com/bba/data/default.asp) and (https://public.myfwc.com/FWRI/EagleNests/nestlocator.aspx)];
- USFWS IPaC data [https://ecos.fws.gov/ipac/, August 18th, 2017];
- State Historic Preservation Officer (SHPO), Florida Master Site File (http://www.flheritage.com/);
- USFWS National Wetlands Inventory (NWI) Maps (Web-based maps available from http://www.fws.gov/wetlands/Data/mapper.html);
- Federal Emergency Management Agency (FEMA) Digital Flood Insurance Rate Maps (FIRM; Web-based maps available from http://msc.fema.gov/);
- St. Johns River Water Management District (SJRWMD) Interactive GIS Map, Florida Department of Environmental Protection (FDEP) MapDirect GIS; and
- Existing Wetland Jurisdictional Determinations for the South Parcels issued by SJRWMD (Parcels 40, 47, 49-54, and 66).

A full review of existing environmental conditions was provided in Chapter 7 of this Master Plan Update Report.

3. AVIATION ACTIVITY FORECAST

3.1. INTRODUCTION

This section of the Master Plan Update contains the assumptions, methodologies, and resulting projections of future aviation activity at DAB. Projections of future operational activity were developed for the following components of aviation activity:

- Passenger Enplanements;
- Air Carrier Operations and Fleet Mix;
- Air Cargo Activity;
- Based Aircraft and Fleet Mix;
- General Aviation Operations; and
- Total Airport Operations.

The timeframe for this forecast is 20 years, from 2017 to 2037. These projections will be utilized as a basis for the assessment of future demand versus existing airfield and facility capacity at future planning activity levels. The aviation industry is highly dynamic and is subject to fluctuation industry-wide, as well as within specific markets due to a wide range of both internal and external influences that include, but have not been limited to, economic downturns or, conversely, economic growth, geo-political events, fuel prices, security threats, and airline mergers. The forecast effort will consider potential influencing factors as well as historical trends, previous forecasting efforts, regional socio-economic information, aviation industry trends, and local information and trends that could act to influence current and future activity levels at DAB.

3.1.1. REFERENCED FORECASTS

To gain perspective for the development of updated activity forecasts for DAB, it is both informative and beneficial to review previous projections of both operational and passenger levels for the overall industry and, more specifically, for the Airport. Three key projections of aviation activity were reviewed and are referenced below.

2003 Master Plan Forecast

The last Master Plan Update was completed in 2003. The study included forecasts of aviation activity developed for a 20-year planning horizon focusing on years 2005, 2010, and 2020. The projections included a base case, which was used in the creation of the Recommended Development Plan. The base case projection of passenger enplanements indicated growth from a base year total of 268,082 to 290,000 in 2005, 330,000 in 2010, and reaching 400,000 by the end of the 20-year planning horizon in 2020. The base case condition projected a mix of regional commuter aircraft (generally less than 70 seats) service that would account for 25 percent of all commercial aircraft operations in 2005 to 35 percent of all commercial operations by 2020. Conversely operations by larger air carrier aircraft would decline from 75 percent of all air carrier service in 2005 to 65 percent by the year 2020. It should be noted that DAB saw 355,157 enplaned passengers[10] in 2016. Activity statistics through November of 2017[11]

[10] Enplaned Passengers are passengers boarding a flight out of DAB. Enplaned passenger levels are a typical measure used in activity forecasting and in facility requirements evaluations.

[11] Daytona Beach International Airport Air Traffic Report, November 2017.

showed the Airport running 10,000 more enplaned passengers year to date 2017 than in 2016. In short, the 2003 projected enplaned passenger level are very close to being realized by 2020 given current growth in passenger enplanements.

The second demand scenario developed in the 2003 forecast effort consisted of a high growth case projection. The high growth passenger projection was based on a market share projection approach and assumed that DAB would capture a greater percentage of statewide passenger enplanements than that associated with the base case. This assumption was tied to historic market capture rates experienced in 1980, 1985, 1990, and 1995. Based on the market share methodology, passenger enplanements would increase from the actual level of 262,082 in 2000 to 350,000 in 2005, 480,000 in 2010, and reach 750,000 by 2020. Due to the higher enplaned passenger volumes projected, the anticipated fleet mix was slightly different than under the base case, showing a lower percentage of regional commuter aircraft and a higher percentage of narrow-body commercial transports. By 2020, regional commuter aircraft would have comprised 30 percent of the fleet serving DAB in lieu of the 35 percent in the base case forecast. Given the historical enplanement data through November 2017, the high growth scenario did not manifest itself at DAB. The two scenarios from the previous Master Plan Update are shown below in **Table 3.1.**

Table 3.1 - 2003 Master Plan Update Summary

	Annual Enplanements		Total Annual Operations	
Year	**Base Case**	**High Case**	**Base Case**	**High Case**
2000	268,082	263,891	362,412	362,412
2005	290,000	350,000	381,289	382,749
2010	330,000	480,000	400,269	403,919
2020	400,000	750,000	436,569	445,329

Source: Daytona Beach International Airport 2003 Master Plan Update.

FAA Aerospace Forecast

The FAA Aerospace Forecast FY 2017-2037 contains projections for future aviation demand on a national level. The publication provides a 21-year outlook and is updated on an annual basis. It is the FAA's view and high-level projection of future aviation activity over the noted timeframe. The Aerospace Forecasts provides a key overview of the broader economic assumptions and factors that influence all sectors of the aviation industry in general, as well as noting significant trends that may impact commercial and general aviation activity on a national basis, including anticipated changes in fuel costs. Included in the FAA Aerospace Forecast are forecasts for the following:

- Passenger enplanements, revenue passenger miles, airline fleet by broad category (e.g. narrow-body, wide-body, commuter regional), and hours for large carriers and regional/commuters;
- Cargo revenue ton miles and cargo fleet for large air carriers;
- Fleet, hours flown, and projections of licensed pilots for general aviation, general aviation fleet composition by broad category, (single engine, multi-engine, turbo-prop, jet, rotorcraft, other); and
- Activity forecasts for FAA and contract towers by major user category.

FAA Terminal Area Forecast

The FAA Terminal Area Forecast (TAF) is a top-down forecast produced annually by the FAA Office of Aviation Policy and Plans (APO) and covers airports contained in the NPIAS. The TAF serves as a tool for the FAA to determine personnel requirements and is particularly focused on the potential personnel requirements in the nation's air traffic control system. The FAA also uses the TAF as a benchmark against Airport master plan forecasts to assess the reasonableness of the projections in the master plan. The FAA has established specific percentage thresholds that master plan activity projections (passengers, operations, and based aircraft) should not exceed by specific time frames over the 20-year planning horizon. Contained within the TAF is historical passenger, based aircraft, and aircraft operations data, along with forecasts of future demand developed for individual Airport levels of future passenger enplanements, Airport operations, Terminal Radar Control (TRACON) operations, and based aircraft. The data covers 264 FAA towered airports, 253 Federal contract tower airports, 31 terminal radar approach control facilities, and 2,817 non-towered airports.

When a locally derived Airport activity forecast exceeds the projections contained in the most recent TAF, the FAA typically requires the airport sponsor to provide considerable additional detail to support a deviation from the general TAF numbers. While FAA prefers the TAF not be used for airport planning purposes and recommends the development of locale-specific activity forecasts for use in airport facility master planning, the Agency tends to be far more reticent in accepting a forecast that is not within the prescribed range of the TAF, even when additional justification is provided.

3.2. MARKET AREA DISCUSSION

An Airport's market is defined by a variety of factors, of which the proximity and accessibility of other competing airports is a key consideration. In the case of DAB, four airports in the east central Florida region were identified as generally competing with DAB for market share and passengers and, as a result, tended to define the general market area for DAB. These four airports, their characteristics, and air travel offerings are listed below and discussed in a later section.

- Orlando Melbourne International Airport – Melbourne, FL – 75 miles due south of DAB via I-95;
- Jacksonville International Airport – Jacksonville FL – 100 miles north of DAB via I-95;
- Orlando Sanford International Airport – Sanford, FL – 40 miles southwest of DAB via I-4;
- Orlando International Airport – Orlando, FL – 70 miles southwest of DAB via I-4 or I-95 to the Beachline Expressway

3.2.1. FACTORS AFFECTING AIRPORT CHOICE

In addition to proximity and accessibility, several other factors and drivers are at play as to why an airport is selected by a traveler when choices are available. To frame the discussion on these airports' relationship to DAB and how they might compete for DAB demand, general factors affecting airport choice are discussed below.

3.2.1.1. Airline of Choice Availability

Related to business travel and frequent travelers in particular, the availability of an airline of choice can be a major factor in the decision to utilize one airport versus another given similar drive times and general airport accessibility. Airline frequent flyer programs at the legacy carriers are structured to reward loyal passengers, especially frequent business travelers who are likely in these programs' elite tiers, such as Delta Medallion and United Premier Executive. In times of travel disruption by weather or other events outside of the traveler's control, these loyalty programs generally will prioritize the re-accommodation of the loyal traveler ahead of the general traveler. In today's environment, if a traveler's flight is cancelled and they do not possess some level of preference, it is not uncommon for the person to be unable to obtain an available seat on another flight for hours, and in many instances, a day or more.

In addition, frequent travelers with one airline are likely accruing and "banking" mileage with their favored airline for eventual travel reward redemption, and often have other ways to accrue mileage beyond actual air travel, such as airline-branded credit cards that can also contribute to a traveler's loyalty program status by their level of personal spending.

3.2.1.2. Airfare

Airfare is a key driver in airport choice, as many business travelers and the majority of leisure travelers, especially those with families in tow, are going to be budget-minded in their air travel shopping. For example, the difference in price of flying a family of four on one of the legacy airlines (United, Delta, American) versus flying on an ultra-low cost carrier (Allegiant, Spirit, Frontier) can be significant, often ranging in hundreds of dollars, and often outweighs the level of service provided by the ultra-low cost carriers, both in terms of amenities and frequency. Given airport choices, the airport that has significantly lower fares by way of the airline(s) operating there will likely capture that traveler over another airport.

3.2.1.3. Range of Direct Destination Availability

The availability of nonstop destinations from an airport is a significant driver in its ability to capture traveler demand. As mentioned before, given a choice of airports in geographic proximity, a greater offering of nonstop destinations is likely to divert travelers to that airport. The availability of more nonstop destinations eliminates the requirement of a traveler to connect through a major hub airport and potentially risk missing a connection, as well as reducing overall trip time. Nonstop service, coupled with reduction in trip time, is typically a key consideration for businesses travelers and can make the difference between a single day trip versus a two-or even a three-day trip; this difference can end up costing a business traveler while providing extra convenience to the leisure traveler.

3.2.1.4. Frequency and Time of Travel

The route frequency, or number of flights serving a market on a daily basis, plays a major role in the attractiveness of one airport versus another. More daily frequencies and, in particular, nonstop frequencies, on a route offers additional flexibility in arranging and planning a trip and offers redundancy in the event of inclement weather, missed connections, or other travel disruptions. The redundancy can allow the disrupted traveler to be re-accommodated on a later flight rather than having to wait until potentially the next day for the next available flight that has an open seat.

Business travelers seek frequency on a route to allow the accommodation of their preferred departure and return times. The traveler that wishes to leave their home or be returning to their home at a certain time will be more likely to choose the airport that offers a flight that has a departure or arrival time convenient to their preferred times of actual trip commencement or conclusion. For a leisure traveler, flight frequency can make the difference of arriving to their destination early and when they depart for home.

Having multiple frequencies within a defined period of the day can also be key. The period of 6:30 AM to 9:00 AM is a key business travel time. Providing flight choice within a prime travel period can be key in capturing travelers who do not want to leave at 6:30 AM because it means getting up at 4:00 AM, but will take a 7:30 AM flight or an 8:00 AM or 8:30 AM flight. In short, frequency equals choice and choice equals market capture.

The preceding considerations do not necessarily dictate the choice of an airport for travelers, but they have been found to combine as influencing factors that are considered when making a choice as to where to travel from. Keeping these factors in mind is important when considering future demand at DAB and the competitive position of surrounding airports versus DAB as a travel option.

3.2.2. DAB COMPETING AIRPORTS

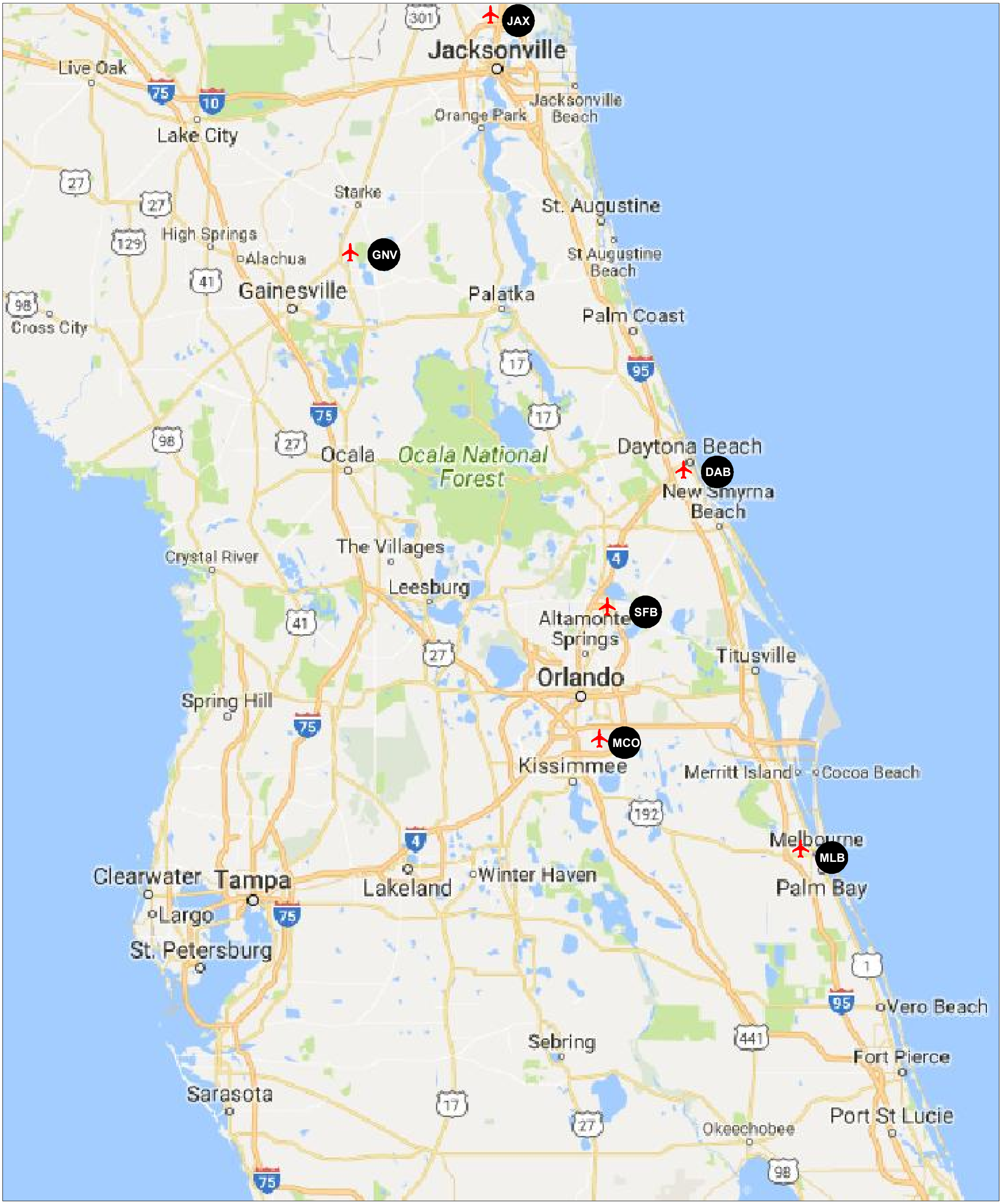
The following provides an overview of the four airports noted earlier that are geographically positioned to compete directly with DAB for market share. These airports vary in their size, number of airlines, level of service provided, and, in at least one case, the composition of the market that the airlines serving the Airport focus on capturing. Each airport is reviewed qualitatively relative to the perceived ability each airport must draw travelers from DAB's general catchment area. The airports in this overview are depicted on **Exhibit 3.1.**

Orlando Melbourne International Airport

Orlando Melbourne International Airport (MLB) is located approximately 75 miles south of DAB, nearly straight-line distance on I-95. MLB is served by four airlines: Delta, American, Porter Airways, and Elite Airways. Delta and American offer service to their hubs of Atlanta and Charlotte, respectively, at average departure frequencies of 3-4 times daily during the week and less on weekends. These frequencies are very similar to what is offered at DAB. Porter Airways offers once to twice weekly service to the Toronto area, and Elite Airways offers twice weekly service to Portland, Maine and the Bahamas. MLB offers two of the same destination choices as DAB (Atlanta and Charlotte), and limited weekly service to niche markets. DAB and MLB are to some degree separated by the large expanse of the Kennedy Space Center, the Merritt Island National Wildlife Area, and Canaveral National Seashore, which contributes to a large and sparsely developed area between the two airports with limited air travel demand to capture. The opportunity for MLB to capture passengers from DAB is limited and likely driven by travelers located in the middle areas between DAB and MLB, including Rockledge, Tierra Verde, Satellite Beach, Cocoa Beach, and Titusville. It should be noted that MLB is situated well within the market area largely served by Orlando International Airport, which is easily access via I-95 and the Beachline Expressway.

Jacksonville International Airport

Jacksonville International Airport (JAX) is located 100 miles to the north of DAB on the north side of the City of Jacksonville. JAX primarily serves the Jacksonville metro area, but also draws passengers from nearby communities that primarily include Green Cove Springs, Ponte Vedra Beach and St. Augustine to the south, and Amelia Island, St. Marys and the Brunswick, Saint Simons Island, and Sea Island Georgia area to the north. JAX is served by eight airlines that consist of Air Canada, Allegiant Airlines, American, Delta, JetBlue, Silver Airways, Southwest Airlines, and United Airlines. Together these eight airlines provide nonstop service to a total of 28 destinations with approximately 85-90 daily nonstop flights. While it has a greater offering of airlines, mix of airline types (ultra-low fare, low cost, and legacy carriers), nonstop destinations, and flight frequency, it is located the furthest away from DAB compared to the other markets in this discussion, requiring driving either around or through Jacksonville to the north side of the metro area, which can discourage travelers from the south of JAX, particularly during high volume traffic periods of the day. JAX establishes the northern limits of the DAB catchment area, with travelers located in the northern periphery of the DAB catchment area, such as those in the St. Augustine vicinity, may at times be captured by JAX due to its greater selection of destinations and frequency, while at other times may use DAB from an accessibility perspective.



Source: googlemaps.com

DAYTONA BEACH INTERNATIONAL AIRPORT

Exhibit 3.1

Market Area Airports

Orlando Sanford International Airport

Orlando Sanford International Airport (SFB) is approximately 40 miles southwest of DAB. SFB was previously the home to significant international service by British-based low cost air tours that used SFB for two reasons. First, the completion of the Greenway Expressway around the east side of Orlando offered a direct, uncongested route to the front gate of Walt Disney World, which was the destination of the majority of their passenger base. Secondly, SFB maintained a low Cost Per Enplanement (CPE) level, even after they had constructed a new terminal facility; when compared against the CPE at Orlando International Airport, costs to the carrier were between $15 to $20 per passenger higher.

Today, SFB retains a base of international low-cost service; however, this service is no longer the dominant commercial activity at the airport. Year-end 2016 data showed that international passenger enplanements totaled 146,567 while domestic enplanements totaled 1,215,427. Most of this domestic passenger demand is generated by Allegiant Airlines, which utilizes an ultra-low fare, no-frills business model. SFB is one of the major markets for Allegiant Airlines, with nearly 70 nonstop markets, primarily east of the Mississippi river. Allegiant Airlines operates a unique business model in which they aim for budget-minded travelers in mid-sized cities around the country who are generally underserved by legacy air carriers. The airline typically offers once or twice weekly nonstop service to SFB and other destinations with major leisure and vacation offerings. Allegiant has tapped into a segment of the market that accepts bare bones service and amenities in exchange for ultra-low fares. SFB is an ideal location for the airline, as it can draw extensively from the entire Orlando/Sanford metropolitan area, capture attraction-related travelers, and operate from an airport that is uncongested and maintains a low CPE.

The numerous destinations offered at SFB, with the dominant presence of a low-cost carrier and easy access to Orlando's major attractions, coupled with its relatively short distance from DAB and the southern portion of DAB's catchment area, lends to the ability of SFB to capture a portion of DAB's market demand.

In addition to Allegiant Airlines, SFB is also served by airlines providing international nonstop service. These include Interjet, a low-cost airline based in Mexico providing service to Mexico City, Surinam Airways, providing service to the southern Caribbean and South America, and Tui, providing nonstop service to Belgium and Amsterdam as well as several charter destinations in the United Kingdom.

Orlando International Airport

Orlando International Airport (MCO) is a large hub airport located approximately 70 miles southwest of DAB on the southeast side of the Orlando area. MCO is a multi-terminal, international gateway airport for the Central Florida region, which enplaned 20,927,371 passengers in 2016. MCO is in the Orlando-Kissimmee-Sanford Metropolitan Statistical Area (MSA), based on the 2012-2016 American Community Survey 5-year estimates, which has a resident population of 2,328,500. As of late 2017, MCO served 124 nonstop destinations, including 46 nonstop international destinations, and was served by 38 individual airlines, providing over 800 daily flights. In short, MCO provides a significant number of airlines to choose from, nonstop connections to 78 U.S. domestic markets, and extensive frequency of service to these domestic markets.

MCO draws its passenger base from the immediate MSA, as well as having a significant draw from throughout the Central Florida region, encompassing several commercial service airports within its general catchment area. These other airports include Gainesville Regional Airport, Orlando Melbourne International Airport, and Daytona Beach International Airport. By far the most significant factor in the level of service into MCO is the tourism industry, and most notably the travel demand generated by the theme parks: Walt Disney World, Universal Studios, and SeaWorld. The Orlando theme parks draw travelers from across the U.S. and from all over the world.

Volusia County is considered part of the market area for MCO, and with the presence of nearly every domestic airline at MCO coupled with the excellent accessibility of MCO provided by I-4 to the Greenway or I-95 to the Beachline Expressway, MCO captures a significant portion of traveler demand from DAB's catchment area.

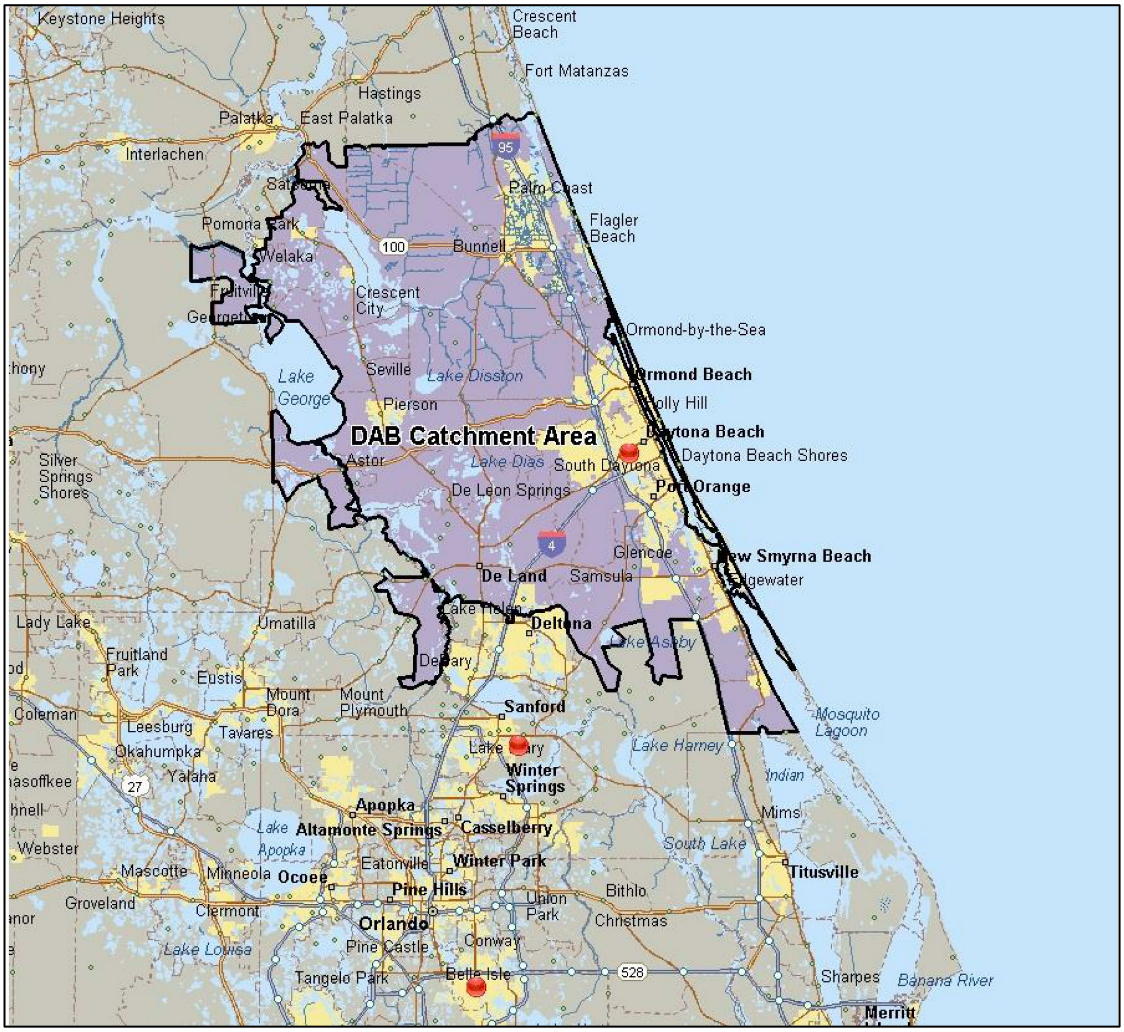
3.2.3. COMPETING MARKET AREA EFFECTS ON DAB

A True Market Estimate was prepared for DAB in 2016 by Mead and Hunt. The goal of this effort was to realistically identify the extent of market capture by DAB as well as assessing the impact that other airports in the area were having on the level of market capture. Based on this analysis, it was determined that DAB is capturing approximately 39 percent of travelers from its catchment area, shown below in **Exhibit 3.2.** The True Market Estimate indicated that MCO was capturing approximately 44 percent of the travel demand in the DAB catchment area and JAX was capturing 9 percent; the remaining 8 percent was split between other airports with SFB and MLB being noted. Based on discussions with DAB senior staff, it is anticipated that SFB accounts for the large majority of the remaining 8 percent. From the preceding discussion of the competing airports in proximity to DAB, it can be discerned that the combined capture of MCO and SFB poses significant competition to DAB and the ability of DAB to capture the full extent of its passenger demand within its catchment area. Additional contributing factors that act to challenge market capture by DAB are highlighted below.

The development of airline routes and service is heavily tied to market demand. As airlines are for-profit businesses, their model is to introduce and maintain service and frequency to markets where travel demand exists and can be sustained by draw and population density. The Orlando area, as mentioned above, has an estimated population of over 2.3 million people, along with the proximity of several world-renowned tourist attractions. In addition to population and tourist attraction demand, MCO and SFB combined offer nonstop service to nearly 200 destinations, both domestic and international, which alludes to the factors affecting airport choice discussed above such as frequency and destination/airline availability.

DAB is not unique in this challenge, as numerous examples exist around the U.S. where an airport in similar size and role to DAB must compete with a nearby large hub airport. Examples include Springfield, IL located proximate to Lambert St. Louis International; Sarasota, located in the shadow of Tampa, Florida; Rockford, Illinois and Champaign, Illinois, which compete for passengers from both Chicago area airports; and Colorado Springs Municipal Airport, which competes for passengers from Denver International.

Exhibit 3.2 - DAB Catchment Area based on 2016 True Market Estimate



Source: Mead and Hunt, 2016.

3.2.4. MARKET OPPORTUNITIES FOR DAB

While DAB is challenged by its proximity to MCO, SFB, and, to a lesser extent, JAX, DAB did experience the successful introduction of new air service by JetBlue in January 2016 to New York's John F. Kennedy International Airport (JFK). Based on monthly activity reports since JetBlue's initiation of service, load factors continually increased and are maintaining a steady 90 percent and above level, indicating strong demand and, likely, demand that is not currently being served but could be captured with the addition of increased service by JetBlue. At the time of the True Market Estimate for DAB report's publication, DAB was capturing only 22 percent of its capture area travel demand to JFK, which is the number one market pair with DAB. As noted previously, JetBlue had just initiated service at that time. Given the success of this service, it is deemed highly probable that an increase in market capture on this specific route has occurred. The introduction of JetBlue has allowed DAB to become more competitive with the competing airports in the surrounding regions that contribute to market leakage.

DAB had nonstop connections at the time of the study, notably Atlanta and Charlotte, with a 64 percent and 70 percent capture rate respectively. The 2016 True Market Estimate study did not have a significant base of data regarding JetBlue service to New York, as the airline had only been operating for a very limited period when the study was performed. What was discernable from some of the top 25 DAB destinations data was that the potential market capture benefit from the addition of nonstop service to another top 25 market, either by an existing carrier or by a new carrier, would provide. Notable among these potential markets served by existing carriers are Detroit (Delta), Minneapolis (Delta), Dallas (American), Chicago (American), Boston (JetBlue), along with additional frequency or service to an additional airport in New York (Newark or LaGuardia) by JetBlue.

Finally, as MCO continues to grow, the ability to accommodate additional airlines and additional flights by existing airlines will be a challenge. While development of the south terminal complex will provide some relief, fact will remain that each airside terminal at MCO is comprised of a relatively limited number of gates, and each has a finite square footage for accommodation of passengers and the amenities they require. This could lead some carriers to consider adding flights at nearby airports, such as DAB, that have capacity. This allows the carrier the ability to capture the same or greater share of the overall regional market, while avoiding the need for a large capital development program at their primary location in the region. As such, DAB may have an opportunity to secure new routes to markets on its top destinations list served by its current carriers, as well as additional frequencies on existing routes to alleviate pressure at MCO.

3.3. SOCIOECONOMIC DATA

Socioeconomic data is often incorporated into the development of an aviation forecast, as it can represent potential indicators of air travel demand. This includes historical data and future projections on variables such as population, employment, or income. Woods & Poole socioeconomic data was obtained for both Volusia County and the larger Deltona-Daytona Beach-Ormond Beach Metropolitan Statistical Area (MSA). Socioeconomic data from these two statistical areas was utilized as independent variables in a regression analysis, described in a later section. These areas were deemed representative of the likely catchment area for DAB. Certain variables were selected to be potential indicators of future enplanements, including population, Personal Income Per Capita (PIPC), and employment.

PIPC was utilized as a representation of the average income for the population of the statistical areas. Income can be an indicator of the amount of potential disposable income for the population, which may be a predictor of the ability or desire to travel.

Population for the region was also examined for both the MSA and the county. Population has increased over time for both statistical areas, as well as projections of increases over the future horizon, but, the Volusia County population is projected to grow at a slower rate than the MSA. Population growth in the may increase the potential to generate demand for air travel.

Total employment for the region was considered as well as specific segments of employment. Segments relating to tourism were considered, such as retail and accommodation-related employment. It was assumed that historic and projected trends in these specific segments may be related to tourism and visitors to the area.

3.4. TOURISM DATA

In addition to socioeconomic data, visitor profile information was obtained from the City of Daytona Beach. This information provided an overview of the habits and patterns of visitors to the area. Some of the indicators included point of origin for both in-state and out-of-state visitors, mode of travel, reason for visiting, and whether DAB was utilized versus other area airports.

Based on monthly visitor profiles from January 2017 through July 2017, an average of 35 percent of visitors from out of state traveled to Daytona Beach by air, ranging from 29 percent to 46 percent. Of these visitors, an average of 68 percent of visitors utilize DAB as their airport, whereas the remaining utilize other airports, generally MCO or SFB. The majority of visitors come to Daytona Beach for leisure reasons, such as the beach areas, the Daytona International Speedway, or to visit relatives. Business travel was reported between 10 percent and 20 percent as the reason for visiting.

Overall, the visitor profile information alludes to the notion that DAB competes with MCO and SFB in capturing passengers, which will be considered as part of the enplanement forecast development.

3.5. FORECAST ASSUMPTIONS

Described below are the key forecast assumptions that were made for the purposes of developing the aviation activity forecast.

3.5.1. UNCONSTRAINED FORECAST

In the development of the forecasts, it was assumed that the Airport is physically unconstrained, meaning there will be sufficient airside and landside capacity to accommodate aviation activity through the forecast period. The ability of the Airport to accommodate demand were further reviewed and evaluated in subsequent sections of this Master Plan Update. It is also assumed destination airports will be developed sufficiently to accommodate current and future anticipated demand in the DAB catchment area.

3.5.2. ECONOMIC GROWTH

The forecast assumes that no major economic downturn such as one similar to the Great Recession, will occur within the forecast period. However, the economy will likely grow and contract with periodic business cycles. It does deserve noting the use of historic socio-economic data as independent variables in the regression analyses, including historic employment by sector and changes in per capita income, picks up and incorporates the influence past periods of economic contraction and expansion had on the propensity to travel. Thus, while not projecting major economic downturns, the use of the noted data as independent variables in regression-based forecasting does inherently incorporate some consideration of economic fluctuation into the projections of future activity levels.

3.5.3. LOAD FACTOR

Passenger load factor relates to the number of passengers on a flight versus the total available seats available. In the late 1990’s, average U.S. domestic load factors ranged in the 65 to 70 percent vicinity and were up from typical load factors that were experienced in the late 1980’s and early 1990’s. Load factors in the U.S. market increased between 2000 and 2017, growing from an industrywide average of roughly 70 percent in 2000 to 84.59 percent by the end of 2016, and remaining between 84 to 85 percent through the first nine months of 2017. Since the start of the Great Recession, and triggered by airline financial issues, bankruptcies, and mergers, airlines sharply reduced available seat capacity in their systems, which has allowed them to maintain high load factors and increase profitability.

In the DAB market, passenger load factors have averaged 87 percent within the 10-year historical period from 2007 to 2016. An exception is the period that encompassed the Great Recession, which saw lower load factors of 82 percent and 76.5 percent for the years 2007 and 2008, respectively. In 2016, JetBlue began service, with load factors averaging 77.5 percent for the year. In 2017, the load factor for the 12 months to date was 90 percent, with the monthly load factor average for 2017 being 92 percent. By all accounts, load factors nationally are nearing the level that additional increases in that percentage are difficult. It is important to note that as load factors hit 85 percent or higher, it is indicative of a system that is seeing increased incidents of overbookings on prime flight time travel, resulting in airlines bumping travelers or paying for them to voluntarily take a later flight.

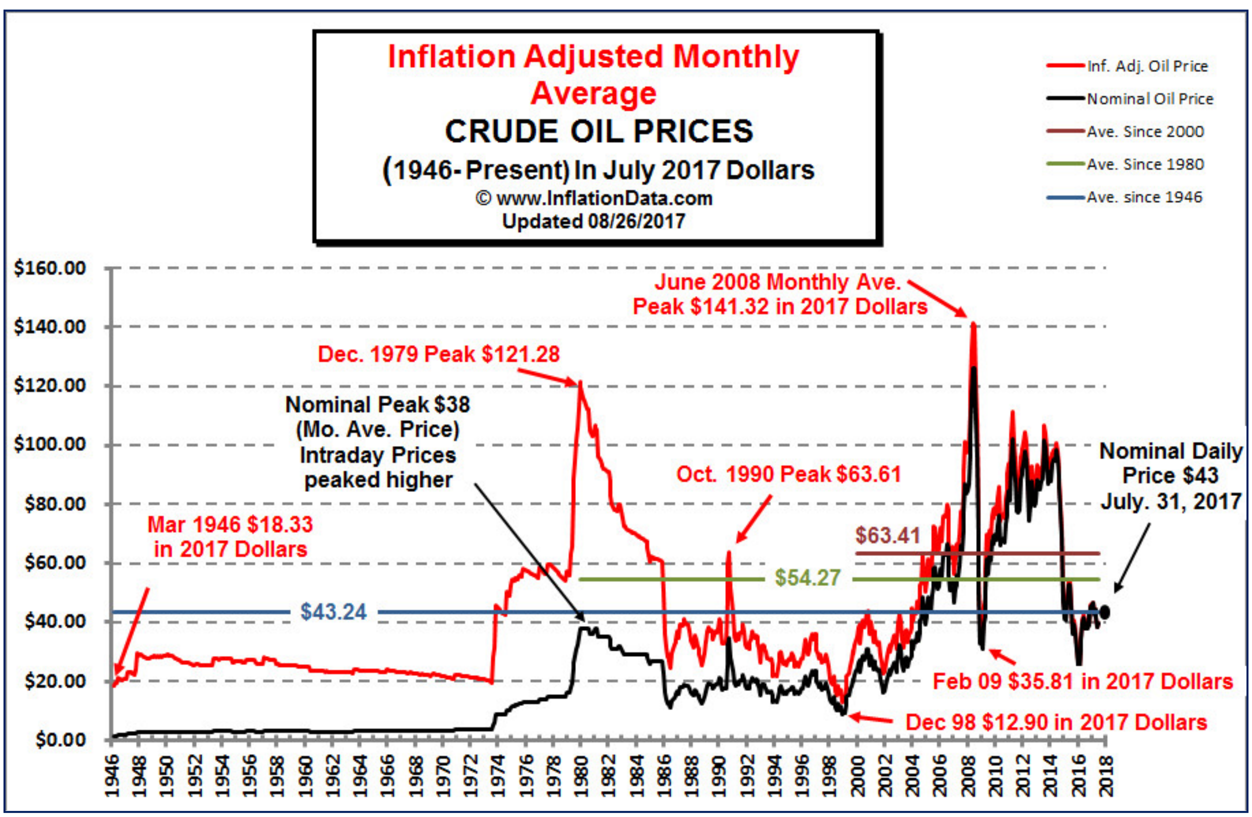
Given the load factors being experienced at DAB, there is little room for any further increase in load factors as they are already running somewhat higher than industry norms. For master planning purposes, the load factor level currently being experienced are anticipated to remain generally consistent for the forecast period. Some fluctuations will likely occur as additional carriers enter the market, additional flight frequencies are added to existing markets, or new routes are created with existing air carriers.

3.5.4. FUEL PRICES

In 2007, the price of a barrel of oil was approximately $45, having dropped from approximately $64 a barrel the previous year. By June of 2008, the nominal price of a barrel of oil was just under $130, and prices were fluctuating upward and downward on a daily basis by as much as $30 a barrel; both the cost and fluctuations in price had a chilling impact on the aviation industry.

A senior executive of a major legacy airline speaking at an industry conference said that the uncertainty in the market had rendered long-range planning virtually impossible, and the ability to address the impacts to the airline's bottom line was virtually impossible. If the price of oil were to reach a predicted level of $200 per barrel, they would be forced to cease operations. As can be seen in **Exhibit 3.3**, oil did not reach $200 a barrel and dropped sharply six months later, then rose to between $80 to $100 a barrel for several years until 2014, when the price dropped sharply and has remained in the range of $40 a barrel since.

Exhibit 3.3 - Oil Prices – 1946-2017



The cost of fuel coupled with the concurrent recession was a double hit for the airlines and operators of private and business aircraft. Surcharges were added to tickets to cover fuel costs which impacted the affordability of flying for segments of the population resulting in a decline in demand. Additionally, even with surcharges, the high costs of fuel contributed to significant financial losses which contributed to the rapidity with which consolidation within the airline industry took place. Spiking fuel costs can be triggered by a number of factors. It is generally felt that the 2007 fuel spike was triggered by speculation in the market and not by any actual issue of availability. Other fuel cost spikes evident in the above chart were the result of geopolitical events, such as the Oil Embargo of 1973, the Iran Hostage Crisis of 1979 and the first Persian Gulf War in 1990. None of these events were foreseen or forecastable. For this forecast effort, projected increases in the price of oil used as a basis of the FAA's 2017-2037 Aerospace Forecasts were assumed.

3.5.5. REGULATORY, SECURITY, POLITICAL, AND ENVIRONMENTAL FACTORS

This forecast assumes there will not be a return to airline regulation, such as the environment that existed prior to 1979. Airlines will continue to be able to add or remove service and adjust fares as market conditions change in a generally unfettered manner. It is also assumed that the period of significant airline consolidation is nearing its culmination. Further mergers by major carriers such as what occurred between American and US Airways, Delta and Northwest, and United and Continental are not deemed likely. Additional limited mergers could occur within other smaller components of the industry such as the ultra-low fare tier of carriers.

For forecast purposes, it was also assumed there would be no major international conflicts that would be disruptive to DAB air service, including any major security or terrorist events. It is recognized that given the current status of the geo-political environment, the potential for such an event exists; however, the ability to effectively forecast, the timing, location, intensity and impact of such an event is simply beyond the realm of possibility. Finally, it was assumed there would be no significant and burdensome increase in TSA security requirements that would act to impact the level of potential passengers or operations. TSA costs were also assumed to remain steady through the forecast period. No major changes to the physical environment are anticipated.

3.6. COMMERCIAL AIR CARRIER FORECASTS

The following section describes the methodologies and forecasts of commercial air carrier enplanements and operations.

3.6.1. METHODOLOGY

3.6.1.1. Market Share Analysis

A methodology that is often utilized in aviation activity forecasting is a market share approach. In performing the market share analysis, an evaluation was made of DAB's ability to capture a portion of a defined market. The market share analysis utilized FAA TAF projected and historic enplanement data as well as data provided by DAB on historic enplanements as a basis for enplanement projections. The market area, as described previously, included JAX, SFB, MCO, and MLB.

The enplanements of these five airports were totaled from the TAF to compare DAB to other markets. For DAB, the actual enplanement numbers from the Airport's Total Passenger Traffic Report from 2007-2016 were used as a more accurate representation of enplanement numbers. **Table 3.2** shows the historic enplanements for the airports within the market area as well as the five-market total.

Table 3.2 - FAA Terminal Area Forecast FY 2016-2045

Year	Air Carrier and Commuter Enplanements										
	Daytona Beach International Airport (DAB)		Orlando Sanford International Airport (SFB)		Orlando International Airport (MCO)		Jacksonville International Airport (JAX)		Melbourne International Airport (MLB)		5-Market Total
	Enplanements	Percent Market Share	Enplanements	Percent Market Share	Enplanements	Percent Market Share	Enplanements	Percent Market Share	Enplanements	Percent Market Share	
2000	258,040	1.42	454,579	2.49	14,683,594	80.53	2,574,846	14.12	261,880	1.44	18,232,939
2001	263,734	1.44	564,244	3.08	14,572,145	79.62	2,622,060	14.33	280,962	1.54	18,303,145
2002	227,256	1.42	607,028	3.78	12,612,194	78.56	2,405,934	14.99	201,376	1.25	16,053,788
2003	264,465	1.61	502,054	3.05	13,101,057	79.64	2,391,465	14.54	192,235	1.17	16,451,276
2004	303,144	1.61	873,457	4.65	14,861,041	79.10	2,549,487	13.57	200,334	1.07	18,787,463
2005	310,293	1.50	816,091	3.96	16,413,830	79.59	2,856,419	13.85	226,632	1.10	20,623,265
2006	264,203	1.25	857,012	4.06	16,889,695	79.98	2,929,983	13.88	175,467	0.83	21,116,360
2007	354,826	1.62	973,381	4.44	17,301,375	78.95	3,139,856	14.33	145,093	0.66	21,914,531
2008	299,645	1.35	978,043	4.42	17,694,279	79.98	3,011,401	13.61	141,180	0.64	22,124,548
2009	213,065	1.05	819,996	4.04	16,340,494	80.54	2,802,543	13.81	113,538	0.56	20,289,636
2010	254,009	1.25	594,060	2.91	16,651,359	81.69	2,727,113	13.38	157,673	0.77	20,384,214
2011	283,453	1.33	694,335	3.27	17,315,900	81.55	2,734,770	12.88	204,721	0.96	21,233,179
2012	300,076	1.41	833,541	3.93	17,247,816	81.31	2,614,884	12.33	214,940	1.01	21,211,257
2013	305,096	1.45	944,086	4.50	16,971,381	80.91	2,545,262	12.13	209,997	1.00	20,975,822
2014	317,129	1.50	979,332	4.63	17,054,096	80.67	2,576,796	12.19	213,975	1.01	21,141,328
2015	314,700	1.39	1,134,834	5.03	18,217,381	80.71	2,686,257	11.90	218,965	0.97	22,572,137
2016	355,157	1.45	1,271,140	5.19	19,900,771	81.30	2,729,033	11.15	222,469	0.91	24,478,570

Source: FAA Terminal Area Forecast (TAF) FY 2016-2045.
Note: Daytona Beach International Airport enplanements from 2007-2016 are representative of enplanement data found in the Airport's Total Traffic Report for the years 2007-2016.

A five-market total of enplanements was also calculated, and a ratio of the Airport's enplanements in relation to the five-market total was determined for historic enplanements. This ratio of the total market was either grown, decreased, or kept relatively unchanged through future years to forecast enplanements. DAB's market share, according to the TAF and the Airport's Traffic Reports, has increased from 1.42 percent of the market in 2000, to 1.45 percent in 2016.

A decline in enplanements was observed during the great recession and was reflected in the enplanement numbers for 2009 and 2010. Following the recession, DAB and SFB saw a significant increase in enplanements. SFB also had the addition of new airlines and routes to the airport, especially related to Allegiant Airlines. MCO remained constant post-recession, while JAX and MLB both saw a decrease in enplanements over time.

3.6.1.2. Regression Analysis

In addition to the market share analysis, a series of regression analyses were performed, which considered various historic and projected socioeconomic data to determine if there were correlations between the data and projected enplanements. This method of forecasting is instrumental in identifying potential socioeconomic factors that could have stronger correlation between air travel demand and which factors could potentially temper demand.

3.6.2. COMMERCIAL CARRIER ENPLANEMENT FORECAST

3.6.2.1. Market Share Forecasts

Five enplanement forecasts were developed utilizing a market share approach: a strong market share decline, modest market share decline, post-recession growth, five-year historic peak average, and post-recession historic peak average.

The strong market share decline forecast assumes that consolidation of airlines, bankruptcies, and an overall reduction in domestic seats available would occur. The purpose of this forecast was to illustrate trends in the domestic aviation market post-recession, which are outlined in the FAA Aerospace Forecast, which have included airline consolidations and restructuring of business models for domestic air carriers.

The modest market share decline forecast takes into consideration the five markets and accounts for an anticipated modest decline in market share as surrounding airports capture a greater portion of the market. Greater variance in flight schedule and route options from surrounding airports can be attributed to some of the market leakage at the Airport and decline in market share from 1.45 percent in the base year to 1.38 percent for the forecast period.

The post-recession growth forecast scenario anticipated that DAB's market share would return to its maximum historic market share that occurred post-recession. In terms of socioeconomic indicators, PIPC, population, and employment have indicated steady future growth for the MSA and County. Factoring this anticipated growth into this scenario, enplanements would grow from their current market share of 1.45 percent and show steady growth over time as they reach 1.5 percent of the five-airport market.

The five-year historic average scenario took an average of five historic peak market share percentages, which was 1.57 percent, and grew passenger enplanements over the 20-year period to this value. Four of these peak market share values occurred before the great recession and accounted for a period from 2000 to 2016 in determining the top five historic peak values. Enplanements were grown from the base level market share of 1.45 percent to 1.57 percent.

The post-recession historic peak average took into consideration the five historic peak values for the Airport from 2007, the start of the great recession, to 2016. Many peak values, like those mentioned in the previous forecast scenario, occurred prior to 2007. Reviewing enplanements from 2008 to 2016, and determining the historic peak average for this period, tempered growth slightly and showed the Airport's ability to regain passenger enplanements post-recession. This scenario grew enplanements from 1.45 percent to 1.49 percent of the market share.

3.6.2.2. Regression Forecasts

Three regression forecasts were developed utilizing various socioeconomic indicators as described previously. Two of the forecasts utilized PIPC for Volusia County and the MSA, respectively, as the variable in determining future passenger enplanements. In these regressions, PIPC had a strong correlation historically to enplanement levels at the Airport and were deemed to be an influencing factor in passengers travelling by air. Both Volusia County and the MSA were used for comparative purposes.

An additional regression forecast utilized data on retail and accommodation segments of employment in the MSA. Retail and accommodation employment segments were selected because fluctuations and projected trends in these segments can be indicators of increasing or decreasing tourism in the area, which in turn can correlate to air travel demand.

The regression forecasts were also compared to the FAA TAF forecast for enplanements. **Table 3.3** summarizes the 20-year projected enplanement forecasts for the regression analysis forecast inputs as well as the TAF projected enplanements. **Exhibit 3.4** shows the enplanement forecasts in graphic form.

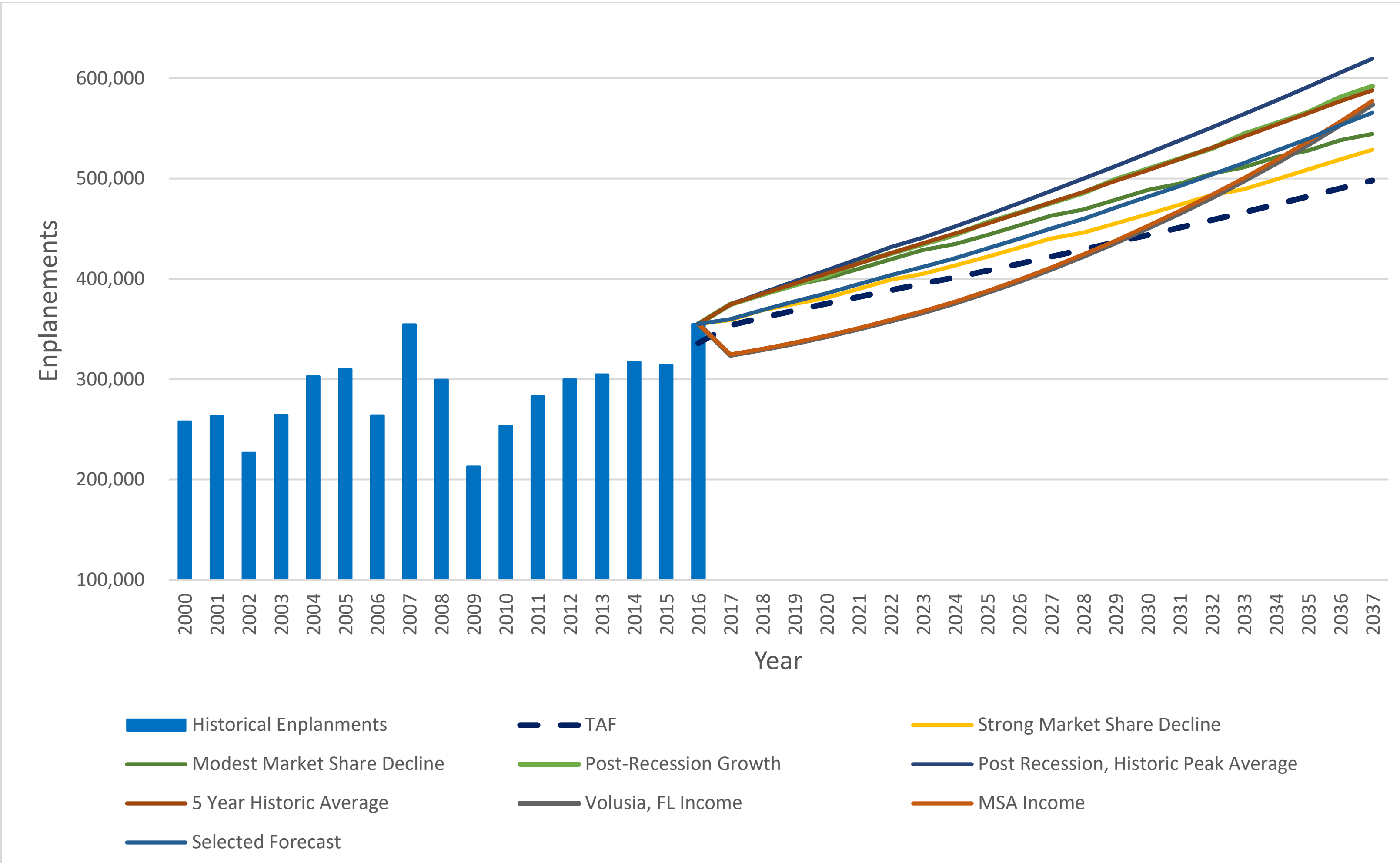
Table 3.3 - Enplanement Forecasts

Forecast Method	2017	2022	2027	2032	2037	CAGR 2017-2037
TAF	*353,787*	*288,730*	*422,271*	*458,728*	*498,114*	*1.7%*
Strong Market Share Decline	359,075	399,217	440,362	483,572	528,779	2.0%
Modest Market Share Decline	374,574	419,615	463,027	505,065	544,564	1.9%
Post-Recession Growth	374,574	425,443	475,979	530,139	591,917	2.3%
Post-Recession, Historic Peak Avg.	374,574	431,731	487,909	551,065	619,540	2.5%
5 Year Historic Average	374,571	425,596	476,320	530,704	587,971	2.3%
Volusia, FL Income	324,087	358,120	409,836	481,207	573,884	2.9%
MSA Income	324,822	359,261	411,587	483,799	577,559	2.9%
MSA Employment	372,278	411,177	438,384	468,041	504,199	1.5%

Sources: FAA Terminal Area Forecast (FY 2016-2045); Woods & Poole Socioeconomic Data, Deltona-Daytona Beach-Ormond Beach, FL (MSA, 19660); Volusia, FL (County, 12127); Kimley-Horn analysis.

After reviewing and taking into consideration the previously discussed forecast data, methodology, and additional considerations that had an impact on the DAB market share, future projections for the Airport were determined. These projections were compared to the FAA TAF forecast for enplanements at the Airport. Despite changes in the market that would impact future enplanements, it is estimated that the Airport would have between 504,199 and 619,540 passenger enplanements for the 20-year forecast period. This is higher than the TAF enplanement forecast of 498,114 for 20-year forecast period.

Exhibit 3.4 - Passenger Enplanement Forecast



3.6.3. PREFERRED PASSENGER ENPLANEMENT FORECAST

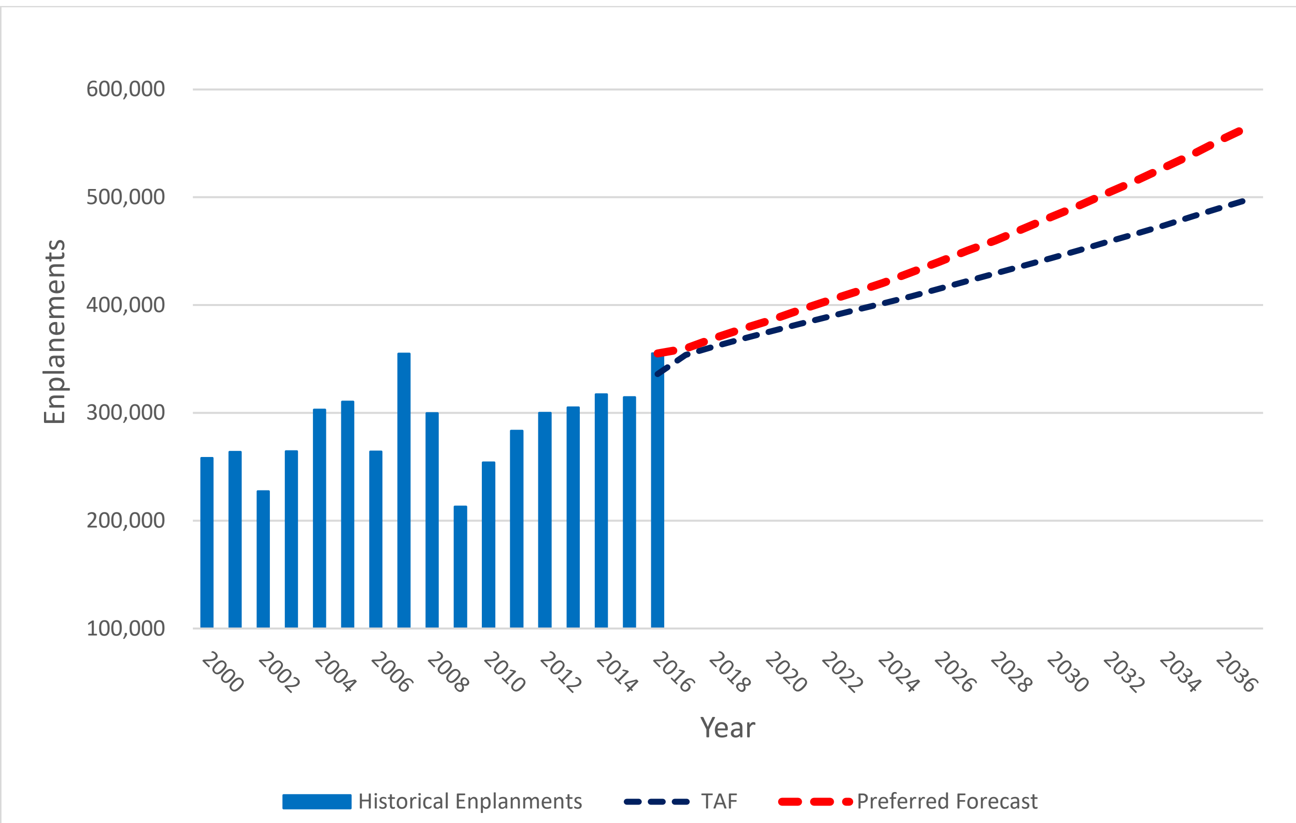
After consideration and review of each individual forecast alternative, a preferred forecast was developed by taking an average of the forecast scenarios. The preferred forecast lies near the midpoint of the various scenarios and was deemed appropriate in representing a reasonable projection of future enplanements. **Table 3.4** summarizes the preferred forecast and its relation to the TAF. The enplanement forecast methods, in addition to the TAF and selected forecast, are graphically depicted in **Exhibit 3.5**. The preferred forecast anticipates 565,587 enplanements by the year 2037 with an average growth rate of 2.3 percent.

Table 3.4 - Preferred Enplanement Forecast

Forecast	Year				
	2017	2022	2027	2032	2037
TAF Enplanements Forecast	353,787	388,730	422,271	458,728	498,114
Preferred Forecast	359,820	403,770	450,425	504,199	565,587
Comparison to TAF (%)	1.7	3.9	6.7	9.9	13.6

Source: Terminal Area Forecast (TAF) FY 2016-2045; Kimley-Horn analysis.

Exhibit 3.5 - Preferred Enplanement Forecast



3.6.4. AIR CARRIER FLEET MIX AND OPERATIONS

3.6.4.1. Fleet Mix Assumptions

The existing commercial carrier fleet mix was developed using DAB monthly activity reports for the most recent full year of available data, which was 2016. Historic reports were also reviewed to understand trends in the airline fleet mixes at DAB to aid in forecasting future fleet changes and airline fleet utilization. Based on DAB reports from 2012 to 2016, industry trends analyzed by the FAA, aircraft manufacturer trends, and anticipated changes to the fleets of specific airlines through announced aircraft orders, the following assumptions on fleet mix have been made. **Table 3.5** summarizes the current airline fleets, seating capacity, anticipated phase out timeframe, and anticipated fleet mix replacement.

- Delta has decreased operations of its Boeing 757 fleet at the Airport, from 308 operations in 2012 and 429 operations in 2013, to 286 in 2016, as indicated in the Airport's monthly landing reports. The airline has also announced its plans to transition the fleet within the next five years, with changes potentially coming sooner for the domestic markets served by the airline. Operation of the Boeing 737-900 as a replacement, with 180 seating capacity, is anticipated to increase.[12]
- Delta also has also started removing its McDonnell Douglas (MD) 88 from service, with plans to remove all aircraft by 2020. The MD 90 is also anticipated to be retired within a few years after 2020. These aircraft are expected to be replaced by the 737-900, with 180 seats, the A321, with 192 seats, and the CS 100 (now the Airbus A220-100), with 110 seats. [13]
- Based on monthly landing reports, JetBlue primarily flies the A320 to DAB, with occasional operations with the E190 and A321. The airline has orders for the A320neo and A321neo. Year 2016 was JetBlue's first year of service to the Airport.
- PSA Airlines, a subsidiary of American Airlines, ended deliveries of the Bombardier CRJ-900 in 2016, and it is not anticipated they will change fleet for the duration of the forecast period.
- Overall, regional carriers are switching from smaller 50-seat jets, to larger more fuel efficient 70 seat or greater jets.

Table 3.5 - Anticipated Fleet Mix Changes

Airline	Current Fleet to Phase Out	Number of Seats	Anticipated Fleet Phase Out	Anticipated Fleet Replacement	Number of Seats
Delta	MD 88	149	2017-2020	B 737-900	180
				CS 100	110
	B 757-200	199	2019-2023	B 737-900	192
	MD 90	158	2021-2023	B 737-900/ A321	180
JetBlue	A320	150	2020-2022	A320 NEO	150*

Sources:
http://news.delta.com/delta-orders-state-art-fuel-efficient-bombardier-c-series.
http://mediaroom.jetblue.com/.
**While the seating capacity is currently unavailable for this aircraft, it assumed the seat capacity will remain the same as the standard A320.*

[12] https://worldairlinenews.com/2013/09/29/delta-air-lines-takes-delivery-of-its-first-boeing-737-900-er/

[13] https://www.bloomberg.com/news/articles/2017-11-06/delta-is-said-to-eye-100-jet-order-to-remake-short-haul-fleet

3.6.4.2. Methodology

Forecasted enplanements were used as the basis for determining air carrier operations. Assumptions on aircraft types and the number of available seats, coupled with load factor, determined the number of departures necessary to meet the forecast of passenger enplanements.

Passenger load factors have averaged 87 percent within the ten-year historical period from 2007 to 2016. An exception is the period during the Great Recession, which saw lower load factors of 82 percent and 76.5 percent for the years 2007 and 2008, respectively. In 2016, JetBlue began service, with load factors averaging 77.5 percent for the year based on the Total Passenger Traffic report from 2015 to 2016. In 2017, the load factor for the 12 months to date was 90 percent, with the monthly load factor average for 2017 being 92 percent.

For the period from 2012 to 2016, the load factors have grown from 87 percent to 88 percent. The years 2014 and 2015 saw historically high load factors of 91 percent. The decrease in load factor to 88 percent for 2016 may be correlated to JetBlue beginning service to DAB. Load factors are anticipated to grow slightly through the forecast period based on a slight increase in 2017 Total Passenger Traffic reports. Fluctuations in load factor may occur if additional carriers enter the market, or if changes to routes flown or flight frequency changes.

Load factors for the airlines operating at the Airport have historically remained relatively high, indicating that flights are potentially being overbooked. If load factors continue to grow, considerations should be made to review the potential for additional routes or additional flight frequency to established routes. This will contribute to the Airport's ability to capture current and future passenger markets.

3.6.4.3. Forecast Fleet Mix

The 2016 air carrier monthly landing reports were reviewed to determine the aircraft types operating at DAB. The seating configuration for each type was obtained and the aircraft were categorized into seating ranges from zero to over 200 seats. **Table 3.6** shows the predominant air carrier fleet currently operating at DAB and the seat ranges for those aircraft types.

To determine the air carrier operations forecast, the base year fleet seat configurations per air carrier were first defined. This process involved a review of the Airport's monthly landing reports, then a categorization of the Airport's fleet mix by seating range, where an average number of seats for each seat range was established.

Table 3.6 - 2016 Air Carrier Fleet Mix		
Seat Range	**Air Carrier**	**Aircraft**
210+	Delta	B 757-300
	JetBlue	A321
190-209	Delta	B 757 200
170-189	Delta	B 737-900
150-169	Delta	B 757-800
	JetBlue	A320
130-149	Delta	MD 88 MD 90
110-129	American	A 319
	Sun Country	B 737-700
90-109	JetBlue	E 190
70-89	PSA	CRJ-900
0-69	PSA	CRJ-200 CRJ-700

Sources:
Delta Airlines, https://www.delta.com/content/www/en_US/about-delta/corporate-information/aircraft-fleet.html, Accessed November 27, 2017.
JetBlue Airways, https://www.jetblue.com/travel/planes/, Accessed November 27, 2017.
American Airlines, https://www.aa.com/i18n/travel-info/experience/planes/planes.jsp, Accessed November 28, 2017.
Sun Country, https://www.seatguru.com/airlines/Sun_Country/Sun_Country_Boeing_737-700.php, Accessed November 28, 2017.
PSA Airlines, https://www.psaairlines.com/fly-with-us/our-fleet/, Accessed November 28, 2017.

Table 3.7 shows the air carrier operations forecast which includes a breakdown of the anticipated fleet mix seat range, average seats per departure, enplanements per departure, annual departures, and overall annual operations.

The number of operations from the 2016 landing reports was converted into a percentage of overall yearly operations by the seating ranges previously established. The anticipated fleet mix percentages vary through the forecast period, reflecting anticipated future changes in airline fleets based on industry trends and known airline fleet changes. These changes include: phasing out of 190 seat and larger aircraft operations, an increase in operations from aircraft with 170 to189 seating capacity, a decrease in 150-169 seating range aircraft, a decrease in 130 to149 seating range aircraft, and an increase in 110 to 129 seating range aircraft.

Average seats per departure was calculated based on the fleet mix seat range and the percentage of operations by seat range, giving the base year 125 average seats per departure. Factoring in the base year boarding load factor of 88 percent, it is expected that there are 110 enplanements per departure. This number grows through the forecast period as the load factor is expected to increase from 88 percent to 92 percent.

Annual Departures were obtained by dividing the total enplanements by the enplanements per departure. For the purposes of this forecast, it was assumed that the number of annual departures would be equal to the number of annual arrivals and that annual operations would be double the annual departures. For the base year, the number of annual departures is estimated to be 3,271 and 6,542 annual operations. Annual air carrier operations are expected to grow to 9,844 through the forecast period.

Table 3.7 - Air Carrier Operations Forecast

Fleet Mix Seat Range	Fleet Mix Forecast				
	2017	2022	2027	2032	2037
210+	0.18%	0.00%	0.00%	0.00%	0.00%
190-209	0.92%	0.00%	0.00%	0.00%	0.00%
170-189	9.27%	12.10%	13.00%	14.85%	16.00%
150-169	24.45%	23.00%	22.35%	21.00%	20.10%
130-149	25.15%	12.80%	12.80%	12.80%	12.80%
110-129	0.70%	12.90%	12.90%	12.90%	12.90%
90-109	0.43%	0.43%	0.43%	0.43%	0.43%
70-89	37.52%	37.52%	37.52%	37.52%	37.52%
0-69	1.38%	1.25%	1.00%	0.50%	0.25%
Average Seats Per Departure	125.00	122.90	123.40	124.40	124.90
Passenger Load Factor	88.00%	90.00%	90.00%	92.00%	92.00%
Enplanements Per Departure	110.00	110.61	111.06	114.45	114.91
Enplanements	359,820	403,770	450,425	504,199	565,587
Annual Air Carrier Departures	3,271	3,650	4,056	4,405	4,922
Annual Air Carrier Operations	6,542	7,301	8,111	8,811	9,844

Source: Kimley-Horn analysis.

3.7. AIR CARGO ACTIVITY FORECASTS

Most of the air cargo activity at DAB is belly-hauled, meaning that the cargo is carried on passenger flights in the baggage hold compartment, or the “belly” of the aircraft. Regarding the types of air cargo activity, “Air Freight” references bulk items that are shipped from business to business and may also include cadavers. “Air Express” refers to items from courier companies that ship from door-to-door which typically originate from a designated factory or pick up location.

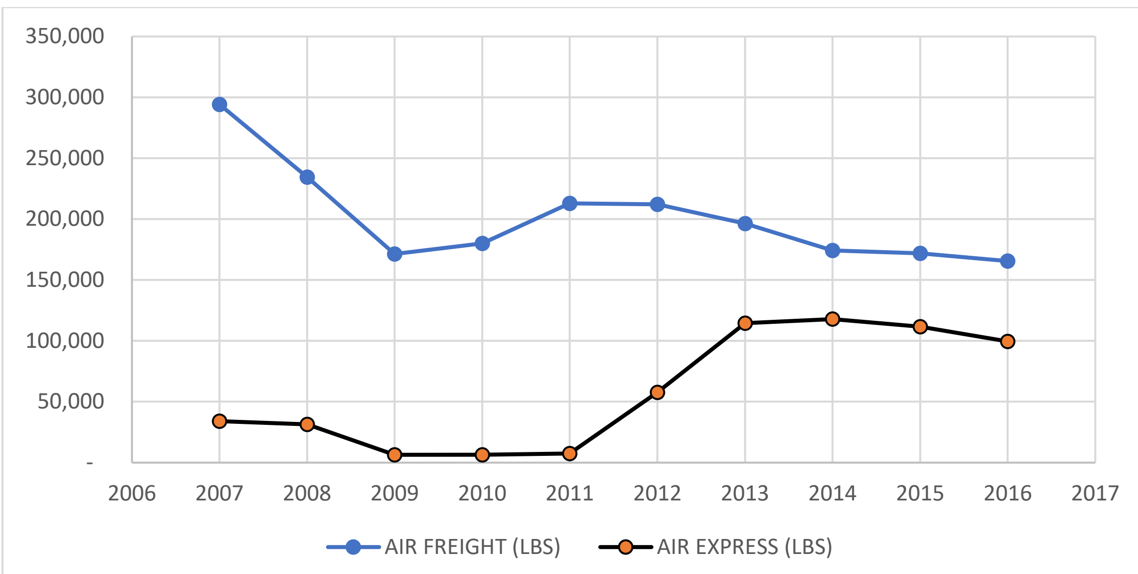
3.7.1. HISTORIC AIR CARGO ACTIVITY

Since 2007, total Air Freight transported has decreased significantly, while Air Express has increased. Historic air cargo activity is shown below in **Table 3.8** and **Exhibit 3.6.**

Table 3.8 - Historical Air Cargo Activity			
	Air Freight (lbs.)	Air Express (lbs.)	Total (lbs.)
2007	294,210	34,180	328,390
2008	234,622	31,401	266,023
2009	171,349	6,536	177,885
2010	179,991	6,496	186,487
2011	213,058	7,435	220,493
2012	212,029	57,668	269,697
2013	196,337	114,656	310,993
2014	174,346	117,863	292,209
2015	172,023	111,732	283,755
2016	165,545	99,648	265,193

Source: Daytona Beach International Airport.

Exhibit 3.6 - Historical Air Cargo Activity



3.7.2. AIR CARGO ACTIVITY FORECAST

Projections of future air cargo activity were developed by obtaining an average cargo weight per air carrier departure by the two cargo classifications. The annual weight by each type of cargo was divided into the annual air carrier departures to obtain an average weight per departure of each cargo type. For the available data from 2007 to 2016, the average weight per departure for Air Freight has been approximately 58 pounds for the period of 2007 to 2016. For the same period with regard to Air Express, the average weight per departure is approximately 17 pounds. However, Air Express cargo has been significantly higher since 2011 when compared to the period of 2007 to 2011, with an average weight per departure of 34 pounds. To account for this more recent trend, the Air Express departure weight was adjusted upwards by 25 pounds, which averages the two weights. Projected air carrier departures were utilized to obtain a forecast of air cargo activity in terms of annual weight, as shown in **Table 3.9**.

Table 3.9 - Forecast Air Cargo Activity							
Average Air Cargo per Air Carrier Departure					Annual Air Freight and Air Express		
Year	Air Freight (lbs.)	Air Express (lbs.)	Total (lbs.)	Forecast Air Carrier Departures	Air Freight (lbs.)	Air Express (lbs.)	Total (lbs.)
2017	58	25	83	3,271	189,723	81,777	271,500
2021	58	25	83	3,650	211,723	91,260	302,983
2027	58	25	83	4,056	235,248	101,400	336,648
2032	58	25	83	4,405	255,490	110,125	365,615
2037	58	25	83	4,922	285,476	123,050	408,526
Source: Kimley-Horn analysis.							

3.8. GENERAL AVIATION FORECASTS

This section presents forecasts of GA activity at DAB. Within this section, projections of based aircraft and annual GA operations are discussed and broken down into categories such as flight training, air taxi, local operations, and itinerant operations. Projections of military activity are also discussed in this section.

GA comprises most activity at DAB, with a significant flight training component. There are several flight schools located on the airfield, the largest of which is ERAU. Generally, flight training activity accounts for approximately 75 to 80 percent of all air traffic at DAB.[14]

For the overall U.S. market, based on the 2017-2037 FAA Aerospace Forecast, the fixed wing piston aircraft fleet is expected to decline at an average annual rate of -0.8 percent, resulting in a predicted reduction of 22,500 aircraft through 2037. However, a counterbalance to the reduction in the fleet is an increase in the issuance of student pilot certificates and Airline Transport Pilot certificates, which is an indicator of increased flight training activity.

One of the key drivers of GA activity at DAB is the planned growth of ERAU. As of May 2017, ERAU was planning to enroll 100 additional flight students in the Fall of 2017, an increase of 30 percent over 2016. Over the next several years, ERAU is anticipating growing its training fleet by 15 to 17 aircraft from its current level. At ATP - Jet Center, flight training is currently at its maximum capacity and students are remaining after graduation as flight instructors for approximately 24 months before moving into full-time employment. As a general industry trend, flight training is expected to grow amidst a wave of retirements in the current pilot workforce. DAB's location in a mainly-sunny climate with year-round favorable weather conditions is conducive to growth in flight training.

Based on interviews during the inventory stage of the Master Plan Update, Sheltair and Yelvington Jet Aviation, Inc. FBOs cater more to corporate aviation, while the FBO at ATP - Jet Center caters more to smaller GA aircraft, aligned with its significant flight training operation. It is anticipated most GA growth will occur with flight training activity, as DAB seems to be less preferred for individual aircraft storage by private owners due to the high volume of training activity and traffic pattern usage by flight training institutions.

[14] Based on historical ATC daily count data and discussions with DAB ATC personnel, October 2017

3.8.1. BASED AIRCRAFT FORECAST

Based aircraft at DAB include aircraft stored in hangars and on tie-down spaces. The projections of based aircraft will inform the planning and development of required hangar space and apron space to accommodate these aircraft.

Overall, based aircraft at DAB have reduced over the period of 2009-2016, falling from 226 aircraft in 2009 to 211 aircraft in 2016. The greatest variation has been in the single-engine aircraft category, ranging from 161 aircraft in 2009, growing to over 200 aircraft in 2014, and falling to 153 in 2016. **Table 3.10** below highlights the historical based aircraft by category.

Table 3.10 - 2009-2016 Based Aircraft

	Single - Engine	Multi - Engine	Turbo Jet	Helicopter	Total
2009	161	40	24	1	226
2010	167	36	26	2	231
2011	172	46	23	1	242
2012	171	44	25	1	241
2013	169	44	26	1	240
2014	202	40	25	2	269
2015	173	40	21	1	235
2016	153	36	21	1	211

Source: Daytona Beach International Airport.

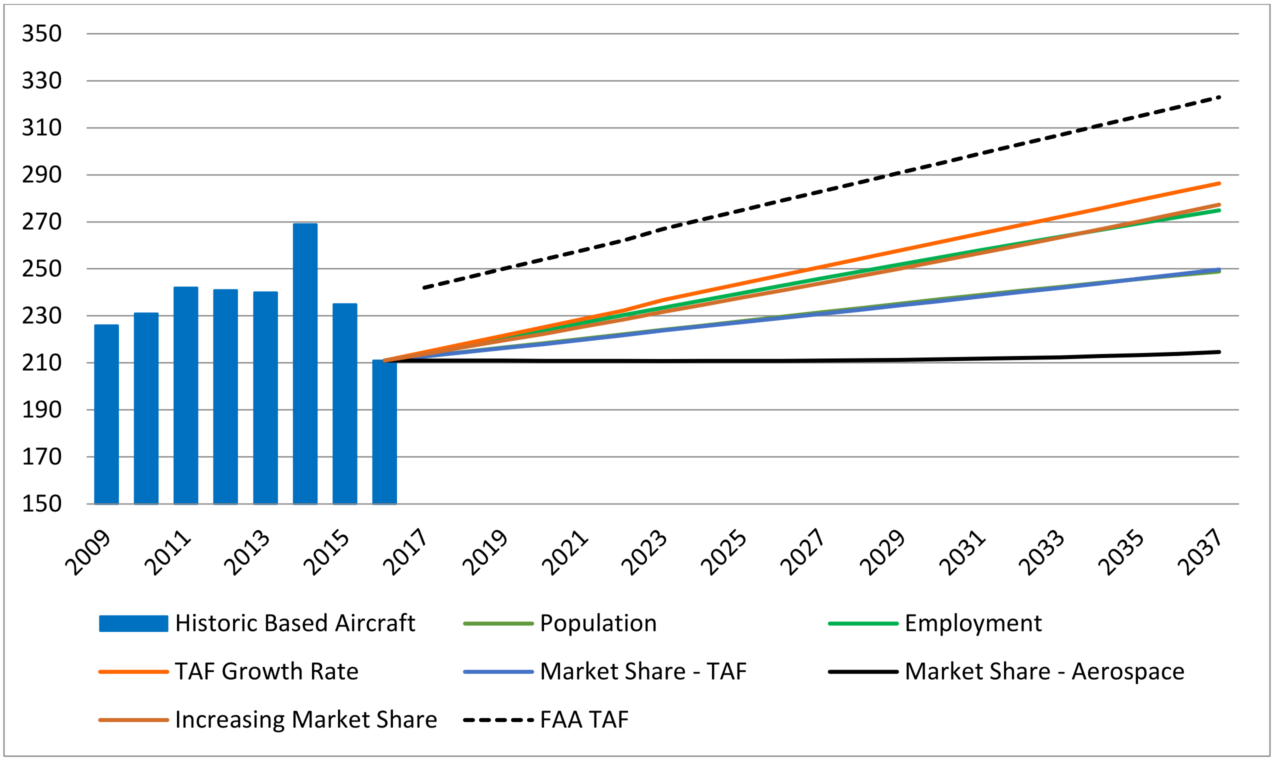
Projections of based aircraft were developed using several methodologies, including regressions that utilized socioeconomic indicators, market share analysis, and annual based aircraft growth rates from the TAF. **Table 3.11** below, as well as **Exhibit 3.7**, show the ranges of based aircraft projections. It is important to note that there is a discrepancy between the based aircraft data as shown in the TAF compared to the based aircraft data maintained by DAB.

Table 3.11 - Based Aircraft Forecasts

Year	Employment Growth	Population Growth	Market Share – TAF	Market Share – Aerospace Forecast	Increasing Market Share	TAF Growth Rate	TAF
2017	214	213	213	211	214	215	242
2021	230	222	222	211	228	232	262
2027	246	232	231	211	244	251	283
2032	261	241	240	212	260	269	303
2037	275	249	250	215	277	286	323
Compounded Annual Growth Rate							
2017-2037	1.3%	0.8%	0.8%	0.1%	1.3%	1.5%	1.4%

Source: Kimley-Horn analysis.

Exhibit 3.7 - Based Aircraft Forecasts



Two forecasts were developed using a socioeconomic regression approach, utilizing employment and population growth data from the Volusia County statistical area. Three market share forecasts were developed as well. Two market share approaches compared the ratio of DAB's based aircraft to the growth of the total general aviation fleet in two national forecasts, the FAA Aerospace Forecast and the FAA TAF. These market share forecasts indicate near flat or relatively slow growth in based aircraft, as these national forecasts anticipate very low growth in the U.S. total GA fleet. A third forecast assumed an increasing market share, where DAB's share of based aircraft would increase at an annual rate of 1 percent greater than the U.S. fleet as projected in the FAA Aerospace Forecast.

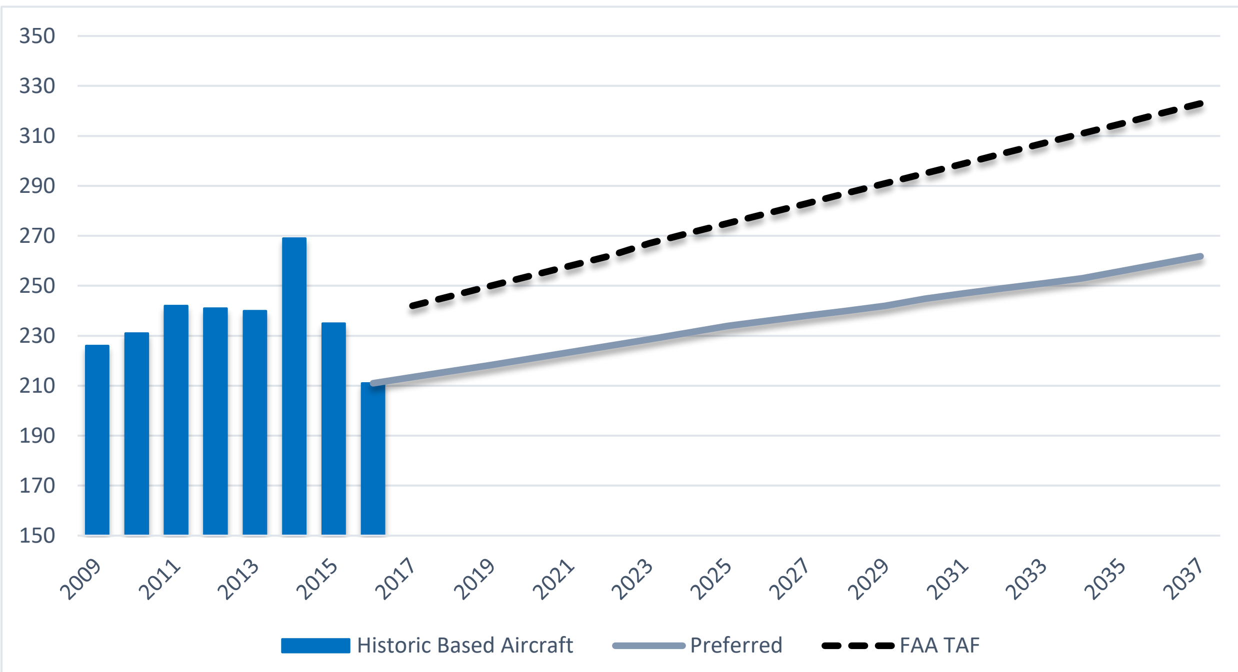
An additional forecast was developed utilizing the growth rate of based aircraft from the TAF. This forecast was prepared to account for the discrepancy between TAF data on DAB's based aircraft versus DAB records on based aircraft, highlighting what the growth would likely be if the numbers were reconciled.

3.8.2. PREFERRED BASED AIRCRAFT FORECAST

The preferred forecast recognizes that based aircraft have declined overall since 2009 and anticipates modest growth, aligning closely with the midrange of the forecast scenarios above. The preferred scenario shown below in **Table 3.12** and **Exhibit 3.8** anticipates growth of 51 based aircraft over the 20-year forecast period to 262 aircraft, which is near the historic peak of 269 aircraft attained in 2014.

Table 3.12 - Preferred Based Aircraft Forecast	
Year	**Preferred Forecast**
2017	213
2021	226
2027	238
2032	249
2037	262
Compounded Annual Growth Rate	
2017-2037	1.0%
Source: Kimley-Horn analysis.	

Exhibit 3.8 - Preferred Based Aircraft Forecast

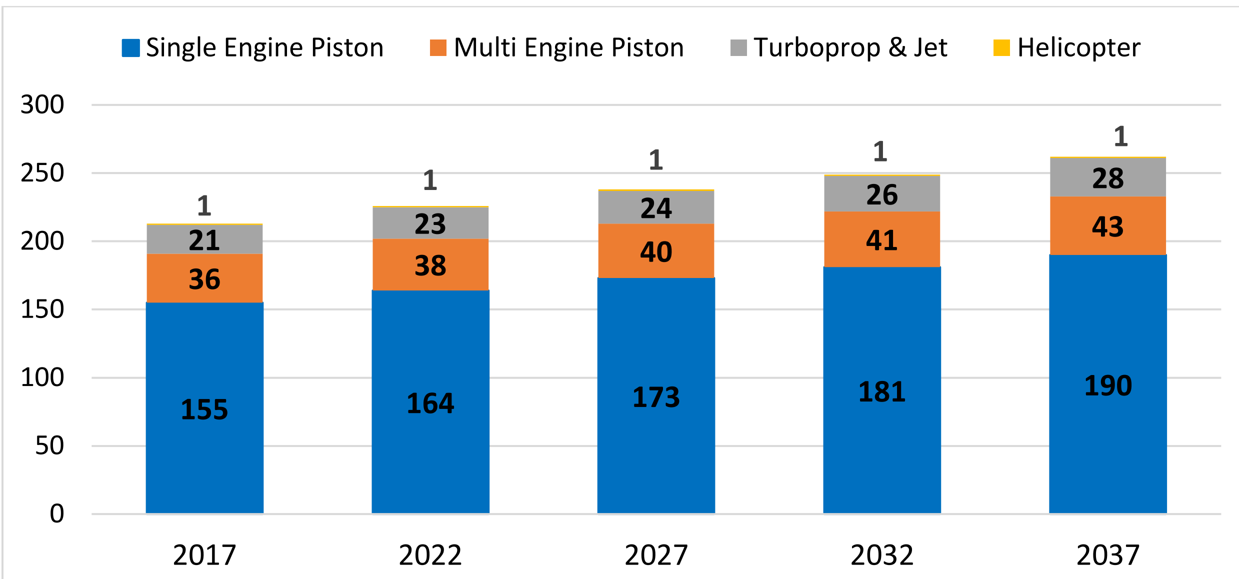


3.8.3. BASED AIRCRAFT FLEET MIX FORECAST

The total projected based aircraft as described above is broken down further into a fleet mix by categories of single-engine piston, multi-engine piston, turboprop/turbojet, and helicopter. The existing fleet mix from 2016, as well as a historical average fleet mix since 2009, is presented in **Table 3.13** and **Exhibit 3.9** below. Based on the consistency through previous years, it is assumed that the fleet mix will remain relatively unchanged from current levels through the forecast period, with a slight reduction in the multi-engine piston mix and slight increase in the turboprop and turbojet mix.

Table 3.13 - Based Aircraft Fleet Mix				
Year	Single - Engine Piston	Multi - Engine Piston	Turboprop and Turbojet	Helicopter
2016	72.5%	17.1%	10.0%	0.5%
2009-2016 Average	72.2%	17.2%	10.0%	0.5%
2017-2037 Fleet Mix	72.5. %	16.5%	10.5%	0.5%
2017	155	36	21	1
2022	164	38	23	1
2027	173	40	24	1
2032	181	41	26	1
2037	190	43	28	1
Source: Kimley-Horn analysis.				

Exhibit 3.9 - Based Aircraft Fleet Mix



3.8.4. GENERAL AVIATION OPERATIONS FORECAST

GA operations comprise nearly all segments of the overall aviation industry, except for commercial air carrier and military operations. These operations include flight training, corporate aviation, law enforcement, medical operations, and personal general aviation, among others. An operation is defined as a takeoff or a landing. This section presents projections of GA operations over the 20-year planning horizon. For this forecast, GA operations are inclusive of air taxi, as flight training operations at DAB are often reported as Air Taxi due to the nature of aircraft callsigns utilized by the flight training institutions. Projections of GA operations were developed using various methodologies, including market share analysis, based aircraft growth rates, and historic operations growth rates.

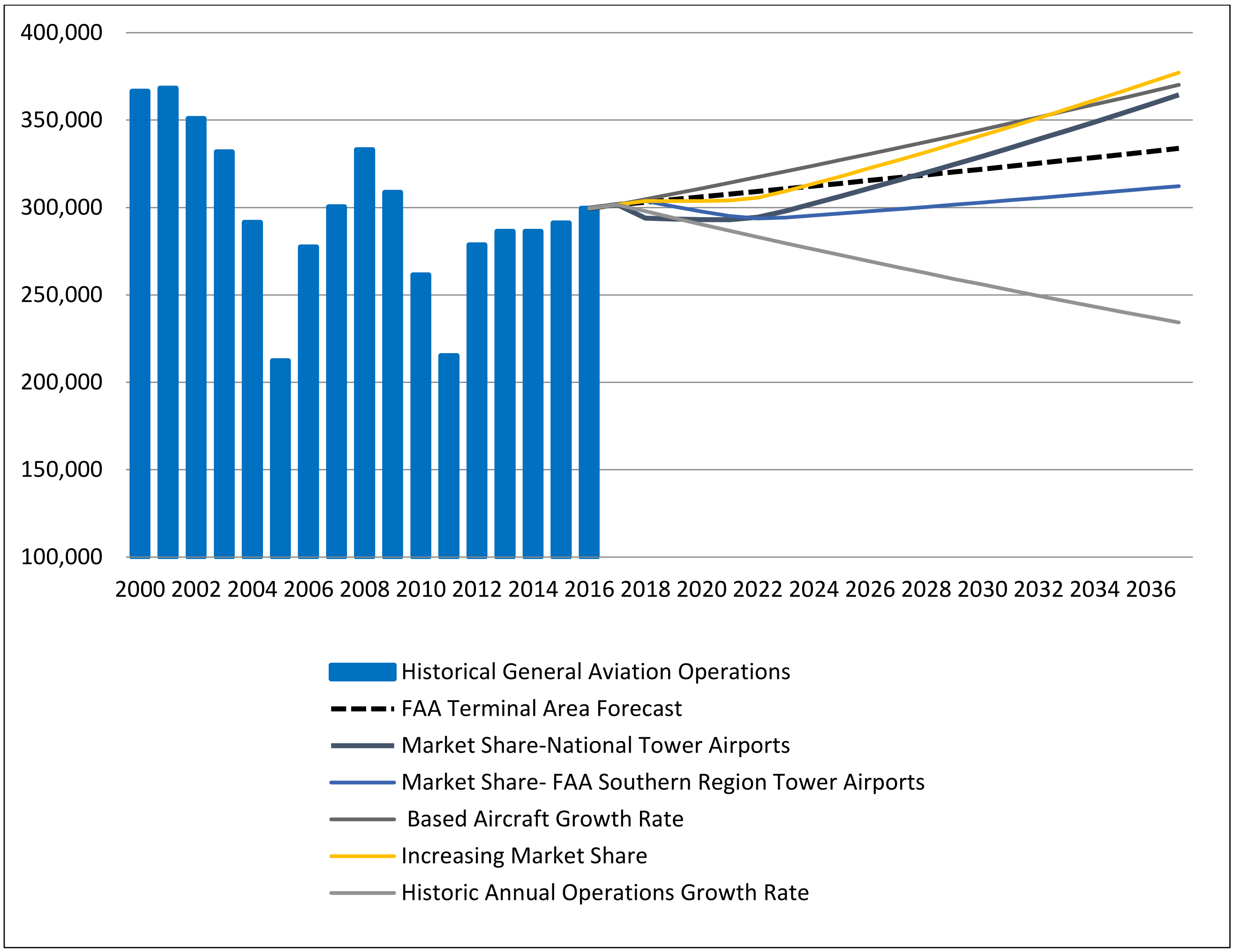
Three operations forecasts were developed using a market share approach. Two of them compared DAB's share of GA operations to those at all tower-controlled airports in the U.S., as well as to towered airports in the FAA Southern Region. Both forecasts projected a near time dip in operations levels before eventually growing due to the FAA's projection that GA operations would decrease in the near term.

A third market share approach utilized the FAA Southern Region forecast as described above, but instead of holding the market share constant with the total region, it was assumed that DAB's operations would increase greater than the rest of the market, recognizing that flight training demand is likely to be a significant component of operations growth.

Two operations forecasts were developed utilizing growth rates; one forecast utilized the growth rate of the preferred based aircraft forecast, and another utilized the growth rate of historic annual GA operations since 2000. As operations have declined since 2000, this particular methodology predicts an eventual decline in operations through the forecast period.

The forecasts using these methodologies, as well as the projections from the TAF, are shown below in **Exhibit 3.10**.

Exhibit 3.10 - General Aviation Operations Forecasts



3.8.5. PREFERRED GENERAL AVIATION OPERATIONS FORECAST

While the industry trend may indicate a gradual reduction in the single engine fleet across the U.S., it is anticipated DAB will continue to capture modest growth in operations activity, mainly related to flight training. As previously discussed, ERAU is anticipating fleet growth by approximately 15 to 17 aircraft, and other flight training institutions at DAB are experiencing continued flight training demand.

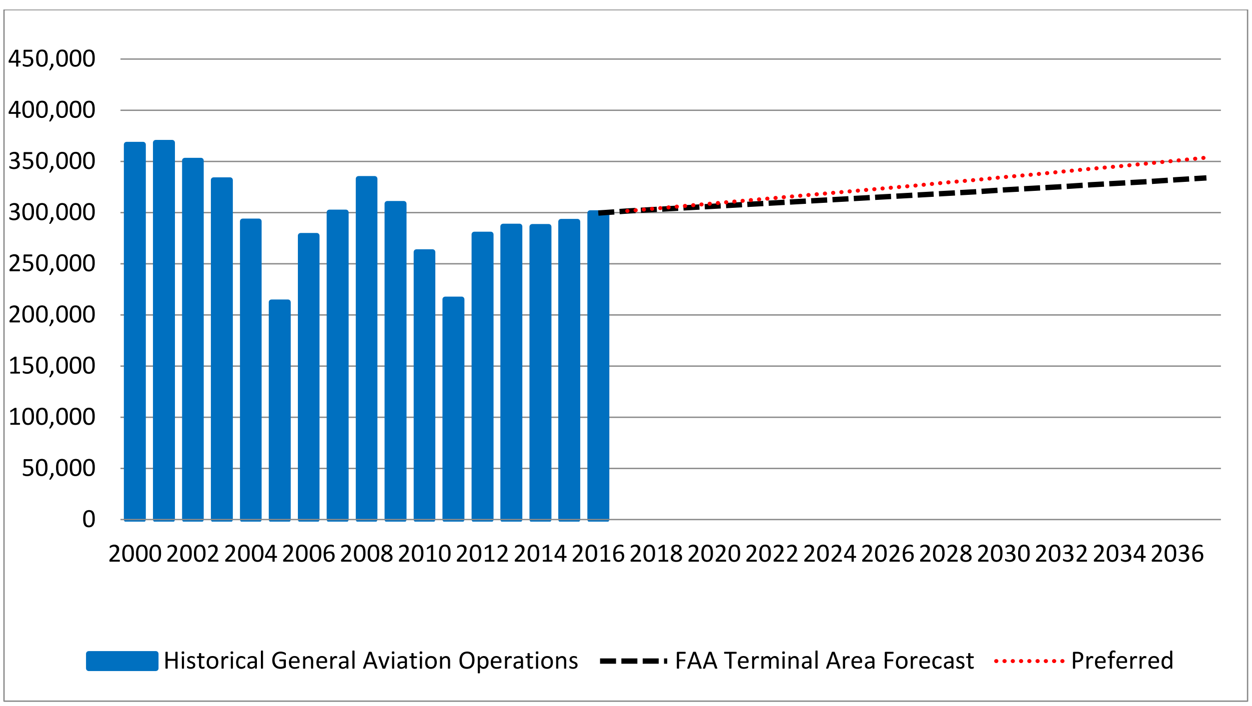
The preferred forecast for GA operations growth at DAB is correlated with the TAF for GA operations growth, but is increased slightly in recognition of flight operations growth. These forecasts are shown below in **Table 3.14** and **Exhibit 3.11.**

Table 3.14 - Preferred GA Operations Forecast

Year	Preferred Forecast
2017	301,586
2021	313,844
2027	326,600
2032	339,875
2037	353,689
Compounded Annual Growth Rate	
2017-2037	0.8%

Source: Kimley-Horn analysis.

Exhibit 3.11 - Preferred General Aviation Operations Forecast



3.9. MILITARY AND GOVERNMENT ACTIVITY FORECAST

Since 2000, military and government flight operations have fluctuated between a low of 711 annual operations in 2007 to a high of 1,175 operations in 2015, with an average of 988 annual operations over this period. DAB is not a major hub of activity for these types of operations, with most operations coming as fuel stopovers for military aircraft enroute to other destinations. A significant increase in military operations is not anticipated for this forecast period and are forecast to remain relatively steady at approximately 1,100 annual operations for the 20-year horizon, with year-to-year variations expected.

3.10. LOCAL VERSUS ITINERANT

General aviation operations are classified into categories of local versus itinerant. Local operations are “touch-and-go” activities where the aircraft does not leave the Airport traffic pattern, whereas itinerant operations are aircraft that either arrive at, or depart from, DAB from another airport or away from the immediate Airport traffic pattern area. **Table 3.15** below shows the historic breakdown of itinerant versus local operations. Since 2014, operations have skewed more towards 47 percent local operations and 53 percent itinerant operations. Presumably, this shift occurred because of a change in reporting of aircraft call signs at some of flight training institutions. Based on the historical consistency (including the change in reporting since 2014), it is assumed that the breakdown of local and itinerant traffic will continue at 47 percent local and 53 percent itinerant for the forecast period.

Table 3.15 - Historic Itinerant vs. Local Splits

Year	Itinerant	Local
2001	83.1%	16.9%
2002	82.0%	18.0%
2003	81.2%	18.8%
2004	80.1%	19.9%
2005	77.9%	22.1%
2006	78.0%	22.0%
2007	72.8%	27.2%
2008	71.7%	28.3%
2009	71.8%	28.2%
2010	72.5%	27.5%
2011	78.4%	21.6%
2012	71.3%	28.7%
2013	71.5%	28.5%
2014	72.0%	28.0%
2015	62.4%	37.6%
2016	53.2%	46.8%
2017[1]	53.4%	46.6%

Notes: 1. DAB Tower Data through August 2017
Sources: 2000-2016 – FAA ATADS Database; 2017 – DAB Tower Records.

3.11. TOTAL AIRPORT OPERATIONS FORECAST

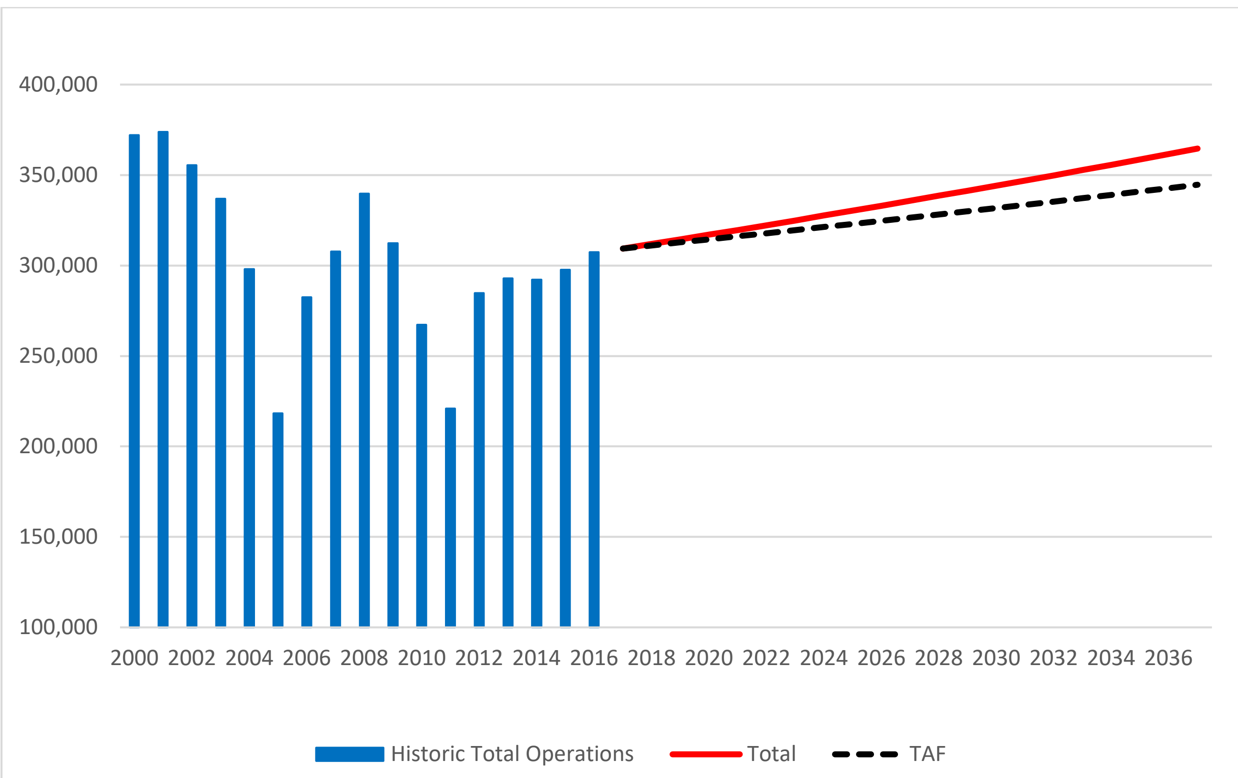
A forecast of total Airport operations, including air carrier, military, air taxi, and general aviation operations are presented below. Air Taxi operations at DAB are almost all flight training due to the classification of aircraft call signs from some of the flight training institutions. Therefore, the forecast of GA operations includes the air taxi classification. **Table 3.16** below shows the total Airport operations forecast, stratified into categories of air carrier, general aviation, and military, and is shown graphically in **Exhibit 3.12**.

Table 3.16 - Total Airport Operations Forecast

Year	Air Carrier	General Aviation		Military/Govt	Total
		Itinerant	Local		
2017	6,669	159,841	141,745	1,100	309,355
2022	7,301	166,337	147,507	1,100	322,245
2027	8,111	173,098	153,502	1,100	335,812
2032	8,811	180,134	159,741	1,100	349,786
2037	9,844	187,455	166,234	1,100	364,633

Source: Kimley-Horn analysis.

Exhibit 3.12 - Total Airport Operations Forecast



3.12. PEAKING ANALYSIS

Preceding sections have identified overall projected passenger and aircraft operational levels at DAB. This is key to the master planning process but does not yet provide the requisite level of detail needed to convert macro-level activity values into peak daily or hourly levels of demand that are typically used for facility planning. The following section presents the identification of aircraft operational and passenger enplanement peaking factors for a peak month, average day of the peak month (ADPM), and peak hour demand levels.

3.12.1. AIRPORT OPERATIONS PEAKING

Airport operations traffic levels vary from month to month over the course of a year. At DAB in 2016, the difference in number of aircraft operations in the peak month and the lowest monthly level of operations was 11,529 operations. In 2015, this difference totaled 11,987 operations, while in 2014 it was 11,544 operations. Between 2007 and 2016, peak month for operations occurred in April two times, March three times, and October five times. The range of peak month operations to total annual aircraft operations ranges from a low of 9.41 percent in 2012 to a high of 10.78 percent in 2011. The average of all peak months between 2007 and 2016 was calculated to be 10.1 percent. This value is consistent with levels seen at other similarly sized airports and it was assumed that the percentage of peak month operations to annual Airport operations would remain constant through the planning period.

To determine the ADPM level of activity, total peak month aircraft operations were divided by 31, representative of the number of days in the peak month. The average peak hour operations during the peak month were also calculated; hourly operational data was not available at DAB, so a general industry standard was used. Using this approach, it was assumed that design hour operations would represent 10 percent of ADPM operations, which resulted in a projected 101 design hour operations in the base year. The percent of peak hour operations is expected to remain constant through the forecast period. **Table 3.17** shows the total Airport operation's peaking characteristics.

Table 3.17 - Airport Operations Peaking

	2017	2022	2027	2032	2037
Total Annual Operations	309,355	322,245	335,812	349,786	364,663
Peak Month	31,356	32,663	34,038	35,454	36,962
Average Day Peak Month	1,011	1,054	1,098	1,144	1,192
Peak/Design Hour	101	105	110	114	119

Source: Kimley-Horn analysis.

3.12.2. ENPLANEMENT PEAKING

To determine the enplanement peaking characteristics, the historical enplanement data was reviewed to identify which month had the highest activity. In terms of historic passenger enplanements, March was identified as the peak month from 2007-2016, and the peak month averaged 11.1 percent of total annual passenger enplanements. It was assumed that the percentage of total passenger enplanements for the peak month, March, would remain constant at 11.1 percent during the planning period. To determine the ADPM, the number of peak month passenger enplanements was divided by 31, representative of the number of days in March.

Hourly passenger enplanement data was not available, so to identify the peak month/design hour passenger enplanements, the number of seats available from the aircraft fleet was calculated, which took into account the latest information on flight frequency and schedule from the Airport to determine the number of available seats. The anticipated load factors as presented in the air carrier fleet mix; operations forecast was also considered in calculating the number of seats filled during the peak hour. Based on a load factor of 88 percent, there will be 299 available seats and 263 enplanements during the peak hour for the base year. **Table 3.18** shows the passenger enplanement's peaking characteristics.

Table 3.18 - Passenger Enplanements Peaking

	2017	2022	2027	2032	2037
Annual Passenger Enplanements	359,820	403,770	450,425	504,199	565,587
Peak Month	39,883	44,755	49,926	55,887	62,691
Peak Month Average Day	1,287	1,444	1,611	1,803	2,022
Peak/Design Hour	263	295	329	369	413

Source: Kimley-Horn analysis.

Although ADPM enplanements are expected to nearly double through the forecast period from 1,287 to 2,022 enplanements, peak hour enplanements will be growing at a slower rate, from 263 to 413 enplanements. Although enplanements are anticipated to increase through the forecast period, it was assumed an additional, larger than normal share of this increase in enplanements would occur outside of the current peak hour, from 11:00 AM to 12:00 PM. Added flight frequency, which in turn would create additional enplanements, has a high likelihood of being added at other high-demand travel times, such as the 7:00 A.M. to 9:00 A.M. period or in the 5:00 P.M. to 7:00 P.M. or later evening hours in to better capture market demand.

3.12.3. AIR CARRIER OPERATIONS PEAKING

Using the same methodology as the enplanement peaking, design hour peaks of air carrier operations were also projected and are presented below in **Table 3.19.**

Table 3.19 - Air Carrier Operations Peaking

	2017	2022	2027	2032	2037
Total Air Carrier Operations	6,542	7,301	8,111	8,811	9,844
Peak Month	725	809	899	977	1,091
Average Day Peak Month	23	26	29	32	35
Peak/Design Hour	5	5	6	6	7

Source: Kimley-Horn analysis.

3.13. COMPARISON TO TAF

Table 3.20 below provides a comparison of the preferred forecast with the FAA TAF. FAA guidance on the review and approval of aviation forecasts indicates that projections of enplanements and operations are consistent with the TAF if they differ by less than 10 percent in the five-year timeframe, and 15 percent in the 10-year timeframe.

Table 3.20 - TAF Comparison						
Year	**Enplanements Forecast**	**TAF**	**Percent Comparison**	**Airport Operations Forecast**	**TAF**	**Percent Comparison**
2017	359,820	353,787	1.7	309,355	309,366	0.0
2022	403,770	388,730	3.9	322,245	317,861	1.4
2027	450,425	422,271	6.7	335,812	326,420	2.8
2032	504,199	458,728	9.9	349,786	335,337	4.1
2037	565,587	498,114	13.6	364,633	344,637	5.5
Source: Kimley-Horn analysis.						

The preferred enplanements and operations forecast as shown below for DAB are consistent with guidance above, as both are within 10 percent within five years, and within 15 percent at 10 years and throughout the forecast period.

4. DEMAND / CAPACITY ANALYSIS AND FACILITY REQUIREMENTS

4.1. AIRFIELD DEMAND/CAPACITY

The preceding overview of existing airfield facilities at the Airport, coupled with the aviation activity demand forecasts, provided the foundation of requisite data needed to conduct an assessment of airfield capacity as set forth under AC 150/5060-5, *Airport Capacity and Delay*. The demand/capacity analysis examined the capability of the airfield system at DAB to address existing levels of activity, as well as the projected future levels of demand, without incurring adverse levels of aircraft delay. The following sections of this chapter, "Facility Requirements," provided the specific recommendations intended to address any deficiencies identified in this analysis.

While elements of the traditional FAA methodology for assessing airfield capacity have been conducted, this analysis did not focus solely on the definition of Annual Service Volume (ASV) as a measure of airfield capacity. The determination of ASV at DAB was undertaken to provide the basis for estimating the levels of delay that would result as the Airport reached various operational levels over the course of the planning horizon. In the past, the emphasis on ASV as an absolute capacity value tended to oversimplify the more complex considerations that drive decisions relative to undertaking an airfield capacity improvement program. To address this, the process employed in this analysis included the assessment of incurred hourly as well as annual delays, and estimated the direct impact to users, based on incurred minutes of delay per aircraft operation. Once completed, the capacity analysis provided the requisite information necessary to assess whether improvements to the airfield systems were needed and justifiable to address the identified level of delay and to meet any significant shortfalls in capacity.

4.1.1. CAPACITY ASSESSMENT METHODOLOGY

The FAA's standard method for determining airport capacity and delay for long range planning purposes is delineated in AC 150/5060-5 Change 2, entitled "Airport Capacity and Delay." Airfield capacity was calculated in terms of the hourly capacity of the runways, ASV of the current airfield system, and average aircraft delay, using the FAA's methodology. This approach utilized the projections of annual operations by the specified fleet mix as presented in the Aviation Activity Forecasts of the Master Plan Update, while considering a variety of other elements including airfield configuration and runway capabilities, meteorological conditions, and current and projected operational activities at DAB, which are all described in the following sections.

4.1.1.1. Airfield Characteristics

In addition to the updated aviation activity forecasts, an understanding of the Airport's airfield characteristics and configuration, operational practices, and operational conditions, are required to properly conduct the FAA capacity analysis. The elements that most affect assessing airfield capacity using the FAA methodology for long range planning are listed below:

- Runway Configuration;
- Aircraft Mix Index;
- Taxiway Configuration;
- Operational Characteristics; and
- Meteorological Conditions.

When analyzed collectively, the above elements provided the required parameters that were the basis for establishing the estimated operational capacity of an Airport as expressed by ASV as set forth in FAA guidance. The following sections evaluated each of these DAB characteristics as it relates to their impact of capacity.

4.1.1.2. Runway Configuration

The existing airfield at DAB includes three paved runways, two of which are aligned parallel to one another and a third oriented generally perpendicular to, and intersecting with, the two parallel runways. Each runway is briefly described in the following sections.

Runway 7L/25R serves as the primary runway at DAB. Runway 7L/25R is 10,500 feet in length and 150 feet wide with a weight bearing capacity of 915,000 pounds on a double dual tandem gear configuration. Runway 7L/25R is a precision instrument capable runway with minimums of three-quarter mile visibility and 200-foot ceilings on the 7L end, and one-half mile visibility and 200-foot ceiling on the 25R end. As such, it is the most capable runway at DAB.

Runway 7R/25L is 3,195 feet long by 100 feet wide and is used extensively by the flight schools that are located at DAB for their training operations. Runway 7R/25L has a lateral centerline to parallel Runway 7L/25R centerline separation of 1,650 feet. This runway has RNAV/GPS based non-precision approach capabilities with minimums of one-mile horizontal visibility and a 500-foot ceiling on the 7R end, and one-mile visibility with a ceiling of 600 feet on the 25L end. This runway is used exclusively by general aviation aircraft at DAB.

Runway 16/34 measures 6,001 feet in length and 150 feet wide and serves as the Airport’s crosswind runway. Runway 16/34 can serve the fleet of scheduled air carrier aircraft presently operating at the Airport and is equipped with non-precision approach capabilities to both runway ends. The approach to Runway 16 has a minimum ceiling of 400 feet and visibility of one and one-half mile or 500 feet and one-mile while Runway 34 has minimums of 400 feet vertically with one-mile visibility. Runway 16/34 intersects Runway 7L/25R approximately 1,600 feet west of the Runway 25R threshold and intersects Runway 7R/25L approximately 950 feet west of the Runway 25L threshold. The intersecting nature of the runway system at DAB is one of several significant considerations in the capacity analysis.

4.1.1.3. Aircraft Mix Index

Most airports, including DAB, serve a diverse array of aircraft types that typically possess significant variations in their operational characteristics. These differences in operational characteristics are one of the elements considered when assessing airfield capacity. The FAA capacity assessment guidance utilizes an aircraft classification system that is tied to the maximum certificated gross takeoff weight, which is used as the basis for defining four classes of aircraft when assessing airfield capacity. The aircraft fleet mix at DAB was derived from the fleet mix projections contained in the aviation activity forecasts. Knowing the current and projected aircraft fleet, it is possible to calculate an aircraft fleet mix index as a required element needed to compute the airfield’s capacity in the FAA methodology. The aircraft mix index is calculated based on the gross weight of the specific aircraft currently operating at DAB, and those that are expected to operate into and out of the Airport over the 20-year planning horizon.

The formula, as expressed in FAA guidance, for calculating the mix index is the percent Class C aircraft plus 3 times the percentage of Class D aircraft, where C is the percentage of aircraft over 12,500 pounds but less than 300,000 pounds, and D is the percentage of aircraft over 300,000 pounds. Aircraft under 12,500 pounds do not count towards the calculation of mix index. As can be seen by the typical aircraft types by Class delineated in **Exhibit 4.1**, the aircraft in Classes A and B consist primarily of single engine and small twin engine aircraft, with a few small jets including the Very Light Jets (VLJs). The current and projected air carrier fleet to serve DAB, along with the majority of the corporate business jet fleet, are contained within the Class C aircraft classification. At DAB the current and future operational fleet mixes include aircraft from Classes A through C but does not display a discernible level of operations by Class D aircraft.

Exhibit 4.1 - Aircraft Classifications for Capacity Analysis

Aircraft Class	Aircraft Silhouette	Max Certificated Takeoff Weight	Typical Aircraft in Category		
A		Under 12,500 lbs Takeoff Weight	Cessna 150 Cessna 172 Beechcraft Bonanza	Piper Arrow Mooney Ovation	Piper Mirage Piper Meridian
B		Under 12,500 lbs Takeoff Weight	Beechcraft Baron HondaJet Cessna 402	Phenom 100 Piper Seneca Piper Seminole	King Air 200 Cessna 310 Eclipse 500
C		Between 12,500 & 300,000 lbs Takeoff Weight	Airbus 319 Boeing 737 Embraer 170-190 CRJ 700-900	Gulfstream 550 Citation VII Dash 8 300/400 HS 125-700	Falcon 900 Boeing 757 Airbus 320 Citation X
D		Greater than 300,000 lbs Takeoff Weight	Boeing 767 Boeing 777 Boeing 747	DC 10-10/30/40 Airbus 340 Boeing 787	Airbus 300-600F MD 11 Airbus 330

Source: AC 150/5060.5, Changes 1 and 2.

Applying the FAA methodology to the operational mix currently serving DAB, and the mix forecasted to serve the Airport, results in a current mix index value of 10 and will rise to 11 by the end of the 20-year planning horizon. This represents an index which, from an operations standpoint, clearly shows the impact of the extensive flight training activity employing light single and twin-engine aircraft that occurs at DAB, along with a commercial fleet made up of narrow-body (Class C) aircraft.

4.1.1.4. Taxiway Configuration

Key to the capacity of an airfield is the ability to move aircraft to and from the runway system quickly and efficiently. This requires a system of well-positioned connector taxiways providing access to taxiways paralleling the runway alignment, along with other movement taxiways accessing developed aviation facilities on the Airport. Runway 7L/25R has a full-length parallel taxiway, which is designated as Taxiway N that parallels the north (Passenger Terminal) side of the runway and extends the full length between the Runway 7L/25R thresholds. Taxiway N is separated from the runway centerline of Runway 7L/25R by 500 feet, which exceeds FAA lateral separation design requirements for aircraft up to Group V (B747-400) at airports at or below an elevation of 1,345 feet Mean Sea Level (MSL).

A second partial parallel taxiway identified as Taxiway P is located south of Runway 7L/25R. Taxiway P begins approximately 750 feet west of the Runway 25L threshold and ends at a location approximately 2,350 feet east of the Runway 7L threshold. Taxiway P maintains 450 feet of lateral separation from Runway 7L/25R, with the exception of the section of Taxiway P east of Runway 16/34, which provides 400 feet of runway to taxiway centerline separation. Taxiway P provides access for general aviation and FBOs located along the south side of Runway 7L/25R. Taxiway P meets FAA lateral separation requirements for up to ADG-V aircraft.

There are thirteen connector taxiways linking Runway 7L/25R with Taxiway N. Based on the FAA's criteria for appropriately located taxiway exits, the taxiway exit factor is maximized when a runway has four exit taxiways within a range determined by the mix index of the operations using that runway. For a mix index of 0 to 20, this range is between 2,000 feet to 4,000 feet from the landing threshold of both runway ends. Likewise, for both cases, each exit must be separated by at least 750 feet. Using the FAA criteria, arrivals to both Runway 7L and 25R are considered to have three exits within that range while also having well-placed exit taxiways beyond the specified range for aircraft that would require a longer landing roll-out. On the south side of Runway 7L/25R, there are two connectors linking the runway to the taxiway within the specified range for Runway 7L and only one exit taxiway within the 2,000 to 4,000 feet range for Runway 25R.

Runway 16/34 has a full-length parallel taxiway along both sides of the runway alignment. Taxiway W is a 60-foot wide taxiway that is located along the west side of Runway 16/34; it maintains a runway to taxiway lateral separation of 420 feet, which meets all current and projected activity forecast to operate at the Airport. Taxiway E is a full-length taxiway that runs parallel along the east side of Runway 16/34. Taxiway E is constructed to a width of 40 feet, which meets the needs of most general aviation aircraft but is not suitable for most larger aircraft due to its width. Taxiway E maintains a runway centerline to taxiway centerline separation of 400 feet from Runway 16/34. There are nine connector taxiways linking Runway 16/34 with both Taxiways E and W. Based on the FAA's criteria for appropriately located taxiway exits, arrivals to Runway 16 and Runway 34 are both considered to have two exits.

Applying the exit range criteria to Runway7R/25L results in two available exits within the FAA's criteria for appropriately located taxiway exits. The runway is used by air carrier aircraft on a relatively infrequent basis and is predominantly utilized by general aviation piston aircraft, turbo-prop aircraft, and a portion of the business jet fleet. The majority of operations on this runway are by aircraft in Classes A and B while the Class C aircraft consist primarily of a limited percentage of overall business jet activity that either opt not to use the primary runway, or due to wind or weather conditions or maintenance closures of other alignments, have to use the shorter parallel runway.

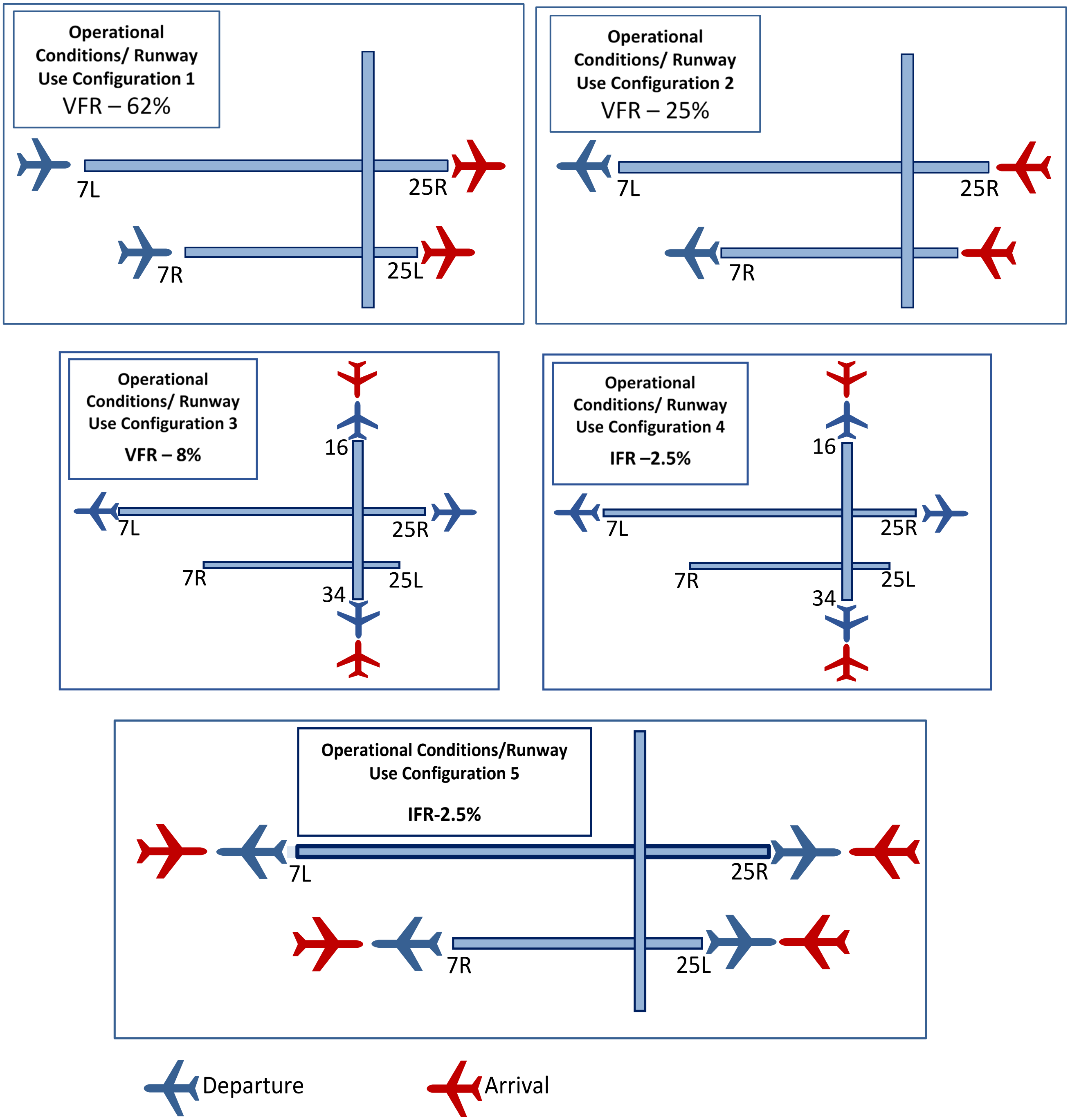
4.1.2. OPERATIONAL CHARACTERISTICS

Significant operational characteristics affecting an airfield's overall capacity include how the runways are utilized or runway use percentages, which is the percentage of aircraft arrivals and the percentage of "touch-and-go" or local training operations.

4.1.2.1. Runway Use Percentages

To determine the operational utilization of the runway system at DAB, wind data from the National Oceanic and Atmospheric Administration (NOAA) was reviewed to obtain an idea of prevailing and winds at DAB at various velocities (calm wind conditions, 10.5 knots, 13 knots, 16 knots, and above 16 knots). This information was then supplemented with discussions with representatives of the DAB ATCT, and with an interview with Airport senior staff. Based on the combined input and wind data, it was first estimated that approximately 92 percent of all operations occur in an east/west orientation on the parallel runways, while activity on the crosswind runway would account for approximately 8 percent of operational activity. When operating on the parallels, activity is estimated to occur in an east flow approximately 65 percent of the time and in west flow an estimated 27 percent of the time. Flow diagrams are presented in **Exhibit 4.2** that show a general depiction of the five operational configurations that were used in the capacity analysis.

Exhibit 4.2 - Airfield Operational Flows



4.1.2.2. Percentage of Aircraft Arrivals

The percentage of aircraft arrivals is the ratio of landing operations to the total operations of the Airport and is considered because aircraft approaching an airport for landing require more runway occupancy time than an aircraft departing the airfield. The FAA methodology used herein provides for computing airfield capacity with a 40, 50, or 60 percent of arrivals figure. The 40 and 60 percent figures result in an average annual service volume variance of ±11 percent when compared to the 50 percent level, with the lower 40 percent level representing the highest capacity condition.

After discussions with Air Traffic Control (ATC) personnel and a review of the ATCT data and the schedules of both airlines and flight schools, there are no significant peak periods when the Airport is considered to have more arrivals than departures. This mode of operation is not expected to change over the course of the planning period. Therefore, for the purposes of this analysis, the 50 percent of arrivals value was utilized to determine the overall capacity at DAB.

4.1.2.3. Percentage of Touch-and-Go Operations

The percentage of “touch-and-go” operations plays a key role in the determination of Airport capacity. “Touch-and-go” operations are counted as one landing and one takeoff (i.e., two operations) and are normally associated with flight training activities. DAB experiences significant flight training normally associated with ERAU, as well as other commercial flight schools based at the Airport. It is very common to see multiple aircraft conducting “touch-and-go” operations on the Airport often with six or more aircraft in the traffic pattern. These operations are projected to continue over the course of the planning horizon, growing by approximately 30,000 annually in 2037 and accounting for roughly 51 percent of all operational activity.

4.1.2.4. Meteorological Conditions

Meteorological conditions influence the decision as to which runway end a pilot will choose to make an approach from based on wind and other weather conditions. Thus, these conditions can affect the overall capacity for the airfield. Runway utilization is normally determined by wind conditions, while the cloud ceiling and visibility dictates spacing requirements.

There are three measures of cloud ceiling and visibility conditions recognized by the FAA in calculating the capacity of an Airport. These include:

- **Visual Flight Rules (VFR)** – Cloud ceiling is greater than 1,000 feet above ground level (AGL) and the visibility is at least three statute miles;
- **Instrument Flight Rules (IFR)** – Cloud ceiling is at least 500 feet AGL but less than 1,000 feet AGL and/or the visibility is at least one statute mile but less than three statute miles; and
- **Poor Visibility and Ceiling (PVC**) – Cloud ceiling is less than 500 feet AGL and/or the visibility is less than one statute mile.

Based on discussions with DAB ATCT staff, DAB experiences VFR conditions approximately 95 percent of the time, IFR conditions 4 percent of the time, and poor visibility and ceiling conditions 1.0 percent of the time. As noted in the airfield inventory section, DAB has instrument landing capabilities providing Category I landing minimums with a 200-foot ceiling and one-half mile visibility on Runway 25R and 200-foot ceiling and three-quarter mile visibility on Runway 7L. Non-precision approach capabilities are available on the other runways.

4.1.3. AIRFIELD CAPACITY ANALYSIS

The preceding airfield characteristics were used in conjunction with the methodology developed by the FAA to determine airfield capacity. As mentioned previously, this FAA methodology generates the hourly capacity of runways and the ASV for measuring airfield capacity.

4.1.3.1. Hourly Capacity of Runways

Hourly capacity of the runways measures the maximum number of aircraft operations that can be accommodated by the Airport's runway configuration in one hour. Based on the FAA methodology, hourly capacity for runways is calculated by analyzing the appropriate VFR and IFR figures for the Airport's runway configuration(s) contained in AC 150/5060.5 Changes 1 and 2. For this analysis, three VFR airfield configurations were considered, and two IFR configurations were used, along with the affiliated mathematical values delineated in the guidance that is associated with each airfield configuration addressing exit factor ratings, "touch-and-go" factor, and percent arrivals are identified and used in the calculation methodology.

For both VFR and IFR conditions, the hourly capacity for runways is calculated by multiplying the hourly capacity base, "touch-and-go" factor, and exit factor. This equation is:

Hourly Capacity = C* x T x E

where: C* = hourly capacity base

T = "touch-and-go" factor (from guidance)

E = exit factor value (from guidance)

An Airport's mix index can substantially change the value of the hourly capacity base in the FAA capacity tables. However, the slight change in the fleet mix identified at DAB is not sufficient to result in a measurable change of the hourly capacities shown in **Table 4.1** for the 2017 to 2037 planning period.

Table 4.1 - Hourly Capacity Calculation

Year	VFR Hourly Capacity Base	IFR Hourly Capacity Base	Weighted Hourly Capacity (Cw)
Base Year			
2017	180	58	172.2
Forecast			
2037	180	58	172.2

Source: C&S/Kimley-Horn analysis.

4.1.3.2. Annual Service Volume

Under the FAA methodology, the most ultimate value that must be computed to evaluate the capacity at an Airport is the ASV. ASV represents a measure of the approximate number of total operations that the Airport can support annually. In other words, the ASV represents the theoretical limit of operations that the Airport can safely accommodate. Using the FAA's methodology to estimate ASV, the first step involves calculating the ratio of annual operations to average daily operations, during the peak month, which is then followed by calculating the ratio of average daily operations to average peak hour operations, during the peak month. These values are then multiplied together and the resulting product is multiplied by the weighted hourly capacity. This equation is:

Annual Service Volume = Cw x D x H

where: Cw = weighted hourly capacity

D = ratio of annual operations to average daily operations during the peak month

H = ratio of average daily operations to average peak hour operations during the peak month

For the equation, the weighted hourly capacities shown in **Table 4.1** were utilized with the values calculated for the variables D and H. The following paragraphs describe how these values were calculated for D and H.

The official Airport Traffic Records were obtained from the Airport to evaluate the characteristics of peak month and ADPM operations. Between 2007 and 2016, the peak month for operations occurred in April two times, March three times, and October five times. The range of peak month operations to total annual aircraft operations ranges from a low of 9.41 percent in 2012 to a high of 10.78 percent in 2011. The average of all peak months between 2007 and 2016 was calculated to be 10.1 percent.

The average daily operations during the peak month were derived by taking the number of operations calculated for the peak month and dividing that figure by the number of days in the peak month, which for October is 31 days. For 2037, the average daily operations during the peak month were derived by assuming that the peak month share for each operational category (domestic passenger, air taxi, general aviation and military) would remain constant. The above information was used to calculate the ratio of annual operations to average daily operations during the peak month (D) for the ASV calculation. The results are reflected in **Table 4.2.**

Table 4.2 - Calculation of Demand Ratios

Element	2017	2037
Annual Operations	309,355	364,663
Average Daily Operations – Peak Month	1,011	1,192
Daily Demand Ratio (D)	**307**	**307**
Average Daily Operations – Peak Month	1,011	1,192
Average Peak Hour – Peak Month	101	119
Hourly Demand Ratio (H)	**10.01**	**10.02**

Source: C&S/Kimley-Horn analysis.

Available hourly operational data for the historic peak months including October 2016 was not available. As a result, it was assumed after discussion with ATCT representatives and Airport personnel that a peak hour value consisting of 10 percent of the peak day operations should be used. The average peak hour percentage for 2037 was assumed to remain essentially the same as in 2017. Therefore, by applying the same percentage to the already adjusted average daily operations (of the peak month) figure for 2037, the average peak hour (of the peak month) for 2037 was calculated. Since the same hourly percentage was used, the hourly demand ratio (H) for both 2017 and 2037 are essentially the same. The results, reflected in **Table 4.2**, were then used in the calculations for ASV.

The final ASV calculations are reflected in **Table 4.3** based on the assumed continuation of the existing airfield layout. This value was then compared to the existing and forecast level of annual operations for

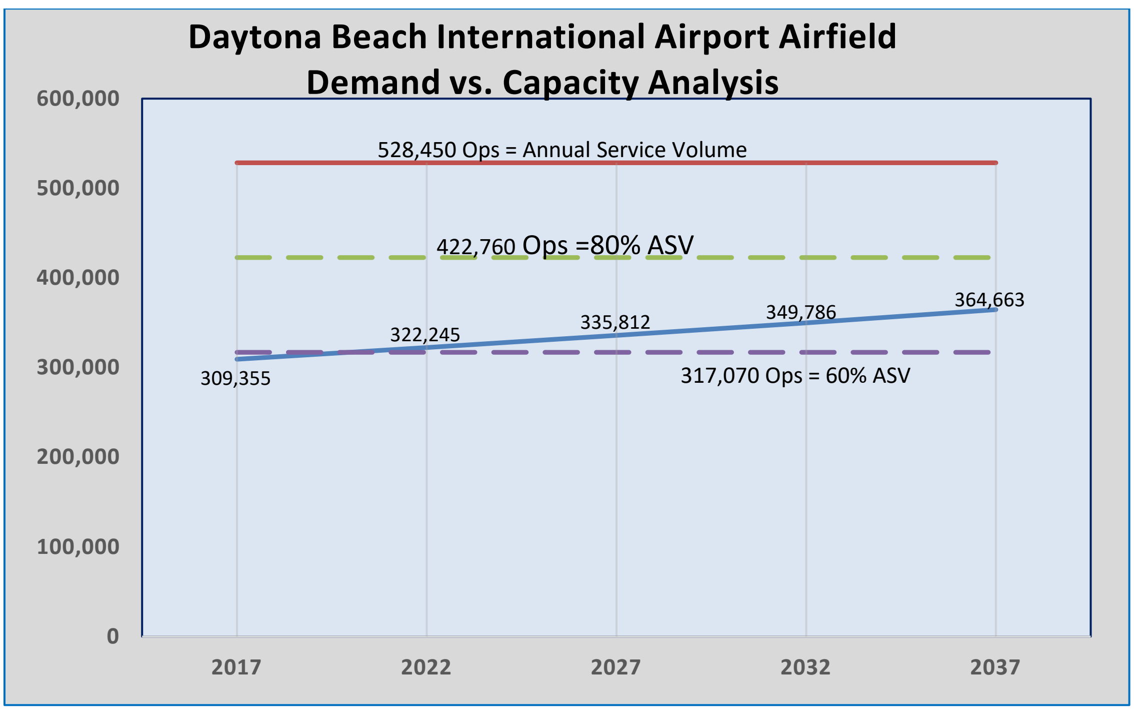
DAB. According to the FAA methodology, a demand that exceeds the ASV will result in significant delays on the airfield. However, no matter how substantial an Airport's capacity may appear, it should be realized that delays can occur even before an Airport reaches its stated capacity. In fact, a number of projects that would increase the capacity at an Airport are eligible for funding from the FAA well before an Airport actually reaches its calculated airfield capacity. According to FAA Order 5090.3B, "Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)," this eligibility is achieved once the airfield has reached 60 percent of its current capacity and the general rule of thumb is that capacity projects should be under construction as the airfield reaches 80 percent of its defined capacity. This allows improvements to be made before demand levels exceed the capacity of the facility in order to avoid lengthy delays.

Table 4.3 - Annual Service Volume

Year	Forecast Annual Operations	Annual Service Volume	Capacity Level
Base Year			
2017	309,355	528,450	59%
Forecast			
2037	364,663	528,450	69%
Source: C&S/Kimley-Horn analysis.			

Future capacity levels for the Airport have been calculated based on the forecasted annual operations and the calculated ASV for the Airport. The calculated future airfield capacity levels are delineated in **Table 4.3** and **Exhibit 4.3.**

Exhibit 4.3 - Projected Operations and Annual Service Volume



Source: C&S/Kimley-Horn analysis.

Table 4.3 along with **Exhibit 4.3** shows that the current airfield configuration provides a fully adequate level of operational capacity to accommodate the forecasted level of aircraft operations through the 2037 master planning horizon. The airfield will reach 69 percent of the calculated annual airfield capacity by

2037 indicating that initial planning for a possible capacity enhancement action should be under consideration towards the end of the master planning horizon. Such improvements could involve improving egress from certain runways within the specified exit factor range for the airfield which would act to reduce runway occupancy times and enhance runway availability.

4.1.3.3. Annual Aircraft Delay

As an Airport's level of annual operations increases, so do the times when the airfield experiences periods of delay. Calculating the average delay for each aircraft allows a total to be estimated for all incurred operational delay at the Airport annually. FAA AC 150/5060-5 Change 1 and 2 provides an abbreviated method by which an estimated delay value per operation and the total annual delay can be quantified. This estimate includes arriving and departing aircraft operations under both VFR and IFR conditions. Essentially, the ratio of annual demand to ASV is utilized in FAA charts to determine the average delay per aircraft. This value is then applied to both the actual and forecasted annual operational demand to calculate the total hours of annual delay for the Airport. The results of these calculations are included in **Table 4.4.**

Table 4.4 - Average Delay per Aircraft and Total Annual Delay		
Year	**Average Delay Per Aircraft (Minutes)**	**Total Annual Delay (Hours)**
Base Year		
2017	0.27 seconds per operation	2,320 hours annually
Forecast Horizon Year		
2037	0.41 seconds per operation	4,143 hours annually
Source: C&S/Kimley-Horn analysis.		

Based on the delay per operation and the total annual hours of delay that occur, the Airport will see a slight increase in the extent of operational delay over the planning horizon, but the extent of that increase is well below delay per operation level typically required to trigger a need or meet a cost versus benefit threshold for a significant capacity enhancement.

4.1.4. SUMMARY OF AIRFIELD DEMAND/CAPACITY

DAB is not currently projected to reach a level of demand that would require significant capacity improvements to meet the projected level of operational demand until beyond the 20-year planning horizon of the current planning effort. This does not, however, mean that opportunities to improve the efficiency of aircraft movements on the current airfield should not be considered or taken advantage of as they arise. Improvements that could act to reduce runway occupancy times, improve ground movements, reduce interaction between smaller and larger aircraft and accommodate better staging of aircraft near runway ends could all have the potential for improving operational efficiency at DAB. Consideration of some of these potential opportunities were considered in later portions of the planning effort.

4.2. AIRFIELD FACILITY REQUIREMENTS

This section provided an analysis of individual facilities on the airfield, including runways, taxiways and their applicable design standards.

4.2.1. DIMENSIONAL STANDARDS

Airport facility dimensional standards are determined by the of each runway. The RDC is a combination of the most demanding ADG and AAC expected to use the runway on a regular basis, coupled with the planned instrument approach visibility minimums. Dimensional standards pertaining to runways and runway-related separations and safety areas are essential to provide clearances from potential hazards affecting routine aircraft movements on the runways. These standards relate to separations of parallel runways, painted runway hold lines, parallel taxiways, aircraft parking, obstacle free areas, and dimensions of object free and safety areas.

Table 4.5 below highlights the various AAC and ADG classifications published by the FAA.

Table 4.5 - FAA Aircraft Classifications

Aircraft Approach Category	Approach Speed (knots)	Airplane Design Group	Wingspan (feet)	Tail Height (feet)
A	Less than 91	I	Less than 49	Less than 20
B	91 to 120	II	49 up to but less than 79	20 up to but less than 30
C	121 to 140	III	79 up to but less than 118	30 up to but less than 45
D	141 to 165	IV	118 up to but less than 171	45 up to but less than 60
E	166 or Greater	V	171 up to but less than 214	60 up to but less than 66
		VI	214 up to but less than 262	66 up to but less than 80

4.2.1.1. Critical Aircraft

The critical design aircraft is used to determine the appropriate airfield dimensional requirements and operational capabilities for the Airport during the planning period. The critical aircraft is the aircraft that is the most demanding aircraft from an airport design criteria perspective that will regularly use the Airport during the planning period.

According to the FAA, use of an airport on a regular basis is considered to be 500 or more annual operations (equivalent to 250 takeoffs and landings per year) conducted by a particular aircraft or aircraft group. Based on a review of DAB monthly landing reports for the full year of 2016 and 2017, the current critical aircraft is a Boeing 757-200, which is classified as having an AAC of D and ADG IV and is operated at DAB by Delta. Based on recent trends in airline fleets, Boeing 757 aircraft are being retired from active fleets and being replaced by aircraft such as the Airbus A321 and Boeing 737-900 and 737-MAX 10 aircraft. These aircraft offer comparable seating capacity and range as the 757 but are classified as ADG III as opposed to ADG IV. As detailed in the aviation forecast in Chapter 2, Delta is anticipated to phase the majority of its Boeing 757 fleet out over the next five years and has reduced its utilization of the 757 at DAB consistently year-over-year. It is anticipated the future critical aircraft at DAB will be the Boeing 737-900ER, which is classified as a C-III aircraft.

4.2.2. RUNWAY REQUIREMENTS

Within this section was an evaluation of the runway facilities at DAB and their ability to accommodate the anticipated critical aircraft type through the planning horizon. Runway attributes such as length and width were addressed, as well as orientation and pavement strength.

4.2.2.1. Runway Orientation

The orientation of runways at an airport is primarily a function of wind direction and speed, with aircraft aiming to take off and land in the same direction as the prevailing wind. FAA guidance recommends an airport's runway configuration provide runway wind coverage of at least 95 percent. Based on the wind rose as presented in Chapter 1 of this report, the runway configuration and orientation at DAB provides 99 percent all weather wind coverage and is anticipated to be adequate for the planning horizon.

4.2.2.2. Runway Length

FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*, provides guidance for determining runway length. According to this document, a multi-step process is utilized to determine runway lengths based on identifying the airplanes that will make regular use of a runway for planning period of at least five years.

Runway 7L/25R

Runway 7L/25R is the longest runway at DAB and is the primary air carrier runway. It is 10,500 feet in length and 150 feet wide, which meets requirements for a RDC of C-III serving aircraft over 150,000 pounds. The current critical aircraft at DAB as noted previously is the Boeing 757-200, and is expected to shift to Airbus A321 in the next few years as the Boeing 757 is retired from the U.S. airline fleets. A runway length analysis was conducted for these two aircraft types. Aircraft planning manuals published by the aircraft manufacturers were referenced for determination of runway length requirements. The following assumptions for these calculations were made:

- Airport Elevation — 34 feet
- Mean Daily Maximum Temperature — 86°F
- Runway Conditions — Dry
- Average Length of Haul — 1,500 nm
- Payload — 80% of maximum

Based on these assumptions, the following runway length requirements were determined for these aircraft types as shown in **Table 4.6.**

Table 4.6 - Runway Length Requirements

Aircraft	AAC/ADG	Takeoff Runway Length (ft)[1]	Landing Runway Length* (ft)
Boeing 757-200	C-IV	5,500	4,800
Airbus A321-200	C-III	6,600	5,600

**Note: Values shown for landing length represent max landing weight*
Source: Boeing and Airbus Aircraft Characteristics Manuals.

Based on the requirements of the Airbus A321-200, the existing length Runway 7L/25R is expected to be adequate for the planning horizon.

Runway 16/34

Runway 16/34 is the crosswind runway at DAB and is 6,001 feet long by 150 feet wide. According to FAA Advisory Circular 150/5325-4B, *Runway Length Requirements for Airport Design*, the crosswind runway should provide 100 percent of the recommended runway length determined for the lower crosswind-capable airplanes using the primary runway. Runway 7L/25R currently provides over 99 percent wind coverage for the 16-knot crosswind component for an RDC of C-III, and as such, Runway 16/34 is not required to provide 100 percent of the required length of the primary runway.

The normal runway configuration at DAB is an east/west flow using Runway 7R/25L for “touch-and-go” operations, which is used approximately 90 percent of the time. When in the crosswind flow using Runway 16/34, the primary activities are “touch-and-go” activity by light flight training aircraft. At DAB, the lower crosswind-capable aircraft using the Runway 16/34 are single and multi-engine piston aircraft utilized by the numerous flight training institutions. These aircraft, such as the Cessna 172, Piper Arrow, and Diamond DA-40 and DA-42 have runway length requirements ranging from 900 feet to 1,400 feet.

Runway 16/34’s existing length of 6,001 feet is anticipated to be adequate for the planning horizon based on the primary activity of local flight training. For larger aircraft such as the critical aircraft, they may be restricted to shorter stage lengths, but would still be able to take off and land in the case of a crosswind condition necessitating use of this runway.

Runway 7R/25L

Runway 7R/25L is parallel to Runway 7L/25R and has an RDC of B-I (small aircraft only). It is used almost exclusively for local flight training activity (i.e., “touch-and-go” activity) by single engine and multi-engine piston aircraft under 12,500 pounds. Runway 7R/25L is 3,500 feet in length. The majority of flight training aircraft utilized at DAB include the Cessna 172 and the Diamond DA-40, which have takeoff lengths varying between 1,000 to 2,500 feet. As such, the existing runway length for Runway 7R/25L is expected to be adequate for the planning period.

4.2.2.3. Runway Pavement Strength

Pavement capacity requirements are related to three primary factors:

- The operating weight of aircraft anticipated to use the Airport;
- The landing gear type and geometry; and
- The volume of annual aircraft operations, by type.

The existing runway pavement strengths as listed on FAA Form 5010-1 for DAB are shown below in **Table 4.7**

Table 4.7 - Runway Pavement Strengths				
Runway	Pavement Strength (1,000 pounds)			
	Single Wheel	Double Wheel	Double Tandem	Dual Double Tandem
7L/25R	120.0	224.0	402.0	915.0
7R/25L	24.0	38.5	--	--
16/34	120.0	225.0	385.0	892.0
Source: DAB Airport Master Record 5010, 2018.				

The necessary runway strength for the planning horizon is based upon the anticipated critical aircraft of an Airbus A321-200. Depending on specific version of the aircraft, the A321-200 has a Maximum Take Off Weight (MTOW) ranging from 176,000 to 206,000 pounds, and a maximum landing weight ranging from 162,000 to 174,000 pounds in a double wheel configuration. Flight training aircraft used extensively at DAB have MTOWs ranging from 2,600 to 4,000 pounds in a single wheel configuration.

Based on these characteristics, the existing runway pavement strengths are anticipated to be adequate for the planning horizon.

4.2.2.4. Runway Dimensional Standards

Based on the anticipated future critical aircraft for the planning horizon, runway dimensional standards for safety and object free areas should conform to C-III standards for Runway 7L/25R and Runway 16/34. Runway 7R/25L should continue to conform to B-I standards for small aircraft. These standards are listed below in **Table 4.8** and **Table 4.9.** As a point of comparison, standards for both C-III and D-IV are listed in the table, along with existing dimensions measured from the 2016 Interim ALP Update for Runway 7L/25R and Runway 16/34.

Runway Safety Areas

Runway Safety Areas (RSAs) are centered on runway centerlines and are intended to provide overrun, undershoot, and lateral runway excursion protection to aircraft. As such, RSAs have standards for clearing and grading, drainage, object clearing, and weight bearing capacity for aircraft and emergency vehicles. RSA standards cannot be modified through a modification of standards (MOS) process and should be continually evaluated for all practicable alternatives to improve any substandard RSAs.

A review of RSAs at DAB was conducted to determine if there are any substandard RSA conditions. Based on this review, it was found that the RSA off the departure end of Runway 25R is encroached by the Airport perimeter road and Williamson Boulevard by approximately 207 feet. Currently, declared distances for Runway 25R account for this encroachment by limiting the Accelerate-Stop Distance Available (ASDA) and Landing Distance Available (LDA).

The RSA off the departure end of Runway 16 is also encroached upon by the Airport perimeter road by approximately 32 feet and is mitigated currently through application of declared distances reducing ASDA and LDA for operations on Runway 16.

Runway Object Free Areas

Runway Object Free Areas (ROFAs) are centered on the runway centerline and require clearing of above-ground objects protruding above the nearest point of the RSA. Objects not essential for air navigation or aircraft ground maneuvering should not be placed in the ROFA, and objects should meet the same frangibility requirements as RSA requirements.

The ROFA off the departure end of Runway 25R is also encroached by the perimeter road and Williamson Boulevard similarly to the RSA by 207 feet. The ROFA off the departure end of Runway 16 is encroached upon by the perimeter road as well by approximately 97 feet.

Table 4.8 - Runway Dimensional Standard Requirements – 7L/25R and 16/34								
Standard	Design Standard				Existing Runway Dimensions			
	C-III Standard		D-IV Standard		7L / 25R		16 / 34	
	Not Lower than 1 mile	Lower than ¾ mile	Not Lower than 1 mile	Lower than ¾ mile	7L	25R	16	34
Runway Width	150’		150’		150’		150’	
Shoulder Width	25’		25’		25’		25’ (unpaved)	
Blast Pad								
Width	200’		200’		150’	150’	150’	150’
Length	200’		200’		400’	200’	200’	200’
Runway Safety Area								
Width	500’		500’		500’	500’	500’	500’
Length Beyond Runway End	1,000’		1,000’		1,000’	1,000’*	1,000’*	1,000’
Length Prior to Threshold	600’		600’		600’	600’	600’	600’
Runway Object Free Area								
Width	800’		800’		800’	800’	800’	800’
Length Beyond Runway End	1,000’		1,000’		1,000’	793’	903’	1,000’
Length Prior to Threshold	600’		600’		600’	600’	600’	600’
Runway Obstacle Free Zone								
Width	400’		400’		400’	400’	400’	400’
Length	200’		200’		200’	200’	200’	200’
Precision Obstacle Free Zone								
Width	N/A	800’	N/A	800’	800’	800’	N/A	N/A
Length	N/A	200’	N/A	200’	200’	200’	N/A	N/A
Approach Runway Protection Zone								
Length	1,700’	2,500’	1,700’	2,500’	1.700	2,500’	1,700’	1,000’
Inner Width	500’	1,000’	500’	1,000’	1,000’	1,000’	500’	500’
Outer Width	1,010	1,750	1,010	1,750	1,510	1,750	1,010	700’
Departure Runway Protection Zone								
Length	1,700’	1,700’	1,700’	1,700’	1,700’	1,700’	1,000’	1,000’
Inner Width	500’	500’	500’	500’	500’	500’	500’	500’
Outer Width	1,010’	1,010’	1,010’	1,010’	1,010’	1,010’	700’	700’
Runway Centerline to Parallel Runway Centerline	700’ (Simultaneous VFR)				1,652’		N/A	
Runway Centerline to Holding Position	250’		250’		250’	250’	250’	250’
Runway Centerline to Parallel Taxiway Centerline	400’		400’		>400’	>400’	>400’	>400’
Runway Centerline to Aircraft Parking Area	500’		500’		>500’	>500’	>500’	>500’

**Met through the application of declared distances.*
Note: Red text indicates standards that are not met.
Source: Kimley-Horn analysis, 2018.

Table 4.9 - Runway Dimensional Standard Requirements – 7R/25L				
Standard	**B-I Standard (Small)**		**Existing Dimensions**	
			7R	**25L**
Runway Width	60’		100’	
Shoulder Width	10’		10’	
Blast Pad				
Width	N/A		N/A	
Length	N/A		N/A	
Runway Safety Area				
Width	120’		120’	
Length Beyond Runway End	240’		240’	
Length Prior to Threshold	240’		240’	
Runway Object Free Area				
Width	250’		250’	
Length Beyond Runway End	240’		240’	
Length Prior to Threshold	240’		240’	
Runway Obstacle Free Zone				
Width	250’		250’	
Length Beyond Runway End	200’		200’	
Precision Obstacle Free Zone				
Width	N/A	N/A	N/A	N/A
Length	N/A	N/A	N/A	N/A
Approach Runway Protection Zone				
Length	1,000’		1,000’	1,000’
Inner Width	250’		250’	250’
Outer Width	450’		450’	450’
Departure Runway Protection Zone				
Length	1,000’		1,000’	1,000’
Inner Width	250’		250’	250’
Outer Width	450’		450’	450’
Runway Centerline to Parallel Runway Centerline	700’ (Simultaneous VFR)		1,652’	
Runway Centerline to Holding Position	125’		125’	
Runway Centerline to Parallel Taxiway Centerline	150’		225’	
Runway Centerline to Aircraft Parking Area	125’		>125’	

Source: Kimley-Horn analysis, 2018.

Runway Protection Zones

Runway Protection Zones (RPZ) are two-dimensional trapezoidal areas located off the ends of runways that are designated for the protection of people and persons on ground rather than protection of aircraft. It is preferable for airports to exercise control over RPZs through sufficient property interest, and also taking steps to clear RPZs of incompatible objects and activities. It is desirable to clear RPZs of all above ground objects, but when it is impractical, RPZs should be cleared of incompatible uses and facilities.

As depicted on the 2016 Interim ALP update, the approach RPZ for Runway 34 has dimensions of 500 feet inner width, 700 feet outer width, 1,000-foot length. Standard RPZ dimensions for a C-III Runway with non-precision instrument minimums of one-mile or greater require RPZ dimensions of 500 feet inner width, 1,010 feet outer width, and 1,700-foot length. This RPZ currently does not meet standards and was explored in the alternatives analysis for impacts resulting from application of standard RPZ dimensions for the appropriate RDC.

4.2.2.5. Taxiway Dimensional Standards

The taxiway system serves the purpose of aircraft movement between aviation-related facilities. Taxiway requirements are addressed to maintain and/or improve existing and future airfield capacity levels previously identified, and to provide more efficient and safe ground traffic movements. Taxiways, which provide vital links between independent Airport elements, should optimize Airport utility by providing free movement to and from the runway, general aviation terminal areas, and aircraft parking areas.

Dimensional standards pertaining to taxiways/taxilanes and taxiway/taxilane-related separations are necessary to ensure FAA recommended clearances between taxiing aircraft and fixed or movable objects during routine operations. These standards relate to separations for parallel taxiways/taxilanes, aircraft parking, service roads, object free areas, wingtip clearances, safety areas, and shoulders. Also addressed are recommended taxiway widths.

Separation Standards

The current runway system has two different RDC designations; therefore, different taxiway separation and dimensional standards are required. Runways 7L/25R and 16/34 currently require taxiways designed to meet ADG IV standards and Runway 7R/25L requires taxiways designed to meet criteria associated with ADG I standards. The requirement of ADG IV is expected to shift to ADG III standards over the next five years. All three runways currently meet taxiway separation standards for the applicable existing and future RDCs.

Taxiway Width and Shoulders

The taxiways associated with the ADG IV design criteria require a 50-foot taxiway width, plus 20-foot paved shoulders. This requirement is also coupled with accommodating aircraft in Taxiway Design Group (TDG)-4, which encompasses the existing and future critical aircraft. Taxiway N primarily accommodates the largest aircraft at DAB, including those in ADG IV, and meets requirements based on ADG IV, including paved shoulders. All other taxiways at DAB primarily accommodating ADG III and ADG IV aircraft meet or exceed the required 50-foot taxiway width and paved shoulder requirements.

The taxiway system serving Runway 7R/25L has been designated as ADG I. Taxiways E, S, and T currently meet criteria associated with ADG I standards. The design standards from a TDG perspective require a taxiway width of 25 feet and a shoulder width of 10 feet. ADG I standards do not require, nor recommend, paved shoulders adjacent to the paved taxiways.

4.2.3. LIGHTING AND MARKING

Lighting and marking requirements were addressed at a cursory level for purposes of this Master Plan Update. DAB's airfield has signage, markings, and lighting in place per the requirements of CFR Part 139, and significant modifications and/or additions are not anticipated for the planning horizon.

4.2.4. NAVIGATIONAL AIDS AND APPROACH PROCEDURES

DAB currently has many standard Navigational Aids (NAVAIDS) in place that are commonly found at commercial service airports of its size and role. NAVAIDS onsite include the following:

- Automated Surface Observation System;
- Low Level Windshear Alert System (LLWAS);
- Automatic Dependent Surveillance-Broadcast (ADS-B);
- Glideslope Antenna; and
- Localizer Antenna.

Instrument Approach Procedures (IAP) provide a means for aircraft to approach and land at an airport in IMC. DAB currently has IAPs on all runway ends. Runway 7L/25R has ILS approaches to both ends, as well as vertically guided GPS approaches, or Localizer Performance with Vertical Guidance (LPV) approaches. The approach capability on 7L/25R is anticipated to be adequate for the planning horizon.

Runway 16/34 has non-precision approaches with both vertical and non-vertical guidance. Considering the predominance of VMC conditions at DAB and generally favorable climate, the existing IAP capability is considered to be adequate for the planning horizon.

4.2.5. RUNWAY INCURSION MITIGATION CRITERIA

The following sections described guidelines for airfield design conforming to geometric principles for the safe and efficient operation of aircraft on the airfield. AC 150/5300-13A, *Airport Design,* details these design principles with an emphasis on improving existing airfield geometry whenever feasible, with a particular emphasis on addressing areas where an FAA designated "hot spot" is noted. To the extent practicable, existing pavement may need to be reconfigured to mitigate confusing airfield layouts. Potential airfield gaps in runway incursion mitigation criteria airfield elements were reviewed in subsequent sections of this report for potential mitigation options.

4.2.5.1. Geometric Design Principles

Increase Pilot Situational Awareness/Three-Node Concept: The three-node concept simplifies taxiway intersections and keeps the number of possible maneuvers at intersection to no more than three. Adherence to this principle keeps taxiway intersections simple by reducing the number of taxiways intersecting at a single location and allows for proper placement of airfield markings, signage, and lighting.

Avoid Wide Expanses of Pavement: Taxiway to runway interface encompassing wide expanses of pavement is not recommended. Wide pavements require placement of signs far from the pilot's eye and reduces the conspicuity of other visual cues. Under low visibility conditions, or due to pilot focus on the centerline, signs can be missed. This is especially critical at runway entrance points.

Limit Runway Crossings: The airport designer can reduce the opportunity for human error by reducing the need for runway crossings. The benefits of such design are twofold – through a simple reduction in the number of occurrences, and through a reduction in air traffic controller workload.

Avoid "High Energy" Intersections: High energy intersections are in the middle third of the runway. By limiting runway crossings to the outer thirds of the runway, the portion of the runway where a pilot can least maneuver to avoid a collision is kept clear of crossing aircraft.

Increase Visibility: 90-degree angle intersections both between taxiways and between taxiways and runways, provide the best visibility to the left and right for a pilot. Acute angle runway exits provide for greater efficiency in runway usage but should not be used as runway entrance or crossing points, as they require a pilot to turn their head further to identify traffic.

Avoid "Dual Purpose" Pavements: Runways utilized as taxiways can lead to pilot confusion. A runway should always be clearly identified as a runway and only a runway.

Indirect Access: Taxiways should not lead directly from an apron to a runway without requiring a turn. Such configurations can lead to confusion when a pilot typically expects to encounter a parallel taxiway and instead accidently enters a runway.

4.2.5.2. Potential Runway Incursion Criteria Deficiencies

Y-Shaped Taxiway

These taxiways decrease situational awareness by introducing similar angles to different taxiway directions and can lead to pilot confusion and increase the likelihood of runway incursions. The existing airfield at DAB contains one Y-shaped taxiway leading from Taxiway A1 through Taxiway N and splitting into the Y-shaped Taxiways N6 and N7. The split Taxiways N6 and N7 lead directly onto Runway 7L/25R. This split, in close proximity, to the runway does not give ATCT ample time to correct pilots if they make an incorrect turn. The recent Taxiway N construction project removed this condition.

Greater than 3-node intersection

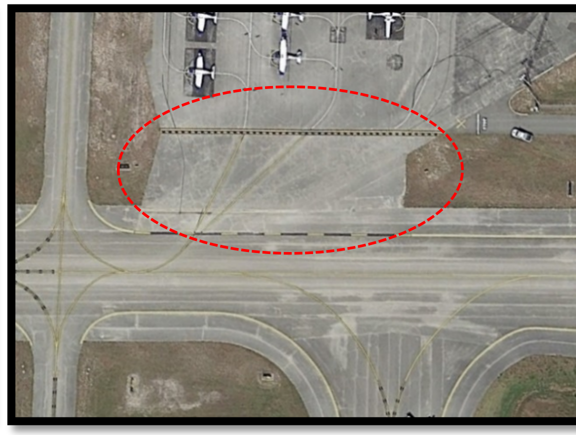
Complex intersections can cause pilot confusion. Simple intersections, that present the pilot with three options, reduce likelihood of a runway incursion and allow for proper placement of airfield markings, signage, and lighting. The existing airfield contains a 4-node intersection at Taxiways A, N, and W (see next page for an illustration). The options to turn contain an irregular angle other than the recommended straight, left, and right turn options, leading to pilot confusion. The recent Taxiway N construction project removed this condition.

Direct Access

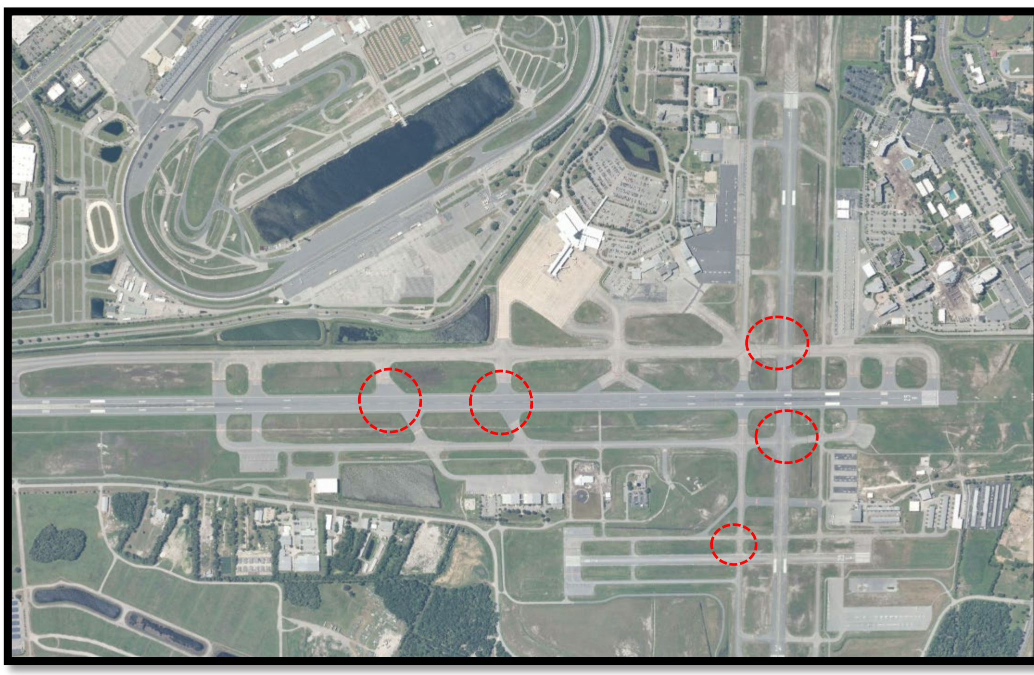
Direct access to a runway can lead to pilot confusion when a pilot typically expects to cross a parallel taxiway. The existing airfield contains seven direct access taxiways from apron area to a runway, they include Taxiways E2, E3, P5, R1, T2, W3, and W4. These taxiways are not in compliance with geometric criteria.

Multi-Entrance-Taxiway Without Grass Island/Taxiway With Extra-Wide Pavement

Under limited visibility conditions, or due to pilot focus on the centerline, signage can be missed at wide pavements. This is particularly critical at runway entrance points; therefore, it is recommended to add grass islands between the taxiway entrances. The existing airfield at DAB has three occurrences of multi-entrance-taxiways that do not have grass islands between them. The locations are Taxiway S at the Runway 7R entrance, Taxiway T at Runway 7R, and Taxiway S at Runway 25L. The airfield also contains a taxiway with extra-wide pavement located at the intersection of Taxiway R1 and Taxiway N.



These are intersections that cross through the middle third of the runways. By routing crossings to the outer thirds of the runway, the portion of the runway where a pilot can least maneuver to avoid a collision remains clear. The existing airfield contains five instances of high-energy runway crossings. These crossings occur at Taxiway N4/P4 on Runway 7L/25R, Taxiway N5/P5 on Runway 7L/25R, Taxiway N on Runway 16/34, Taxiway P on Runway 16/34, and Taxiway W on Runway 7R/25L.



4.2.6. SOUTH PROPERTY DEVELOPMENT CONSIDERATIONS

A significant study running in tandem with this Master Plan update was an assessment of market opportunities and conceptual permitting of a large tract of Airport -owned land immediately to the south of the airfield, adjacent to the taxiway systems supporting Runway 7R/25L and Runway 16/34. There has been significant interest in potential development of this site for aviation specific uses.

Should an aviation user with regular usage of aircraft larger than ADG 1 and TDG-1 ultimately occupy the portion of the property immediately adjacent to the south airfield along Taxiway T, improvements to Taxiway T and potentially Taxiway W could be necessary. Runway 7R/25L has a primary purpose of accommodating "touch-and-go" activity by small ADG I aircraft and would likely not accommodate takeoff and landing performance requirements of aircraft larger than ADG I. As such, taxiway circulation improvements would be necessary to allow larger aircraft to potentially taxi from Taxiway T to other runways. Currently, runway to taxiway separation for Runway 7R meets standards for ADG I, and may require increased separation to accommodate regular movements of larger aircraft.

4.2.7. SUMMARY OF AIRFIELD FACILITY REQUIREMENTS

Based on the review of airfield facilities in the previous sections, the following airfield facility requirements were recommended to be evaluated as part of the alternatives analysis:

- Address runway incursion criteria deficiencies to the extent practicable as noted in Section 4.3.6;
- Consider implementation of an off- Airport landing facility for the accommodation of "touch-and-go" flight training activity;
- Address potential need to upgrade taxiway facilities in the south airfield area to accommodate potential aviation user with aircraft larger than ADG I;
- Reevaluate options to bring the substandard RSA and ROFA off the departure ends of Runways 16 and 25R into full conformity; and
- Evaluate impacts of applying larger RPZ dimensions to the approach and departure of Runway 34.

4.3. TERMINAL FACILITY REQUIREMENTS

The commercial service passenger terminal at DAB was last remodeled in 1992, which brought the total terminal square foot area to 203,593 square feet on three levels. The square foot area has been evaluated against the FAA approved Aviation Activity Forecasts for enplaned passengers, enplanements per departure, and annual and peak hour operations. Based on discussions with DAB staff, the current terminal was designed for approximately one million annual passengers, including enplanements and deplanements.

Using standard forecasting methods and considering features of the terminal unique to DAB, the following capacity analysis was developed. This analysis was considered the baseline terminal facility requirements.

4.3.1. TICKETING AND AIRLINE OFFICE REQUIREMENTS

The ticketing and airline offices area at DAB are currently underutilized. While there are 35 check-in stations and 22 bag wells, only eight check-in counter stations and six check-in kiosks are currently being used among three airlines. This is due, in part, to the way that airline check-in and behaviors have evolved over time compared to when the terminal was designed. Today, many passengers check-in for their flight at home through the airline's website or using the airline's mobile application. If they are not checking baggage, many have no need to go into the ticketing area of the terminal.

At DAB, it is anticipated that the number of check-in counters required will increase at a relatively slow rate compared to the forecasted increase in enplanements. As passengers become progressively more familiar and comfortable with check-in kiosks and mobile check-in, it is anticipated the number of kiosks will increase, and most transactions at the Airport will be handled by kiosks. It is likely check-in counters will continue to be needed for those passengers with difficulties in their schedule, re-ticketing issues, and other more detailed transactions. The requirements likely to occur over the planning period in the Ticketing and Airline Offices area of the terminal are shown in **Table 4.10**

Table 4.10 - Ticketing and Airline Office Requirements						
	Existing	2017	2022	2027	2032	2037
Number of Check-In Counters	35	8	5	5	4	4
Number of Check-In Kiosks	10	10	10	12	17	19
Area of Ticket Counters and Queue (sq ft)	8,068	2,600	2,700	2,900	3,500	3,900
Airline Ticket Offices (sq ft)	7,403	3,074	4,100	4,100	4,100	4,100
Source: AVCON, Inc. 2018.						

It is projected the number of required check-in counters will decrease to four in 2037 at DAB, while the number of check-in kiosks will rise to 19 from 10. The area required to accommodate the check-in counters and kiosks, as well as the queues for each, are projected to increase somewhat from the 2,600 square feet required today to approximately 3,900 square feet in the year 2037. This is less than half of the area currently available for these functions.

There is currently 7,403 square feet available for airline ticket offices. Of that amount, the airlines are leasing only 3,074 square feet. It is anticipated an additional airline could elect to enter the market within the next 20 years. When this occurs, it is anticipated that about 1,000 square feet of additional airline ticketing office will be required.

4.3.2. BAGGAGE MAKE-UP REQUIREMENTS

Currently, the baggage make-up device at DAB is a single, oval conveyor used by all three current airlines. One airline uses one side of the oval shaped conveyor and the other two airlines share the second side of the oval. Each airline manually places baggage carts adjacent to the baggage make-up conveyor. This system works well for the amount of checked baggage generated at the Airport.

Currently, there is approximately 5,291 square feet of space in the baggage make-up area that houses the conveyor belt, space for the baggage carts, and space used to maneuver the carts into position. It is anticipated that, as the number of bags increase, with the increase in enplanements and another airline perhaps enters the market, the area required will need to increase by 1,400 square feet in 2022 to 5,600 square feet and an additional 2,800 square feet by 2032. These projections are shown in **Table 4.11**.

Table 4.11 - Baggage Make-up Space Allocation Requirements						
	Existing	2017	2022	2027	2032	2037
Baggage Make-Up Area (sq ft)	5,291	4,200	5,600	5,600	8,400	8,400
Source: AVCON, Inc. 2018.						

4.3.3. DEPARTURE LOUNGES

There are currently six departure lounges at the Airport with a total of 13,412 square feet. Of these, only four are currently leased to airlines. As the enplanements and number of flights and perhaps another airline enters the market, it is anticipated the number of departure lounges required will also grow. It is projected that five departure lounges will be needed in 2027 and six departure lounges will be needed in 2037, as shown in **Table 4.12** Along with the number of departure lounges required, it is also anticipated the required area will also grow from the 9,220 square feet in 2017 to 11,500 in 2027 to 13,800 in the year 2037. This requirement effectively represents the maximum capacity of the departure lounges by the end of the planning period, should the growth of passenger activity occur as projected.

Table 4.12 - Departure Lounge Space Allocation Requirements						
	Existing	**2017**	**2022**	**2027**	**2032**	**2037**
Number of Departure Lounges	6	4	4	5	5	6
Total Area of Departure Lounges (sq ft)	13,412	9,220	9,200	11,500	11,500	13,800
Source: AVCON, Inc. 2018.						

4.3.4. BAGGAGE CLAIM

The Airport currently has 9,524 square feet of space dedicated to baggage claim devices. This area includes the baggage claim devices themselves as well as area for passengers and meeters/greeters to stand while waiting for baggage to arrive on the baggage claim device. There are currently two baggage claim devices of the flat-plate type, meaning that the plates that make up each device are flat and perpendicular to the floor. Baggage Claim Device 1 has a presentation length of approximately 120 linear feet and Baggage Claim Device 2 has a presentation length of approximately 195 linear feet, for a total of 315 feet. The presentation length is the length of the conveyor that the passenger has access to for the retrieval of baggage.

As shown in **Table 4.13** it is anticipated that the capacity of the two existing baggage claim devices will be sufficient to accommodate the projected number of passengers and their associated baggage.

Table 4.13 - Baggage Claim						
	Existing	**2017**	**2022**	**2027**	**2032**	**2037**
Required Baggage Claim Units	2	2	2	2	2	2
Required Presentation Length of All Units (linear ft)	315	168	188	210	235	263
Required Area of Baggage Claim (sq ft))	9,524	4,500	5,000	5,600	6,300	7,000
Source: AVCON, Inc, 2018.						

4.3.5. SECURITY SCREENING CHECKPOINT

There are currently three security screening positions at the Airport encompassing 3,182 square feet. Based on current security screening procedures, and the minimum area required for those procedures, it is anticipated the existing security screening checkpoint will be able to accommodate the forecasted growth in enplanements under the current security screening procedures, as shown in **Table 4.14.**

Table 4.14 - Security Screening Checkpoint						
	Existing	**2017**	**2022**	**2027**	**2032**	**2037**
Number of Security Screening Positions	3	2	2	2	2	2
Security Screening Area (sq ft)	3,182	1,950	1,950	1,950	1,950	1,984
Security Queueing Area (sq ft)	1,229	605	679	757	849	950
Source: AVCON, Inc. 2018.						

4.3.6. TERMINAL CONCESSIONS

The area reserved for terminal concessions at an Airport can vary widely depending upon the type of passenger an Airport serves as well as the philosophy of each Airport on its approach to concessions. The area set aside for concessions, including storage, typically varies from 8 to 12 percent of the total building area of the terminal. In some cases, it can go as high as 20 percent. Existing and projected areas for terminal concessions are shown in **Table 4.15.**

Table 4.15 - Terminal Concessions

	Existing	2017	2022	2027	2032	2037
Total Concession Area	22,276	21,600	21,800	22,000	22,200	22,400
Airside Concessions Area	3,854	3,900	4,800	5,700	6,600	7,500
Landside Concessions Area	18,422	17,700	17,000	16,300	15,600	14,900

Source: AVCON, Inc. 2018.

It is likely that the total square foot area for concessions at DAB could well serve the Airport throughout the planning period. However, some consideration might be given to shifting a larger percentage of the concessions to airside. Since the events of September 11, 2001, the screening at security checkpoints has become more time consuming. Passengers at most airports are eager to get through the security screening checkpoint before relaxing before a flight as they are concerned with how much time they might have to allow for the security screening process. Therefore, they are looking for more concessions to be located on the secure side of security checkpoint.

4.3.7. TERMINAL REQUIREMENTS SUMMARY

For the most part, the commercial passenger terminal at DAB will be able to accommodate the projected number of passengers throughout the planning period. There is more than enough space in the ticketing and airline offices areas of the terminal, although reconfiguration of the space may be necessary as airline passenger processing trends continue to evolve away from the full-service counter model to the self-service kiosk-based experience.

The security screening area should be able to continue to process passengers at the current requirements for security screening. The unknown factors are industry security events such as terrorist attacks or other elevated security threats that may trigger new security requirements. The number and size of departure lounges is expected to be sufficient, although they will be reaching capacity by the end of the planning period.

The total existing area dedicated to concessions is projected to be sufficient for the projected number of passengers. However, some consideration might be given to shifting some of the concessions area from landside to airside.

The baggage make-up area may need to be extended, depending on the number of bags that are checked and if another airline should enter the market. This is potentially the one area of the terminal that may need to be enlarged. **Table 4.16** shows a summary of the terminal areas and requirements were discussed in this section.

Table 4.16 - Terminal Requirements Summary						
	Existing	**2017**	**2022**	**2027**	**2032**	**2037**
Number of Check-in Counters	34	8	5	5	4	4
Number of Check-in Kiosks	10	6	10	12	17	19
Area of Ticket Counters and Queue (sq ft)	8,068	2,600	2,700	2,900	3,500	3,900
Airline Ticket Offices (sq ft)	7,403	3,074	4,100	4,100	4,100	4,100
Baggage Make-up Area (sq ft)	5,291	4,200	5,600	5,600	8,400	8,400
Number of Security Screening Positions	3	2	2	2	2	2
Security Screening Area (sq ft)	3,182	1,950	1,950	1,950	1,950	1,984
Security Queueing Area (sq ft)	1,229	605	679	757	849	950
Number of Departure Lounges	6	4	4	5	5	6
Total Area of Departure Lounges (sq ft)	13,412	9,220	9,200	11,500	11,500	13,800
Number of Baggage Claim Units	2	2	2	2	2	2
Total Presentation Length of All Units (sq ft)	358	168	188	210	235	263
Total Area of Baggage Claim (sq ft)	9,524	4,500	5,000	5,600	6,300	7,000
Airside Concessions (sq ft)	3,854	3,900	4,800	5,700	6,600	7,500
Landside Concessions (sq ft)	18,422	17,700	17,000	16,300	15,600	14,900
Total Concessions Areas (sq ft)	22,276	21,600	21,800	22,000	22,200	22,400

Note: Red text indicates existing facilities do not meet projected demand requirements.
Source: AVCON, Inc. 2018.

4.4. ROADWAYS AND GROUND TRANSPORTATION FACILITIES

This section addressed vehicular roadway and ground transportation provider facility requirements, including rental car facilities and the passenger drop-off/pick-up curb front roadway. Requirements were primarily addressed in this section as they pertain to passenger terminal roadways but were also examined for roadway facilities that access the southern area of the Airport, including the South Property parcels.

4.4.1. ACCESS ROADWAYS

4.4.1.1. Northern Airport Facilities

For the passenger terminal facilities and northern general aviation facilities such as Sheltair, the Airport's primary access roadway is Midway Avenue, which bridges International Speedway Boulevard and South Williamson Boulevard on the Airport's northwest vicinity. Catalina Drive is the terminal access roadway that leads to the curbside and parking facilities and is accessed via Midway Avenue. Richard Petty Boulevard connects Midway Avenue and Coral Sea Avenue, which provides direct access to GA facilities north of the terminal.

Based on 2017 FDOT data,[15] Midway Avenue has an Average Annual Daily Traffic (AADT) volume of approximately 5,500 vehicles, having increased from 4,400 vehicles in 2013. The 2017 AADT is well below general FDOT traffic planning guidelines of 39,800 vehicles per day for a four-lane divided roadway such as Midway Avenue.[16] Therefore, Midway Avenue is anticipated to be more than adequate for the planning horizon with regard to sufficient roadway capacity for terminal access.

4.4.1.2. Southern Airport Facilities

On the south side of the Airport, Bellevue Avenue provides access to the south GA and Airport support facilities such as Yelvington Jet Aviation, Inc. and the ATCT. Year 2017 FDOT data indicates the AADT for Bellevue Avenue is 3,400 vehicles per day, increasing from 3,100 in 2013. This value is also well below FDOT planning guidelines for two-lane undivided roads, with a threshold of 17,700 vehicles per day.

While there is currently relatively light traffic generation along Bellevue Avenue, as evidenced by the 2017 AADT information and existing low intensity land uses, there is significant interest by the Airport in exploring potential aeronautical and aerospace revenue support uses and development in this area. As a component of this Master Plan Update, land use strategies and conceptual permitting were accomplished to support potential development along Bellevue Avenue, including potential industrial or office uses. Development in this area would likely trigger the need for detailed traffic impact assessment studies which could potentially identify the need for expansion of Bellevue road to accommodate higher levels of traffic beyond the capacity of the existing two-lane configuration.

4.4.2. TERMINAL CURBFRONT ROADWAY

The terminal curbfront roadway serves as the primary area where passengers can be picked-up and dropped-off at the ticketing and baggage claim areas. The current roadway consists of four lanes, with one dedicated to drop off/pickup activity, or "curbing" activity, and three "through" lanes. However, based on observations of the curbfront during the inventory process of this Master Plan Update, the second lane is used for dropping-off and pick-up activity as well. The curbfront roadway primarily services private automobiles, with limited taxi and limo activity drop-off, and occasional courtesy shuttle drop-off.

Terminal curbfront roadway requirements are generally based upon accommodating peak hour activity for enplanement and deplanements. For the purposes of this analysis, estimations of required linear curb length are based upon curbfront estimation methodology contained within Airport Cooperative Research Program (ACRP) Report 25, *Airport Passenger Terminal Planning and Design*. This approach was deemed sufficient for the needs of DAB due to the existing and projected peak hour activity of approximately six air carrier operations in the peak hour by the end of the planning period.

4.4.2.1. Assumptions and Methodology

For this analysis, a spreadsheet-based approach was utilized based upon the methodology contained within ACRP Report 25, *Airport Passenger Terminal Planning and Design*. As a precursor to this analysis, the overall vehicular mode split was estimated based upon observations performed during the inventory process, as well as based upon ACRP industry guidance on general mode splits for airports. **Table 4.17** below shows the assumed vehicular mode split for DAB utilized in the development of curbfront roadway requirements.

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[15] Florida Department of Transportation (FDOT) Florida Traffic Online Web Application

[16] 2012 FDOT Quality/Level of Service Handbook Tables

Table 4.17 - Assumed Mode Split	
Passenger Mode	**Percentage**
Private Auto – Curbfront Drop-Off/Pick-Up	49%
Private Auto – Straight to Parking	41%
Taxi	5%
Limo	1%
Courtesy Shuttle	3%
Public Bus	1%
Total	100%
Source: ACRP Report 40; Kimley-Horn Observations, July 2017.	

This mode split was utilized to estimate the number of vehicles that would be utilizing the curbfront roadway for drop off and pick up activity by applying the applicable mode split percentages to the number of peak hour arriving and departing passengers. Assumptions on vehicle occupancies of 1.2 passengers per private auto and 1.5 passengers per taxi were made based upon airport industry guidance in ACRP Report 40 – *Airport Curbside and Terminal Area Roadway Operations*.

The curbfront roadway was divided into two main sections: arrivals and departures. The existing linear feet of available curbfront roadway was estimated using recent aerial imagery available from Google Earth. Approximately 200 feet is available for drop off (departures) and 150 feet is available for picking up (arrivals). **Table 4.18** below highlights the assumed peak hour demand for arriving and departing vehicular activity at the curbfront, taking into account the vehicular occupancy and mode split assumptions described previously.

Table 4.18 - Peak Hour Curbfront Vehicular Demand								
	2022		**2027**		**2032**		**2037**	
	Dep	**Arr**	**Dep**	**Arr**	**Dep**	**Arr**	**Dep**	**Arr**
Private Auto Curbfront	145	145	161	161	181	181	202	202
Taxis*	15	--	16	--	18	--	21	--
Limos*	3	--	3	--	4	--	4	--
Courtesy Shuttles*	9	--	10	--	11	--	12	--
Public Bus	1	1	2	2	2	2	2	2
Source: Kimley-Horn analysis, 2018. **Note: Taxis, limos and shuttles removed from arrival curb, as these vehicles pick up passengers at the ground transportation door.*								

4.4.2.2. Curbfront Requirements

These estimated hourly vehicular demands as shown above in **Table 4.18** were utilized in the ACRP Report 25 curbfront requirements model, which takes into account hourly vehicle demands by mode, and assumptions on dwell time and vehicle length, to derive an estimated level of service (LOS) for curbfront roadway operations. A general guideline for most airports in the development of curbside roadway operations is to achieve LOS "C" during peak period operations. A visual example of airport curbside LOS is shown in **Exhibit 4.4**.

Exhibit 4.4 - Airport Curbfront Roadway Level of Service Guidelines – ACRP Report 40

Level of Service A

Level of Service B

Level of Service C

Level of Service D

Level of Service E

Source: LeighFisher.

The curbside roadway requirements in terms of estimated length and LOS are shown below in **Table 4.19.** Without any improvements or modifications by the end of the planning period, it is anticipated that the departures curbside roadway will remain at LOS A for the majority of the period, while the arrivals curb will begin to experience LOS C during peak periods near the end of the period. While these conditions are still within general parameters for airport curbside planning, improvements to ease congestion may be necessary as the Airport traffic levels increase during peak periods.

Table 4.19 - Curbfront Length Requirements

	2022		2027		2032		2037	
	Dep	Arr	Dep	Arr	Dep	Arr	Dep	Arr
Capacity Ratio	0.38	0.43	0.48	0.48	0.48	0.54	0.53	0.6
Level of Service	A	A	A	A	A	B	B	C
Required Curbfront Range for LOS C (ft)	118-139	110-118	131-155	111-131	147-174	124-147	164-194	138-163

Source: Kimley-Horn analysis, 2018.
ACRP Report 25 Terminal Planning Model – Curb Requirements Module

Aside from potential geometric modifications to increase the available curbfront length for arrivals, non-construction related improvements such as active curbfront dwell enforcement can be utilized to ensure vehicles are not loitering and occupying curbside space during peak periods. Other strategies could include relocation of existing non-passenger vehicle uses of the curbside, such as Airport police vehicles.

4.4.2.3. Transportation Network Company Considerations

It is anticipated that as TNCs such as Uber/Lyft continue to gain popularity in Volusia county, there may be a gradual mode shift towards more pick-up and drop off activity by these providers, which adds congestion to Airport curbfront roadways. It is recommended the Airport continue monitoring the level of TNC activity at the existing curbfront and explore options for alternative or designated locations to accommodate TNC activity, such as the end of the curbfront or the ground transportation curbfront area. Potential alternatives for spatial accommodation of these providers were addressed in the Alternatives Analysis.

4.4.3. RENTAL CAR FACILITIES

Airport rental car facilities consist of three basic components: (1) customer service counters where customers complete rental agreements and pick-up keys; (2) ready and return (ready/return) car facilities where cars are picked-up and dropped off by customers; and (3) service and storage facilities where cars are refueled, cleaned, and washed. At the Airport, rental car vehicles are stored and serviced in remote-Airport properties managed by the rental car companies. The following summarizes space requirements for the ready/return and customer service counters that are located adjacent to the terminal. It is assumed the rental car companies will continue to store and service vehicles in remote locations, and therefore, requirements for these areas were not determined.

4.4.3.1. Methodology

A survey of the rental car industry at DAB was accomplished to determine future rental car needs, which provided detailed information on rental car transactions. Daily rental car transactions for the design week and hourly transactions for the design day were used to establish existing facility requirements. It was assumed that growth in transactions and facility requirements would be directly related to enplaned passenger growth.

4.4.3.2. Customer Service Counters

Based on the survey, it was determined that the peak rental day was Sunday with 127 cars rented during the peak hour between 10:00 A.M. and 11:00 A.M. Based on industry standards, the average time at the counter to complete a transaction is seven minutes. Rental car planning incorporates an industry standard surge factor of 125 percent to accommodate unanticipated peaks. Applying the formula to the customer counters suggests the existing demand is 22 counter positions. The projected customer service counter demand for each forecast year and projected enplanement level is presented in **Table 4.20.**

Table 4.20 - Projected Counter Demand

	Enplanements	Counter Positions
Base Year - 2017	359,820	22
2022	403,770	25
2027	450,425	27
2032	504,199	29
2037	565,587	33

Source: Kimley-Horn, 2018.

4.4.3.3. Ready/Return Facilities

Peak week rental and return information was provided by the rental car agencies, and is presented in **Table 4.21**. Based on the survey it was determined that Sunday was the peak rental day with 632 cars rented and 840 cars returned.

Table 4.21 - Design Week Rentals and Returns

	Rentals	Returns
Sunday	632	840
Monday	661	588
Tuesday	555	420
Wednesday	547	540
Thursday	619	535
Friday	619	596
Saturday	633	687

Source: Kimley-Horn, 2018.

It is a common industry standard that the number of parking spaces required in a rental car ready/return area be equal to 2.5 times the number of rentals plus the number of returns in the peak hour on the design day. At DAB the peak hour rental factor was reduced to 1.75 because of the unusual spikes in rental demand due to race day and two other large events. **Table 4.22** presents the peak hour rental and return information for the design day. Applying the formula to the rental car ready/return area suggests that the existing demand for ready/return is 325 spaces. The projected ready/return space demand for each forecast year and enplanement level is presented in **Table 4.23**.

Table 4.22 - Existing Ready / Return Demand	
Rental Demand Factor	**1.75**
Peak Hour Rentals	133
Peak Hour Returns	93
Return Demand Factor	1.0
Estimated ready / return	325
Source: Kimley-Horn, 2018.	

Table 4.23 - Projected Ready / Return Demand		
	Enplanements	**Spaces**
Base Year - 2017	359,820	325
2022	403,770	365
2027	450,425	407
2032	504,199	456
2037	565,587	511
Source: Kimley-Horn, 2018.		

4.4.4. GROUND TRANSPORTATION

The Airport has a separate ground transportation pick-up area located on the east end of the terminal past the baggage claim devices. This area has a dedicated curbfront roadway for taxi and shuttle pick-up, approximately 200 feet in length, in addition to three (3) parking stalls for motor coach buses and shuttles. A taxi staging lane is located upstream of the ground transportation curb for taxis to hold before being queued up at the curbfront.

Currently, DAB does not have a large presence of ground transportation providers or scheduled shuttle activity. In addition, TNCs such as Uber or Lyft do not pick up at the ground transportation curbfront, rather pick up on the main arrivals curb. However, as popularity of TNCs continues to increase, there could be the potential to specifically accommodate these vehicles at the ground transportation curb to alleviate congestion on the main curbfront roadway.

4.5. VEHICULAR PARKING FACILITIES

The purpose of this section is to estimate future requirements for public parking, employee parking and rental cars. The following are definitions of terms that are referred to throughout this analysis:

- **Effective Parking Supply** is the number of spaces required to ensure that parking patrons can find available parking without a time-consuming search for the last available space. It includes the amount of parking spaces available for use and a cushion to reduce search time. Not every physical space may be available for use due to improperly parked vehicles, temporary equipment storage, maintenance work etc. For this study, effective supply equals 95 percent of total supply which will result in a recommended parking supply number that is 5 percent over demand.
- **Parking Demand** is the number of spaces required to ensure that parking spaces are available to satisfy parking needs at specific planning periods.
- **Absolute Peak Day** is the day of the year with the highest occupancy. The Airport should be able to accommodate the absolute peak day demand, but available parking options may be limited. Peak day parking is comparable to a church on Easter Sunday. The church may be able to

accommodate all patrons but they may have to bring in additional seating. On the absolute peak day, for example, parking patrons seeking long-term parking may be forced to park in an overflow lot or in more expensive short-term parking.

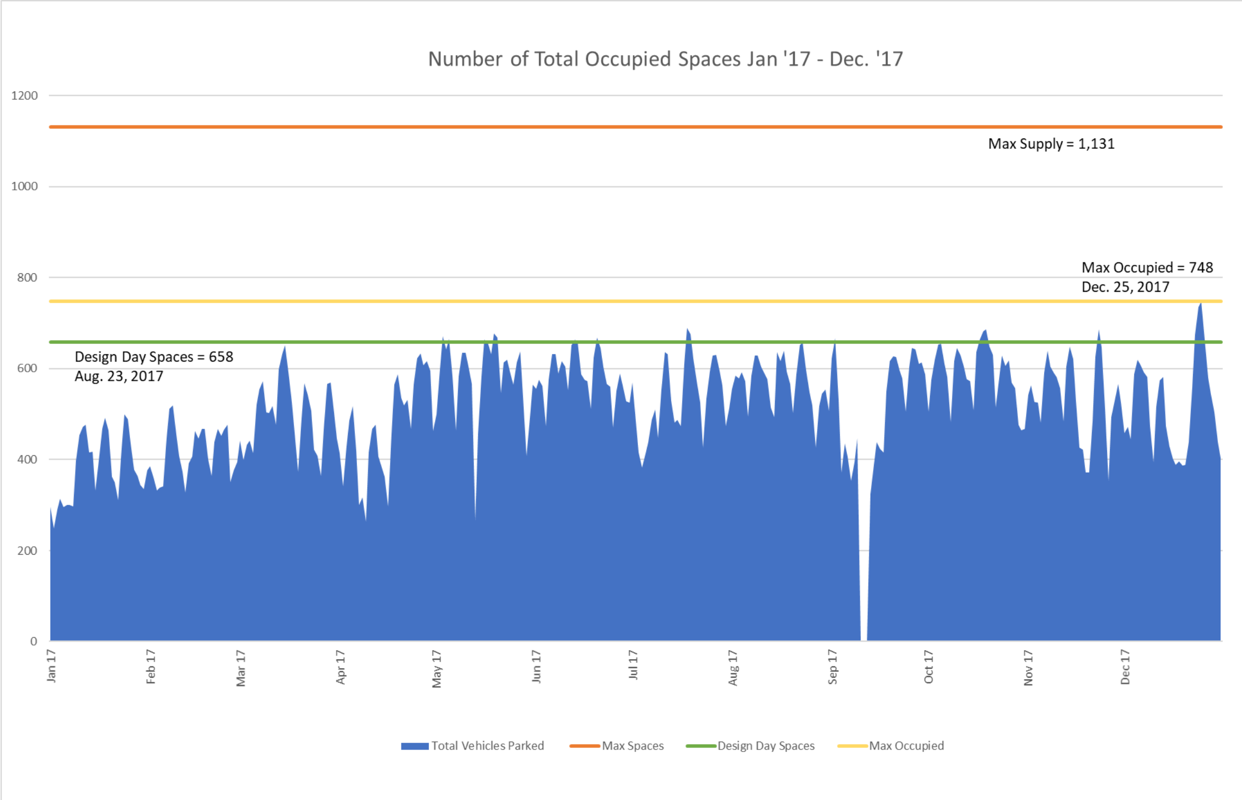
- **Design Day**. On the design day, the full range of parking options should be available to parking patrons. It is not always economically prudent to size parking facilities to accommodate the absolute peak day parking when expensive multi-level parking structures are required. It is a customary industry practice to select a design day to size parking structures to satisfy parking demand 90 percent of the days of the year and provide less expensive surface parking for the remaining 10 percent of the days.
- **Parking Demand Ratios** are the number of spaces required to accommodate 1,000 annual passenger enplanements. Ratios are typically calculated for the design day and the absolute peak day which will experience different rates of occupancy.
- **Midday Occupancy** is typically the time of day with the highest parking occupancy at the Airport.
- **Overnight Inventory** is the parking occupancy at night when all air travel has been completed. This represents the lowest parking occupancy for any given day. The Airport collects overnight inventory for each day of the year.

4.5.1. PARKING DEMAND RATIOS

The Airport currently provides a total of 1,131 public parking spaces with a designated short- and long-term lot. Parking data provided by the Airport was used to calculate parking demand ratios for the Absolute Peak Day and the Design Day. The Airport provided the overnight data for each day of the year for 2017.

Exhibit 4.5 depicts the overnight inventory from January 2017 to December 2017. Based on this information the absolute peak overnight inventory occurred on December 25, 2017, with 748 occupied spaces. The 20th highest occupancy was selected as the Design Day and occurred on August 23, 2017, with 658 occupied spaces.

Exhibit 4.5 - Overnight Parking Inventory



The Airport does not collect midday occupancy data. Based on experience and trends seen in other similar airports, the midday occupancy typically increases 20 percent above overnight inventory. Based on this experience, the overnight inventory for the Design Day and the Absolute Peak Day was increased by 20 percent to estimate existing parking demand. The calculated parking demand ratios represent the number of spaces required per 1,000 annual enplanements.

The estimated parking occupancy of 790 spaces was compared to 2017 enplanements thus determining the Design Day parking ratio of 2.20 occupied parking spaces per 1,000 annual enplanements. Using the same approach, the calculated parking demand ratio for the Absolute Peak Day is 2.50 spaces per 1,000 annual enplanements. The results are presented in **Table 4.24**.

Table 4.24 - Parking Demand Ratio

	Overnight Occupancy	Projected Occupancy	Parking Demand Ratio
Design Day	658	790	2.20
Absolute Peak Day	748	898	2.50
2017 Enplanements	359,820		
Source: Kimley-Horn.			

Short-term parking demand can be estimated by subtracting the overnight inventories from the midday occupancy. Since midday occupancy was estimated based on experience at other airports, the estimate of short- and long-term parking demand is based on the same methodology and should be considered an estimate based on experience and trends rather than data specific to DAB. This approach suggests existing parking demand is 132 spaces less than the total parking demand on the Design Day and 150 spaces less on the Absolute Peak Day.

4.5.2. FUTURE PARKING DEMAND

Parking ratios are applied to forecast horizon years to determine future parking demand for the Design Day and Absolute Peak Day. Based on a total parking supply of 1,131 spaces the existing parking system had a surplus of 284 spaces on the Design Day in 2017, growing to a deficit of 167 spaces in 2037. In 2017, the Absolute Peak Day was adequate to serve the needs of the Airport. However, the deficit increases to 337 by the end of the period for the Absolute Peak Day. These demands are shown in **Table 4.25** and **Table 4.26.**

Table 4.25 - Parking Demand for Design Day

	Projected Enplanements	Projected Parking Demand	Surplus/(Deficit)*
2017	359,820	790	284
2022	403,770	886	188
2027	450,425	989	86
2032	504,199	1,107	(33)
2037	565,587	1,242	(167)

Source: Kimley-Horn.
**Calculated based on Effective Parking Supply of 95% of actual supply*

Table 4.26 - Parking Demand for Absolute Peak Day

	Projected Enplanements	Projected Parking Demand	Surplus/(Deficit)*
2017	359,820	898	176
2022	403,770	1,008	67
2027	450,425	1,124	(50)
2032	504,199	1,258	(184)
2037	565,587	1,412	(337)

Source: Kimley-Horn.
**Calculated based on Effective Parking Supply of 95% of actual supply*

4.5.3. PARKING FACILITY SUMMARY

It is anticipated that an additional 170-200 spaces will be required by the end of the planning period to accommodate Design Day parking demand. As mentioned previously, the goal is not to accommodate the Absolute Peak Day of demand, but rather the Design Day. However, should the Absolute Peak Day be planned for, an additional 337-350 spaces would be necessary by the end of the planning period.

4.6. GENERAL AVIATION FACILITY REQUIREMENTS

GA facilities are those that generally support all aviation activity that is not commercial passenger or military related. For this analysis, GA facility requirements that were addressed include GA apron space and storage hangar space. These analyses were intended to be a general guide for the spatial needs of the varying tenants and GA users, as it is recognized most of the GA activity is driven by the development needs of flight training institutions and FBOs. This planning level analysis was not intended to supersede these entities' own planning and business development efforts, but rather consider breakdowns of activity based on storage location and type of activity (based vs itinerant) to obtain aggregated estimates of space to allocate for GA users.

4.6.1. AIRCRAFT APRON AND TIE-DOWNS

Apron areas are utilized for based and itinerant aircraft parking. Itinerant aircraft are expected to require additional space while based aircraft typically require less space for longer periods of time than itinerant aircraft as based aircraft are stored and not rearranged on the apron as often.

In recognition that there are relatively distinct categories of GA flight operations at DAB, especially flight school operations, apron area requirements were developed for three categories: flight school aprons, FBO aprons, and non-FBO aprons. All three apron areas were combined to determine an overall apron requirement that was then compared with the existing apron area available. For this analysis, it was assumed that 65 percent of based aircraft, and 65 percent of itinerant aircraft, would be stored in apron tie-down areas. It was also assumed that an additional 30 percent of the apron required would be added to account for aircraft circulation areas on the apron.

4.6.1.1. Flight School Aprons

Utilizing Airport records of based aircraft, it was determined that flight school aircraft represented approximately 60 percent of the overall based aircraft. The existing flight school aprons taken into consideration were PEA, ERAU, and ATP Flight School totaling 594,042 square feet. **Table 4.27** shows the summary of flight school apron parking requirements. By the end of the planning period, there is anticipated to be a deficiency of 100,808 square feet.

Table 4.27 - Flight School Aircraft Apron Parking

Forecast Year	Number of Aircraft	Apron Required (sq ft)	Circulation Area Required (sq ft)	Total Apron Required (sq ft)	Existing Apron (sq ft)	Net Surplus/(Deficiency) (sq ft)
2022	136	461,000	138,300	599,300	594,042	(5,258)
2027	143	485,500	145,650	631,150	594,042	(37,108)
2032	149	508,000	152,400	660,400	594,042	(66,358)
2037	157	534,500	160,350	694,850	594,042	(100,808)

Source: Kimley-Horn analysis, 2018.

4.6.1.2. FBO Aprons

The apron areas included for the category of FBO apron parking were Sheltair, ATP - Jet Center, and Yelvington Jet Aviation, Inc. The same general methodology as previously described was utilized for determining FBO apron needs. Itinerant aircraft traffic utilizing apron area was also included in determining FBO apron requirements, By the end of the planning period, it is anticipated that FBO apron space will be nearly at capacity as shown in **Table 4.28.**

Table 4.28 - FBO Aircraft Apron Parking									
Forecast Year	Number of Aircraft		Apron Required (SF)			Circulation Area Required (sq ft)	Total Apron Required (sq ft)	Existing Apron (sq ft)	Net Surplus/ (Deficiency) (sq ft)
	Based	Itinerant	Based	Itinerant	Total				
2022	29	29	95,500	134,400	229,900	68,970	298,870	343,887	45,017
2027	30	30	100,500	140,500	241,000	72,300	313,300	343,887	30,687
2032	32	31	105,200	146,600	251,800	75,540	327,340	343,887	16,547
2037	34	33	110,700	152,800	263,500	79,050	342,550	343,887	1,337

Source: Kimley-Horn analysis, 2018.

4.6.1.3. Non-FBO Apron

Non-FBO apron space was categorized by apron space not operated by either a flight training institution or a FBO. The apron areas inclusive of this category include the apron space occupied by corporate entities such as Brown and Brown, and the Southeast Ramp. By the end of the planning period, it is anticipated there will be a surplus of 124,730 square feet for Non-FBO apron space as shown in **Table 4.29.**

Table 4.29 - Summary of Non-FBO Aircraft Apron Parking						
Forecast Year	Number of Aircraft	Apron Required (sq ft)	Circulation Area Required (sq ft)	Total Apron Required (sq ft)	Existing Apron (sq ft)	Net Surplus/(Deficiency) (sq ft)
2022	18	75,600	22,680	98,280	255,770	157,490
2027	19	79,380	23,814	103,194	255,770	152,576
2032	20	83,160	24,948	108,108	255,770	147,662
2037	22	90,720	27,216	117,936	255,770	137,834

Source: Kimley-Horn analysis, 2018.

4.6.1.4. Apron Area Requirements Summary

Facility requirements for apron space as detailed above have been developed primarily on a numerical basis incorporating assumptions of breakdowns of GA users. Looking at the requirements on an aggregate scale, there is an overall net surplus of apron space at the Airport through the planning period, as shown in **Table. 4.30.** However, by separating the analysis into separate categories of GA user as they apply specifically to DAB, there is likely a need for additional apron space to accommodate anticipated growth in flight school operations by ERAU and other flight school institutions. This need is reflective of the current economic climate for aviation, as airlines are seeking to replace a retiring workforce of senior pilots and, in addition, international airlines are continually forming agreements with flight training institutions in favorable climates such as Florida to provide training to foreign student pilots.

Strategies for accommodating this need for flight training apron space could include new construction of apron space to accommodate the need but could also likely involve reconfiguration and reallocation of existing apron areas, such as the Southeast Ramp, to accommodate the anticipated need for space. Strategies to meet these requirements were addressed in the Alternatives Analysis.

Table 4.30 - Summary of Total Parking Demand						
Forecast Year	Based and Itinerant Apron Requirements (Demand)			Total Apron Required (sq ft)	Total Existing Apron (sq ft)	Net Surplus/(Deficiency) (sq ft)
	Flight School	FBO	Non-FBO			
2022	599,300	298,870	98,280	996,450	1,193,699	197,249
2027	631,150	313,300	103,194	1,047,644	1,193,699	146,055
2032	660,400	327,340	108,108	1,095,848	1,193,699	97,851
2037	694,850	342,550	117,936	1,155,336	1,193,699	38,363
Source: Kimley-Horn analysis, 2018.						

4.6.2. AIRCRAFT HANGARS

Similar to the development of apron space requirements, hangar requirements were classified into categories based on the general type of hangar. The aggregate hangar space requirement was delineated into requirements for T-hangars, FBO-conventional hangars, and FBO-non-conventional hangars, which are defined below:

T-Hangars – These types of hangars are individual storage units typically used for single-engine, or light twin engine classified as ADG I. T-hangars refer to the overall shape of the unit and are generally grouped into linear buildings containing multiple units in a row.

FBO-Conventional Hangar – This type of hangar is a large building intended to store multiple aircraft in protective storage, with a large door for aircraft to pass through. Conventional FBO hangars are operated by a provider of public aviation services who generally cater to both based and itinerant aircraft at the Airport.

Non-FBO-Conventional Hangar – This type of hangar is similar to a conventional FBO hangar in structure, but primarily houses aircraft that are operated by the owner or operator of the hangar. These types of hangars can include governmental aviation divisions, private aviation companies, or corporate aviation departments.

For the purposes of this study, the following assumptions about the GA hangar facilities were made based on a review of existing storage locations of based aircraft as well as anecdotal information from discussions with the FBO tenants in the inventory process.

- **Based aircraft**: 36 percent of would be stored in hangars, with 64 percent being stored in apron tie-down areas
    - 40 percent of based aircraft would utilize T-hangars
    - 30 percent of based aircraft would use FBO-conventional hangars
    - 30 percent of based aircraft would be stored in Non-FBO-conventional hangars
- **Itinerant aircraft**: 36 percent would be stored in hangars, with 64 percent being stored in apron tie-down areas
    - 100 percent of itinerant aircraft are assumed to be stored in FBO-conventional hangars

4.6.2.1. Parking Area Requirements

Conventional hangar sizing demand requirements were based upon application of a weighted average square footage for both based and itinerant aircraft. For both types, an average length wingspan and wingtip clearance were calculated for ADGs I, II, III, and helicopters. This average parking area requirement was compared to the percent of fleet mix estimated to be in that category, resulting in a weighted average parking area as shown below in **Table 4.31** and **Table 4.32.**

Table 4.31 - Based Aircraft Parking Area Requirements

Airplane Design Group (ADG)	Average Length (ft)	Average Wingspan (ft)	Additional Clearances (ft)	Average Parking Area Required (sq ft)	Percentage Fleet Mix	Weighted Average Parking Area (sq ft)
I	36	40	5	2,300	85%	2,000
II	61	61	10	6,561	6%	400
III	93	93	10	12,769	6%	800
Helicopter	43	36	12	4,020	3%	100
						Weighted Average: 3,300

Source: Kimley-Horn analysis, 2018.

Table 4.32 - Itinerant Aircraft Parking Area Requirements

Airplane Design Group (ADG)	Average Length (ft)	Average Wingspan (ft)	Additional Clearances (ft)	Average Parking Area Required (sq ft)	Percentage Fleet Mix	Weighted Average Parking Area (sq ft)
I	36	40	5	2,300	60%	1,400
II	61	61	10	6,561	30%	2,000
III	93	93	10	12,769	10%	1,300
Helicopter	43	36	12	4,020	0%	0
						Weighted Average: 4,700

Source: Kimley-Horn analysis, 2018.

The higher weighted average for itinerant aircraft accounts for an assumption that there will be more ADG II and III aircraft operating in an itinerant fashion as compared to ADG I. T-hangars were measured and the average area per hangar was determined to be 1,200 square feet.

4.6.2.2. Hangar Demand by Type

In the base year, 211 aircraft were based at the Airport, and this number is anticipated to grow to 262 aircraft through the planning period. By factoring in assumptions on hangar versus apron storage locations, it is estimated there will be a need for 122 aircraft to be stored in hangars. **Table 4.33** shows the GA aircraft hangar demand for based and itinerant aircraft, following the assumptions mentioned previously.

The assumptions on storage location were applied to determine how many aircraft would be stored in T-hangars, FBO-conventional hangars, and non-FBO-conventional hangars. **Table 4.34** shows the GA demand by hangar type.

Table 4.33 - General Aviation Aircraft Hangar Demand					
Forecast Year	Total Based Aircraft	Based Aircraft Stored in Hangars	Total Itinerant Aircraft	Itinerant Aircraft Stored in Hangars	Total Aircraft Stored in Hangars
2022	226	82	68	24	106
2027	238	86	71	25	111
2032	249	90	74	26	116
2037	262	95	76	27	122
Source: Kimley-Horn analysis, 2018.					

Table 4.34 - General Aviation Aircraft Demand by Hangar Type					
Forecast Year	Hangar Type				
	T-Hangars	FBO-Conventional		Non-FBO-Conventional	TOTAL
		Based Aircraft	Itinerant Aircraft		
2022	33	25	24	25	107
2027	34	26	25	26	111
2032	36	27	26	27	116
2037	38	29	27	29	123
Source: Kimley-Horn analysis, 2018.					

4.6.2.3. Hangar Space Requirements

Based upon the number of aircraft in hangars as detailed above in **Table 4.34**, these numbers were multiplied by the weighted average square feet per aircraft for the applicable hangar type to obtain an aggregate hangar space requirement for the three types of hangars. The hangar space requirements by type are detailed in the following tables.

Table 4.35 - T-Hangar Space Requirements					
Forecast Year	Required Based Aircraft	Existing T-Hangars	Existing Area (sq ft)	Net Surplus/(Deficiency)	
				T-Hangars Available	Area (sq ft)
2022	33	51	61,200	21	25,200
2027	34	51	61,200	25	30,000
2032	36	51	61,200	29	34,800
2037	38	51	61,200	33	39,600
Source: Kimley-Horn analysis, 2018.					

Table 4.36 - FBO-Conventional Hangar Space Requirements						
Forecast Year	Required Based Aircraft	Required Area (SF)	Required Itinerant Aircraft	Required Area (sq ft)	Existing Area (sq ft)	Net Area Surplus/(Deficiency) (sq ft)
2022	54	91,800	24	55,200	105,845	(41,155)
2027	57	96,900	25	57,500	105,845	(48,555)
2032	60	102,000	26	59,800	105,845	(55,955)
2037	63	107,100	27	62,100	105,845	(63,355)
Source: Kimley-Horn analysis, 2018.						

Table 4.37 - Non-FBO-Conventional Hangar Space Requirements				
Forecast Year	Required Based Aircraft	Required Area (sq ft)	Existing Area (sq ft)	Net Area Surplus/(Deficiency) (sq ft)
2022	54	91,800	73,980	(17,820)
2027	57	96,900	73,980	(22,920)
2032	60	102,000	73,980	(28,020)
2037	63	107,100	73,980	(33,120)
Source: Kimley-Horn analysis, 2018.				

4.6.2.4. Hangar Requirements Summary

On aggregate scale, there is an identified need based on numerical analysis to provide for additional hangar space at DAB through the planning period. Based on the requirements, the need translates to approximately 100,000 square feet of conventional hangar space, or approximately three average-sized conventional hangars, with one being non-FBO, and two FBO hangars. This requirement aligns with conversations with FBO tenants during the inventory process that identified not necessarily an immediate need for additional space, but more growing desire for larger hangars to accommodate larger aircraft such as the G550 and G650. In addition, one FBO indicated they were currently full and did not have room in the hangar to accommodate new based aircraft.

With regard to non-FBO-conventional hangar space, the identified spatial requirement of approximately 33,000 square feet represents the recommendation that space be allotted for a potential new non-FBO entrant at DAB, such as a corporate aviation department hangar similar to NASCAR or Brown and Brown.

4.7. AIRPORT SUPPORT FACILITIES

This section addressed requirements for support facilities for the ongoing operations at DAB, including fuel storage, air cargo, maintenance, and ARFF.

4.7.1. FUEL STORAGE

As discussed in the inventory chapter, there are three major organizations at DAB providing fuel services to the flying public, which are Sheltair, Yelvington Jet Aviation, Inc., and ATP - Jet Center. Their existing storage capacities are shown in **Table 4.38.**

Table 4.38 - Fuel Storage Facilities				
Tenant	Jet A (gal)		Avgas (gal)	
	Tank	Truck	Tank	Truck
Sheltair	120,000	N/A	40,000	N/A
ATP - Jet Center	10,000	3,000	10,000	1,200
Yelvington Jet Aviation, Inc.	24,000	12,000	17,000	1,950
Source: Tenant Interviews (2017).				

Sheltair has the largest fuel capacity mainly since it holds a contract with DAB to provide fueling services to the commercial passenger carriers as well as a contract to provide fuel to ERAU. The FBOs were interviewed during the inventory process and expressed that their fuel storage needs were adequately met at the time. The purpose of this fuel requirements section is not to fully address specific FBO fueling needs, as these needs are specific to each FBO's business development. However, as aircraft activity grows at DAB, FBOs may need to consider expansion of their farm or receive more frequent fuel deliveries to accommodate growth in activity or expansion of air carrier service. As Sheltair provides a majority of the fueling service at DAB, they would be most likely to consider expansion to their fuel farm and/or new air carrier service.

A potential fueling requirement as growth in flight training operations occurs could be the acquisition of additional fuel trucks to potentially support reconfigured or expanded apron space for flight training operations. A major shift in the fueling capability such as installation of a hydrant system is not anticipated to be necessary for DAB.

4.7.2. CARGO FACILITIES

Nearly all of the air cargo activity at DAB is belly-haul cargo, meaning that shipments are carried in the cargo compartments or “bellies” of scheduled air carrier operations. This is heavily attributed to the proximity of several large airports in the central Florida region within easy trucking distance of Daytona that are served by traditional all-cargo carriers such as UPS and FedEx, including MCO and JAX.

Annual air cargo at DAB has been rising steadily since the Great Recession, but has not returned to pre-recession levels. Total 2017 activity air cargo activity was 281,000 pounds, compared to pre-recession highs of 328,390 pounds in 2007. Based on projected air cargo activity through the planning period, air cargo activity by annual weight is expected to approach over 400,000 pounds annually by 2037. A key element in the need for air cargo space could be entrant of a new air carrier. Currently, the only cargo user of the air cargo facility is Delta, which leases a portion of the space, with the remainder of the building used by DAB maintenance personnel and equipment. A new entrant carrier wanting space for belly-haul cargo operations could potentially trigger the need to reconfigure the cargo building for more dedicated cargo space, which would displace the existing maintenance operation.

4.7.3. AIRPORT MAINTENANCE

Airport maintenance equipment and personnel are currently housed within the air cargo building located on the northern airfield area adjacent to Sheltair hangars. Approximately half of the air cargo building is dedicated to Delta Air Cargo for belly-haul cargo purposes, while Airport maintenance has the rest of the space. As described above, it is anticipated there could be a need for additional air cargo space within the existing air cargo building, should air cargo continue growing or should another airline enter the DAB market. For these reasons, it was recommended that an alternative Airport maintenance facility site be explored as part of the alternatives development phase of this study.

4.7.4. AIRPORT RESCUE AND FIREFIGHTING

DAB is a Part 139 certificated Airport, and as such, is required to provide ARFF services. The required level of these services is based upon the specific ARFF index of the airport, which is based upon the types of commercial aircraft operating into DAB. The index determination is made by the type of aircraft operating at least five daily departures. The indices are below in **Table 4.39.**

Table 4.39 - ARFF Index Determination

ARFF Index	Aircraft Length
A	less than 90 feet in length.
B	at least 90 feet but less than 126 feet in length.
C	at least 126 feet but less than 159 feet in length
D	at least 159 feet but less than 200 feet in length
E	at least 200 feet in length

Source: CFR Part 139.

As of 2018, Delta and JetBlue operate the largest aircraft on a scheduled basis at DAB. Between these two airlines, an average of six daily departures occur on MD-88 (148 feet) and Airbus A320 (146 feet). As discussed earlier, it is anticipated the MD-88 will be retired from aircraft fleets and will be replaced for the most part by Airbus A321 and Boeing 737-900 aircraft, which are under 159 feet in length. Based on this fleet mix, the ARFF index for DAB is, and will remain, “C”.

Index C requirements include the following three vehicles:

- One vehicle carrying at least 500 pounds of sodium-based dry chemical, halon 121, or clean agent; or 450 pounds of potassium-based dry chemical and water; and
- Two vehicles carrying an amount of water and commensurate quantity of AFFF so the total quantity of water carried by both vehicles is at least 1,500 gallons.

In 2017, a brand new ARFF station was completed on the site of the former ARFF facility. This facility has four firefighting apparatus bays, which meets the requirements for a Class C facility, and is anticipated to be adequate for the planning period of this study.

4.8. STORMWATER/DRAINAGE

A significant tandem component of this Master Plan Update was a comprehensive Stormwater/Drainage Master Plan (SWMP) for the Airport which, serves as an update to a previous stormwater model last modified in November 2012. Precedents for this SWMP included the desire to pursue development of the south parcels along Beville Road, as well as filling of the south detention pond adjacent to the approach of Runway 34, colloquially known as the “South Pond”, to mitigate a wildlife attractant near the runway approach. In order to accommodate future projected stormwater runoff, filling of the South Pond, and obtaining conceptual permitting for development of the south parcels along Beville Road, a SWMP was developed to establish a system of retention ponds and use of existing wetlands in the south parcels to accommodate the future stormwater needs.

A comprehensive existing and future SWMP report and model have been developed and is included as Appendix 1 of this Master Plan Update.

4.9. FACILITY REQUIREMENTS SUMMARY

This section has analyzed functional facilities of the Airport with regard to their anticipated capability and capacity with respect to the anticipated growth in aviation demand, as well as conformance with regulatory and airport design criteria. The next section of the Master Plan Update involved detailed analysis of alternatives to satisfy the identified facility needs.

5. ALTERNATIVES ANALYSIS

5.1. INTRODUCTION

Following the identification of Airport facility requirements, the next step in the master planning process was the development of alternatives to address the identified requirements from both a numerical demand basis as well as user-identified needs. The analysis presented in this section provided an overview of several approaches that satisfy numerically-driven facility requirements identified in the previous section, as well as facility needs that were expressed by Airport users and stakeholders as part of the master planning process. This section addresses the following:

- Airfield Facility Alternatives;
- Terminal Area Alternatives;
- Ground Transportation Alternatives;
- General Aviation and Support Alternatives;
- South Development Area Alternatives; and
- Preferred Alternative Overview.

The presentation of the alternatives in this section focused on the identification and description of the alternatives that were considered. The overview of the preferred alternative at the conclusion of this section discussed the attributes/constraints that were factored into the decision-making process of the preferred alternative.

5.2. AIRFIELD FACILITY ALTERNATIVES

The following section provides an overview of several alternatives that addressed identified airfield facility needs and enhance airfield safety. In general, the airfield alternatives analysis focused on relatively minor airfield enhancements to the taxiway system and addressing of runway incursion mitigation criteria.

5.2.1. TOUCH-AND-GO CAPACITY

Based on the airfield capacity analysis in the previous section, there is not a substantial need for airfield capacity enhancements with respect to overall ASV. Forecasted annual Airport operations are anticipated to reach approximately 69 percent of ASV by the end of the planning horizon. However, despite the available airfield capacity on an annual basis, the high volume of flight training activity on Runway 7R/25L presents a constraint to the available capacity for repeated “touch-and-go” activity for the numerous flight training entities.

5.2.1.1. Alternative 1 – Third Parallel Runway

An alternative discussed during the course of this Master Plan Update was the implementation of a third parallel runway to accommodate flight training operations. This potential runway was proposed as being located further south from Runway 7R/25L such that simultaneous dual traffic patterns could be accommodated.

A third parallel runway would require considerable lateral separation from Runway 7R/25L, (approximately 2,500 feet) to accommodate two flight training patterns, one of which would involve a non-standard pattern. This would place the alignment of a third parallel runway in the southern portion of the South Development Area and would impact the development potential of the South Development Area, both due to the location of the proposed runway as well as the requisite parallel taxiway and existing airfield connector taxiway.

The training pattern associated with a potential third parallel runway would overlie extensive residential development south of the Airport, which could incur additional noise and other environmental impacts to local residents and properties within that area. This alternative would also require land acquisition west of the South Development Area to accommodate a portion of the proposed runway as well as its RPZ. With the dual traffic patterns, Runway 7L/25R (the primary runway) could effectively be sterilized during periods of dual training patterns.

Due to these factors, implementation of a third parallel runway was not considered viable and tabled from further analysis.

5.2.1.2. Alternative 2 – Use of Other Area Airports

Alternative 2 is an operational alternative in which the use of other area GA airports is maximized to the extent practicable for flight training operations, including “touch-and-go’s”, to alleviate traffic pattern congestion on Runway 7R/25L. Other area airports in relatively close proximity include DeLand-Taylor, Ormond Beach, New Smyrna Beach, and Flagler Executive.

5.2.2. RUNWAY INCURSION MITIGATION CRITERIA

Runway Incursion Mitigation (RIM) is currently a national priority for the FAA, and master planning efforts across the United States are working towards identifying and addressing RIM issues, either through geometric modifications, signage/marking improvements, or a combination of both. As a result of the ongoing Taxiway N rehabilitation project which was under construction as of the publication of this document (2019), certain existing RIM criteria deficiencies identified in the facility requirements chapter will be mitigated via geometric modification, including the following:

- Relocation and realignment of Taxiway P4 such that it is no longer a high energy crossing point and incorporates a standard 90-degree crossing angle.
- Relocation and realignment of Taxiway P5 at a standard 90-degree crossing angle.
- Reconfiguration of the intersection of Taxiways A, N, and W to a three-node intersection, removing the existing Taxiway A node.

DAB has several high energy runway crossings, many of which exist out of necessity due to the Airport’s intersecting runway configuration that must provide parallel taxiway circulation capability. These instances of high energy crossings are necessary links in the taxiway circulation system and are not recommended for removal or modification. The following RIM alternatives are depicted on **Exhibit 5.1.**

5.2.2.1. Taxiway E3/W3

Currently, Taxiways E3 and W3 provide direct access from an apron to Runway 16/34 without requiring a situational awareness turn. The proposed alternative is to relocate Taxiways E3 and W3 such that they do not allow direct apron access from both the Sheltair apron as well as the ERAU apron. The relocation of Taxiway E3 further south also provides a more expeditious exit point for aircraft exiting Runway 16/34, taxiing to the ERAU apron when the airfield is in a crosswind weather configuration.

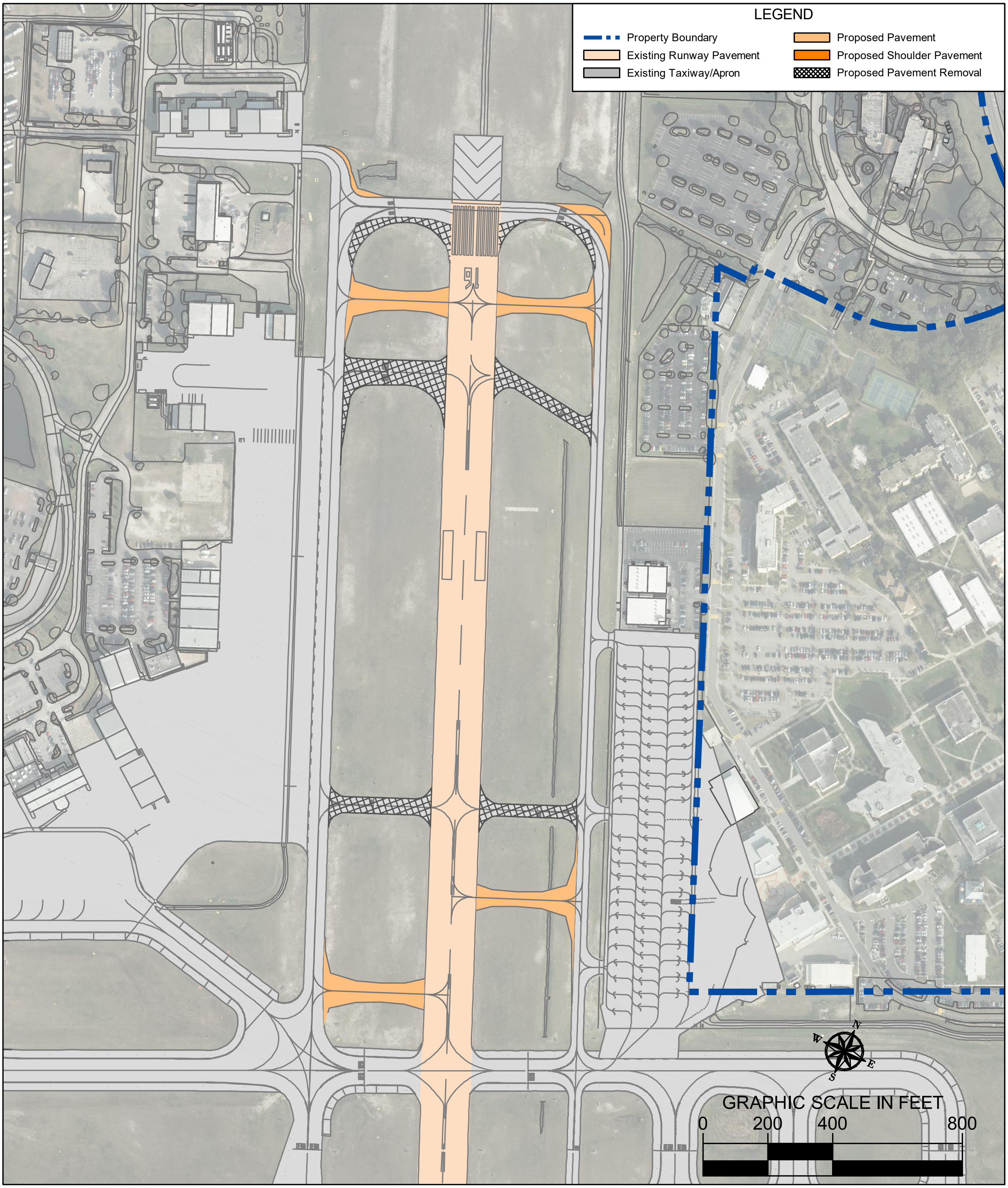


Exhibit 5.1

RIM Criteria Alternatives

5.2.2.2. Taxiway E4/W4

Taxiway W4 currently allows direct access from the private aviation hangar apron north of the Sheltair apron to Runway 16/34. The proposed alternative shifts Taxiway W4 further north such that the direct access from the apron is eliminated. Conversely, this alternative would involve shifting Taxiway E4 to align with the relocated Taxiway W4 such that it becomes a standard 90-degree crossing as opposed to the current acute angle taxiway entrance, which is inconsistent with RIM criteria.

5.2.3. RUN-UP APRON

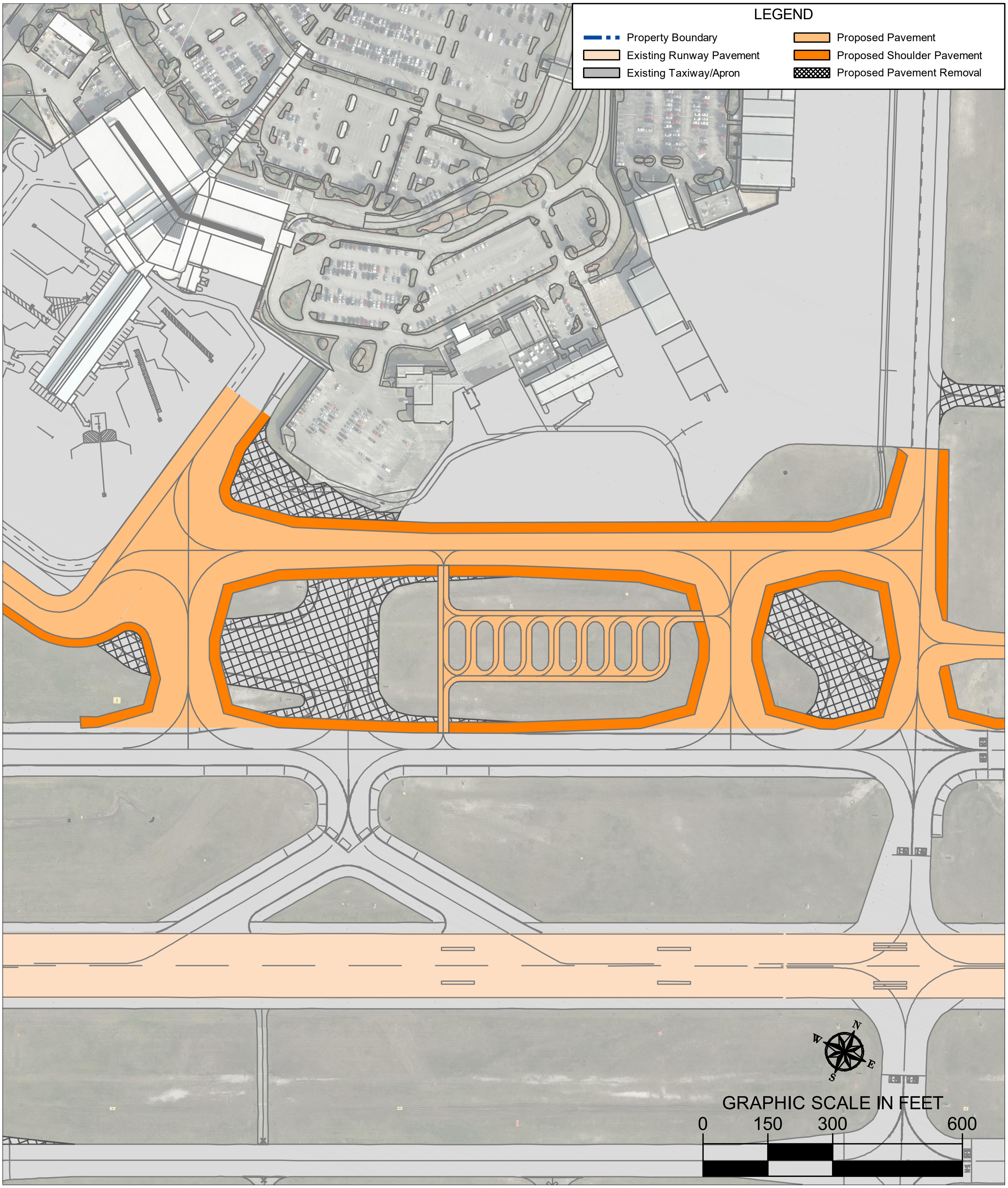
One of the primary airfield constraints as identified by DAB stakeholders and staff is the availability of sufficient apron area to accommodate engine run-ups by flight training aircraft. During peak flight periods, numerous aircraft require space to conduct engine run-ups prior to taking off. The following subsections describe the two alternatives that were considered for the expansion of run-up apron areas.

5.2.3.1. Alternative 1 – Midfield Vicinity

Alternative 1 involves construction of a midfield run-up apron situated between Taxiways A and N south of the existing terminal apron. This alternative provides a central location for aircraft from multiple flight training institutions to conduct engine run-ups with ideal visibility from the ATCT and allows for expeditious access to Runway 7L/25R, which is the primary runway for takeoffs from midfield intersections. Alternative 1 provides up to nine run-up positions for ADG I aircraft and is depicted in **Exhibit 5.2.**

5.2.3.2. Alternative 2 – Taxiway E Vicinity

Alternative 2 proposes a run-up apron adjacent to Taxiway E, east of Runway 16/34 and north of Taxiway N. Placement of the run-up apron in this location would locate the facility inside the ROFA of Runway 16/34. This alternative was developed originally outside of this master planning effort but was vetted by the master plan team and DAB staff as a potential run-up apron expansion location. Due to the placement of the run-up area within the ROFA and challenges related to the sequencing and staging of aircraft on Taxiway E, this alternative was not deemed viable.



DAYTONA BEACH INTERNATIONAL AIRPORT

Exhibit 5.2

Run Up Apron Alternative 1 - Midfield Vicinity

5.3. TERMINAL AREA ALTERNATIVES

The existing passenger terminal was completed in 1992, and contains six departure gates with passenger boarding bridges. Based on discussions with Airport staff, the existing terminal was originally designed to accommodate approximately one million annual passengers (MAP). Based on the FAA approved aviation activity forecast for this Master Plan Update, passenger enplanements are projected to reach approximately 565,000 by the end of the planning horizon, or 1,130,000 annual passengers.

Through most of the planning horizon, there is not anticipated to be significant demand-based improvements required for the terminal facility, as many areas are currently underutilized. Even with forecast passenger growth, the spatial requirements for many traditional passenger terminal functions such as ticketing counters are being reduced with the deployment of mobile technology. Areas that have been identified for alternatives analysis include gate capacity enhancement, airside concessions space, and CBP facilities.

International Terminal Complex

Adjacent to the main passenger terminal on the east side is a building complex known as the International Terminal. This complex contains several buildings, including an international flight hold room and passenger bridge, offices, and classroom spaces currently occupied by various educational tenants, and a vacant flight kitchen. In addition, an employee parking lot is located south of the existing rental car ready/return lot adjacent to the International Terminal apron area. The majority of this site was previously occupied by the former passenger terminal, associated vehicle parking areas, and aircraft apron areas that were replaced in 1992, by the existing passenger terminal.

This area has been identified as part of this alternatives analysis as a site for potential reconfiguration and repurposing. Its current configuration is reflective of a series of miscellaneous improvements and land uses over the past 25 years and does not provide ideal use of space with optimal access to the airfield and taxiway system. Additionally, this area encompasses the existing rental car ready/return lot, which sits on the former parking lot for the old terminal facility. The shape and configuration of this lot is challenging for rental car customers, due to a lack of space for ready/return circulation during peak events. Additionally, the area is not fully gate-secured, which disallows rental car customers to bypass the traditional check-in counter and proceed directly to their car.

5.3.1. CUSTOMS AND BORDER PATROL FACILITY

The U.S. CBP currently occupies space in the International Terminal facility. However, the space is not currently fully utilized, and is remote from the main terminal facility and its passenger amenities such as rental car counters and ground transportation providers.

Scheduled international air carrier service began at DAB in January 2019 while this Master Plan Update was being conducted. At that time, service was provided on twice-weekly flights to and from Toronto, Canada provided by Sunwings Airlines, and arriving passengers were “precleared” so they were not required to proceed through international arriving screening upon arrival at DAB. As part of this Master Plan Update, alternatives were analyzed for the provision of a CBP facility enhancing the viability of the Airport to continue to accommodate scheduled international air carrier service as well as allowing service to grow modestly. During initial discussions with DAB personnel, it was identified that facility planning should focus on the accommodation of one to two daily international flights.

Planning criteria for this facility that were reviewed and considered included the following:

- FAA AC 150/5360.13A;
- ACRP Reports 23 and 25; and
- Assumption of 200-250 passengers per hour demand, consistent with Boeing 737-900/Boeing 737 Max 10 and Airbus A321.

Based on a review of essential, minimum services required for CBP facility for air carrier passenger processing, approximately 20,000 square feet of space was estimated as a footprint for a CBP facility.

5.3.1.1. Alternative 1 – CBP Facility in Existing Landside Terminal

Alternative 1 examined the feasibility of accommodating a CBP facility within the existing passenger terminal, by utilizing generally vacant space in the western portion of the facility. As only half of the ticket counters and supporting baggage processing and offices are occupied by airlines, this alternative assumed that this remaining space can be utilized for CBP processes such as primary and secondary screening, baggage claim, and ancillary uses such as U.S. Fish and Wildlife offices. The facility would be accessed via an elevated walkway on the west side of the concourse originating from the area of Gate 2.

Based on a cursory review of the space available in the terminal, approximately 14,000 square feet is available in the main terminal west of the existing occupied ticket offices, which does not meet the minimum spatial requirements for a CBP facility. Conversion of this ticketing space into CBP uses would also essentially negate any expansion capability of air carrier facilities. Based on these factors, Alternative 1 was not considered to be viable and tabled from further analysis.

5.3.1.2. Alternative 2 – CBP Facility with Terminal Expansion – East of Main Terminal

Alternative 2 (see **Exhibit 5.3)** considered an eastward expansion of the existing passenger terminal from the baggage claim area into the existing ground transportation area. This alternative assumed a single-level international arrivals facility with a dedicated international gate capable of accommodating up to an ADG-V aircraft such as a Boeing 787, has a passenger capacity of 242 passengers. In order to avoid impacts to air carrier gates in the existing concourse, the facility would need to be configured in a manner that would require relocation of the employee parking facility. An additional 177,000 square feet of apron space would need to be constructed to accommodate the aircraft parking area.

In addition to these considerations, the existing rental car ready/return parking lot would need to be shifted further east or relocated elsewhere, which would incur greater walking distances for rental car customers to and from the counters in the terminal building.

5.3.1.3. Alternative 3 – CBP Facility with Concourse Extension

Alternative 3, depicted in **Exhibit 5.4**, considered a CBP facility that could be incorporated into the existing concourse at ground level through an expansion of the concourse. The existing six-gate concourse would be extended to accommodate two additional gates, one of which would be a flex or “swing” gate that would allow for international arrival passengers to exit via a secure corridor to the CBP facilities, while allowing the same gate to be utilized for domestic flights when not in use for international flights. Other elements of Alternative 3 include a secure vertical circulation corridor from the arrival gate to the lower level CBP facility, as well as an elevator and escalator from the lower level back to the main concourse level after passengers have cleared screening and other required processes.

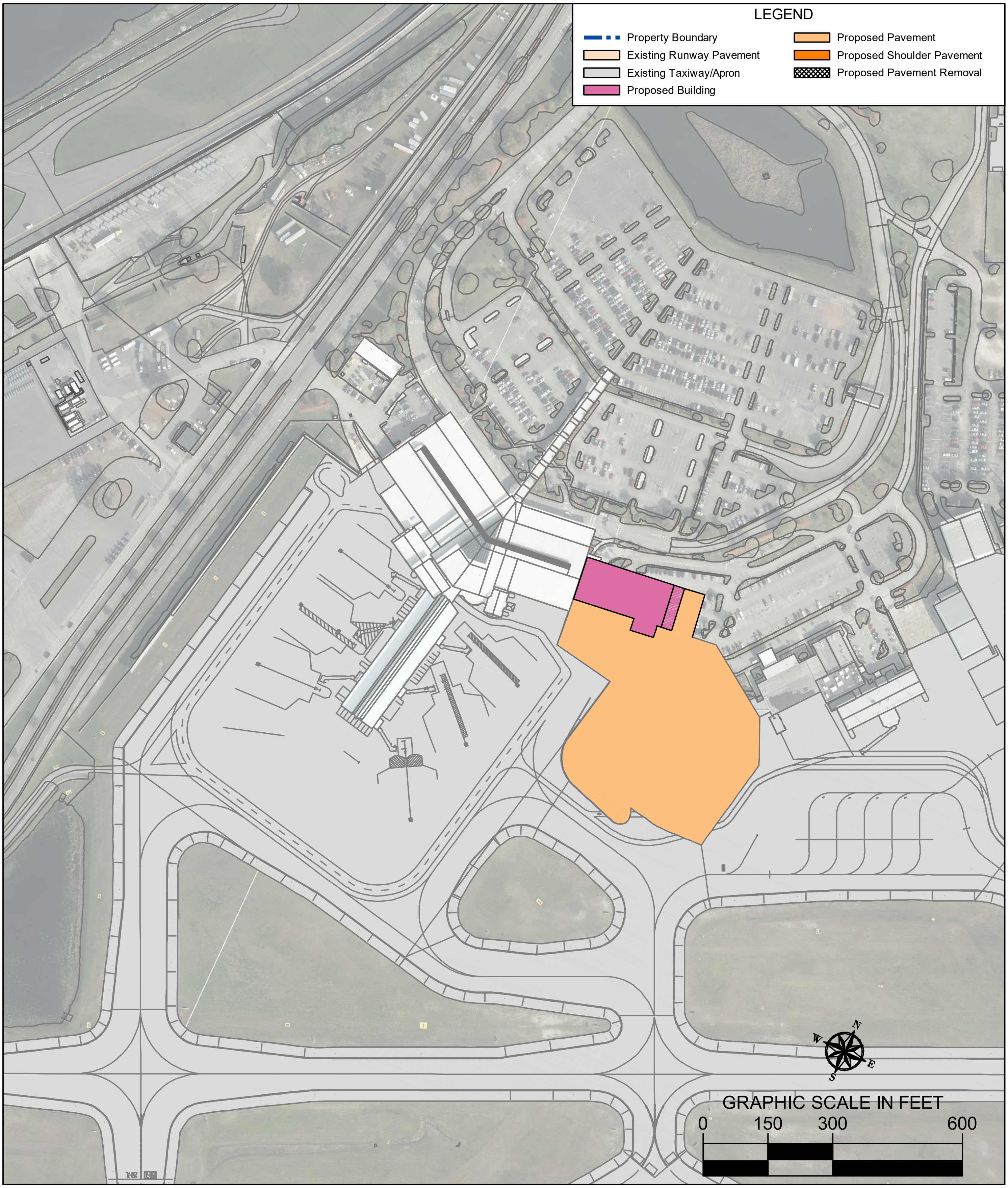
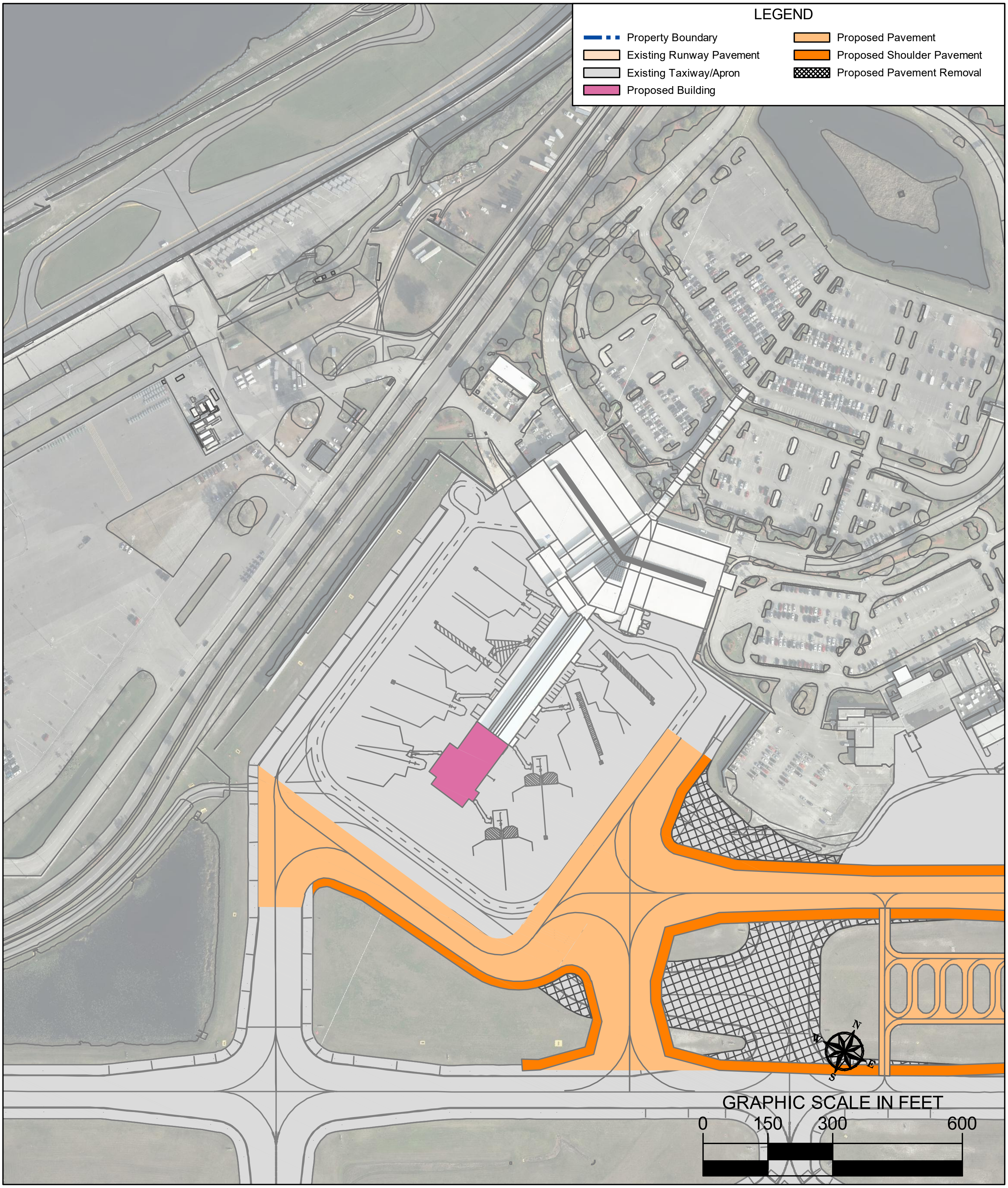


Exhibit 5.3

DAYTONA BEACH INTERNATIONAL AIRPORT

CBP Facility Alternative 2 - East Expansion



DAYTONA BEACH INTERNATIONAL AIRPORT

Exhibit 5.4

CBP Facility Alternative 3 - Concourse Extension

In addition to the extension of the concourse to accommodate the facility and associated gate, the existing apron area will require modest expansion by approximately 25,000 square feet of pavement to allow apron taxilane circulation.

5.3.2. ADDITIONAL GATE CAPACITY

While it is anticipated that the current six gate concourse will be able to accommodate the projected passenger demand through the planning horizon, the gates are anticipated to approach maximum capacity by the end of the 20-year planning period. As such, facility planning for two additional gates can be reasonably justified as passenger enplanements approach 565,000 by 2037 and as potential additional carriers enter the DAB market. The following subsection describes the alternative developed to accommodate additional gate capacity.

5.3.2.1. Alternative 1 – Extend Concourse

As identified in the preceding discussion on CBP facility alternatives, additional gate capacity can be accommodated through a linear extension of the existing concourse. CBP Alternative 3 provides two additional air carrier gates, which are anticipated to be adequate through the remainder of the planning horizon. As with CBP Alternative 3, this alternative would require an expansion of the existing apron area to allow adequate aircraft circulation in the taxilane area with the additional two gates. This alternative is depicted on **Exhibit 5.4.**

5.4. GROUND TRANSPORTATION ALTERNATIVES

Ground transportation facility alternatives were discussed within this section and included alternative approaches to meeting identified needs for public vehicle parking, rental car facilities, and ground transportation providers. Many of these alternatives were linked in such a manner that certain alternatives are required in order to enable other alternatives and are tied to the terminal area alternatives.

5.4.1. PUBLIC PARKING

Based on facility requirements identified in the previous section, DAB will require an additional 170 to 200 public vehicle parking spaces to meet average Design Day demand by the end of the planning period. In order to accommodate an Absolute Peak Day, an additional 330 to 350 spaces will be required. However, facility planning for absolute peak periods of activity often leads to significant underutilization during times of regular Airport use.

Two primary alternatives were analyzed for the expansion of public vehicle parking, ranging from expansion of surface parking to implementation of a parking garage accommodating both public parking demand and potentially rental car ready/return parking.

5.4.1.1. Alternative 1 – Surface Parking Expansion

Alternative 1 proposes an expansion of the existing public parking lot to the north and filling in a portion of the existing stormwater pond, to provide approximately 330 additional public parking spaces **(Alternative 1A)** or 500 spaces **(Alternative 1B).** Alternative 1 would require mitigation and relocation of portions of the existing pond, as well as mitigation of the new impervious surface that would be introduced by the additional pavement. The proposed location of the stormwater mitigation would be further north in the existing area currently utilized for occasional Recreational Vehicle (RV) parking. Alternative 1A and 1B are depicted on **Exhibit 5.5. and Exhibit 5.6.**

A key feature of this alternative is the stormwater mitigation, which is proposed as a curvilinear pond along Midway Avenue and the terminal exit roadway. This proposed stormwater pond would mitigate the existing pond and potential future impervious development in the RV parking area, while also serving as an aesthetic improvement to the Airport entrance, a specific improvement that Airport staff has identified as a need.

It should also be noted that the surface parking expansion alternatives accommodate the required employee parking which is currently located east of the terminal building, which could require ultimate relocation as discussed in subsequent alternatives

5.4.1.2. Alternative 2 – Parking Garage

Alternative 2 proposes the implementation of a parking garage north of the existing terminal building within the existing short-term parking lot footprint. This structure would provide 250 additional spaces, or 500 total spaces, if constructed as a two-story structure. Alternative 2 is depicted on **Exhibit 5.7**

It should be noted that to implement Alternative 2, Alternative 1 must first be implemented in order to attain the necessary parking capacity that would be temporarily displaced by the construction of the parking structure.

5.4.2. RENTAL CAR FACILITIES

The existing rental car ready/return lot east of the terminal building contains 200 ready/return spaces. Based on anticipated facility needs as passenger traffic approaches 2037 levels, 500 ready/return spaces will be necessary to accommodate demand. It is also acknowledged that some of this demand can be flexed between the ready/return lot and maintenance facilities.

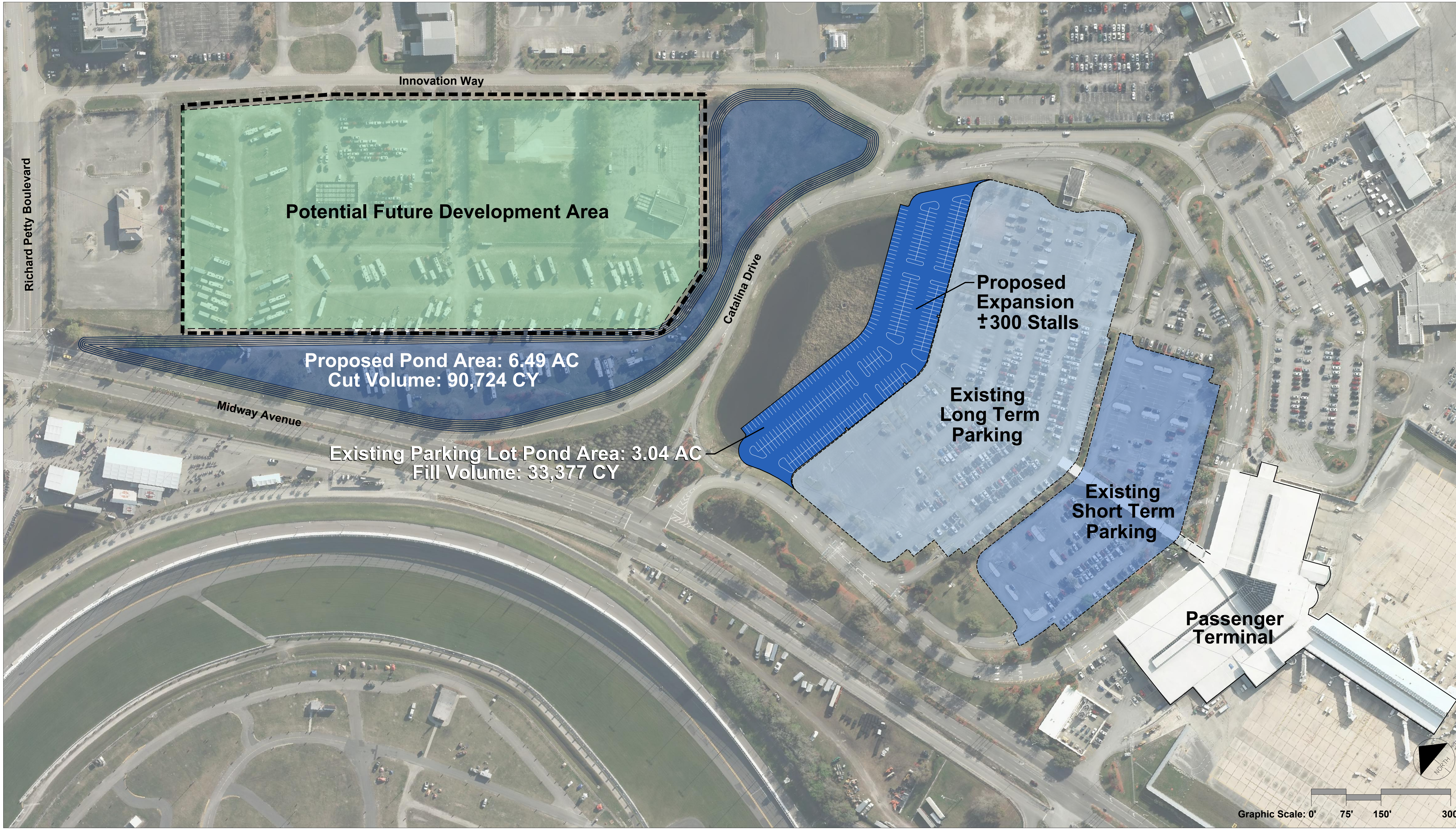
Based on discussions with rental car representatives at DAB during the inventory phase of the Master Plan Update, the existing lot meets needs for existing levels of traffic during non-peak seasons, but there are operational and capacity challenges during the seasonal peak events that occur, primarily due to proximity of Daytona International Speedway. Challenges identified include lack of a secured lot, shortage of sufficient ready/return spaces, confusing wayfinding infrastructure and signage, and absence of dedicated return queues to aid in vehicle check-in during peak periods.

Two primary alternatives were considered for the ready/return area, as well as an alternative to enhance and consolidate rental car maintenance operations.

5.4.2.1. Alternative 1 – Ready/Return Lot Expansion and Reconfiguration

Rental Car Alternative 1 includes reconfiguration and expansion of the existing ready/return lot to provide a secured facility and allow “keys in car” rental processing, which allows customers to bypass the traditional counter and proceed directly to the vehicle, a practice that is increasing in popularity at airports as travelers utilize mobile technology to self-check-in.

Alternative 1 proposes relocation of the existing employee parking lot and ground transportation curbfront east of the baggage claim area. Alternative 1 is depicted in **Exhibit 5.8.**



DAYTONA BEACH INTERNATIONAL AIRPORT

Exhibit 5.5

Alternative 1A - 300 Space Parking Expansion

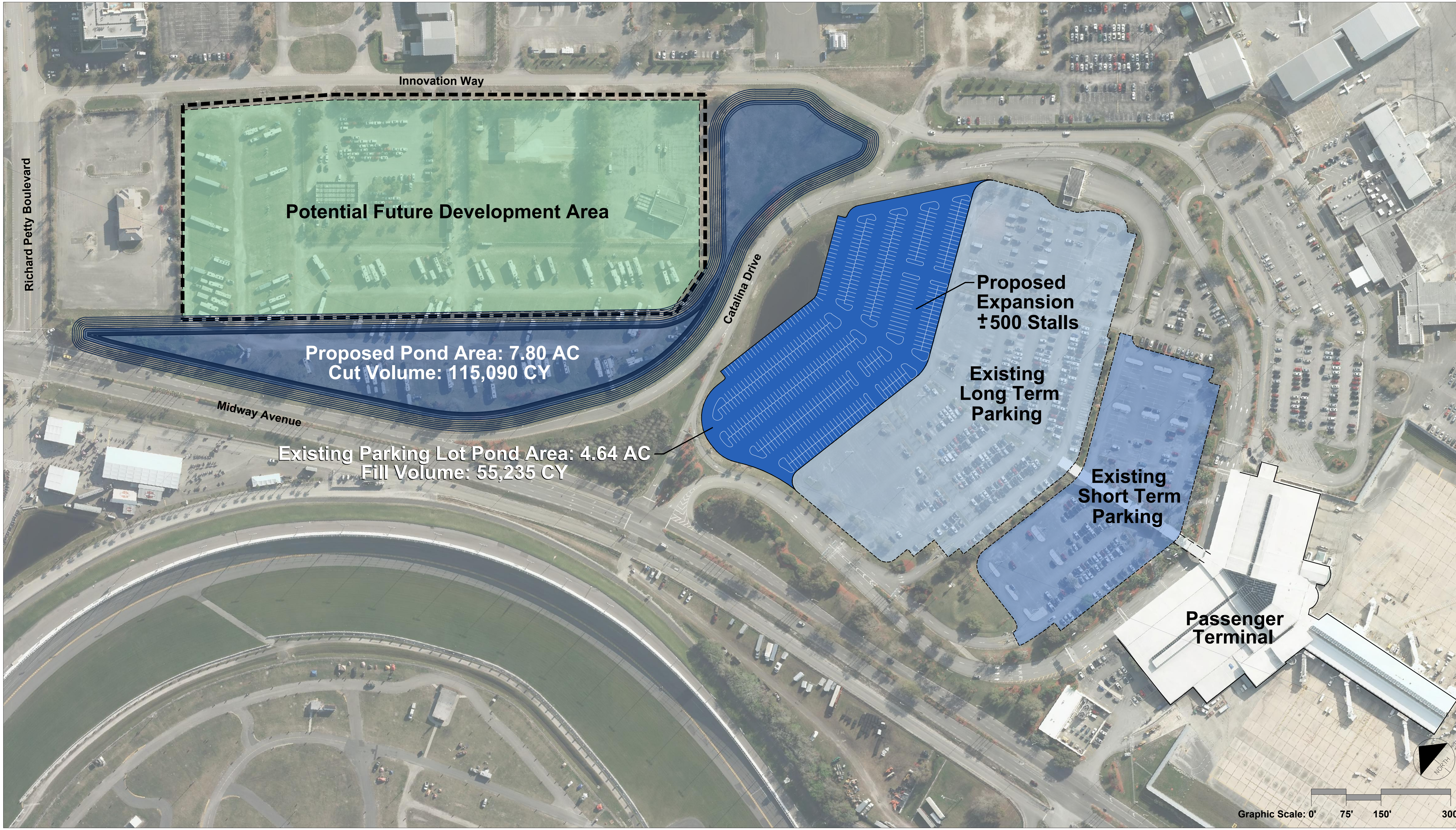


Exhibit 5.6

DAYTONA BEACH INTERNATIONAL AIRPORT

Alternative 1B - 500 Space Parking Expansion

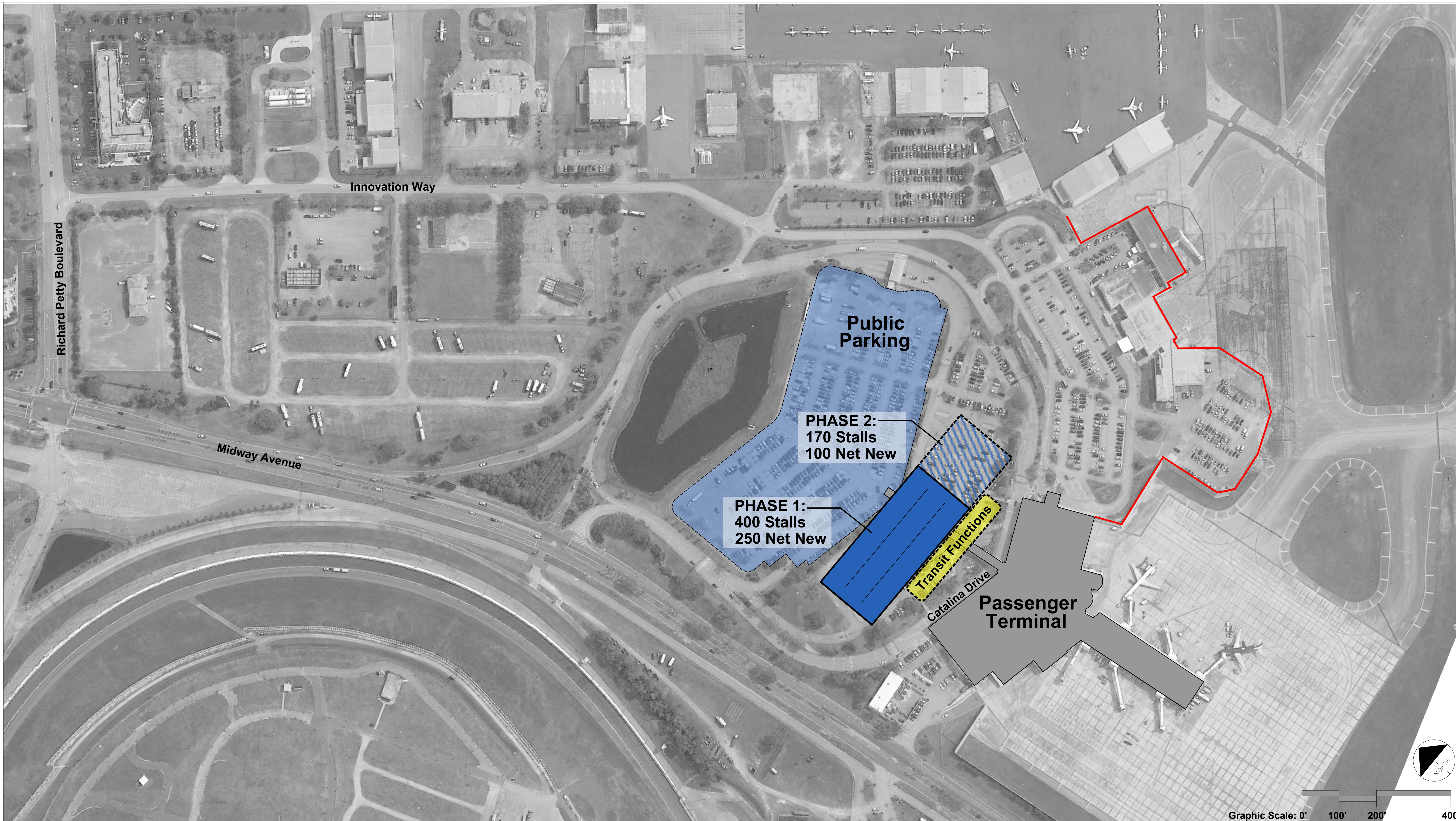


Exhibit 5.7

DAYTONA BEACH INTERNATIONAL AIRPORT

Alternative 2 - Parking Garage

Exhibit 5.8

DAYTONA BEACH INTERNATIONAL AIRPORT

Alternative 1 - Ready/Return Expansion

Daytona Beach International Airport
Master Plan Update

5.4.2.2. Alternative 2 – Ready/Return Parking Garage East of Terminal

Alternative 2 proposes implementation of a two-level parking garage east of the terminal building. The first level would be covered parking for rental car ready/return use, and the second level would provide public parking. The proposed structure would contain approximately 520 spaces built in two phases as demand merits.

Similar to Alternative 1, Alternative 2 would also require the relocation of employee parking. This alternative would also require temporary displacement and relocation of the existing ready/return parking capacity. The most logical location for a temporary ready/return parking lot would be at the existing short-term parking lot north of the terminal. A temporary lot in this location would require additional public parking capacity to ensure that demand is met during construction.

A conceptual exhibit depicting a ready/return parking garage east of the terminal is shown in **Exhibit 5.9.**

5.4.2.3. Alternative 3 – Consolidated Rental Car Maintenance and Storage Facility

Alternative 3, illustrated in **Exhibit 5.10** proposes a consolidated rental car maintenance and storage facility. This facility would be located in the existing RV parking area north of the terminal exit roadway, which is also occupied by several rental car maintenance bays. The existing maintenance bays are scattered among the RV lot and the east side of Innovation Way and are not contiguous.

Alternative 3 proposes a consolidated maintenance facility which would occupy the majority of the existing RV lot. Advantages of this facility include consolidation of the scattered maintenance bays into a single facility, which could enhance revenue generation potential on parcels previously occupied by individual maintenance facilities. This facility would require the implementation of the stormwater mitigation pond as previously described in Parking Alternative 1 to ensure that the new impervious pavement area would be mitigated.

5.4.3. GROUND TRANSPORTATION FACILITIES

This section provides an overview of ground transportation facility alternatives. The existing ground transportation curbfront area is located east of the baggage claim and consists of a single curb plus an area for taxi and bus staging. TNCs such as Uber and Lyft do not utilize this curbfront as they have designated spaces on the main arrivals curbfront roadway.

5.4.3.1. Alternative 1 – Retain Existing Facilities

Alternative 1 is a no-action alternative in which the ground transportation providers such as taxis, shuttles, and other related transportation continue to use the existing curb east of baggage claim. The primary issues related to the long-term retention of this location stems from the limited ability to optimize the rental car customer experience, as well as limited space available to accommodate potential growth in ground transportation providers such as TNCs.

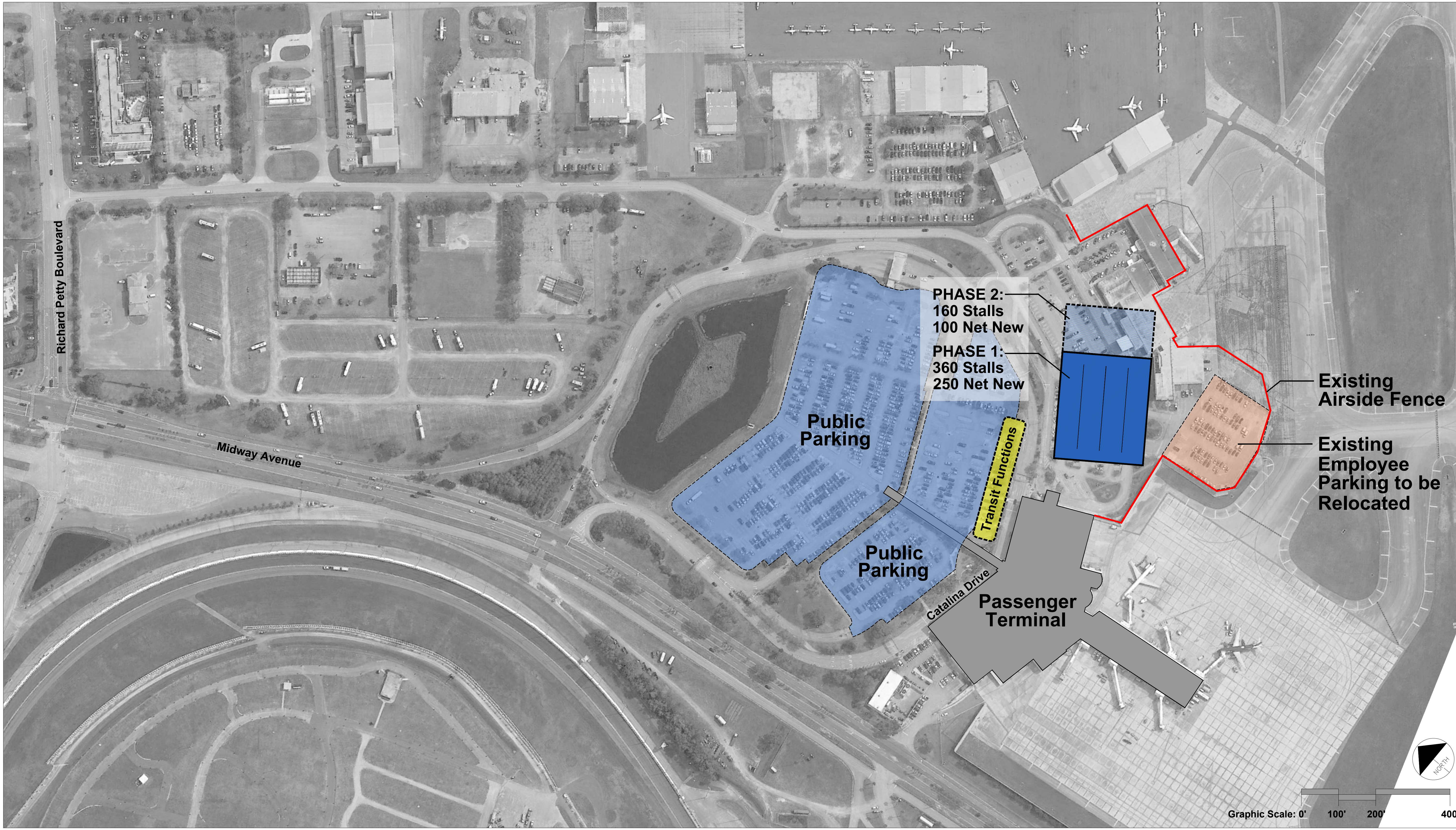


Exhibit 5.9

DAYTONA BEACH INTERNATIONAL AIRPORT

Alternative 2 - Ready/Return Garage East of Terminal

DAYTONA BEACH INTERNATIONAL AIRPORT

Exhibit 5.10

Alternative 3 - Consolidated Maintenance Facility

Daytona Beach International Airport
Master Plan Update

5.4.3.2. Alternative 2 – Relocate Ground Transportation Curb

Alternative 2 proposes to relocate the ground transportation uses from the east side of the terminal to a new dedicated curbfront roadway in front of the terminal. This curbfront would utilize the same terminal entrance roadway and would require implementation of two additional lanes directly in front of the existing short-term parking lot. This dedicated ground transportation curbfront would support users such as courtesy hotel shuttles, TNCs, taxis, and buses.

The advantage of the relocated ground transportation curb includes facilitation of direct customer access to the rental car ready/return lot while retaining flexibility for the eastern footprint of the terminal to expand should the need ever dictate. From a customer standpoint, this curb would provide a centralized location for all ground transportation providers, simplify wayfinding for passengers, allow the Airport to optimize the eastern portion of the terminal, and expand the terminal building as necessary should the need arise outside of this master planning effort.

5.5. GENERAL AVIATION AND SUPPORT FACILITY ALTERNATIVES

The following discussion focuses on potential GA development options for the Airport as well as support facilities. The proposed development options include areas for GA facility development, including aircraft storage hangars and aircraft apron areas, as well as potential FBO facilities. The proposed development options emphasize the development of land currently owned by the Airport first and indicate potential areas for land acquisition, if needed, that would best suit GA requirements.

5.5.1. FLIGHT TRAINING APRON

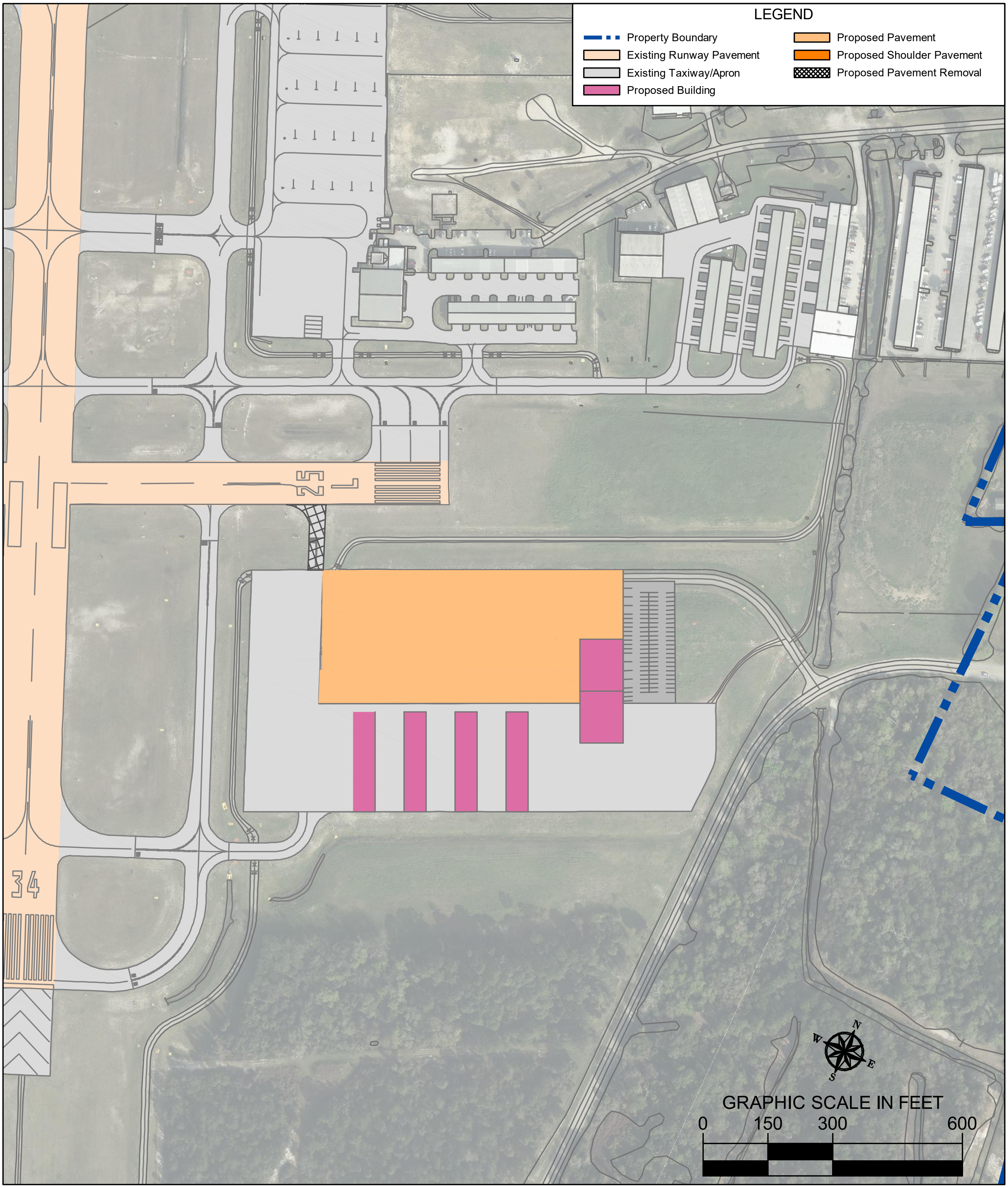
An identified GA facility need is additional apron space for flight training entities. The primary aviation activity at DAB is flight training, which is conducted by many organizations at the Airport, including ERAU, PEA, ATP, and others. The facility requirements analysis indicated that, while there is a modest surplus of total aggregate apron space available on the DAB airfield, there is a need for additional apron, or reconfiguration of existing apron areas, to optimize the available aircraft parking areas specifically for flight training users.

5.5.1.1. Alternative 1 – Enhance and Expand Southeast Apron

Alternative 1 includes expansion and optimization of the existing Southeast Apron, which is currently under-utilized but offers convenient access to the airfield via Taxiway E. This expanded apron area could be utilized for both apron area requirements and to accommodate additional aircraft storage hangars. Alternative 1 identifies that both apron area expansion as well as hangar development could occur on the Southeast apron. Alternative 1 is depicted in **Exhibit 5.11** and is intended to be a conceptual representation of this area only.

5.5.1.2. Alternative 2 – Expanded Apron in ATP Vicinity

Alternative 2 proposes an eastward expansion of the apron area currently utilized by ATP. This expansion has been previously planned and preliminarily designed. This alternative provides an additional 190,000 square feet of apron space to meet flight training needs as well as potential expansion needs for ATP. Alternative 2 is depicted in **Exhibit 5.12.**



DAYTONA BEACH INTERNATIONAL AIRPORT

Exhibit 5.11

Apron Alternative 1 - Southeast Apron

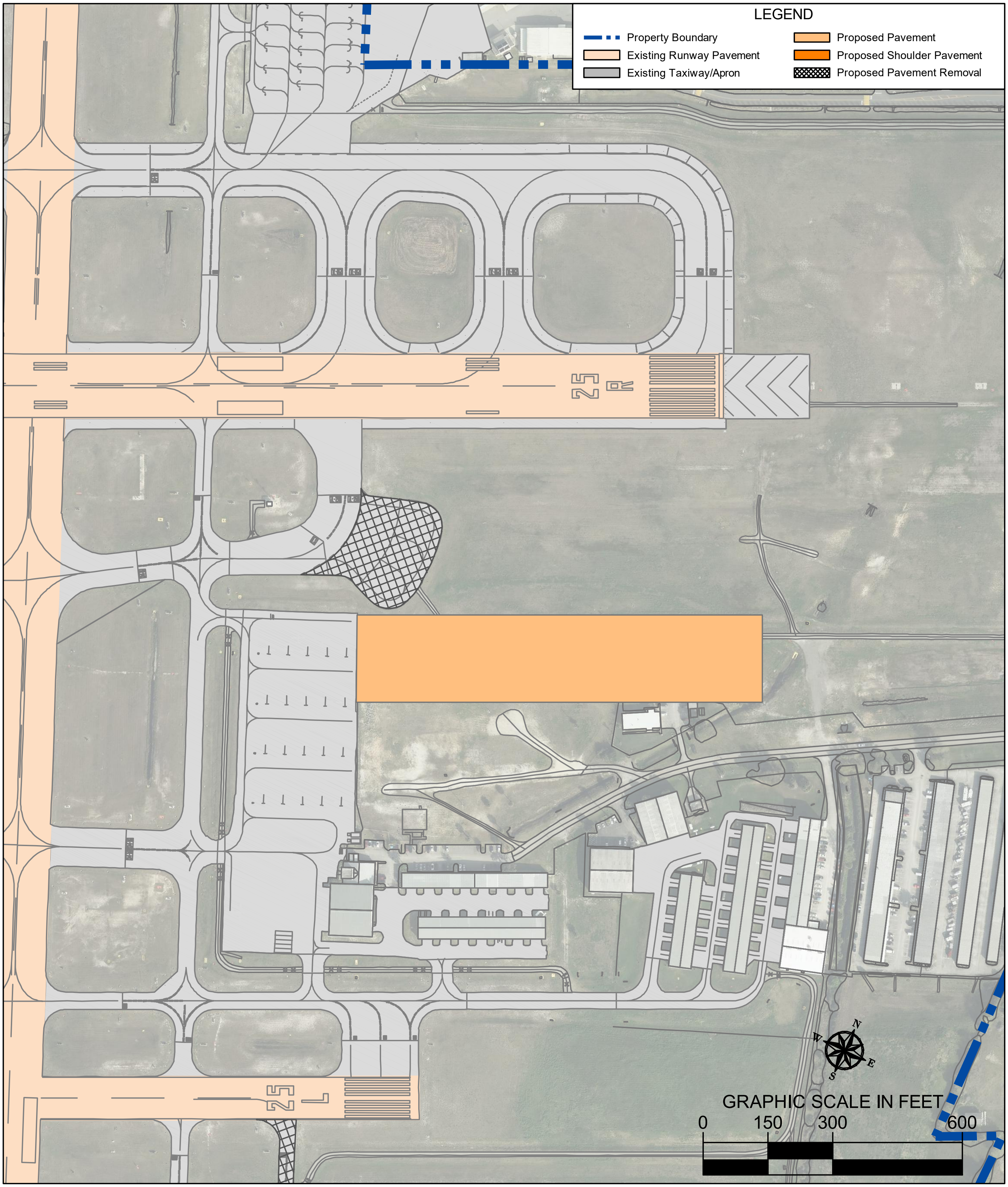


Exhibit 5.12

Apron Alternative 2 - ATP Apron Vicinity

5.5.1.3. Alternative 3 – Expand ERAU Apron

Alternative 3 would expand the existing apron area leased by ERAU further to the north to include an additional 80,000 square feet of area currently occupied by a parking lot and two modular buildings that are currently utilized by ERAU for administrative functions. This expansion would provide for approximately 18 tie-down spaces for ERAU flight training aircraft, depending upon specific configuration. Alternative 3 is depicted in **Exhibit 5.13.**

5.5.2. CONVENTIONAL HANGAR SPACE

Conventional hangars can be described as hangars that accommodate multiple aircraft, as opposed to box hangars or “T-hangars” which generally accommodate only one aircraft. There is an identified need for an additional 60,000 square feet of conventional hangar space, which can be flexed among FBO-type users or single-occupant users (e.g. Brown and Brown). Two alternative general vicinities were identified for future placement of conventional hangar space at DAB and are described below.

5.5.2.1. Alternative 1 – Northern Vicinity

Near the Runway 16 end, two locations were identified for additional hangar capacity as shown in **Exhibit 5.14.** One area is the existing belly cargo facility that could be re-purposed for additional hangar development, with the assumption that belly cargo could be accommodated at the terminal facility. The second area is a potential expansion of the existing facilities owned by Sheltair.

5.5.2.2. Alternative 2 – Southern Vicinity

In the southern vicinity, two areas were identified for additional conventional hangar capacity. The southeast apron is one area that could be expanded to include additional conventional hangars, as it currently well-positioned and adjacent to Taxiway E.

The vicinity west of the Brown and Brown hangar was also identified for future GA hangar development. This area is currently constrained by the alignment of Bellevue Avenue, which tapers north towards Runway 7L/25R. In this alternative, the alignment of Bellevue Avenue. would require a southern shift and acquisition of approximately five acres in order to provide requisite space for placement of additional hangars, vehicular parking, and adequate apron space for corporate-size aircraft. This area is constrained by the location of the glideslope antenna and ASOS weather station array, which limits the westward placement of hangar facilities. This location is depicted on **Exhibit 5.15.**

5.5.3. AIRPORT MAINTENANCE

Airport maintenance is currently housed in the belly air cargo building, which occupies approximately half of the usable space of the facility, with the remainder occupied by Delta Air Cargo’s operations (vacated in mid-2019). While there are no identified needs for additional maintenance space, the land that the current maintenance and cargo building occupies is well-positioned for aeronautical uses such as hangars, FBO expansion, or private aviation activity, as it offers direct taxiway access. Two alternative locations for an Airport maintenance facility were analyzed and are described below.

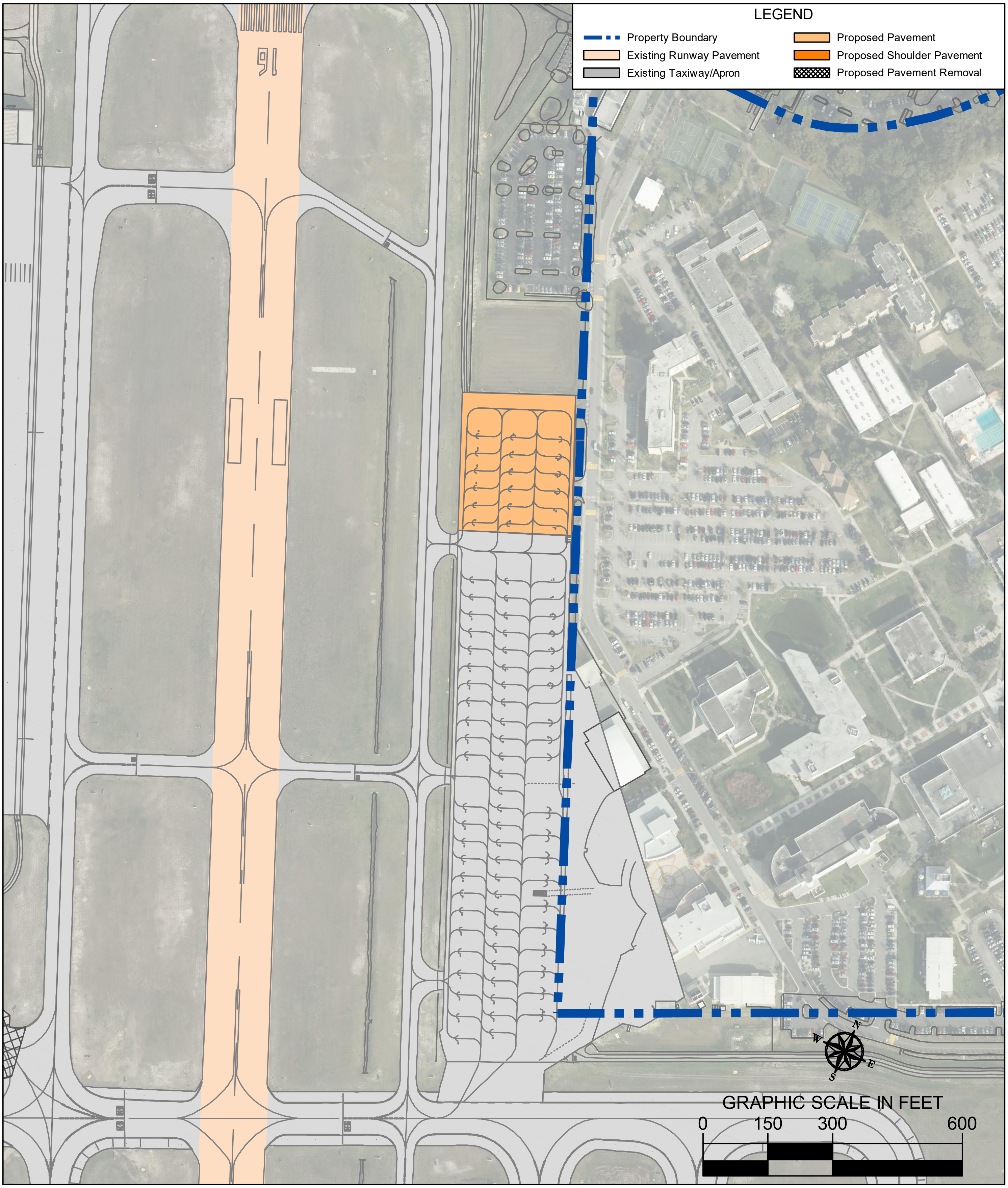


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Exhibit 5.13

Apron Alternative 3 - ERAU Apron Expansion

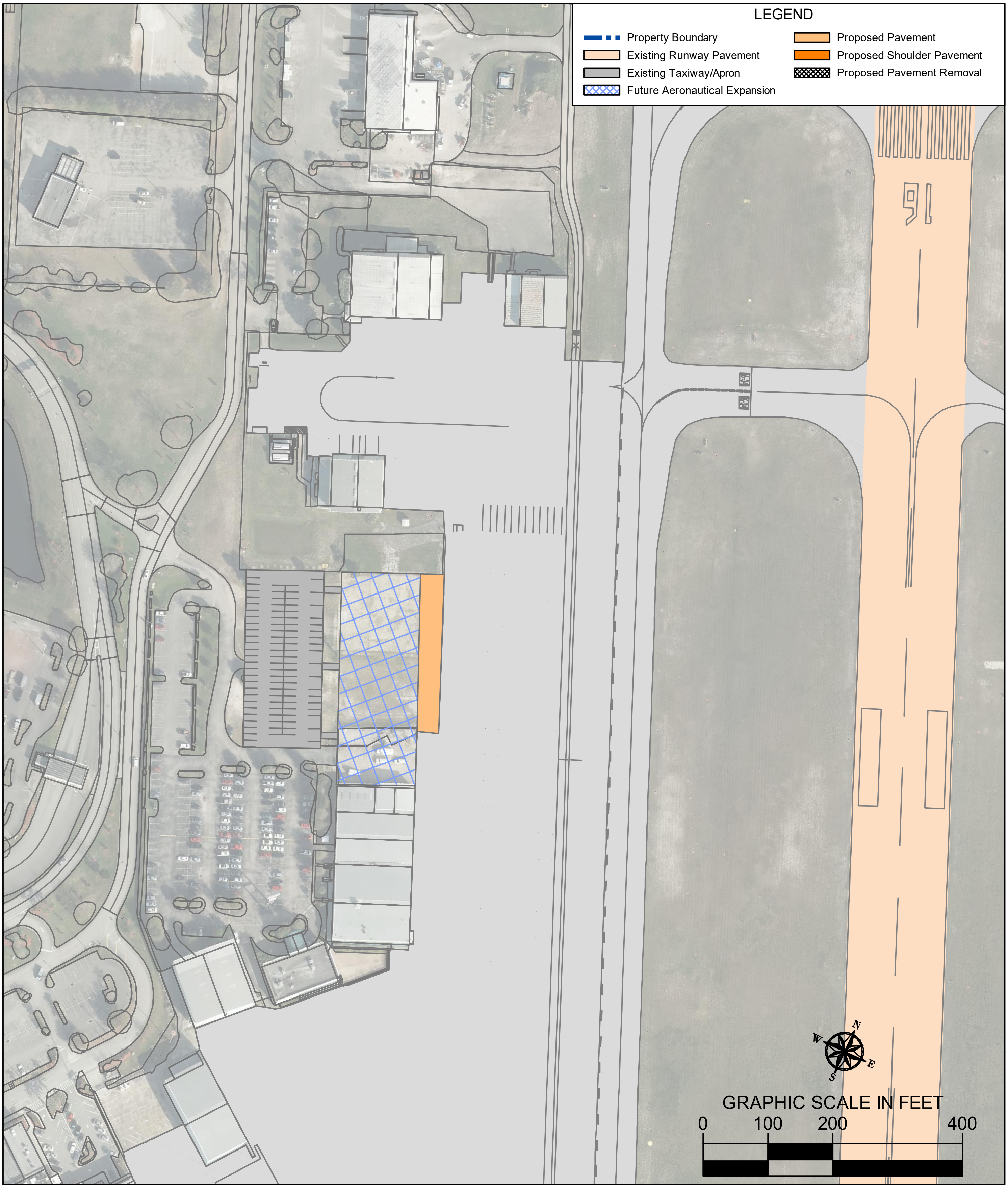
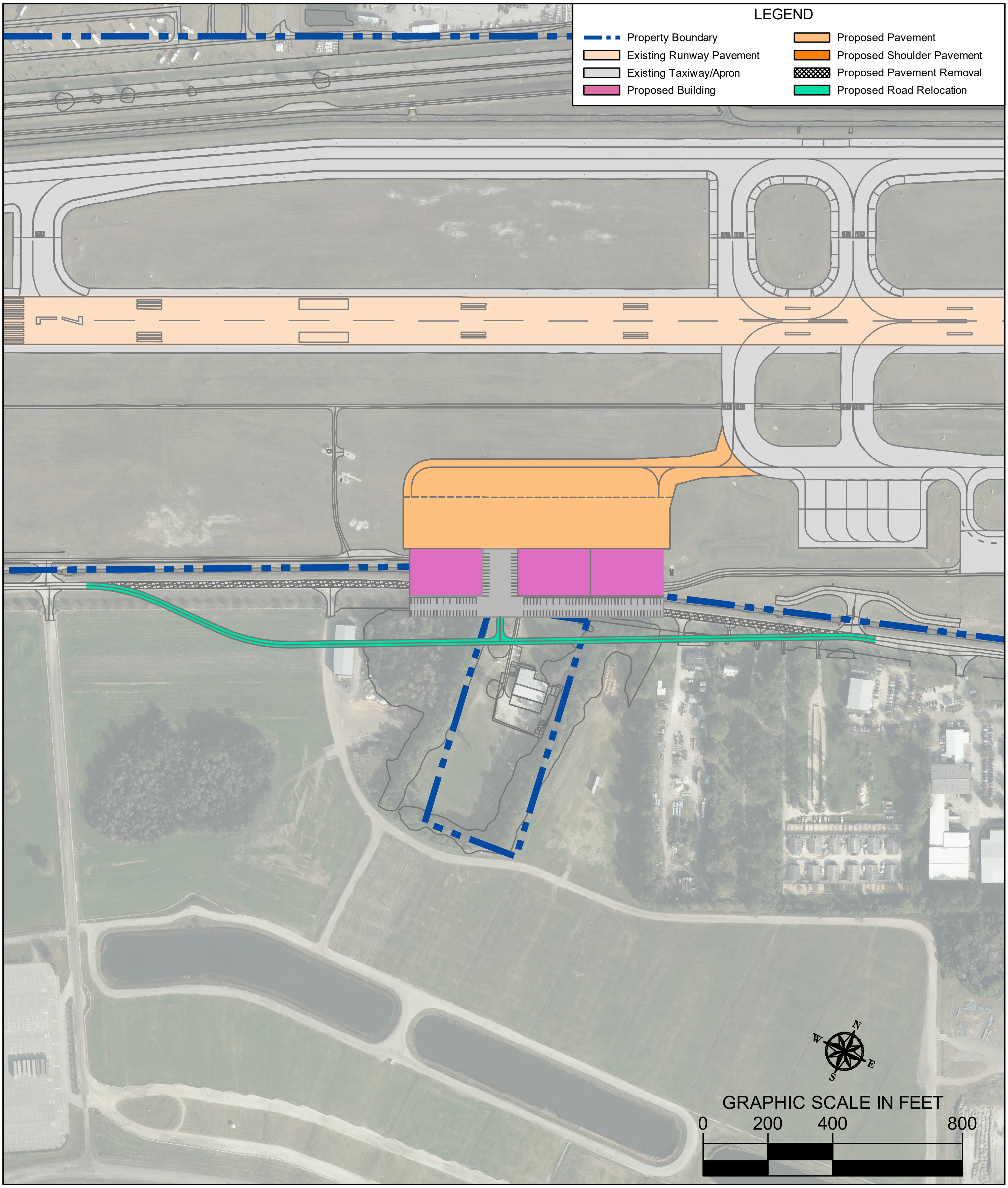


Exhibit 5.14

Hangar Development - Northern Vicinity



DAYTONA BEACH INTERNATIONAL AIRPORT

Exhibit 5.15

Hangar Development - Southern Vicinity

5.5.3.1. Alternative 1 – Remain in Existing Building

Alternative 1 is a "no-action" alternative in which Airport maintenance continues to occupy the existing facility adjacent to Taxiway W. While there have been no identified constraints by this current facility, it is shared with belly cargo uses and occupies valuable "beachfront" property with direct airfield access, which could be better utilized by an aeronautical use, such as a conventional hangar.

5.5.3.2. Alternative 2 – North Relocation

Alternative 2 proposes relocation of Airport maintenance operations to a new facility further north of the Runway 16 threshold in a site currently utilized by a rental car agency for maintenance and storage (see **Exhibit 5.16**). This site provides airfield access via the existing vehicle service road and allows the existing maintenance facility site to potentially be repurposed for aeronautical use. A key element of this alternative is the implementation of a consolidated rental car maintenance facility, which would allow the existing rental car maintenance site to be utilized for this alternative.

5.5.3.3. Alternative 3 – South Relocation

Alternative 3, shown in **Exhibit 5.17**, proposes a maintenance facility located in the southern vicinity of the Airport, adjacent to Taxiway P, east of the ATCT. This location is adjacent to the recently-completed ARFF station and is near the existing Remote Transmitter Receiver (RTR) station, which limits the placement of the facility to a relatively small footprint, at least 100' feet away from the transmitter antenna array.

This facility location is less ideal than the north facility alternative due its distance from other DAB administrative functions located near the terminal, such as Airport operations and administration offices; it introduces a split operation.

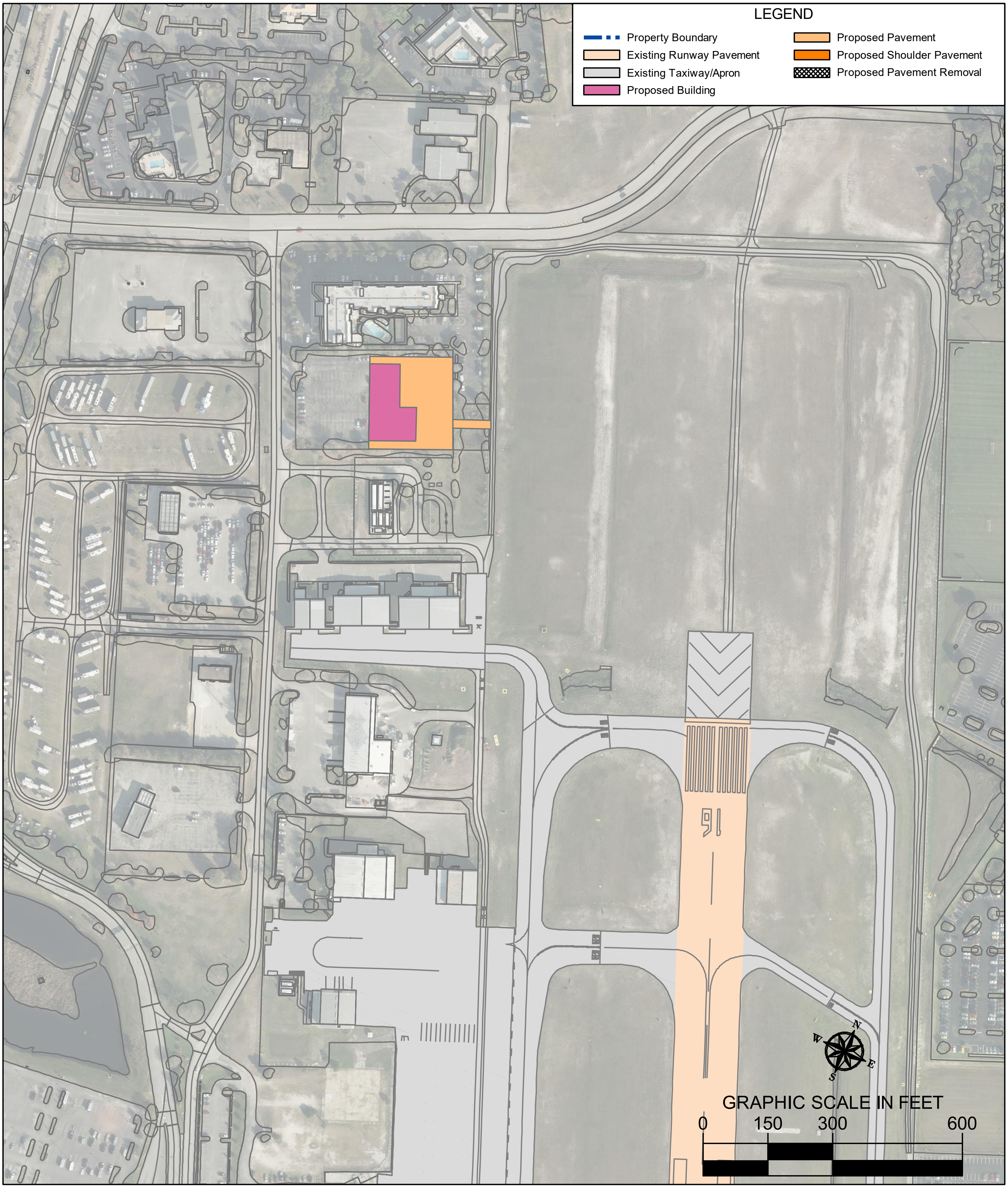
5.5.4. AIR CARGO

Most air cargo activity at DAB is belly-haul cargo, meaning shipments are carried in the cargo compartments or "bellies" of scheduled air carrier operations. The current cargo facility is located in the northern airfield vicinity adjacent to Taxiway W, and currently shares space with DAB maintenance. The sole occupant of this facility, Delta Air Cargo, vacated in mid-2019.

5.5.4.1. Alternative 1 – Retain Existing Facility

Alternative 1 is a no-action alternative in which the existing belly cargo facility is retained for use by either existing airlines or future air carrier entrants to the DAB market. Since the existing sole occupant vacated the facility, there is no significant demand anticipated for additional belly cargo space in the near-term future, and retention of the existing facility is anticipated to serve projected needs through the planning horizon should additional carriers enter the market.

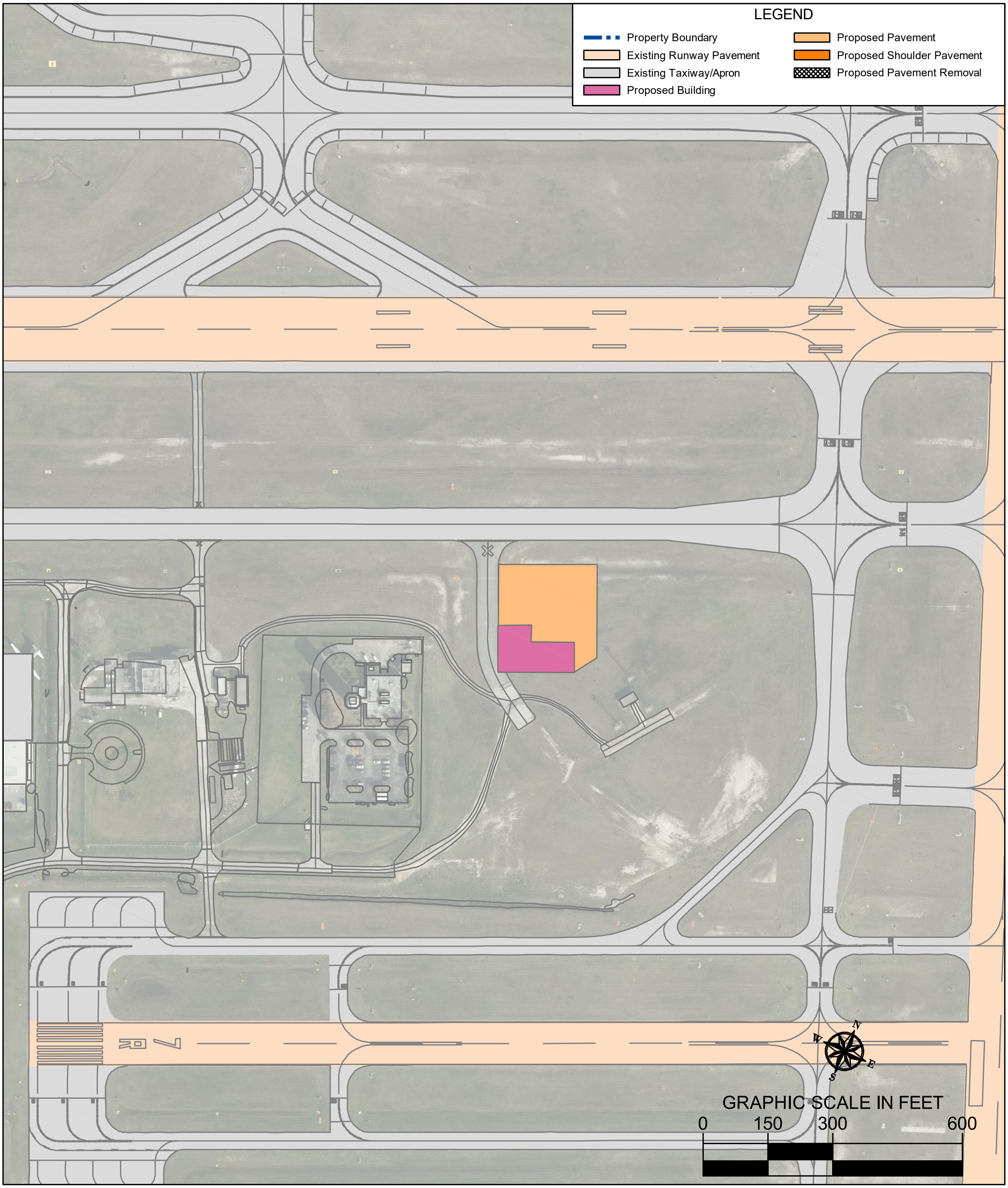
As described in the previous section on maintenance facility alternatives, if a dedicated Airport maintenance facility were to be constructed on a separate site from the air cargo facility, the existing air cargo facility could be fully utilized and optimized for belly cargo purposes and/or small air cargo aircraft operations. Air cargo operations would need to be limited to ADG II, given the relatively small footprint available for apron space.



DAYTONA BEACH INTERNATIONAL AIRPORT

Exhibit 5.16

Airport Maintenance - Northern Relocation



DAYTONA BEACH INTERNATIONAL AIRPORT

Exhibit 5.17

Airport Maintenance - Southern Relocation

5.6. SOUTH DEVELOPMENT AREA ALTERNATIVES

A significant element of this Master Plan Update which commenced ahead of the majority of the traditional planning elements, was a comprehensive Stormwater Master Plan and future drainage model study. It was completed prior to the traditional master plan alternatives analysis. A key reason for this stormwater planning effort was to ascertain the viability of future land development on large tracts of Airport -owned land in the southern vicinity of the airfield, known as the “South Development Area.” This analysis was contained in **Appendix 1.** A key result of this stormwater planning effort was the development of a conceptual alternative, which focused on the maximization of development yield based on the available stormwater retention capacity, and is shown in **Exhibit 5.18**. This alternative was developed primarily for the purpose of obtaining a conceptual development permit by the St. Johns River Watershed Management District (SJRWMD) and does not represent an adopted site plan, but rather an example of a potential layout that would maximize development with the available stormwater management infrastructure.

Subsequent to this stormwater planning effort was a detailed land use and market assessment to understand the potential market demand for revenue development on the South Development Area. This involved stakeholder interviews and market research to understand how to potentially optimize the development of the South Development Area. As a result of this planning effort, two alternatives for site configuration and land use were developed based upon the market opportunities determined to be viable in the Volusia County region. These alternatives are briefly described below. The full market assessment and analysis effort was included as **Appendix 2.**

5.6.1. LAND USE ALTERNATIVE 1

Land use Alternative 1 is shown in **Exhibit 5.19** and represents utilization of the South Development Area tract in its existing roadway configuration with Bellevue Avenue bisecting the tract on its current alignment. This scenario focuses on a mix of uses, geared towards an aerospace and aviation focus, while also maximizing the “low hanging fruit” opportunity of commercial and retail development along Beville Road. Its challenges include limited direct airfield access acreage due to the alignment of Bellevue Road and stiff competition from other Florida airports that have similar or larger airfield access sites.

5.6.2. LAND USE ALTERNATIVE 2

Land use Alternative 2 is shown in **Exhibit 5.20** and represents a “think big” scenario that aims to maximize the available land with direct airfield access to better meet the needs of a potential aerospace company that would need airfield access. The requirement of this alternative; however, is that Bellevue Avenue would need to be realigned further south to allow for more land with airfield access, which also reduces the interior site capacity and flexibility of the tract.

Exhibit 5.18 - Maximum Development Yield Concept

Exhibit 5.19 - Land Use Alternative 1

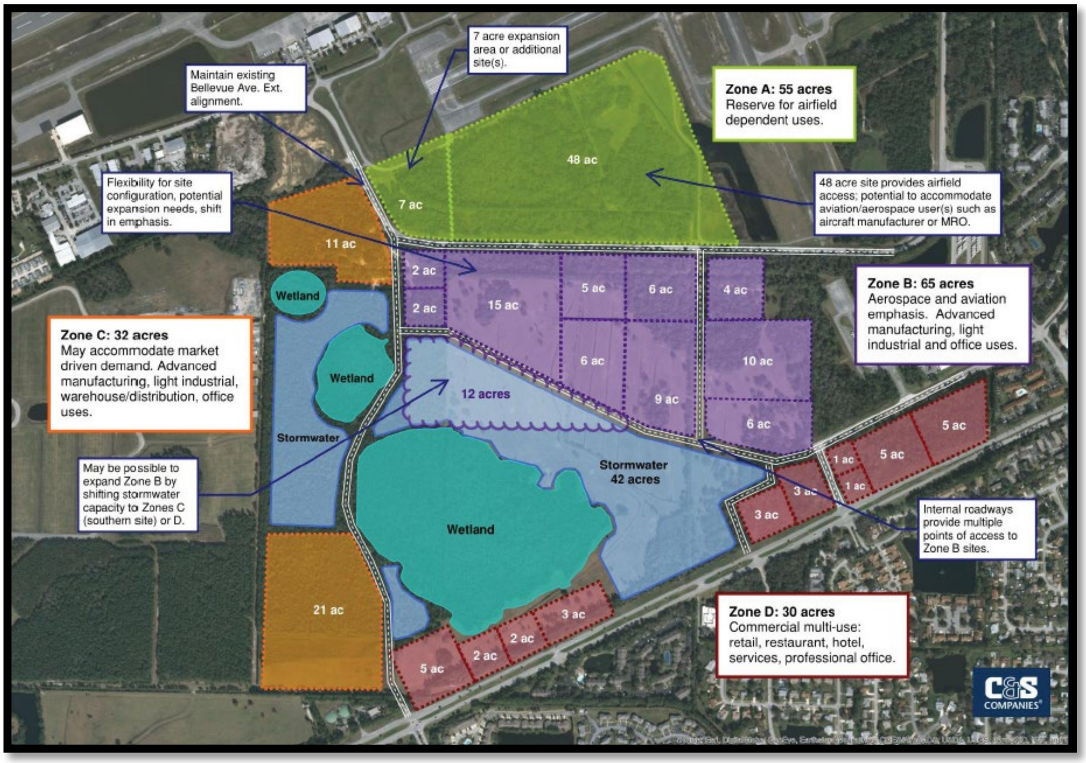


Exhibit 5.20 - Land Use Alternative 2

5.7. PREFERRED ALTERNATIVE OVERVIEW

The alternatives for the various functional areas of the Airport were vetted with the Airport over the course of several collaborative working sessions in which initial concepts were presented for discussion and were subsequently refined and evaluated. The cumulative result of these working sessions was the creation of a preferred Airport development alternative reflective of the decisions reached during the process. The following subsections summarizes the elements of the preferred Airport alternative and is disseminated by the major Airport functional areas. The preferred alternative is depicted on **Exhibit 5.21.** Vicinity-specific views are also provided in **Exhibits 5.22** through **Exhibit 5.24.**

5.7.1. AIRFIELD ELEMENTS

The airfield-specific elements of the preferred alternative are primarily based upon enhancements to taxiway circulation efficiency and enhancement of safety, such as mitigating RIM criteria deficiencies.

5.7.1.1. Midfield Run-up Apron

Implementation of the midfield run-up apron would provide an additional nine run-up positions for ADG I aircraft. This location is close to the midpoint of Runway 7L/25R which is utilized frequently for intersection takeoffs. This site also provides optimum visibility for ATC and reduces the need for aircraft to conduct engine run ups on Taxiway N.

5.7.1.2. Realignment of Taxiways E3 and W3

Taxiways E3 and W3 are proposed to be shifted such that they no longer provide direct access from an apron to a runway without a situational awareness turn. This is a RIM criteria mitigation which would aim to reduce the likelihood of a runway incursion occurring from the proximity of the aircraft aprons with heavy amounts of training activity.

5.7.1.3. Realignment of Taxiways E4 and W4

Taxiway W4 is proposed to be shifted north such that it no longer provides direct access from an apron to a runway. With this proposed action, Taxiway E4 would be shifted north to align with Taxiway W4 with standard 90-degree taxiway geometry as opposed to the acute angled taxiway entrance which exists today.

5.7.1.4. Removal of Taxiway T2

Taxiway T2, which currently provides direct apron access from the southeast apron to Runway 7R/25L, is proposed to be closed to mitigate a RIM criteria deficiency.

5.7.2. TERMINAL AND GROUND TRANSPORTATION ELEMENTS

5.7.2.1. Concourse Extension with Associated CBP Facility

The preferred terminal alternative is the extension of the existing concourse to accommodate two additional gates as well as a ground level CBP Facility. This alternative was selected as opposed to the east terminal expansion alternative based on the following rationale:

The east extension of the terminal would result in the displacement of approximately half of the existing rental car ready/return lot, which would require removal of the existing International Terminal facility and associated uses such as the NextGen test bed and the UCF Business Incubator. Replacement of the displaced ready/return parking further east in the former International Terminal footprint would also result in much longer walking distances for rental car passengers. The east terminal expansion alternative would also be limited from a benefit/cost standpoint, as this facility would be limited to international arrivals only and would not be easily flexed for domestic use.

Implementation of the concourse extension alternative reduces the requirement for additional apron space to accommodate aircraft circulation and operations, and also provides the benefit of additional gate capacity which can be reasonably justified by the end of the planning horizon. In addition, the international arrivals gate is proposed be a “swing gate” meaning that it can be flexed for either domestic or international use, enhancing its benefit/cost attributes.

5.7.2.2. Reconfigure and Expand Ready/Return Parking Lot

The preferred rental car operations alternative is to expand and reconfigure the existing ready/return lot to accommodate anticipated ready/return rental demand throughout the planning horizon. It would also optimize the lot’s circulation and passenger access, such that the lot could be secured to allow “keys in car” service, a growing rental car industry trend especially for business and preferred travelers. The focus on this alternative also enhances the rental car customer experience, which could be improved by implementing vehicle canopies.

Other alternatives considered included the implementation of a consolidated rental car garage facility (CONRAC) east of the existing terminal area within the footprint of the existing ready/return lot. This alternative was considered but not deemed viable for the following rationale:

Implementation of a CONRAC garage east of the terminal carries significant expense on the order of approximately $12,500,000 for a 500-space, two-level facility, and would also require displacement of the existing ready/return lot to a temporary location while the garage would be constructed. The likely location for the interim ready/return parking would be in the existing short-term parking lot north of the terminal curbfront roadway, which subsequently requires relocation of this parking capacity.

5.7.2.3. Expand Surface Parking with Ultimate Parking Garage

The preferred parking alternative is the expansion of public parking lot further north to accommodate projected public parking needs while also accommodating displacement of various parking facilities that would allow flexibility for implementation of other landside alternatives, which could include employee parking, rental car/ready return parking, and ultimately, a public parking garage.

As discussed in Section 5.4.1, expansion of the surface parking allows DAB to meet projected parking demands while also ensuring that displaced employee parking from an expansion of rental car ready/return can be accommodated. Subsequently, the surface parking expansion includes the development of a stormwater mitigation pond, which would not only mitigate the surface parking impervious surface, but would also provide a desired aesthetic enhancement to the DAB entrance along Midway Avenue.

It is understood there is a desire by DAB to ultimately pursue the development of a public parking garage within the footprint of the existing short-term parking lot such that a premium parking product could be provided. Expansion of the surface parking provides the necessary flexibility for DAB to ultimately pursue a parking garage while also ensuring that projected parking demands and temporarily-relocated parking can be accommodated.

5.7.2.4. Consolidated Rental Car Maintenance Facility

The preferred alternative includes the recommendation of a consolidated rental car maintenance facility located north of the terminal parking area within the existing area utilized for RV parking. The advantage of this facility is that it allows for several of the individual rental car maintenance bays, some of which are vacant, to be consolidated in a centralized facility. In turn, former maintenance sites are opened for revenue generating development, which is a key interest of DAB.

5.7.2.5. Relocate Ground Transportation Curbfront Roadway

As part of the preferred alternative, it is recommended that the ground transportation curbfront be relocated from its current location east of the terminal to the outer lanes of the existing terminal curbfront, creating two new dedicated ground transportation lanes and a dedicated outer raised curb median for ground transportation providers, including TNCs, taxis, and courtesy shuttles.

5.7.3. GENERAL AVIATION AND SUPPORT ELEMENTS

5.7.3.1. Hangar Alternatives

Both of the conventional hangar alternatives (Alternative 1 and Alternative 2) were incorporated into the preferred alternative. It is recognized that Alternative 2 carries a requirement of land acquisition and costs to realign Bellevue Road to accommodate conventional hangar development in the southwest vicinity adjacent to the existing Brown and Brown hangar facility.

5.7.3.2. Apron Alternatives

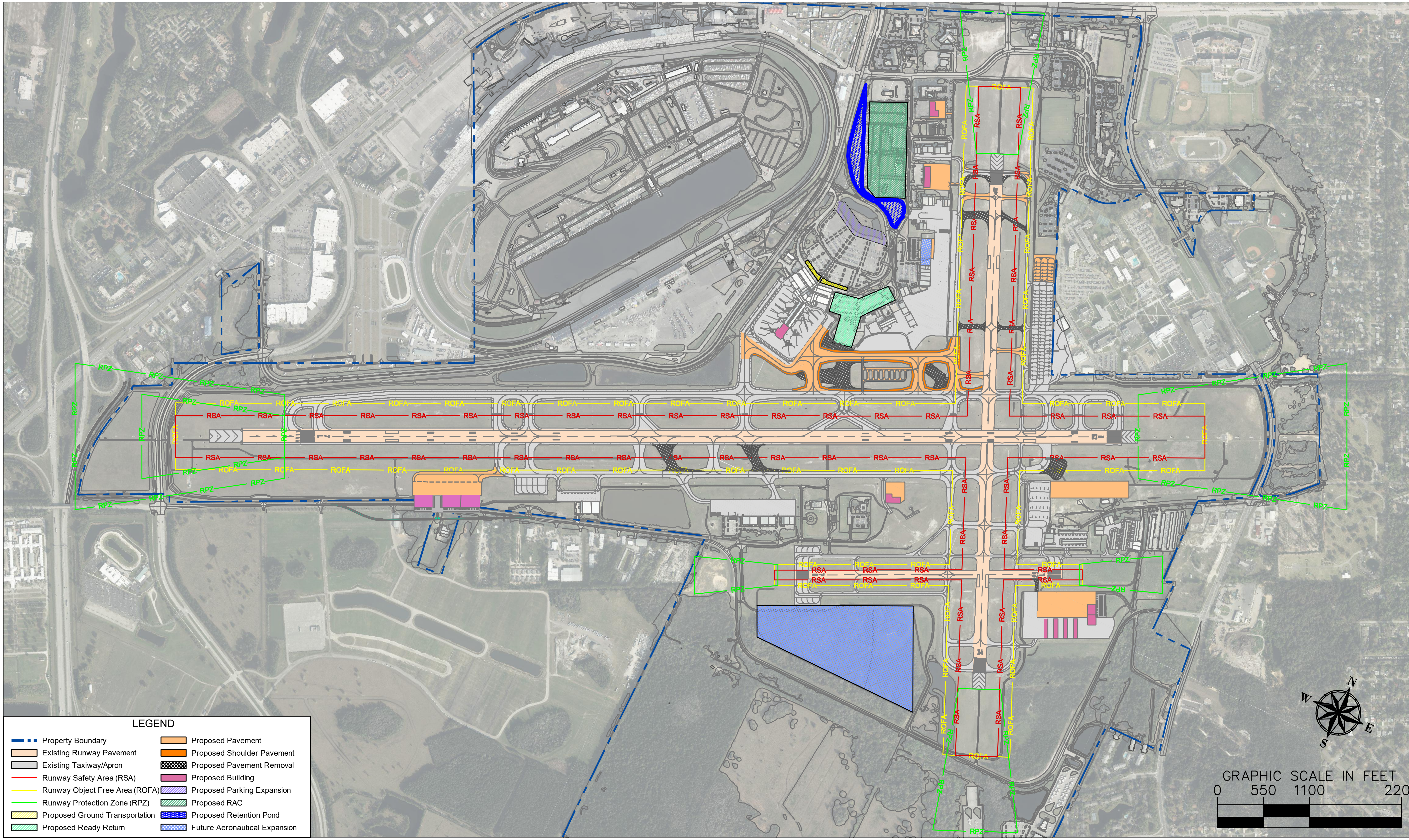
The preferred alternative includes the recommendation of the three apron expansion alternatives, including the Southeast apron area, ATP apron area, and the northward expansion of the ERAU apron.

5.7.3.3. Airport Maintenance

The preferred Airport maintenance alternative is the relocation of the facility north to occupy the former rental car maintenance site. This alternative allows the full utilization of the air cargo building for future belly cargo needs, or repurposing for revenue-generating aeronautical development such as hangars.

5.7.3.4. Air Cargo

The preferred air cargo alternative is to retain the current location and fully utilize its capacity for future needs by air carrier belly cargo or cargo specific carriers such as small freight feeders (i.e. FedEx Express feeder operations or UPS Airlines feeder operations).



DAYTONA BEACH INTERNATIONAL AIRPORT

Exhibit 5.21

Preferred Alternative - Overall

Daytona Beach International Airport
Master Plan Update

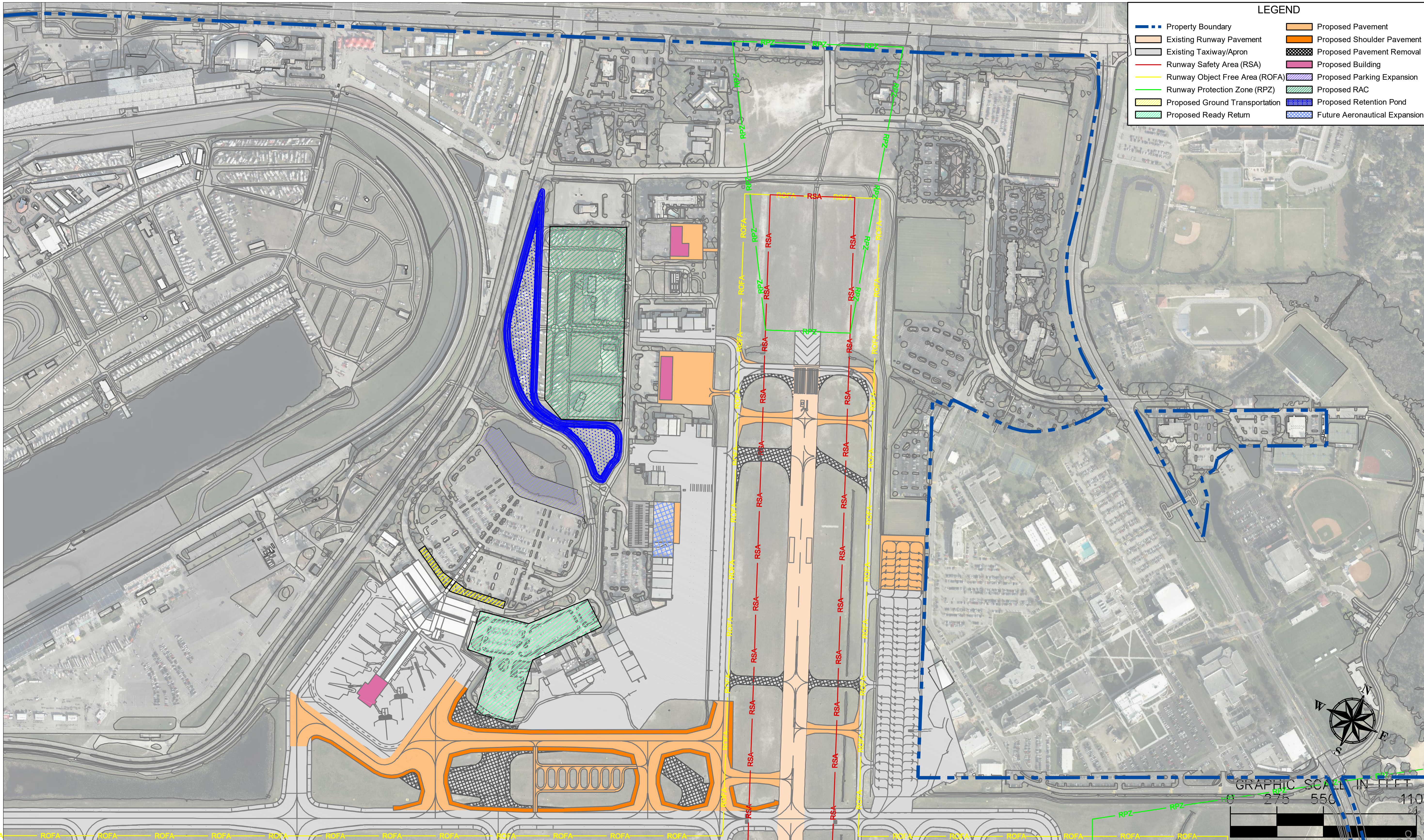


Exhibit 5.22

DAYTONA BEACH INTERNATIONAL AIRPORT

Preferred Alternative - Northeast View

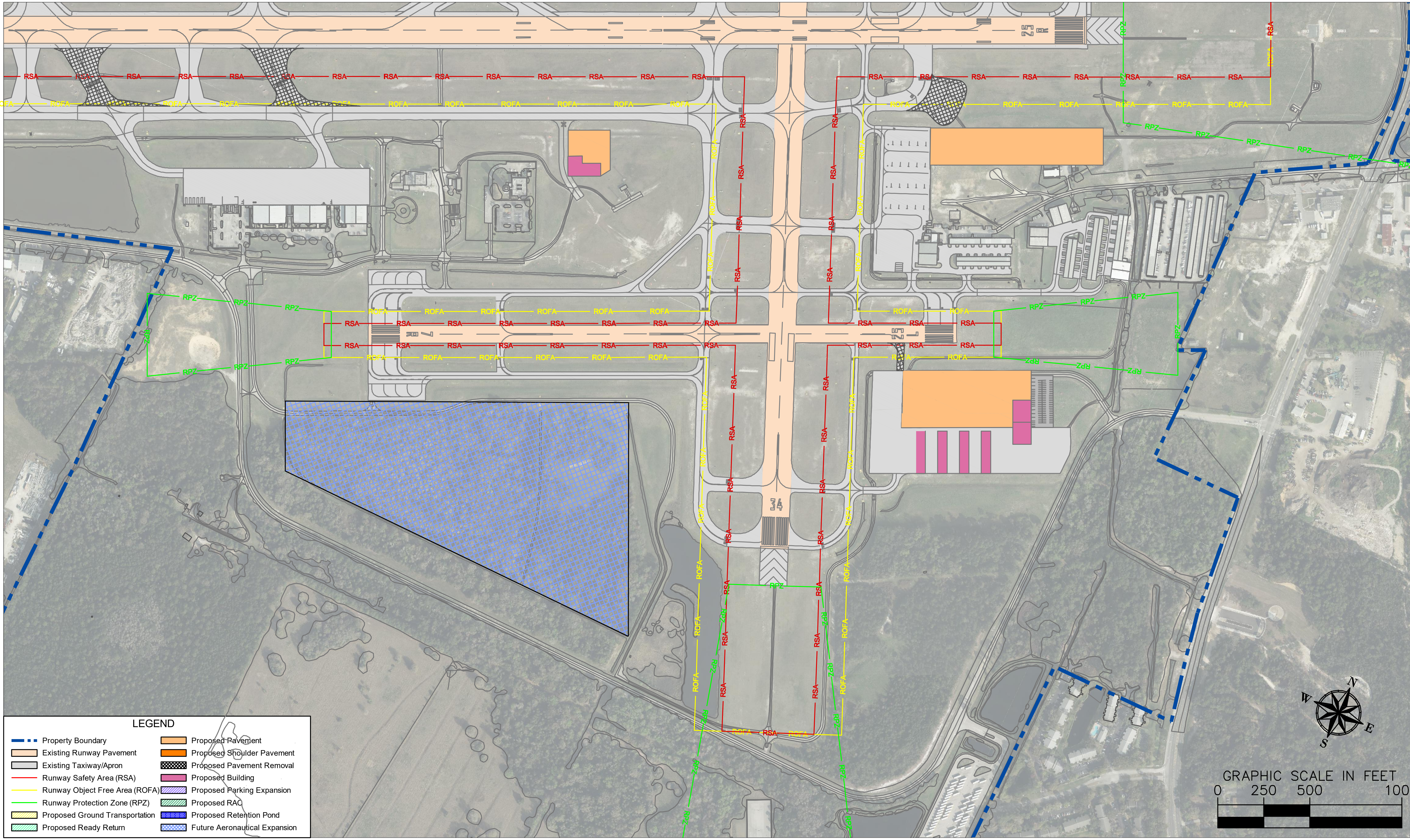
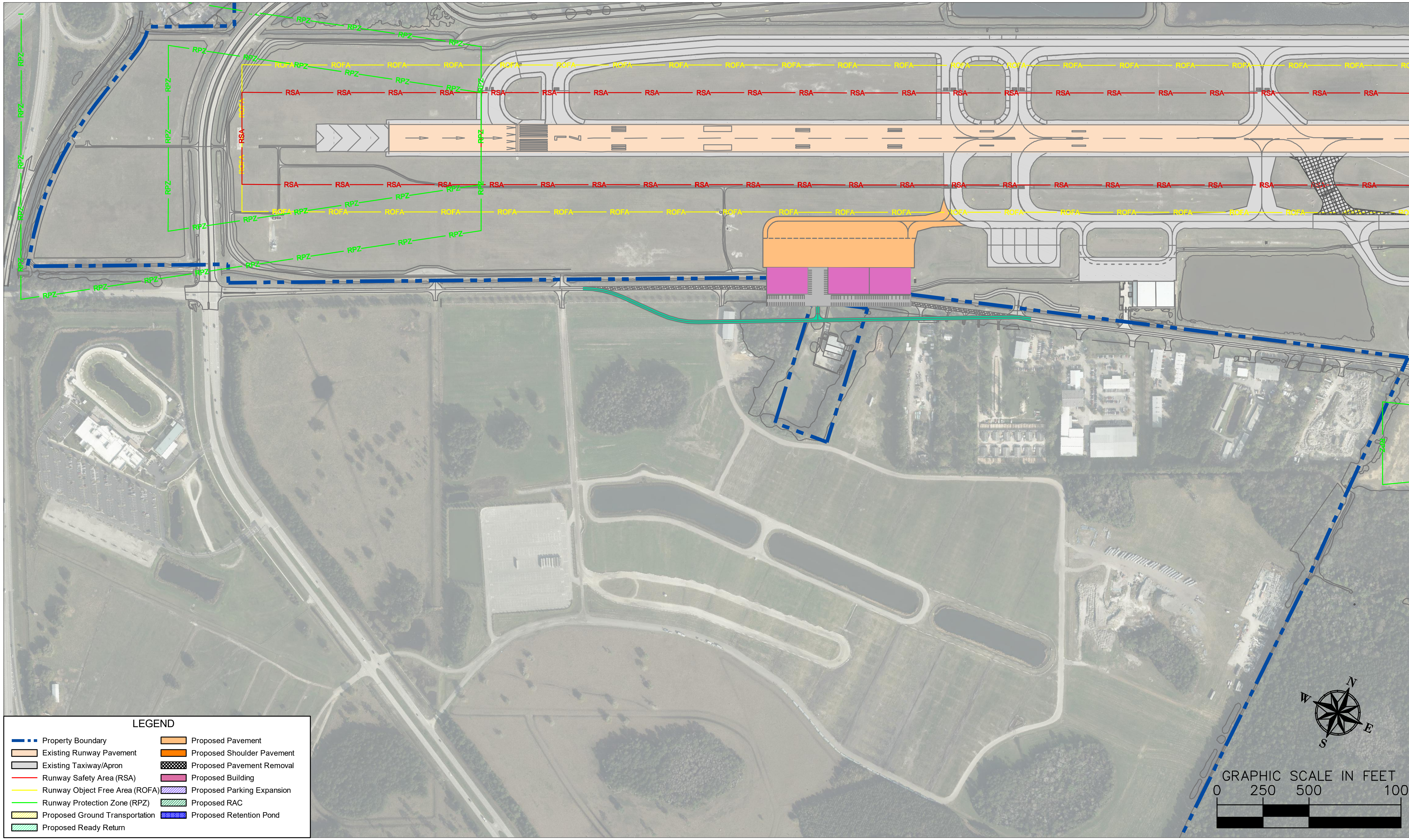


Exhibit 5.23

DAYTONA BEACH INTERNATIONAL AIRPORT

Preferred Alternative - Southeast View

Daytona Beach International Airport
Master Plan Update



DAYTONA BEACH INTERNATIONAL AIRPORT

Exhibit 5.24

Preferred Alternative - Southwest View

Daytona Beach International Airport
Master Plan Update

6. IMPLEMENTATION AND FINANCIAL PLAN

Analyses documented in previous chapters of this Master Plan Update evaluated the Airport's facility needs based on existing infrastructure and forecasts of aviation demand. These facility needs were presented as various development alternatives and culminated in a preferred alternative. The preferred alternative identified all improvements recommended to be implemented within the 20-year planning horizon in 0-5, 6-10, and 11-20-year phases.

In addition to these improvements, DAB staff identified other previously planned or recommended projects in its Airport Capital Improvement Program (ACIP), which were incorporated into the overall program. These projects include previously identified safety and maintenance improvements and projects to enhance airfield capacity and operational efficiency, as well as projects intended to generate revenue. The combination of projects identified in the Master Plan Update and those included in the ACIP represented the Recommended Development Plan (RDP).

This chapter summarized the RDP, and presented the Airport's anticipated phasing plan, environmental documentation requirements, an updated 5-year and 20-year ACIP, likely funding sources, an Airport rates and fees analysis, and a cash flow analysis.

6.1. RECOMMENDED DEVELOPMENT PLAN

Chapter 4 presented the recommended facility improvements developed for the Preferred Alternative, which included airfield and landside components that considered on-Airport land uses, Airport access, and other aviation and support facilities. As noted, the RDP included recommended facilities from the Preferred Alternative and Airport Sponsor planned and programmed projects.

The RDP considered the phasing and timing for the implementation of individual projects and the dependence of projects on one another. Implementation of the RDP was planned to occur in three phases, as described below.

6.1.1. PHASE I IMPROVEMENTS (2020-2024)

Projects from the RDP anticipated to occur in Phase I (0- to 5-year timeframe, FY 2020-2024) are depicted in **Exhibit 6.1**. Non-infrastructure projects such as planning studies, equipment upgrades, and construction design are not shown but are included in cost estimates and financial analysis presented in subsequent sections of this Chapter. The following projects are recommended to be implemented in Phase I (project descriptions included as necessary):

- **Parking Lot Improvements**: Phase I of public parking lot improvements;
- **Taxiway S Rehabilitation**: Design and Construction for rehabilitation of Taxiway S;
- **Flight Training Apron Improvements**: Restriping and minor rehabilitation on existing ERAU apron;
- **Parking Lot Improvements**: Phase II-IV of public parking lot improvements;
- **Runway 25R RSA/ROFA**: Design and construction of ROFA improvements;
- **Stormwater Pond Rehabilitation**: Design and rehabilitation of West stormwater pond including safety area;
- **Realign Bellevue Avenue**: Design and construction;
- **Runway 7R/25L Rehabilitation**: Design and construction including safety areas;
- **Land Acquisition**: Land acquisition for South Property;

- **Airport Beacon Improvements**: Design and construction for replacement of Airport beacon tower and foundation; and
- **Stormwater Pond Relocation**: Stormwater pond relocation, construction including safety areas.

6.1.2. PHASE II

Projects from the RDP anticipated to occur in Phase II (6- to 10-year timeframe, FY 2025-2029) are depicted in **Exhibit 6.2.** The following projects (excluding non-infrastructure improvements, design, planning studies, etc.) are included in Phase II (project descriptions included as necessary):

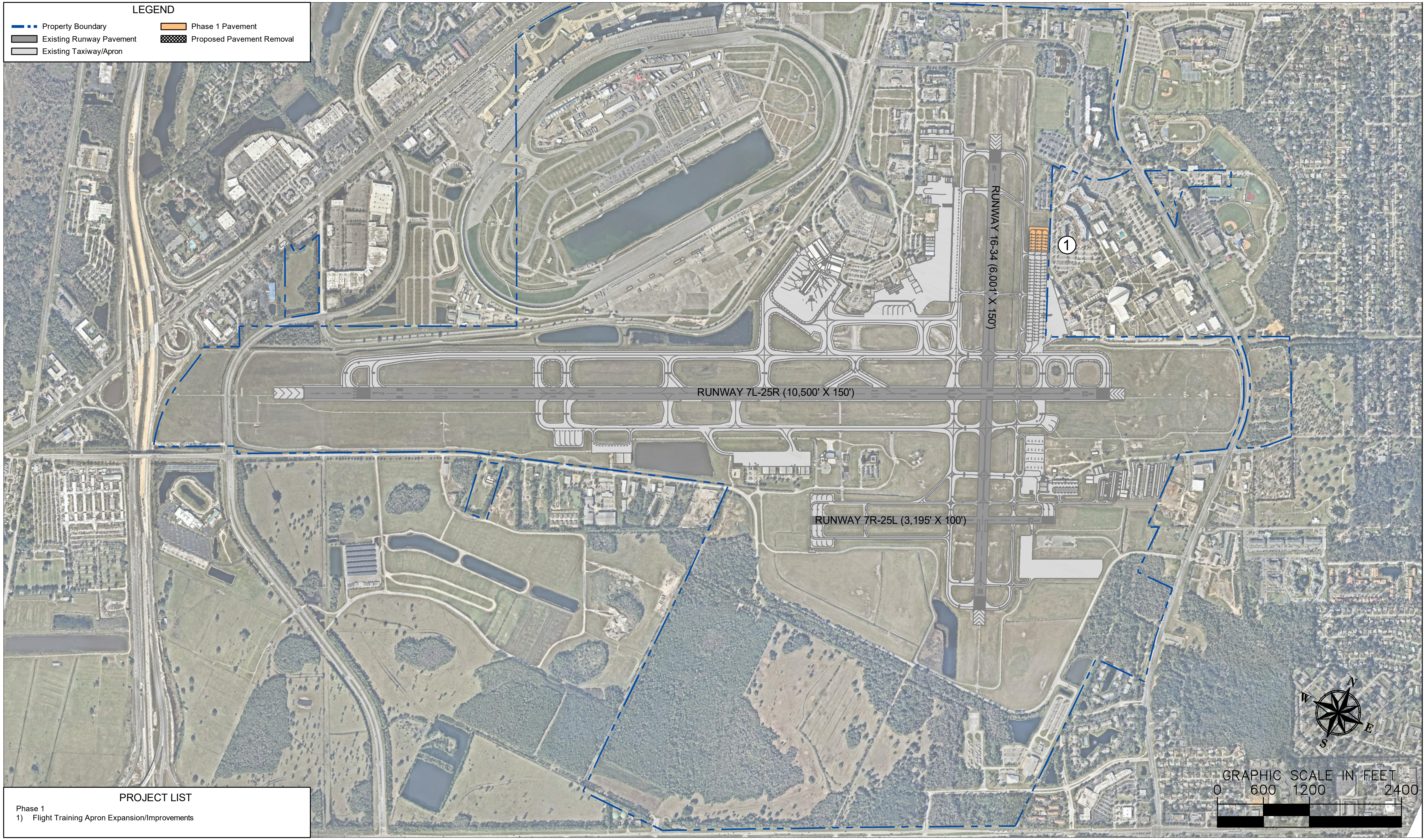
- **Midfield Run-up area**: Design and construction of new midfield run-up area;
- **Taxiways W3 and W4 for Runway Incursion Mitigation**: Design and construction for relocation of Taxiways W3 and W4;
- **Rehabilitate Taxiway W**;
- **Expansion of rental car ready/return lot**: Design and construction for expansion and reconfiguration of existing ready/return lot;
- **Expansion of public vehicle parking lot**: Design and construct 527 additional public vehicle spaces;
- **South Property Site Readiness**: Design and construct earthwork, stormwater improvements, and utilities for South Property development;
- **Stormwater Pond Relocation** (Off-Site);
- **Southeast Ramp Rehabilitation**: Design and construction;
- **Emergency Response Road**: Design and construction of emergency response road;
- **Terminal Ramp Rehabilitation**: Design and construction;
- **Consolidated Rental Car Maintenance Facility**: Design and construction;
- **Relocate Maintenance Facility**: Relocation of Airport maintenance facility to north portion of airfield;
- **Enhanced Air Cargo Facility or GA Hangar Facility**: Pavement expansion and rehabilitation for enhanced GA or air cargo capability;
- **Rehabilitate Taxiway E**: Rehabilitation of Taxiway E and connectors;
- **Relocate Taxiway E3/E4**: Relocate Taxiway E3 and E4 to satisfy RIM issues; and
- **Relocate Ground Transportation Curb**: Design and Construction.

6.1.3. PHASE III

Projects from the RDP anticipated to occur in Phase III (11- to 20-year timeframe, FY 2030-2039) are depicted in **Exhibit 6.3** and include the following (project descriptions included as necessary):

- **Rehabilitate Runway 16/34**;
- **Expand GA Apron**: Design and construction of GA apron, approximately 23,000 square feet;
- **Construct Public Parking Garage**: Design and construction of new public parking garage (500 spaces);
- **Southeast Apron Expansion**: Design and construct expansion of GA apron (approximately 15,000 square yards);
- **Concourse Expansion - Phase I**: Design and construct concourse extension, additional boarding bridges, and vertical circulation;
- **Airfield General Use Facility**: Design and construction of GA use facility on south portion of airfield;

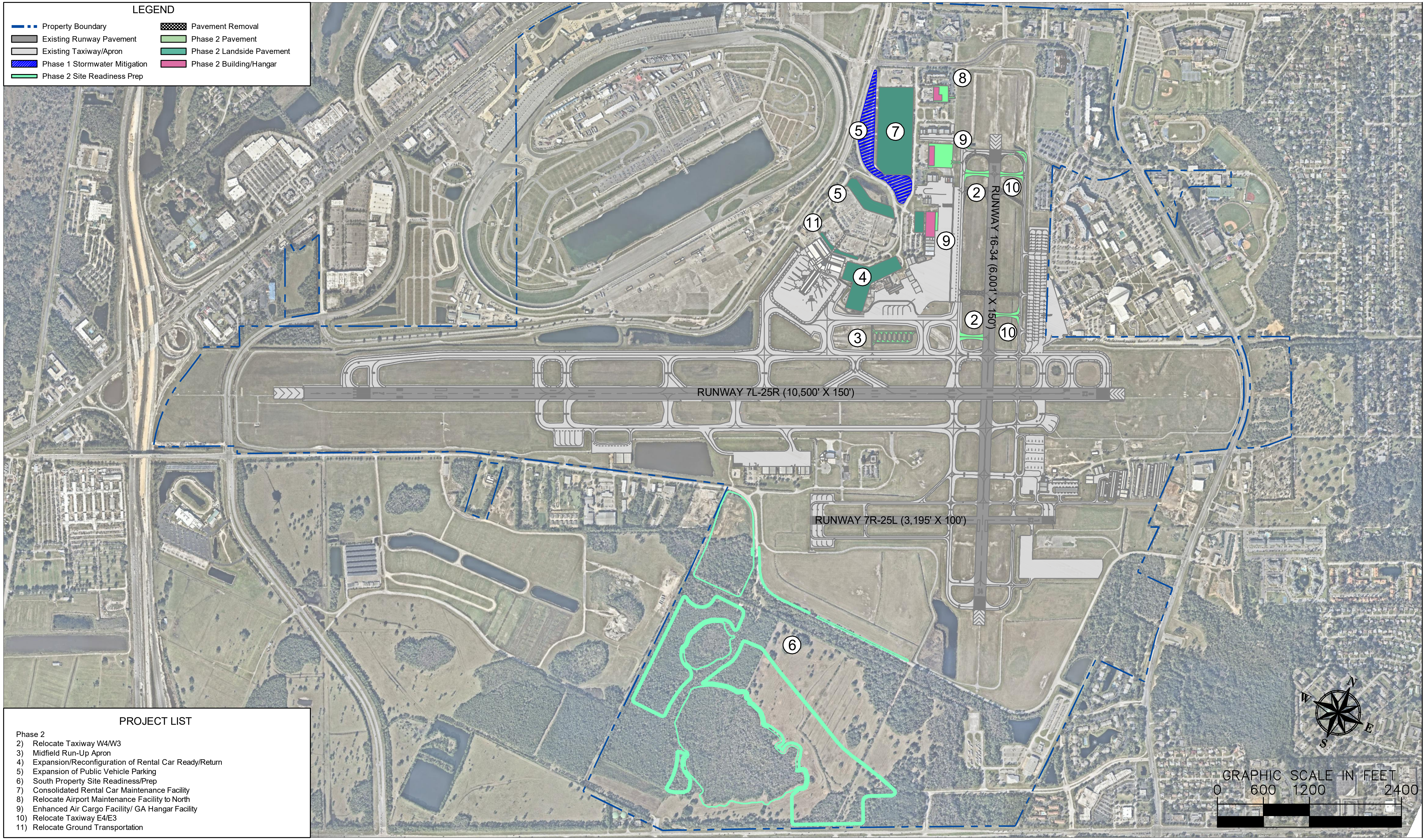
- **Taxiway T Extension**: Design and construct extension to Taxiway T across Runway 16/34; and
- **Concourse Expansion - Phase II**: Construction of ground-level federal inspection station.



DAYTONA BEACH
INTERNATIONAL AIRPORT

Exhibit 6.1

Recommended Development Plan - Phase I (1-5 Years)



DAYTONA BEACH INTERNATIONAL AIRPORT

Exhibit 6.2

Recommended Development Plan - Phase II (6-10 Years)

Daytona Beach International Airport
Master Plan Update

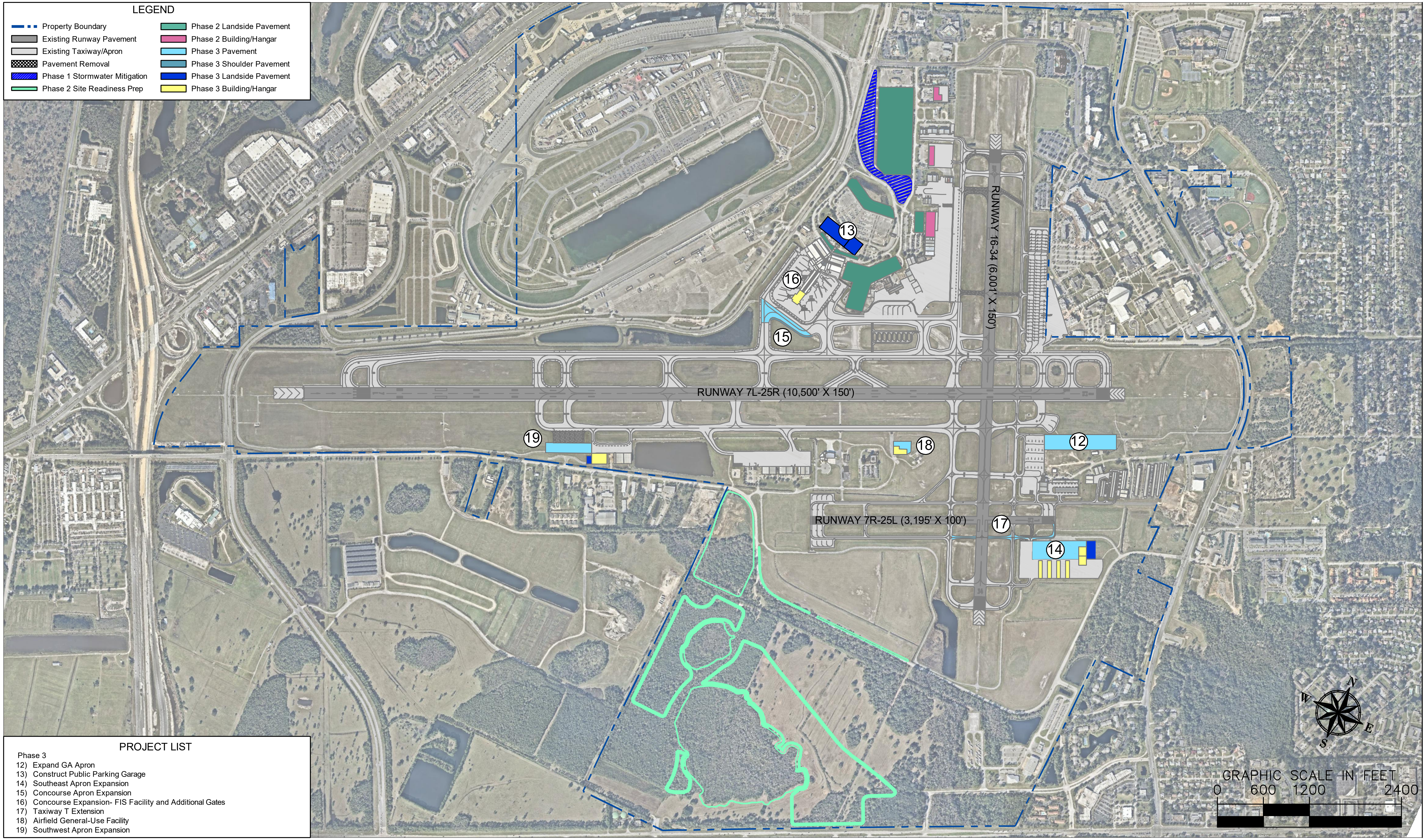


Exhibit 6.3

DAYTONA BEACH INTERNATIONAL AIRPORT

Recommended Development Plan - Phase III (11-20 Years)

6.2. ENVIRONMENTAL DOCUMENTATION REQUIREMENTS

Several projects described in the RDP require environmental documentation prior to design and construction. It is important to have a strategy for obtaining required environmental approvals under NEPA for the RDP. It is anticipated that for certain projects, FAA approval of the ALP will be conditional upon environmental review. Other NEPA-related environmental considerations may include drainage and impacts to sensitive habitat or hazardous waste sites on Airport property.

There are three primary types of environmental documentation requirements associated with Airport improvement projects:

- **Environmental Assessment (EA).** A public document that an airport sponsor prepares to provide sufficient evidence to determine whether a proposed action would require preparation of an Environmental Impact Statement (EIS) or a finding of no significant impact (FONSI). The average completion timeframe is six months to two years.
- **Environmental Impact Statement (EIS).** A public document required for airport development actions that may "significantly affect the quality of the human environment." The EIS describes the impacts on the environment as a result of a proposed action, impacts of alternatives, and plans to mitigate impacts. The average completion timeframe is two to three years.
- **Categorical Exclusion (CatEx).** There is a category of actions which do not individually or cumulatively have a significant effect on the human environment, and therefore, neither an EA nor an EIS is required. The typical timeframe to document a CatEx and receive FAA approval is two to six months.

The projects included in the RDP anticipated to require environmental review are presented in **Table 6.1**. It should be noted that cost estimates developed for the ACIP presented in **Section 6.3** include contingency costs for anticipated environmental documentation needs. It was assumed that environmental documentation would be included in federal and state grants for specific projects.

Table 6.1 - CIP Environmental Documentation Requirements	
Project	**Anticipated Documentation**
RDP Phase I	
Taxiway S Rehabilitation	CatEx
Runway 7R/25L Rehabilitation	CatEx
Runway 25R RSA/ROFA	CatEx
RDP Phase II	
Midfield Run-Up Area	CatEx
Taxiway W Rehabilitation	CatEx
Ready/Return Lot Expansion	CatEx
Public Parking Expansion	CatEx
Consolidated Rental Car Facility	EA
Maintenance Facility Relocation	CatEx
Air Cargo/GA Apron Enhancements	CatEx
Taxiways E3 and E4 Relocation	CatEx
RDP Phase III	
Rehabilitate Runway 16/34	CatEx
GA Apron Expansion	CatEx
Public Parking Garage	CatEx
Southeast Apron Expansion	CatEx
Concourse Expansion	CatEx
GA Apron Construction	CatEx
Taxiway T Extension	CatEx
Source: Kimley-Horn analysis, 2019.	

6.3. PROJECT COSTS AND SCHEDULE

The funding plan identified likely funding sources for projects included in the RDP. In support of the development of the funding plan, an ACIP was developed coincident with the RDP; the ACIP presents funding sources expected to be available through the planning period for projects in the RDP.

6.3.1. ASSUMPTIONS

The funding plan was developed according to information and assumptions that provided a reasonable basis for analysis at a level appropriate for an airport master plan. Some of the assumptions used to project funding sources may not be realized, and unanticipated events and circumstances may occur. Therefore, the actual results will vary, and such variations could be material.

The funding plan was preliminary in nature and was not intended to be used to support the sale of bonds or to obtain any other forms of financing. More detailed cost estimates and financial analyses are required to implement individual projects. It is also important to note that some projects in the RDP could be postponed if forecast aviation activity is not realized, construction costs rise significantly, or if projected funding is not available.

Cost estimates for projects in the RDP were prepared based on criteria specific to the region and assumed the following:

- Projects and cost estimates identified in the Airport's existing five-year ACIP were unchanged.
- Initial cost estimates were calculated in 2019 dollars. Projects identified in Phase II (6-10 year) and Phase III (11-20 year) included a 10 percent escalator to adjust for potential inflation.
- Unless indicated otherwise, all cost estimates for capital improvements identified in the Airport Master Plan Update or depicted on the Airport Layout Plan proposed in Phase II (6-10 year) and Phase III (11-20 year) included a 15 percent contingency for design costs and environmental documentation (reference **Table 6.1** for environmental documentation requirements).

Conservative assumptions were used to avoid overestimating the financial capacity of the Airport Sponsor during the planning period. Key assumptions include the following:

- FAA Airport Improvement Program (AIP) entitlement grants were projected based on passenger enplanement forecasts described in Chapter 2. It was assumed that the formula to calculate AIP entitlement funding, which is described in the following section, will not change throughout the 20-year planning horizon.
- AIP discretionary grants, Florida Department of Transportation (FDOT) grants, and other State capital outlay funds were assumed to be available for specific eligible projects at or below the average annual historical levels for projects with similar eligibility.

6.3.2. FUNDING SOURCES

Assumed funding sources were described in detail in the following sections. Each of the funding sources available to DAB has unique availability, eligibility, and time constraints. For all funding sources considered, the availability of funds does not necessarily mean that all funds projected to be available would be allocated to projects in the RDP.

6.3.2.1. Airport Improvement Program (AIP) Grants

The AIP is the FAA's grant program for funding capital development at eligible airports, including commercial airports such as DAB. The AIP provides primary entitlement grants to airports, which is described in the following section. When additional funding is required, the FAA may issue discretionary AIP grants to supplement entitlement funds. AIP funds can be used for most non-revenue generating airport development. They can also be used for revenue generating projects assuming there are no other needs at an airport and the FAA agrees.

Entitlement Grants

AIP provides funding for eligible projects at airports through an apportionment entitlement program. Primary commercial service airports (which includes DAB) receive a guaranteed minimum level of annual federal funding based on enplaned passengers. A primary airport is defined as any commercial service airport enplaning at least 10,000 passengers annually. An airport enplaning 10,000 or more passengers annually will receive the higher of $1,000,000 or a formula-generated value based on double the amount that would be received according to the following formulas: $7.80 per enplaned passenger for the first 50,000 enplanements, and $5.20 per enplanement for the next 50,000 enplanements. The next 400,000 enplanements provide $2.60 each, and an airport receives $0.65 for the next 500,000 enplanements. For each annual enplanement above one million, the airport receives $0.50. Based on the FAA approved forecasts described in Chapter 2, anticipated AIP entitlement funding by year is presented in **Table 6.2**.

As shown, the Airport is anticipated to accumulate a total of approximately $63M in entitlement funding over the course of the 20-year planning horizon.

Table 6.2 - FAA AIP Entitlement Funding by Year		
Year	**Passenger Enplanements**	**Eligible Entitlement Funding**
2018*	369,088	--
2019*	377,663	--
2020*	385,739	--
2021	394,888	$2,833,418
2022	403,770	$2,879,604
2023	412,077	$2,922,800
2024	420,659	$2,967,427
2025	430,328	$3,017,706
2026	440,206	$3,069,071
2027	450,425	$3,122,210
2028	459,930	$3,171,636
2029	471,066	$3,229,543
2030	481,930	$3,286,036
2031	492,669	$3,341,879
2032	504,199	$3,401,835
2033	515,529	$3,460,751
2034	527,641	$3,523,733
2035	539,799	$3,586,955
2036	553,192	$3,656,598
2037	565,587	$3,721,052
2038**	575,412	$3,772,142
2039**	585,299	$3,823,557
Total	--	$62,787,953

Source: Kimley-Horn analysis, 2019.
*Notes: *Entitlement funding in 2018-2020 was already dedicated to bond payments; **To determine funding in 2038 and 2039, passenger enplanement growth rate from 2018-2037 was extrapolated*

Discretionary Grants

Discretionary grants are administered by FAA for projects based on a prioritized basis. Projects associated with safety, reconstruction/rehabilitation, and capacity receive highest priority. As the operator of a primary non-airport in Florida, the County is eligible for 90 percent of eligible project costs to be financed by discretionary funds, though this percentage may differ based on the amount of available discretionary funds that are administered. Projects anticipated to be eligible for AIP discretionary grants are presented in the subsequent section. It is anticipated that a total of approximately $50.6M will be needed for discretionary funding.

Passenger Facility Charges and Customer Facility Charges

Passenger Facility Charges (PFCs) are authorized by Title 14 of the Code of Federal Regulations, Part 158, and the PFC program administered by the FAA. PFCs are collected from eligible passengers to aid in specific Airport projects. An airport may impose up to a $4.50 fee per passenger, revenues from which may be used as collected or can be applied to pay off debt service on bonds or other debts including local grant match dollars for AIP grants. PFCs can be used for FAA approved projects that improve safety or capacity, increase competition among airlines, or reduces noise and associated impacts.

It was assumed that the Airport will continue to collect and use PFCs at the existing rate of $4.50 per enplaned passenger throughout the planning period. Projected annual PFCs are presented in the Airport's cash flow analysis in the subsequent section and are anticipated to total approximately $36.3M over the course of the 20-year planning horizon.

Customer Facility Charges (CFCs) are generated via agreements with rental car agencies at the Airport. Currently, the Airport charges a daily rate of $2.50 per day, with an anticipated increase to $3.50 per day within the next five years. Projected annual CFCs are presented in the subsequent section and are anticipated to generate approximately $21.5M in revenues over the 20-year planning horizon.

6.3.2.2. Florida Department of Transportation

Aviation Grant Program Overview

Florida Department of Transportation (FDOT) Aviation and Spaceports Office developed the Aviation Grant Program to provide for a safe, cost-effective, and efficient statewide aviation transportation system. The Aviation Grant Program provides financial assistance to Florida's airports in the areas of safety, security, preservation, capacity improvement, land acquisition, planning, and economic development. Program funds assist local governments and airport authorities in planning, designing, constructing, and maintaining public-use aviation facilities.

FDOT may provide up to 50 percent of the local share of commercial service airport project costs when federal funding is available. For example, FDOT provides up to five percent of project costs when the FAA provides 90 percent funding. When no federal funding is available, FDOT provides up to 50 percent of project costs. FDOT may also provide up to 50 percent of the costs to build on-airport revenue-producing capital improvements. For the purposes of this financial analysis, it was assumed that FDOT funding would not be available for all proposed revenue-generating projects. It is anticipated that a total of approximately $19.0M of state grants will be needed through the 20-year planning horizon.

6.3.2.3. Local Funding

Airport operating and maintenance costs, local matching dollars for state and federal grants, and other expenses are funded by PFCs, CFCs, and business income from various Airport fees and rents, which are described in greater detail in Section 6.4. In years when the Airport experiences a financial deficit or to offset volatility in various revenue streams, Volusia County has the authority to deposit reserve capital into various accounts that allow the Airport to operate normally. Approximately $139.3M of local funding will be needed to support all the projects identified in the 20-year ACIP.

6.3.2.4. Third Party/Private Funding

Projects identified in the RDP that provide direct benefit to a tenant or that are anticipated to occur on private leaseholds may not be eligible for AIP or State grants. As such, the County has indicated it will seek third-party financing where appropriate as a funding source for specific projects in the RDP.

6.3.3. CAPITAL IMPROVEMENT PROGRAM

Table 6.3 summarizes the Airport's CIP for near-term (FY 2020–2024), mid-term (FY 2025–2029), and long-term (FY 2030–2039) projects. Estimated capital expenditures total approximately $271.8M (in escalated dollars) for all projects in the RDP.

Table 6.3 - 20-Year ACIP						
	Grant/ Funding Type	Project Cost[1]	Federal Share	State Share	Private Share	Local Share
Near-term (FY 2020-2024)						
ARFF Truck Unit 2	FSL	$1,100,000	$990,000	$55,000	--	$55,000
Air Conditioner for Boarding Bridges	L	$181,200	--	--	--	$181,200
Parking Lot Improvements – Phase I	SL	$3,099,642	--	$1,549,821	--	$1,549,821
Terminal Emergency Generators	SL	$2,000,000	--	$1,000,000	--	$1,000,000
ARFF Access to Taxiway P	SL	$146,152	--	$73,076	--	$73,076
Tree clearing	SL	$250,000	--	$125,000	--	$125,000
Fire Alarm System Replacement	SL	$582,200	--	$291,100	--	$291,100
Information Display System and Digital Content Development Services	SL	$255,000	--	$127,500	--	$127,500
Taxiway S Rehabilitation - Design	FSL	$400,000	$360,000	$20,000	--	$20,000
Pre-conditioned Air for Boarding Bridges	L	$750,000	--	--	--	$750,000
Flight Training Apron Improvements	Private	$100,000	--	--	$100,000	--
TSA Checkpoint Roof Renovation	SL	$600,000	--	$300,000	--	$300,000
Parking Lot Improvements – Phase II-IV	SL	$3,000,000	--	$1,500,000	--	$1,500,000
Taxiway S Rehabilitation - Construction	FSL	$4,000,000	$3,600,000	$200,000	--	$200,000
Runway 25R RSA/ROFA - Design	FSL	$109,000	$98,100	$5,450	--	$5,450
Stormwater Pond Rehabilitation	FSL	$3,000,000	$2,700,000	$150,000	--	$150,000
Realign Bellevue Avenue	SL	$5,000,000	--	$2,500,000	--	$2,500,000
Runway 7R/25L Rehabilitation - Design	SL	$500,000	--	$250,000	--	$250,000
Land Acquisition	FSL	$15,000,000	$13,500,000	$750,000	--	$750,000
Airport Beacon Improvements	FSL	$300,000	$270,000	$15,000	--	$15,000
Runway 25R RSA/ROFA - Construction	FSL	$1,090,000	$981,000	$54,500	--	$54,500
Runway 7R/25L Rehabilitation - Construction	SL	$5,000,000	--	$2,500,000	--	$2,500,000
Stormwater Pond Relocation	FSL	$10,000,000	$9,000,000	$500,000	--	$500,000
Taxiway W Rehabilitation - Design	FSL	$900,000	$810,000	$45,000	--	$45,000
Replace Centrifugal Chillers - Design	SL	$180,000	--	$90,000	--	$90,000
Passenger Boarding Bridge Replacement	L	$6,000,000	--	--	--	$6,000,000
Terminal High Mast Lighting Replacement	L	$1,500,000	--	--	--	$1,500,000
Subtotal		***$65,043,194***	***$32,309,100***	***$12,101,447***	***$100,000***	***$20,532,647***
Mid-term (FY 2025-2029)						
Midfield Run-up area*	FSL	$1,312,500	$1,181,250	$65,625	--	$65,625

Taxiway W4/W3 for Runway Incursion Mitigation*	FSL	$1,566,300	$1,409,670	$78,315	--	$78,315
Rehabilitate Taxiway W - Construction	FSL	$11,250,000	$10,125,000	$562,500	--	$562,500
Expansion of rental car ready/return lot*	L/CFC	$4,875,000	--	--	--	$4,875,000
Expansion of public vehicle parking lot*	L	$11,268,288	--	--	--	$11,268,288
South Property Site Readiness	L	$55,731,187	--	--	--	$55,731,187
Electrical System Upgrade	FSL	$3,300,000	$2,970,000	$165,000	--	$165,000
Stormwater Pond Relocation (Off-Site)	FSL	$3,300,000	$2,970,000	$165,000	--	$165,000
SE Ramp Rehabilitation	FSL	$1,694,000	$1,524,600	$84,700	--	$84,700
Emergency Response Road	SL	$220,000	--	$110,000	--	$110,000
Replace Centrifugal Chillers - Construction	SL	$1,760,000	--	$880,000	--	$880,000
Runway End Taxiway*	FSL	*TBD*	--	--	--	--
Terminal Ramp Rehabilitation	FSL	$10,274,000	$9,246,600	$513,700	--	$513,700
Consolidated Rental Car Maintenance Facility*	L/CFC	$24,375,000	--	--	--	$24,375,000
Relocate Maintenance Facility*	FSL	$750,000	$675,000	$37,500	--	$37,500
Enhanced Air Cargo Facility or GA Hangar Facility*	SL	$2,125,000	--	$1,062,500	--	$1,062,500
Rehabilitate Taxiway E	FSL	$4,210,800	$3,789,720	$210,540	--	$210,540
Relocate Taxiway E3/E4 *	FSL	$1,155,000	$1,039,500	$57,750	--	$57,750
Relocate Ground Transportation Curb	FSL	$825,000	$742,500	$41,250	--	$41,250
Subtotal		***$139,992,074***	***$35,673,840***	***$4,034,380***	**--**	***$100,283,854***
Long-term (FY 2030-2039)						
Rehabilitate Runway 16/34	FSL	$15,956,600	$14,360,940	$797,830	--	$797,830
Expand GA Apron*	FSL	$5,275,000	$4,747,500	$263,750	--	$263,750
Construct Public Parking Garage*	L	$15,625,000	--	--	--	$15,625,000
Southeast Apron Expansion*	FSL	$3,375,000	$3,037,500	$168,750	--	$168,750
Concourse Expansion - Phase I*	FSL	$11,000,000	$9,900,000	$550,000	--	$550,000
Airfield General Use Facility*	SL	$677,500	--	$338,750	--	$338,750
Taxiway T Extension*	FSL	$1,120,000	$1,008,000	$56,000	--	$56,000
Airport Master Plan Update	FSL	$900,000	$810,000	$45,000	--	$45,000
Concourse Expansion - Phase II*	FSL	$12,875,000	$11,587,500	$643,750	--	$643,750
Subtotal		***$66,804,100***	***$45,451,440***	***$2,863,830***	**--**	***$18,488,830***
Grand Total		***$271,839,368***	***$113,434,380***	***$18,999,657***	***$100,000***	***$139,305,331***

Sources: Volusia County 5-Year Forecast; Kimley-Horn.
*Note: [1]Projects in 6-20-year timeframe include 10% escalator to account for anticipated inflation; *Cost estimates include 15% contingency for design and environmental documentation*
FSL = Federal, State, Local; L = Local; SL = State, Local; CFC = Customer Facility Charge

Table 6.4 summarizes costs for projects in the CIP grouped by funding source. Approximately 23 percent of total project costs could be funded by FAA entitlement grants, 19 percent by FAA discretionary grants, seven percent by State grants, less than one percent by private sources, and 51 percent by local funds.

Table 6.4 - Funding Sources

RDP Phase	Project Cost[1]	Federal AIP Grants		State Grants	Private Funding	Local Funds
		Entitlement	Discretionary			
Phase I	$65,043,194	$11,519,100	$20,790,000	$12,101,447	$100,000	$20,532,647
Phase II	$139,992,074	$15,694,315	$19,979,525	$4,034,380	--	$100,283,854
Phase III	$66,804,100	$35,574,538	$9,876,902	$2,863,830	--	$18,488,830
Total	$271,839,368	$62,787,953	$50,646,427	$18,999,657	$100,000	$139,305,331

Source: Kimley-Horn, 2019.
Note: [1]Project costs have been escalated to year of construction assuming an annual rate of 5.0%.
FSL = Federal, State, Local; L = Local; SL = State, Local

The Airport's five-year CIP details funding sources and the anticipated starting year for each project in Phase I of the RDP and is presented in **Table 6.5**. While a 20-year CIP identified anticipated needs throughout the planning horizon, projects identified within a five-year timeframe typically reflect more immediate Airport needs or facilities where potential funding has already been secured. Additionally, the five-year ACIP can be used to inform the FAA and FDOT of proposed near-term improvements and grant funding implications.

Table 6.5 - 5-Year ACIP								
Project	Grant	Start Year	Project Cost[1]	Federal AIP Grants		State Grants	Private Funding	Local Funds
				Entitlement	Discretionary			
ARFF Truck Unit 2	FSL	2020	$1,100,000	--	$990,000	$55,000	--	$55,000
Air Conditioner for Boarding Bridges	L	2020	$181,200	--	--	--	--	$181,200
Parking Lot Improvements	SL	2020	$3,099,642	--	--	$1,549,821	--	$1,549,821
Terminal Emergency Generators	SL	2020	$2,000,000	--	--	$1,000,000	--	$1,000,000
ARFF Access to Taxiway P	SL	2020	$146,152	--	--	$73,076	--	$73,076
Tree clearing	SL	2020	$250,000	--	--	$125,000	--	$125,000
Fire Alarm System Replacement	SL	2020	$582,200	--	--	$291,100	--	$291,100
Information Display System and Digital Content Development Services	SL	2020	$255,000	--	--	$127,500	--	$127,500
Taxiway S Rehabilitation	FSL	2021	$400,000	$360,000	--	$20,000	--	$20,000
Pre-conditioned Air for Boarding Bridges	L	2021	$750,000	--	--	--	--	$750,000
Flight Training Apron Improvements	Private	2021	$100,000	--	--	--	$100,000	$0
TSA Checkpoint Roof Renovation	SL	2021	$600,000	--	--	$300,000	--	$300,000
Parking Lot Improvements	SL	2021	$3,000,000	--	--	$1,500,000	--	$1,500,000
Taxiway S Rehabilitation	FSL	2022	$4,000,000	--	$3,600,000	$200,000	--	$200,000
Runway 25R RSA/ROFA	FSL	2022	$109,000	--	$98,100	$5,450	--	$5,450
Stormwater Pond Rehabilitation	FSL	2022	$3,000,000	$2,700,000	--	$150,000	--	$150,000
Realign Bellevue Avenue	SL	2022	$5,000,000	--	--	$2,500,000	--	$2,500,000
Runway 7R/25L Rehabilitation	SL	2022	$500,000	--	--	$250,000	--	$250,000
Land Acquisition	FSL	2023	$15,000,000	--	$13,500,000	$750,000	--	$750,000
Airport Beacon Improvements	FSL	2023	$300,000	--	$270,000	$15,000	--	$15,000
Runway 25R RSA/ROFA - Construction	FSL	2023	$1,090,000	$981,000	--	$54,500	--	$54,500
Runway 7R/25L Rehabilitation	SL	2023	$5,000,000	--	--	$2,500,000	--	$2,500,000
Stormwater Pond Relocation	FSL	2024	$10,000,000	$9,000,000	--	$500,000	--	$500,000
Taxiway W Rehabilitation	FSL	2024	$900,000	$810,000	--	$45,000	--	$45,000
Replace Centrifugal Chillers	SL	2024	$180,000	--	--	$90,000	--	$90,000
Passenger Boarding Bridge Replacement	L	2024	$6,000,000	--	--	--	--	$6,000,000
Terminal High Mast Lighting Replacement	L	2024	$1,500,000	--	--	$137,500	--	$1,500,000

Table 6.5 (continued) – 5-Year ACIP						
Year	**Project Cost**	**Entitlement**	**Discretionary**	**State**	**Private**	**Local**
2020	$7,614,194	--	$990,000	$3221,497	--	$3,402,697
2021	$4,850,000	$360,000	--	$1,820,000	$100,000	$2,570,000
2022	$12,609,000	$98,100	$6,300,000	$3,105,450	--	$3,105,450
2023	$21,390,000	$1,251,000	$13,500,000	$3,319,500	--	$3,319,500

Source: Volusia County 5-Year Forecast; Kimley-Horn.

6.4. FINANCIAL PLAN

This section presented the anticipated funding plan for implementation of projects identified in the ACIP and assesses the County's ability to fund these projects. Though an implementation schedule was identified, it should be noted that realization of specific projects and the resulting financial requirements may change based on local economic conditions, actual aviation-related activity, or other factors.

As the sponsor of DAB, Volusia County is responsible for management and budgeting of all Airport-generated revenues and expenditures, which includes local matching grants for Federal and State capital improvement projects. The County utilizes the Daytona Beach International Airport Fund, which is adjusted accordingly based on fiscal activity at the Airport.

The County updates its five-year Airport budget forecast on an annual basis. This budget was utilized for near-term projections of revenues and expenditures and provided the basis for anticipated long-term financial requirements when compared with future aviation-related activity and local economic conditions. It should be noted that projected local grant-matching requirements included both projects accounted for in the Volusia County five-year Airport budget as well as those required for projects identified in this \ Master Plan Update.

The following sections provided a summary of the Airport's rates and charges, as well as an overview of forecasted Airport revenues and expenditures, a comparison of anticipated cash flow and local grant-matching requirements identified previously in **Section 6.3**, and high-level recommendations as they pertained to anticipated funding shortfalls.

6.4.1. AIRPORT RATES AND CHARGES

Revenues at the Airport are primarily generated by rates and charges to passengers, tenants, and other Airport users. The primary sources of revenue at the Airport are presented in **Table 6.6**. A specific component of this task was to compare the Airport's standard rates and charges to those at other regional airports with similar characteristics (primarily passenger activity and frequency of commercial operations) to validate or develop recommendations to change existing revenue streams.

Rates and charges from five airports were collected and are depicted in **Table 6.6** (includes Fayetteville Regional Airport (FAY) in North Carolina, Tallahassee International Airport (TLH) in Florida, Gulfport-Biloxi International Airport (GPT) in Mississippi, Shreveport Regional Airport (SHV) in Louisiana, and Gainesville Regional Airport (GNV) in Florida. These airports are relatively similar to DAB in terms of daily commercial flights, equipment used, and passenger volumes.

It should be noted that some other airports' rates and charges are calculated using different metrics than those at DAB (such as charging for a percentage of revenue rather than a flat fee, charging airlines for annual leases versus per flight fees, etc.). These are noted in the table as applicable. Additionally, not all rates and charges data for comparison airports were made available, and in other instances, airports did not have certain fees that are imposed at DAB (such as commercial aircraft gate turn fees).

In general, the rates and charges imposed at DAB fall within a reasonable range of the comparison airports. Comparing the grouping of airports as a whole, DAB tends to charge slightly less for items such as commercial/FBO leases, landing fees, signatory airline gate charges, and rental car CFCs, and slightly more for commercial aircraft Remain Overnight (RON) parking, and general aviation aircraft tie-downs.

Table 6.6 - Airport Rates and Charges Comparison												
Item	Daytona Beach International Airport (DAB)		Fayetteville Regional Airport (FAY)		Tallahassee International Airport (TLH)		Gulfport-Biloxi International Airport (GPT)		Shreveport Regional Airport (SHV)		Gainesville Regional Airport (GNV)	
	Price	Unit	Price	Unit	Price	Unit	Price	Unit	Price	Unit	Price	Unit
Private Hangar Lease	$0.21	Square foot/year	$200 - $225	Month	$0.33	Square foot/year	N/A	N/A	$140 -$385	Month	$197 -$363	Month
Commercial/FBO Land Lease	$0.21	Square foot/year	$0.25 - $0.35	Square foot/year	$0.33	Square foot/year	2.0%	Gross Sales	$0.20 -$0.53	Square foot/year	N/A	N/A
FBO Tie-Down	$55	Month	$45	Month	N/A	N/A	N/A	N/A	$48	Month	$35 -$105	Month Based on Size
Fuel Flowage Fee	$0.08	Gallon	$0.06	Gallon	$0.11 / $0.02	Gallon GA / Airline	$0.11 / $0.03	Gallon GA / Airline	$0.08	Gallon	$0.01	Gallon
Landing Fee – Signatory	$1.35	1,000 pounds	$1.23	1,000 pounds	$2.76	1,000 pounds	$5.08	1,000 pounds	$2.97	1,000 pounds	$1.57	1,000 pounds
Landing Fee – Non-Signatory	$1.69	1,000 pounds	$1.39	1,000 pounds	$2.76	1,000 pounds	$6.35	1,000 pounds	$3.71	1,000 pounds	$1.97	1,000 pounds
Airline Terminal Rate	$43	Square foot/year	$75	Flight	$46.12	Square foot/year	$4.71	Per Passenger	$47 - $76	Flight (based on aircraft size)	$350 -$600	Based on size and time
Commercial Gate Charge	$48,896	Year	$5 - $25	Flight	$58,435	Year	N/A	N/A	$58,000	Year	$6 - $16	Per Passenger
Commercial Ramp Charge	$74,420	Year	N/A	N/A	$50 - $100	Flight (based on aircraft size)	N/A	N/A	$18,000	Year	$0 / $150	Flight (Signatory / Non-Signatory)
Gate Turn Fee (0-4 Hrs.) Signatory/Non-Signatory	$101 / $152	Flight	N/A	N/A	$50 - $100	Flight (based on aircraft size)	N/A	N/A	N/A	N/A	N/A	N/A
Aircraft Overnight Parking Signatory/Non-Signatory	$202 / $305	Flight	$150	Flight	$50 - $100	Flight (based on aircraft size)	50%	Landing Fee	$110 - $138	Flight (based on aircraft size)	N/A	N/A
Rental Car CFC	$2.50	Day	$4.00	Day	$5.50	Day	7.0%	Gross Sales	12.0%	Gross Revenue	$1.00	Day
Private Hangar Lease	$0.21	Square foot/year	$200 - $225	Month	$0.33	Square foot/year	N/A	N/A	$140 -$385	Month	$197 -$363	Month
Commercial/FBO Land Lease	$0.21	Square foot/year	$0.25 - $0.35	Square foot/year	$0.33	Square foot/year	2.0%	Gross Sales	$0.20 -$0.53	Square foot/year	N/A	N/A
FBO Tie-Down	$55	Month	$45	Month	N/A	N/A	N/A	N/A	$48	Month	$35 -$105	Month Based on Size

Source: Volusia County 5-Year Forecast, Kimley-Horn.

6.4.2. CASH FLOW ANALYSIS

Airport revenues are grouped into three primary categories: business income, PFCs/CFCs (described previously in **Section 6.3**), and miscellaneous income. Business income includes revenues generated from rates and charges, described previously in **Section 6.4**, as well as concessions (including vehicle parking), ground handling fees, and revenues from special events. Miscellaneous revenues are largely associated with items such as investment income, reimbursements, and contributions.

The County groups Airport expenditures into five primary categories; personnel services (salaries, benefits), operating expenses (insurance, supplies, and professional services), capital outlay, capital improvements, and debt service. The County has the authority to deposit reserves into six various funds to support the Airport when revenues alone are not sufficient to cover the costs of the aforementioned expenditures.

Historical Airport revenues and expenditures from fiscal year 2013-2014 through 2018-2019 are presented in **Table 6.7** and **Table 6.8**. As shown, the Airport has several revenue and expenditure sources dedicated for specific capital improvements, which include loan repayments on the terminal renovation. For years beyond those identified in the Volusia County 5-Year Forecast, the Airport's projected cash flow analysis identifies what the anticipated surplus or deficit will be. It is anticipated in years when a deficit is projected, the County will elect to dedicate reserves to cover the shortfall.

Table 6.7 - Historical Airport Revenues						
Revenues	**2013-2014**	**2014-2015**	**2015-2016**	**2016-2017**	**2017-2018**	**2018-2019 (Est.)**
Passenger Facility Charges (PFCs)	$1,274,291	$1,246,291	$1,395,653	$1,431,913	$1,488,034	$1,439,568
Customer Facility Charges (CFCs)	--	--	--	--	$860,018	$850,000
Business Income	$10,419,440	$10,605,018	$11,381,148	$11,698,105	$12,321,637	$12,133,765
Miscellaneous Revenue	$539,595	$549,196	$775,465	$644,931	$717,770	$934,682
PY Balance Fund	--	--	--	--	--	$2,722,234
FAA Innovative Financing Grant	--	--	--	--	--	$2,581,644
State Innovative Financing	--	--	--	--	--	$143,425
Terminal Loan Proceeds	--	--	--	--	--	$12,000,000
Total Revenues	**$12,233,326**	**$12,400,505**	**$13,552,266**	**$13,774,949**	**$15,387,459**	**$32,805,318**
Source: Volusia County 5-Year Forecast.						

Table 6.8 - Historical Airport Expenditures						
Expenditures	**2013-2014**	**2014-2015**	**2015-2016**	**2016-2017**	**2017-2018**	**2018-2019 (Est.)**
Personnel Services	$3,190,180	$3,162,201	$3,357,471	$3,442,853	$3,674,721	$3,759,037
Operating Expenses	$5,737,803	$5,613,772	$6,788,931	$6,581,905	$7,575,949	$8,910,526
Capital Outlay/Improvements	$78,715	$94,912	$248,648	$170,079	$295,249	$37,807,695
Capital Improvements - Grant/Local Match	$4,999,737	$4,728,865	$1,476,718	$8,391,929	$9,379,358	$2,882,689
Debt Service	$1,311,457	$1,238,610	$1,032,325	$880,925	$728,483	$3,612,426
Other	--	$2,000	--	-$14,620	--	--
Grant Revenues	--	--	--	--	--	($24,167,055)
Reserves	--	--	--	--	--	$22,193,580
Total Expenses	**$15,317,892**	**$14,840,360**	**$12,904,093**	**$19,453,071**	**$21,653,760**	**$54,998,898**
Source: Volusia County 5-Year Forecast.						

6.4.3. CASH FLOW ANALYSIS

Table 6.9 depicts projections of expenditures and revenues year-by-year through 2023-2024, and summarizes 0 to 5-, 6 to 10-, and 11 to 20-year timeframes concurrent with the ACIP. Annual projections through 2022-2023 utilize the Volusia County 5-Year Forecast. It should be noted that projections of capital improvements were obtained from the ACIP (**Table 6.4**). While the Volusia County 5-Year Forecast framed the basis for projected revenues and expenditures (capital improvements notwithstanding), the following describes assumptions related to projected revenues and expenditures:

Revenues

- PFCs were calculated based on the FAA approved passenger enplanement forecast presented in Chapter 2 and did not factor any rate increases in the future;
- CFCs were assumed to increase at the same rate as FAA approved passenger enplanement forecasts presented in Chapter 2 and were anticipated to increase from $2.50 to $3.50 per day in the 5 to 10-year timeframe;
- Business revenues were anticipated to increase 1.8 percent annually throughout the projection period;
- Miscellaneous revenues were anticipated to increase 2.0 percent annually throughout the projection period;
- Vehicle parking garage revenues assumed that collections would start in FY 2030-2031; 250 additional spaces were anticipated to have 50 percent utilization (i.e. used 50 percent of the year at any given time) at a rate of $20 per day; and
- Previous Year Balance Fund, FAA and State Innovative Financing, and Terminal Loan Proceeds were assumed to be fulfilled as reported in the Volusia County 5-Year Forecast; these revenue sources were not factored for FY 2023-2024 through 2038-2039.

Expenditures

- Debt service was held constant at $362,917 annually through 2034 when the 2019 Capital Improvement Revenue Note is projected to be paid off;
- Capital outlay was anticipated to remain flat at $2,723,250 per year through 2038-2039;
- Personnel services were anticipated to increase 1.8 percent annually throughout the projection period;
- Operating expenses were anticipated to increase 2.0 percent annually throughout the projection period; and
- The Volusia County 5-Year Forecast budgets for local grant matching requirements for improvements identified in the Airport's ACIP; in addition to these projects, improvements identified in this Master Plan Update are also included to identify the Airport's local grant match requirement.

Table 6.9 - Airport Cash Flow Analysis

	2018-2019 (Est.)	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	0-5 Year (Phase I)	6-10 Year (Phase II)	11-20 Year (Phase III)	Total
Revenues										
Passenger Facility Charges (PFCs)	$1,439,568	$1,439,568	$1,439,568	$1,439,568	$1,439,568	$1,607,240	$7,365,512	$8,586,782	$20,387,161	$36,339,454
Customer Facility Charges (CFCs)	$850,000	$850,000	$850,000	$850,000	$850,000	$949,003	$4,349,003	$5,070,107	$12,037,699	$21,456,809
Business Income	$12,133,765	$12,352,004	$12,515,282	$12,716,159	$12,929,944	$13,162,683	$63,676,072	$69,453,793	$158,952,036	$292,081,901
Miscellaneous Revenues	$934,682	$963,786	$885,437	$885,437	$885,437	$903,146	$4,523,243	$4,794,007	$10,691,801	$20,009,051
Vehicle Parking Garage Revenues	--	--	--	--	--	--	--	--	$8,212,500	$8,212,500
Previous Year Balance Fund	$2,722,234	$2,945,474	$1,835,968	$349,875	--	--	$5,131,317	--	--	--
FAA Innovative Financing Grant	$2,581,644	$2,581,644	$2,580,974	--	--	--	$5,162,618	--	--	--
State Innovative Financing	$143,425	$143,425	$142,276	--	--	--	$285,701	--	--	--
Terminal Loan Proceeds	$12,000,000	--	--	--	--	--	--	--	--	--
Total Revenues	$32,805,318	$21,275,901	$20,249,505	$16,241,039	$16,104,949	$16,622,071	$90,493,465	$87,904,689	$210,281,197	$378,099,715
Expenditures										
Local Grant Match Requirement (ACIP and Master Plan Update Projects)	$2,882,689	$3,402,697	$2,570,000	$3,105,450	$3,319,500	$8,135,000	$20,532,647	$100,283,854	$18,488,830	$139,305,331
Personnel Services	$3,759,037	$3,918,645	$4,189,534	$4,575,160	$4,724,956	$4,810,005	$22,218,300	$25,380,320	$58,085,431	$105,684,052
Operating Expenses	$8,910,526	$8,734,669	$8,606,286	$8,818,952	$9,031,185	$9,211,809	$44,402,901	$48,897,395	$113,592,327	$206,892,622
Capital Outlay/Improvements	$37,807,695	$1,920,040	$957,778	$3,110,206	$2,723,250	$2,723,250	$11,434,524	$13,616,250	$27,232,500	$52,283,274
Debt Service	$3,612,426	$4,000,253	$4,625,732	$1,013,720	$1,012,107	$362,917	$11,014,729	$1,814,585	$1,814,585	$14,643,899
Grant Revenues	*($24,167,055)*	--	--	*($2,723,250)*	*($2,723,250)*	--	*($5,446,500)*	--	--	--
Reserves	*$22,193,580*	*$19,248,106*	*$17,412,138*	*$17,062,263*	*$18,077,215*	--	*$71,799,722*	--	--	--
Total Expenses	**$54,998,898**	**$41,224,410**	**$38,391,468**	**$35,495,676**	**$37,394,213**	**$26,060,481**	**$178,648,748**	**$192,965,224**	**$225,904,629**	**$531,165,379**
Surplus/(Deficit)	**--**	**($700,403)**	**($699,825)**	**($1,659,199)**	**($1,982,799)**	**($8,620,910)**	**($13,663,136)**	**($102,087,715)**	**($8,932,476)**	**($140,709,462)**

Source: Volusia County 5-Year Forecast; Kimley-Horn.

6.4.4. SUMMARY AND RECOMMENDATIONS

As shown in **Table 6.9**, the Airport is anticipated to experience a deficit of approximately $141M dollars over the course of the 20-year planning horizon. Projects identified in Phase II present a significant funding challenge, as several large-scale improvements recommended during this timeframe were not assumed to be eligible for FAA or State grants (vehicle parking lot expansion, South Property site preparation, consolidated rental car facility).

Although the Airport is well positioned to take advantage of State and Federal funding opportunities for capital improvements, the cash flow analysis indicated the Airport will continue to rely on County reserves to offset the Airport's operating deficit.

In order to minimize dependency on County reserve funding, the Airport Sponsor could consider the following recommendations:

- Periodically assess operating and maintenance activities and identify opportunities to increase efficiency, sustainability, and cost savings;
- Conduct a formal rates and charges study to identify if existing revenues are commensurate with aviation-related activity and services/facilities offered at the Airport;
- Identify or pursue non-AIP or traditional FDOT funding sources that may assist with specific projects; and
- Conduct cost-benefit analyses for large-scale non-grant eligible projects such as the proposed consolidated rental car facility and vehicle parking garage to ensure that return on investment is positive and sustainable.

7. ENVIRONMENTAL OVERVIEW

Based on known environmental considerations at the Airport and the types of potential future projects, several NEPA environmental resource categories (defined in FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*) may be affected by future DAB projects and require assessment during future NEPA compliance efforts. The project study area for this review includes areas within the existing DAB property.

The resource categories that would likely require detailed review in future environmental evaluations of DAB projects are:

- Air Quality;
- Noise Impacts;
- Endangered and Threatened Species;
- Hazardous Materials and Solid Waste;
- Historical, Archaeological, and Cultural Resources;
- Water Resources (Floodplains, Surface Waters, Wetlands, and Water Quality); and
- Coastal Zone Management Program consistency.

Environmental review of all DAB projects would likely need to include consideration of the following resource categories, but it is anticipated that environmental evaluation would not likely require more than a general discussion of the effects. These categories include:

- Department of Transportation Act, Section 4(f) Resources;
- Existing and Future Land Use;
- Construction Impacts;
- Light Emissions; and
- Social and Socioeconomics.

The following resources are not expected to require detailed evaluation in future environmental reviews because the resources are not present at or near the Airport:

- Farmlands; and
- Wild and Scenic Rivers.

The methodology for this environmental overview included a review of existing state and federal databases as well as previous knowledge from projects planned, designed, and permitted on the Airport. The following resources were reviewed:

- U.S. Environmental Protection Agency (EPA) Green Book (https://www3.epa.gov/airquality/greenbook/ancl.html);
- Florida Natural Areas Inventory (FNAI) Biodiversity Matrix (http://www.fnai.org/biointro.cfm);
- Various Geographic Information System (GIS) data layers from the U.S. Fish and Wildlife Service (USFWS), U.S. Geological Survey (USGS), Florida Fish and Wildlife Conservation Commission (FWC) [(https://myfwc.com/wildlifehabitats/wildlife/bba/) and (https://www.arcgis.com/apps/webappviewer/index.html?id=253604118279431984e8bc3ebf1cc8e9)];
- USFWS IPaC data [https://ecos.fws.gov/ipac/];
- State Historic Preservation Officer (SHPO), Florida Master Site File (http://www.flheritage.com/);

- USFWS National Wetlands Inventory (NWI) Maps (Web-based maps available from http://www.fws.gov/wetlands/Data/mapper.html);
- Federal Emergency Management Agency (FEMA) Digital Flood Insurance Rate Maps (FIRM; Web-based maps available from http://msc.fema.gov/);
- U.S. Census Bureau 2013-2017 American Community Survey 5-Year Estimates;
- St. Johns River Water Management District (SJRWMD) Interactive GIS Map, Florida Department of Environmental Protection (FDEP) MapDirect GIS;
- Existing Wetland Jurisdictional Determinations for the South Parcels issued by SJRWMD (Parcels 40, 47, 49-54 and 66); and
- Existing Environmental Permits for the South Parcels (SJRWMD Conceptual Environmental Resource Permit (ERP) No. 22729-32 and USACE Permit No. SAJ-2018-00999 SP-JCP).

7.1. AIR QUALITY

According to the U.S. EPA Green Book, Volusia County is currently in an attainment area for all National Ambient Air Quality Standards (NAAQS) criteria for air pollutants (i.e., O3, CO, NO2, PM, SO2, Lead).

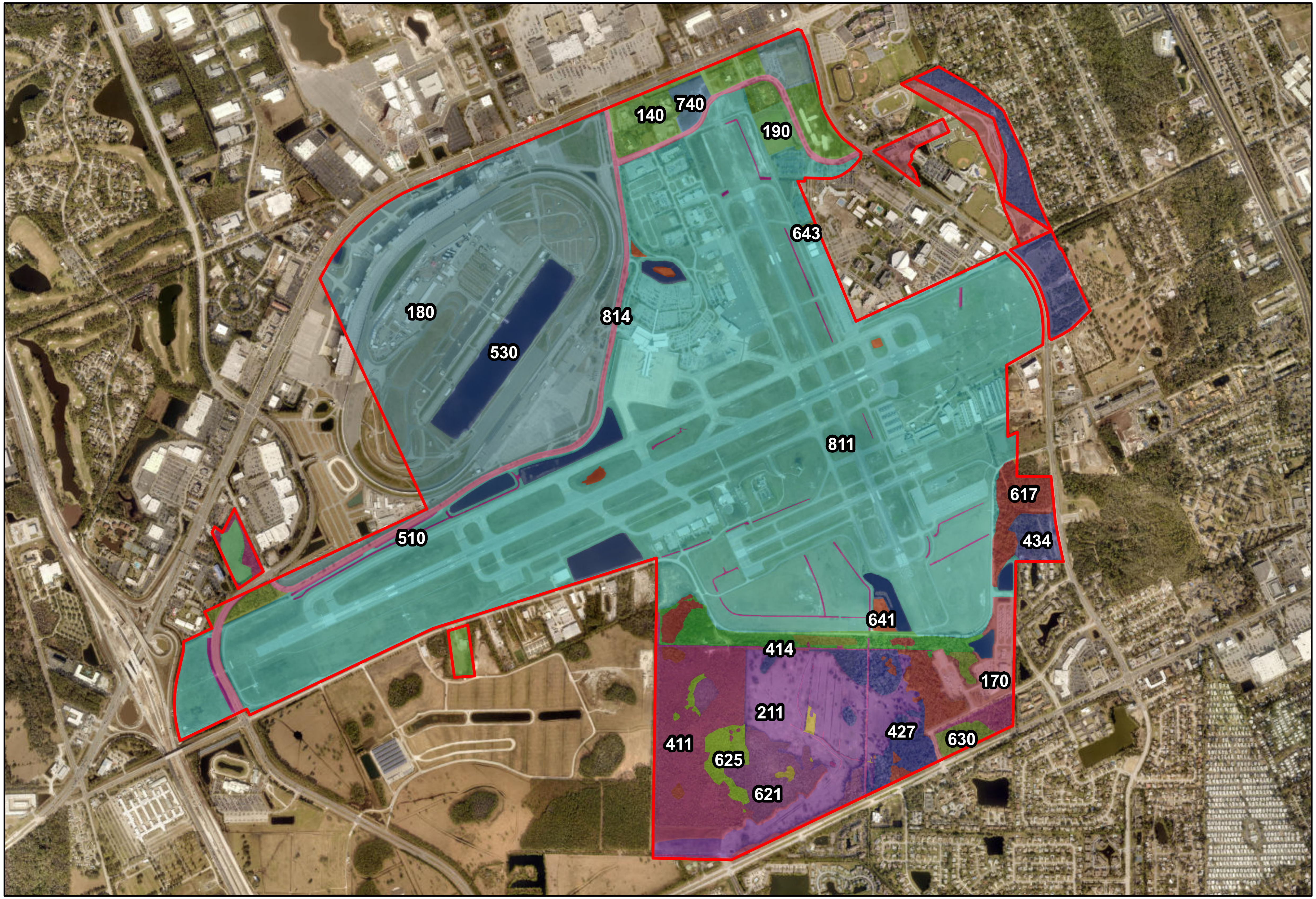
Following criteria established by the EPA, the FAA has identified actions that are presumed to conform to a State Implementation Plan (SIP) for the NAAQS and are therefore exempt from the general conformity regulations. If a DAB project is not exempt, consideration of construction emissions would be necessary to determine if construction would cause pollutant concentrations to exceed thresholds established for one or more of the NAAQS.

In addition to the need to estimate construction emissions for the projects, nearly all projects that are proposed in the Master Plan Update may affect operational emissions as they facilitate growth in aircraft and vehicular operations. Therefore, it is anticipated that analysis would be required to determine if operations with implementation of the projects would cause pollutant concentrations to exceed *de minimis* thresholds or be regionally significant. If a project would exceed *de minimis* thresholds, a conformity determination would be required. If project emissions would not exceed *de minimis* thresholds, or be regionally significant, the FAA can determine that the General Conformity Rule does not apply, and no further analysis or documentation would be required.

7.2. BIOTIC COMMUNITIES

Biotic communities were classified based upon a review of *Florida Land Use, Cover, and Forms Classification System* (FLUCFCS, Florida Department of Transportation, 1999) data from SJRWMD, NWI Maps, and aerial photograph interpretation. The biotic communities on or near DAB include a variety of upland and wetland habitats. A map depicting existing biotic communities is provided in **Exhibit 7.1.**

Most of the study area consists of the Airport (terminal, runways, stormwater management, hangars, and other aviation support development) and the Daytona International Speedway. Vegetation in the developed Airport primarily consists of ruderal grasses that are mowed and maintained. The southern portion of the Airport property contains multiple types of upland forests, as well as pastureland, wetlands and surface waters.



Legend

Daytona Airport Boundary

FLUCFCS Code: Description

- 140: Commercial and Services
- 150: Light Industrial
- 170: Institutional
- 180: Recreational
- 190: Open Land
- 211: Improved Pastures
- 411: Pine Flatwoods
- 414: Pine - Mesic Oak
- 427: Live Oak
- 434: Hardwood-Conifer Mixed
- 510: Streams and Waterways
- 530: Reservoirs
- 617: Mixed Wetland Hardwoods
- 621: Cypress
- 625: Hydric Pine Flatwoods
- 630: Wetland Forested Mixed
- 641: Freshwater Marsh
- 643: Wet Prairies
- 740: Disturbed Lands
- 811: Airport
- 814: Roads and Highways

N W E S

0 1,000 2,000 3,000 Feet

DAYTONA BEACH INTERNATIONAL AIRPORT

Exhibit 7.1

Biotic Communities Map

Daytona Beach International Airport
Master Plan Update

7.3. EXISTING AND FUTURE LAND USE

DAB is bordered to the west by I-95 and to the north by International Speedway Boulevard, with remaining areas surrounding the Airport heavily developed as residential neighborhoods, schools, parks, and commercial services. Existing zoning designations include Airport Property (AP), General Industry (M3), Residential/Professional (RP), and Planned Development - General (PD-G).

Daytona International Speedway, Mainland High School and ERAU are located on Airport property. Eastern portions of DAB are bordered by residential developments, parks, undeveloped land, and commercial services. Bellevue Business Park is located southeast of the Airport, with the remaining southern portions bordered by the Airport boundary consisting of residential development.

Based on the City of Daytona Beach's current Comprehensive Plan (2018), future land use in Daytona Beach focuses on providing a "sufficient supply of land to meet growth demands" while ensuring "that land uses are located in a rational and efficient manner and promotes economic development". Future land use near the Airport includes industrial, commercial, and office properties, with the surrounding areas primarily in Daytona Beach, though DAB and parcels west of I-95 are part of unincorporated Volusia County.

Future Land Use maps for the southern parcels show either agriculture or native habitats; however, the land use will change to commercial and industrial uses. The south parcels of the DAB boundary have been conceptually approved for commercial construction with SJRWMD ERP No. 22729-32.

7.4. ENDANGERED AND THREATENED SPECIES OF FLORA AND FAUNA

The Endangered Species Act (ESA) of 1973, 16 USC 1531-1599, as amended, was passed by Congress for conservation of ecosystems upon which endangered and threatened species depend, and for conservation and recovery of listed species. The ESA is administered by USFWS and the Commerce Department's National Marine Fisheries Service (NMFS). Under the ESA, a federally endangered species is defined as any resident species that is in danger of extinction throughout all or a significant portion of its range. A federally threatened species is defined in the ESA as any resident species that is likely to become an endangered species in the foreseeable future throughout all or a significant portion its range. For the purposes of the study area, there are no marine resources that would be affected; thus, the NMFS would not be involved in review of any development or changes that occur on the Airport.

State threatened and endangered species are managed by FWC pursuant to Rule 68A-27.0031 of the Florida Administrative Code (F.A.C.). FWC manages the Florida Threatened and Endangered Species list (Rule 68A-27.003, F.A.C.), and Species of Special Concern list (Rule 68A-27.005, F.A.C.), with all federally listed species appearing on these lists.

Based on the USFWS Endangered and Threatened Species list for Volusia County, Florida, as well as a FNAI Biodiversity Matrix Report and IPaC Trust Resource Report, the federally and state listed species known to occur in Volusia County are shown below in **Table 7.1**. Review of online FWC and USFWS geodatabases, as well as FNAI Biodiversity Matrix and IPaC data, show no occurrence of these species recorded on or near DAB.

Table 7.1 - Potential Listed Species Occurrence						
Common Name		**Scientific Name**	**Federal Status**	**State Status**	**Comments**	**Likelihood of Occurrence**
Birds	Red-Cockaded Woodpecker	*Picoides borealis*	E	FE	Observed On-site: No Observed in Proximity: No Habitat present: No Habitat Type: N/A	None
	Everglade Snail Kite	*Rostrhamus sociabilis plumbeaus*	E	FE	Observed On-site: No Observed in Proximity: No Habitat present: No Habitat Type: N/A	Low
	Wood Stork	*Mycteria americana*	T	FT	Observed On-site: No Observed in Proximity: No Habitat present: Marginal Habitat Type: Foraging	Low
	Florida Scrub-jay	*Aphelocoma coerulescens*	T	FT	Observed On-site: No Observed in Proximity: No Habitat present: No Habitat Type: N/A	Low
	Southeastern American Kestrel	*Falco sparverius paulus*	NL	ST	Observed On-site: No Observed in Proximity: No Habitat present: Yes Habitat Type: Both foraging and nesting	Medium
	Florida Sandhill Crane	*Grus canadensis pratensis*	NL	ST	Observed On-site: No Observed in Proximity: No Habitat present: Yes Habitat Type: Foraging; potential nesting in existing freshwater marsh wetlands	Medium
	Bald Eagle	*Haliaeetus leucocephalus*	NL*	NL*	Observed On-site: No Observed in Proximity: No Habitat present: Yes Habitat Type: Foraging and Nesting	Medium
Reptiles	Eastern Indigo Snake	*Drymarchon couperi*	T	FT	Observed On-site: No Observed in Proximity: No Habitat present: Yes Habitat Type: Foraging and Nesting	Medium
	Florida Pine Snake	*Pituophis melanoleucus mugitus*	NL	ST	Observed On-site: No Observed in Proximity: No Habitat present: Yes Habitat Type: Foraging	Medium
	Gopher Tortoise	*Gopherus polyphemus*	C	ST	Observed On-site: Yes Observed in Proximity: No Habitat present: Yes Habitat Type: Foraging and Nesting	High
Plants	Rugel's Pawpaw	*Deeringothamnus rugelii*	E	FE	Observed On-site: No Observed in Proximity: No Habitat present: Yes Habitat Type: Pine Flatwoods	Low

[1] Based on Florida's Endangered and Threatened Species updated January 2017 available on http://myfwc.com/wildlifehabitats/imperiled/.

Federal Status: E = Endangered; T = Threatened; C = Candidate Species; NL = Not Listed.

State Status: FE = Federally Endangered; FT = Federally Threatened; ST = State Threatened. Note: Coordination is not required with FWC for Federally listed species.

**The bald eagle is no longer protected under the ESA but remains protected under the Bald and Golden Eagle Act as well as the Migratory Bird Treaty Act, which prohibits the take of the nests of any migratory bird species.*

A listing of species potentially occurring within the project vicinity was reviewed using the databases described above. The results of the database review are as follows:

- **FWC:** FWC documents two bald eagle nests within a mile of DAB (VO102 and VO126). VO102 was last known to be active in 2012, while VO126 was last known to be active in 2016.
- **FNAI:** FNAI does not list any occurrence of listed species within the matrices which encompass DAB. FNAI does list the Florida black bear as likely to occur within the matrix units. There are several nuisance reports of the Florida black bear within one-mile from DAB.
- **USFWS:** The project is located within the following consultation area: Florida scrub-jay. The project is not located within any USFWS-designated critical habitat. The project is not located within any Core Foraging Areas (CFA) for wood stork nesting colonies.

Several species were included in the IPaC Trust Resources Report because USFWS includes historic data. However, when comparing current conditions for the study area as well as current extent of the listed species, it was determined that many of these species would not occur in the study area (southeastern beach mouse, west Indian manatee, piping plover, red knot, Atlantic salt marsh snake, green sea turtle, hawksbill sea turtle, leatherback sea turtle, loggerhead sea turtle, and Okeechobee gourd). Therefore, these species are not discussed further in the document.

A majority of DAB consists of mowed and maintained grass fields or is already developed; therefore, it is unlikely that state or federally listed species would be affected with the implementation of the DAB projects. However, DAB projects identified as having the potential to affect endangered and threatened species are projects that occur on previously undeveloped parcels. The presence of gopher tortoises could potentially occur on DAB and would be reviewed on a project-by-project basis. FWC Rule 68A-9.012 *Take of Wildlife on Airport Property* allows for the destruction of burrows within safety areas (as defined in 14 C.F.R. § 139.5) after or while all existing gopher tortoises within the burrow are live captured. State listed species are disclosed by the FAA in NEPA documentation, and the SJRWMD consults with FWC during Environmental Resource Permitting to determine if state-listed species are affected. Gopher tortoises, if present, can be addressed under the state rule and are not considered a significant environmental issue that could affect DAB projects. In addition, surveys for southeastern American kestrel should also be conducted during design and permitting.

As part of future environmental reviews (i.e., NEPA processing, environmental permitting), current lists of federally and state-listed species should be obtained, and coordination should be conducted with USFWS and FWC, as appropriate.

7.5. CONTAMINATION/HAZARDOUS MATERIALS/SOLID WASTE

The handling, storage, and disposal of solid and hazardous waste is regulated by federal and state authorities. As areas are redeveloped, past uses of the land become important from the perspective of knowing what materials may have been stored and how to dispose of them properly prior to new construction activities being undertaken. The following statutes are relevant to understanding and addressing the regulation of solid and hazardous waste, and associated cleanup requirements, for purposes of NEPA review.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): better known as "Superfund" (because a government trust fund finances certain response costs), CERCLA requires remediation of past releases of hazardous substances that pose a threat to human health or the environment. The Superfund Amendments and Reauthorization Act of 1986 (SARA) reauthorized CERCLA to permit cleanup activities to continue across the country, provided necessary definitions clarifications, and instituted new enforcement authorities and settlement tools. SARA provides procedures to remediate toxic or hazardous materials at closed or abandoned hazardous materials sites. The

National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300, provides procedures for conducting remedial activities under CERCLA. CERCLA complements, and in some cases overlaps, with the Resource Conservation and Recovery Act (RCRA).

Resource Conservation and Recovery Act (RCRA): RCRA primarily regulates on-going hazardous waste management and disposal, but also requires corrective action to address releases from “regulated units” (if the facility has interim status under RCRA) or “solid waste management units (SWMUs)” if the facility has a Part B RCRA Permit for treating, storing, or disposing of hazardous waste. The EPA also establishes technical and performance requirements for hazardous waste management units and exercises responsibility over a permit system for hazardous waste management facilities. RCRA also regulates management of solid waste and underground storage tanks (USTs).

A review of FDEP contamination data identified 12 Petroleum Contamination Monitoring Sites (PCMS) within the Airport property and three landfill sites located on the southern parcels of the Airport **(Exhibit 7.2**). Additionally, there are two brownfield areas (Daytona Beach Area – Areo Park and the Central Business Corridors Economic Enhancement Area), which fully encompass all parcels within DAB.

All 12 PCMS are currently in compliance with FDEP requirements with no further action required. Two of the landfills are currently permitted and closed solid waste disposal facilities. The remaining landfill is a historic landfill, which is not listed in FDEP records as it was closed before the FDEP or its predecessor was formed. Based on the aerial photographs, the historic landfill was constructed between 1958 and 1963 and closed by 1969.

Based on the current FDEP document “Guidance for Disturbance and use of Old Closed Landfills or Waste Disposal Area in Florida”, dated February 3, 2011, the historic landfill is subject to the requirements in the Deptartment of Health and Rehabilitative Services Chapter 10D-12, “Garbage and Rubbish,” October 20, 1964. These requirements allow for closure to consist of a 24-inch soil cover and maintenance of the cover to repair crack and erosional surface. No permit or groundwater monitoring is required.

The FDEP guidance document requires a Waste Excavation and Disposal Plan only if the waste is to be disturbed and activities other than cap maintenance are to occur at the closed facility. The Waste Excavation and Disposal Plan is to be provided to the local FDEP district office prior to initiation of site activities. If the waste is disturbed in the form of excavation and removal or redevelopment, then it may be subject to current FDEP solid waste regulations. The proposed expansion of the Southeast Apron is adjacent to the historic landfill and; therefore, will require further coordination with FDEP.

In all future environmental reviews, the status of these sites and review for new sites must be confirmed to identify the need for additional analysis of hazardous materials impacts. Additionally, the ability to handle solid waste, especially associated with construction and demolition activities, and pollution prevention must be documented for all DAB projects.

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Exhibit 7.2

Contamination Map

Daytona Beach International Airport
Master Plan Update

7.6. HISTORIC, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Impacts from a federal agency undertaking to historic properties listed or eligible for listing in the National Register of Historic Places (NRHP), or to cultural or archeological resources, must be appropriately considered through consultation with affected parties. See National Historic Preservation Act (NHPA) of 1966, 16 USC § 470 et seq.; National Environmental Policy Act (NEPA) of 1969, 42 USC § 4321 et seq.; Section 4(f) of the Department of Transportation Act of 1966, 49 USC § 303(c); and, 40 CFR Part 800. A federal agency undertaking is broadly defined as any project, activity, or program funded in whole or in part by a federal agency and includes actions requiring federal licensing or permitting. See 16 USC § 470w(7); 40 CFR 800.3(o).

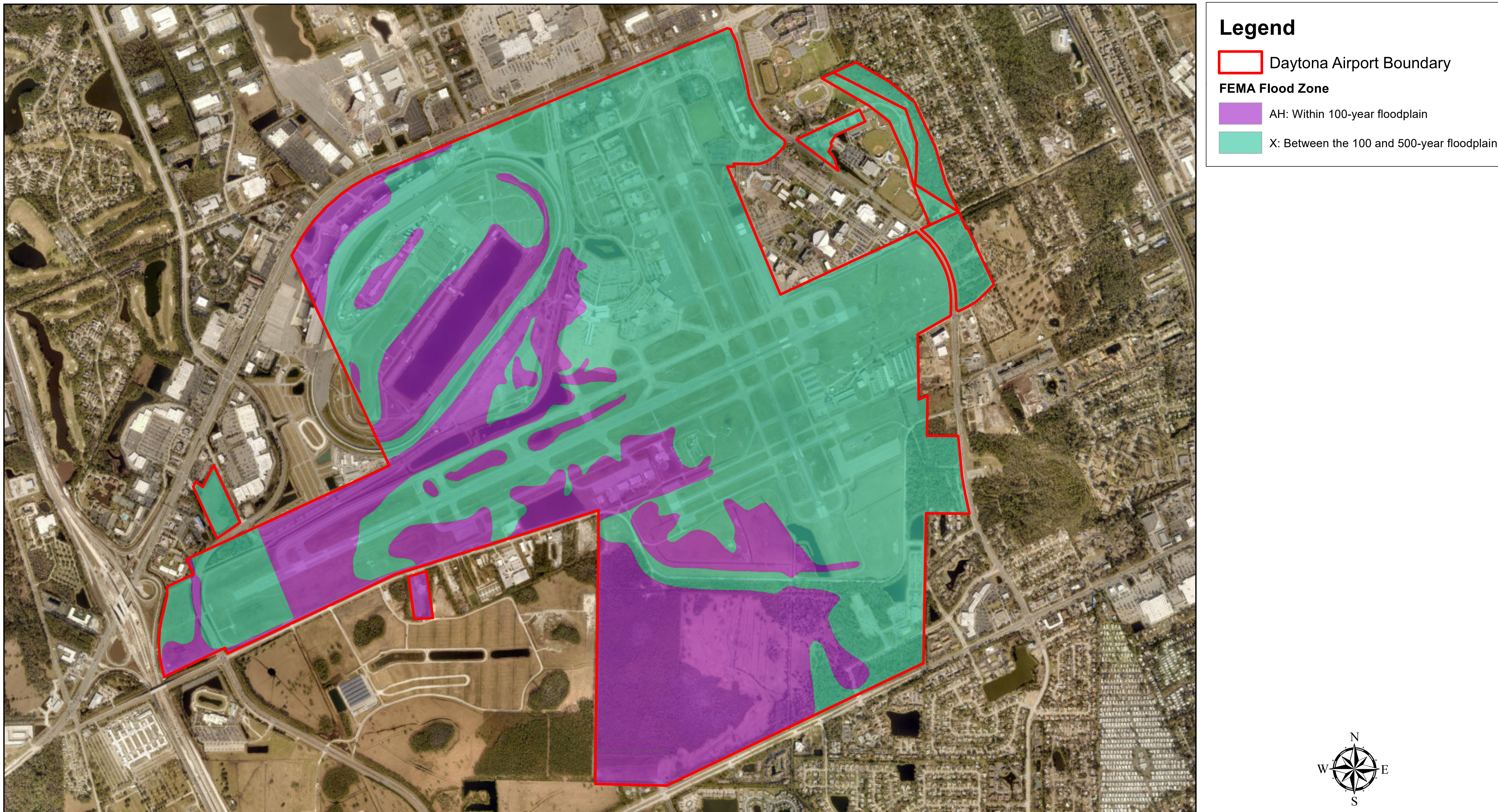
Based on review of the State Historic Preservation Office (SHPO) Florida Master Site File, four previously recorded archaeological sites, sixteen standing structures, one historic cemetery, and four resource groups are found on Airport property or within a quarter-mile of Airport property. Of these historic resources, one archaeological site and two linear resources are found within DAB's boundaries. One archaeological site is eligible for listing with the NRHP (Embry Riddle site No. 2). Based on the potential for archaeological resources, all projects that would disturb soil would require coordination with the SHPO, Native American Tribes, and potentially cultural resource assessment surveys.

7.7. FLOODPLAINS

Executive Order (EO) 11988 defines floodplains as the "lowland and relatively flat areas adjoining inland and coastal waters, including flood-prone areas of offshore islands, including at a minimum, those that are subject to a one percent or greater chance of flooding in any given year" (i.e., the area inundated by a 100-year flood). The 100-year flood (one percent annual chance) has been adopted by FEMA as the base flood for floodplain management purposes. FEMA employs the 500-year flood (0.2 percent annual chance) to indicate additional areas of flood risk. EO 11988 requires Federal agencies to determine whether a proposed action will occur in a floodplain and, if the encroachment is significant, determine if the proposed action is the only practicable alternative before proceeding. If the agency finds that the only practicable alternative requires siting in a floodplain, EO 11988 and DOT Order 5650.2, Floodplain Management and Protection, require that the proposed action be designed or modified to reduce adverse floodplain impacts.

Based on a review of the FEMA, Flood Insurance Rate Maps, Panel Numbers 12127C0354H, 12127C0362H, 12127C0358H, and 12127C0366H (effective date February 19th, 2014), western and southwestern portions of DAB property lie within the 100-year floodplain. Three flood zones are found on the Airport including Zone AH (Special Flood Hazard Areas Subject to Inundation by the one percent Annual Chance Flood. Base Flood Elevations Determined) and Zone X (Special Flood Hazard Areas Subject to Inundation by the two percent Annual Chance Flood. No Base Flood Elevations Determined). The eastern portion of the Airport exists outside of the 100-year floodplain. **Exhibit 7.3** shows FEMA flood zones within the Airport.

A comprehensive drainage study (*Daytona Beach International Airport Master Drainage Plan*, June 2018) was completed as part of this Master Plan Update effort. As stated in the drainage report, impacts to the 100-year floodplain within the undeveloped southern parcels will be compensated by designing the stormwater facilities to discharge no more than the 100-year pre-condition volume. If impacts will occur to the 100-year floodplain from DAB projects located around the existing Airport and runways, compensation measures will be considered during final construction documents.



DAYTONA BEACH INTERNATIONAL AIRPORT

Exhibit 7.3

FEMA Flood Zone Map

Daytona Beach International Airport
Master Plan Update

The proposed additional GA apron in the southwest vicinity, as well as potential commercial development in the South Development Area, would at least partially occur within the 100-year floodplain. If the only practicable alternative to a project that affects a floodplain requires siting the project in the floodplain, a floodplain encroachment would occur, and environmental analysis would be needed to justify this effect. Per FAA Order 1050.1F, if the project is within a floodplain, it must be determined whether the encroachment is significant based on the intensity of the encroachment and its impacts on the floodplain's natural and beneficial values. A significant floodplain encroachment is defined as one that results in one or more of the following: (1) a considerable probability of loss of human life; (2) likely future damage associated with the encroachment that could be substantial in cost or extent, including interruption of service on or loss of a vital transportation facility; and (3) a notable adverse impact on "natural and beneficial floodplain values."

A significant floodplain encroachment; however, is not necessarily considered a significant environmental impact under NEPA. The FAA may approve a project involving a floodplain encroachment if a finding can be made that there is no practicable alternative to placing a project in the floodplain and that all measures to minimize harm are included in the project. The NEPA document should explain that other alternatives were analyzed, justify locating the project in the floodplain as the only practicable alternative, and incorporate mitigation measures into the project to minimize potential harm to or within the floodplain. Advanced planning and design of projects that have the potential to affect floodplains should explore the ability to avoid or minimize floodplain impacts, if possible. If a floodplain effect cannot be avoided and the project encroaches on a 100-year floodplain, notification of a floodplain encroachment would be required as part of the NEPA analysis.

7.8. SECTION 4(f) RESOURCES/PARKS/WILDLIFE REFUGES

Section 4(f) of the Department of Transportation Act of 1966, provides protection for specially-designated properties, including significant publicly-owned parks, recreation areas, wildlife and waterfowl refuges, or any significant historic sites. Section 4(f) prevents the approval of proposed federal actions that require use of these special properties unless no feasible and prudent alternative exists, and then only if the proposed action includes measures to mitigate such impacts. There are no recreational parks or wildlife refuges on the Airport that would be considered resources protected under Section 4(f). It is anticipated that there are no historic sites that are protected under Section 4(f) other than the Embry Riddle site No. 2, which is eligible for listing. Should additional eligible resources be identified during design, permitting or other coordination efforts with the SHPO or Native American tribes, then Section 4(f) could apply.

Multiple parks exist east of DAB, the largest and closest being Tuscawilla Park (**Exhibit 7.4**). This park is approximately 50 acres with amenities including playgrounds, a disc golf course, nature trails, and a picnic area. Other parks east of the Airport are Samuel L. Butts park, with Pine Lake Mini Park and Shangri-La Mini Park found southeast of the Airport. There were no wildlife refuges near the Airport. Development of the RDP would not directly affect these off-site parks and constructive use of the parks from noise or other impact is also not expected. But noise impacts may need to be assessed during future NEPA compliance to confirm that there is no use of Section 4(f) properties or that the use would be considered *de minimis*.

DAYTONA BEACH INTERNATIONAL AIRPORT

Exhibit 7.4

Section 4(f) Resources Map

7.9. WATER QUALITY

Section 303(d) of the federal Clean Water Act (CWA), which Congress enacted in 1972, requires states, territories, and authorized tribes (states) to identify and establish a priority ranking for all water bodies where technology-based effluent limitations required by Section 301 are not stringent enough to attain and maintain applicable water quality standards. Once identified, states are to establish total maximum daily loads (TMDLs) for the pollutants causing impairment in those water bodies (2010 Water Quality Integrated Report, April 2010). The list of impaired waters and TMDLs are submitted to the U.S. Environmental Protection Agency (USEPA). The 2016 Integrated Water Quality Assessment for Florida (Water Quality Report) was reviewed to evaluate the surface water quality designations of surface water features in the vicinity of the Airport and the Section 303(d) list of impaired waters was reviewed to determine if the surface waters are impaired, the reason for impairment and the status of establishing a TMDL for the water body.

Surface waters within DAB property consist of stormwater retention along the western and southern portions of the runway, as well as a large stormwater retention pond in the northwest within Daytona International Speedway. Southern, undeveloped portions of DAB contain surface waters within former agricultural ditches as well as drainage canals. The Tomaka River and Holly Hill Ditch border the Airport to the west and east, respectively; both waterbodies are found in the Halifax River Unit of the Upper East Coast Group (Group 5). Both waterbodies are currently listed on the State's 303(d) list per review of Florida Impaired Waters Rule. Though no TMDL has been established for Holly Hill Ditch, TMDLs for nitrogen (0.78 mg/L) and phosphorous (0.062 mg/L) have been established for the Tomoka River. The Tomoka River is recognized as an Outstanding Florida Water, though no Wild and Scenic Rivers or Aquatic Preserves are near the Airport.

Based on the *Daytona Beach International Airport Master Drainage Plan*, June 2018, wet detention ponds and dry retention ponds will be utilized as the Best Management Practice (BMP) to reduce the discharge of pollutants associated with stormwater runoff from the proposed development within DAB. The Drainage Plan further describes the treatment volume requirements for the proposed projects at DAB.

All of the proposed projects within DAB will require authorization from Volusia County, SJRWMD, and the USACE. A conceptual ERP has been issued for impacts to 33.736 acres of wetlands and surface waters within the southern parcels of the Airport. USACE permit SAJ-2018-00999 SP-JCP has also been issued for the southern parcels.

7.10. WATERS OF THE U.S. INCLUDING WETLANDS

Section 404 of the CWA requires regulation of discharges into "Waters of the United States ("Waters of the U.S.")." The term "Waters of the U.S." has broad meaning and incorporates both wetlands and surface waters. Wetlands are defined as "those areas that are inundated or saturated by groundwater at a frequency and duration sufficient to support, and that under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas." 33 CFR 328.3(b). Executive Order 11990 requires that new construction in wetlands be avoided to the extent possible, and that all practicable measures be taken to minimize or mitigate impacts to wetlands.

Multiple wetlands within the undeveloped southern parcels of DAB have had Jurisdictional Determinations issued by SJRWMD, with district data providing these boundaries; in areas where no determinations of wetland boundaries existed, NWI and FLUCFCS data were used to determine wetland presence as shown in **Exhibit 7.5**. The majority of wetlands are within the undeveloped southern portions of the Airport property, with a wetland in the northwestern portion of the property. Mixed wetland hardwoods, cypress stands, as well as freshwater marsh and wet prairies are found within DAB.

DAYTONA BEACH INTERNATIONAL AIRPORT

Exhibit 7.5

Wetland and Surface Waters Map

The projects within DAB are likely to impact wetlands and/or “Waters of the US” and; therefore, would require permits through Volusia County, SJRWMD and the USACE. As stated in the Surface Waters section above, a conceptual ERP and USACE permit have already been issued for the southern, undeveloped parcels of DAB.

7.11. COASTAL ZONE MANAGEMENT PROGRAM

All federal actions associated with the DAB project implementation should be reviewed for consistency with the enforceable policies of the Florida Coastal Management Program (FCMP). Under The FCMP, federal consistency reviews are integrated into other state-level environmental evaluation processes conducted as part of review of a proposed federal action. The enforceable policies cover wise use and protection of the state’s water, property, cultural, historic, and biological resources; protection of public health; minimization of the state’s vulnerability to coastal hazards; ensuring orderly, managed growth; protection of the state’s transportation system; and sustaining a vital economy.

All DAB projects that involve federal funding would need to be evaluated for consistency with the FCMP. This review is conducted during the ERP process and/or during NEPA scoping if an EA is required.

7.12. SOCIAL AND SOCIOECONOMICS

DAB is located within Volusia County, Florida and therefore it is expected that a majority of workers associated with DAB reside in Volusia County. Total population, median household income, households below poverty level, and unemployment rates for Volusia County were utilized as a basis for evaluating potential socioeconomic impacts for the proposed DAB projects. Data was obtained from the U.S. Census Bureau 2013-2017 American Community Survey 5-Year Estimates.

Total population in Volusia County in 2017 was 518,660, which is a 4.6 percent increase from the population in 2010 (496,053). During the same timeframe, median household income in Volusia County went from $44,400 in 2010 to $43,838 in 2017. There was 14.8 percent of households living below the poverty level in 2017.

The DAB projects would likely support the local economy as the RDP would support growth of GA operations, provide additional concourse concessions space, enhance airfield safety, and provide other features at DAB. It is expected that the construction phase of these projects would generate jobs for the local workforce, along with permanent jobs once construction is complete.

Minority populations included in the U.S. Census Bureau 2013-2017 American Community Survey 5-Year Estimates are identified as White, not Hispanic, Black or African American, Hispanic or Latino of any Race, Asian, or Other (American Indian and Alaskan Native, Native Hawaiian or other Pacific Islander, some other race, or two or more races). Based upon the U.S. Census Bureau 2017, Volusia County had a population of 518,660 persons. Of this total, 82.9 percent were White, 10.7 percent were Black, 12.9 percent were Hispanic or Latino of any Race, 1.8 percent were Asian, and 4.6 percent were Other. The closest population center is the City of Daytona Beach.

There are minority and low-income populations in Volusia County; however, the projects are entirely within the DAB boundary. There are no minority or low-income populations residing within DAB and therefore, the DAB projects would not disproportionately affect any minority or low-income population or community.

7.13. LIGHT EMISSIONS

No impacts from the relatively low levels of light intensity from planned Airport development are anticipated, when compared to background levels associated with existing air navigation facilities. Future expansion of the parking lot and/or implementation of a consolidated rental car maintenance facility will likely require additional light poles to illuminate vehicular areas at night, and future hangar development will likely require apron lighting.

7.14. CONSTRUCTION IMPACTS

Construction Impacts are commonly temporary in nature and cease once construction is complete. Typical impacts resulting from Airport construction projects include: increased vehicular traffic on roadways, noise from construction equipment, noise and dust from delivery of material through local streets, air pollution from construction equipment exhaust and dust, and erosion that may have effects on surrounding water bodies.

During construction of the RDP, there would be minor increases in traffic associated with construction-related activities, particularly along Midway Avenue, Bellevue Avenue, and Beville Road. The majority of the traffic would be associated with delivery of construction materials and removal of unwanted materials. Temporary detours may be required to facilitate construction. The effects on traffic would be temporary in nature and would not be significant when compared with total traffic volumes in the area.

The closest residential area to any proposed project is the residential area south of Beville Road and would likely be associated with a project to prepare the south development area for site readiness or commercial development. It is anticipated that most construction activity would take place during daylight hours. Although it is possible construction activities could occur during nighttime hours, the activity would be temporary in nature and practices to minimize potential nighttime noise impacts would be considered.

7.15. NOISE IMPACTS

As part of this Master Plan Update, noise contours were prepared for the following scenarios:

- Existing Conditions (using the Master Plan Update baseline year of 2017)
- Future Conditions (using the Master Plan Update year 2027)
- Future Conditions (using the Master Plan Update out-year forecast for 2037)

This noise analysis also described the methodology used to develop the contours and the resulting noise exposure in the vicinity of the Airport.

7.15.1. NOISE MODEL AND DAY-NIGHT AVERAGE SOUND

The methodology for assessing noise exposure included preparing day-night average sound level (DNL) contours using the FAA's Aviation Environmental Design Tool (AEDT) Version 2d. DNL, expressed in A-weighted decibels (dBA), accounts for the noise exposure of all individual aircraft events, the number of times those events occur, and the period of day/night in which they occur. The calculation of DNL logarithmically averages aircraft sound exposure at grid locations over a 24-hour period, with an additional weight of 10 decibels for those aircraft events occurring between 10:00 p.m. and 6:59 a.m. Corrections within the AEDT are applied for atmospheric acoustical attenuation, acoustical shielding of the aircraft engines by the aircraft itself, and aircraft speed variations. The cumulative exposure at all grid points are then used to develop noise exposure contours for selected values (e.g. DNL 65, 70, and 75).

Guidelines regarding the compatibility of land uses within various DNL contour intervals are specified in *Appendix A of 14 CFR Part 150*. As shown in **Table 7.2**, the FAA guidelines show that all the land uses listed in the table are normally compatible with aircraft noise exposure below the 65 DNL contour. When evaluating land use compatibility, attention is therefore focused on uses within the 65 DNL contour.

Table 7.2 - Land Use DNL Compatibility

Land Use	DNL expressed in dB(A)					
	Below 65	65–70	70–75	75–80	80–85	Over 85
Residential						
Residential, other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
Public Use						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
Commercial Use						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail—building materials, hardware and farm equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade—general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing, general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming and breeding	Y	Y(6)	Y(7)	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas and spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	Y	N	N	N
Golf courses, riding stables and water recreation	Y	Y	25	30	N	N

Table 7.2 Notes:

SLUCM=Standard Land Use Coding Manual. Y (Yes) = Land Use and related structures compatible without restrictions. N (No) = Land Use and related structures are not compatible and should be prohibited. NLR = Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.

25, 30, or 35=Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structure.

(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10 or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year-round. However, the use of NLR criteria will not eliminate outdoor noise problems. (2) Measures to achieve NLR 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low. (3) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low. (4) Measures to achieve NLR 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal level is low. (5) Land use compatible provided special sound reinforcement systems are installed. (6) Residential buildings require an NLR of 25. (7) Residential buildings require an NLR of 30. (8) Residential buildings not permitted.

***Source:** 14 CFR Part 150.*

7.15.2. EXISTING CONDITIONS NOISE EXPOSURE

This section includes the existing baseline 2017 DNL contours, the data used to develop the contours, and any noise sensitive land uses located within the limits of the 65 DNL.

7.15.2.1. AEDT Input Data

In the development of DNL contours, the AEDT uses both default and Airport -specific factors. The default factors include engine noise levels, thrust settings, aircraft arrival, departure flight profiles and aircraft speed. The Airport -specific factors include the number of aircraft operations, the type of aircraft, runway use, the assignment of aircraft operations to flight tracks, and operational time (day/night). The following describe these Airport -specific data.

The 2017 DAB annual operations were developed using data in the RDP. The 2017 annual aircraft operations by category is provided in **Table 7.3.** As shown, in 2017 annual operations totaled 309,355 (an average of approximately 848 operations per day).

Table 7.3 - 2017 Annual Aircraft Operations

Year	Air Carrier	General Aviation Itinerant	General Aviation Local	Military	Total
2017	6,669	159,841	141,745	1,100	309,355

Source: Kimley-Horn analysis.

For the purposes of preparing DNL contours, operations data were segregated by aircraft type. Since the time the forecasts were developed, the air carrier aircraft types serving DAB have slightly changed. For the purposes of preparing the existing condition 2017 DNL contours in this analysis, the FAA's Traffic Flow Management System Count (TFMSC) data for the six-month period from January 1, 2019 through June 30, 2019, as well as a review of air carrier schedules were used to identify the current types of air carrier aircraft operating at DAB. The air carrier aircraft fleet mix percentages were calculated and applied to the total air carrier operations identified in the forecasts found in Chapter 2 (6,669).

The GA aircraft fleet mix was developed using TFMSC data and a review of ERAU's current aircraft fleet. The data was reviewed and each aircraft type was assigned the corresponding AEDT aircraft type. As required for use in the AEDT, annual aircraft operations were converted to annual average-day operations. The time of day/night for GA operations were determined through the use of a sample of 2019 published IFR data.

The 2017 average-day aircraft fleet of itinerant and local operations[17] are provided in **Table 7.4**.

[17] An itinerant operation is defined as an aircraft departure where the aircraft leaves the airport vicinity and lands at another airport, or an aircraft landing where the aircraft arrives from another airport. Local operations are aircraft touch-and-go training operations or remain within the local airspace. A touch-and-go operation occurs when an aircraft departs an airport, lands on a runway and then departs again without stopping.

Table 7.4 - 2017 Average-Day Aircraft Operations						
	Category	Aircraft Type(s)	AEDT ANP ID	Day	Night	Total
Itinerant	Air Carrier	Bombardier CRJ-700/900	CRJ9-ER	6.41	1.81	8.22
		McDonnell Douglas MD-88	MD83	3.30	0.90	4.20
		McDonnell Douglas MD-90	MD9028	2.58	0.71	3.29
		Boeing 737-800/900	737800	1.15	0.31	1.46
		Bombardier CS-100/300 (A220)	737700	0.86	0.24	1.10
	Piston	Cessna 152 / 172	CNA172	265.99	20.64	286.63
		Baron 58, Diamond Twin Star, Cessna 414	BEC58P	75.69	3.90	79.59
		Piper 28 Cherokee, DA40 Diamond Star	PA28	22.28	1.15	23.42
		Cirrus SR20/22	COMSEP	17.57	0.91	18.48
		Piper PA-24/32, Mooney M20, Cessna 206	GASEPV	9.21	0.47	9.68
	Turboprop	Raytheon King Air 90, Super King Air 200/350	DHC6	1.99	0.10	2.09
		Saab 340	SF340	1.53	0.08	1.61
		Pilatus PC-12, Cessna 208, Beech Bonanza	CNA208	1.78	0.09	1.87
		Piper PA46-TP Meridian, Cessna 441 Conquest	CNA441	0.41	0.02	0.43
	GA Jet	Citation II/Bravo, Phenom 100/300	CNA55B	1.88	0.10	1.98
		Cessna 750 Citation X, Dassault Falcon 50/900/2000	CNA750	1.57	0.08	1.65
		Hawker 700/800, Gulfstream 150/280	IA1125	1.53	0.08	1.61
		Learjet 31/35/45/75, Dassault Falcon/Mystère 10	LEAR35	1.44	0.07	1.51
		Cessna 560 Citation XLS	CNA560XL	1.28	0.07	1.34
		Bombardier Challenger 300 / 600	CL600	1.17	0.06	1.23
		Cessna Citation Sovereign/ Latitude	CNA680	1.17	0.06	1.23
		Cessna Citation CJ1/CJ2/CJ3/CJ4	CNA500	1.10	0.06	1.16
		Raytheon Premier 1, Beechjet 400	MU3001	0.77	0.04	0.81
		Cessna III/VI/VII	CIT3	0.36	0.02	0.38
		Gulfstream GV/G500, Global Express	GV	0.32	0.02	0.34
		Cessna 560 Citation V/Ultra	CNA560U	0.31	0.02	0.33
		Gulfstream III/GIV/G400	GIV	0.20	0.01	0.21
		Cessna Citation Mustang	CNA510	0.17	0.01	0.18
		Eclipse 500, Cirrus SF50	ECLIPSE500	0.15	0.01	0.15
	Military	SH-60 Seahawk	S70	0.88	0.03	0.90
		Texan	GASEPF	0.88	0.03	0.90
		C-130	C130E	0.58	0.02	0.60
		F-18/F16	F16PW0	0.58	0.02	0.60
		Itinerant Total		**427.10**	**32.11**	**459.21**
Local	Piston	Cessna 172	CNA172	313.59	16.50	330.09
		Baron 58, Diamond Twin Star	BEC58P	55.34	2.91	58.25
		Local Total		**368.93**	**19.42**	**388.34**
		All Total		**796.02**	**51.53**	**847.55**

Source: Kimley-Horn analysis; FAA TSFMC; KB Environmental Sciences, Inc.

7.15.2.2. Runway Layout and Use

DAB currently has three runways: Runway 7L/25R which is the primary air carrier runway and is 10,500 feet long, Runway 7R/25L which is 3,500 feet long and is primarily used for flight training, and Runway 16/34 which serves as the crosswind runway and is 6,001 feet long. The runway use by aircraft category was based upon information included in Chapter 3. Overall, the Airport operates in east flow (Runways 7L and 7R) approximately 65 percent of the time and in west flow (Runways 25R and 25L) approximately 27 percent of the time. It is estimated that operations occur on the crosswind runway (Runway 16/34) approximately 8 percent of the time. Additionally, it is estimated that 90 percent of flight training operations occur on Runway 7R/25L.

7.15.2.3. Flight Tracks

The AEDT uses Airport -specific ground tracks and vertical flight profiles to compute three-dimensional flight paths for each modeled aircraft operation. The “default” AEDT vertical profiles, which consist of altitude, speed, and thrust settings, are compiled from data provided by aircraft manufacturers. Aircraft flight tracks utilized by itinerant (arrivals and departures) were modeled straight-in/straight-out in the immediate vicinity of the runway ends. The local “touch-and-go” operations were modeled following a standard left-traffic pattern. The modeled east and west flow aircraft flight tracks are shown on **Exhibits 7.6** and **7.7** respectively.

7.15.2.4. 2017 DNL Contours

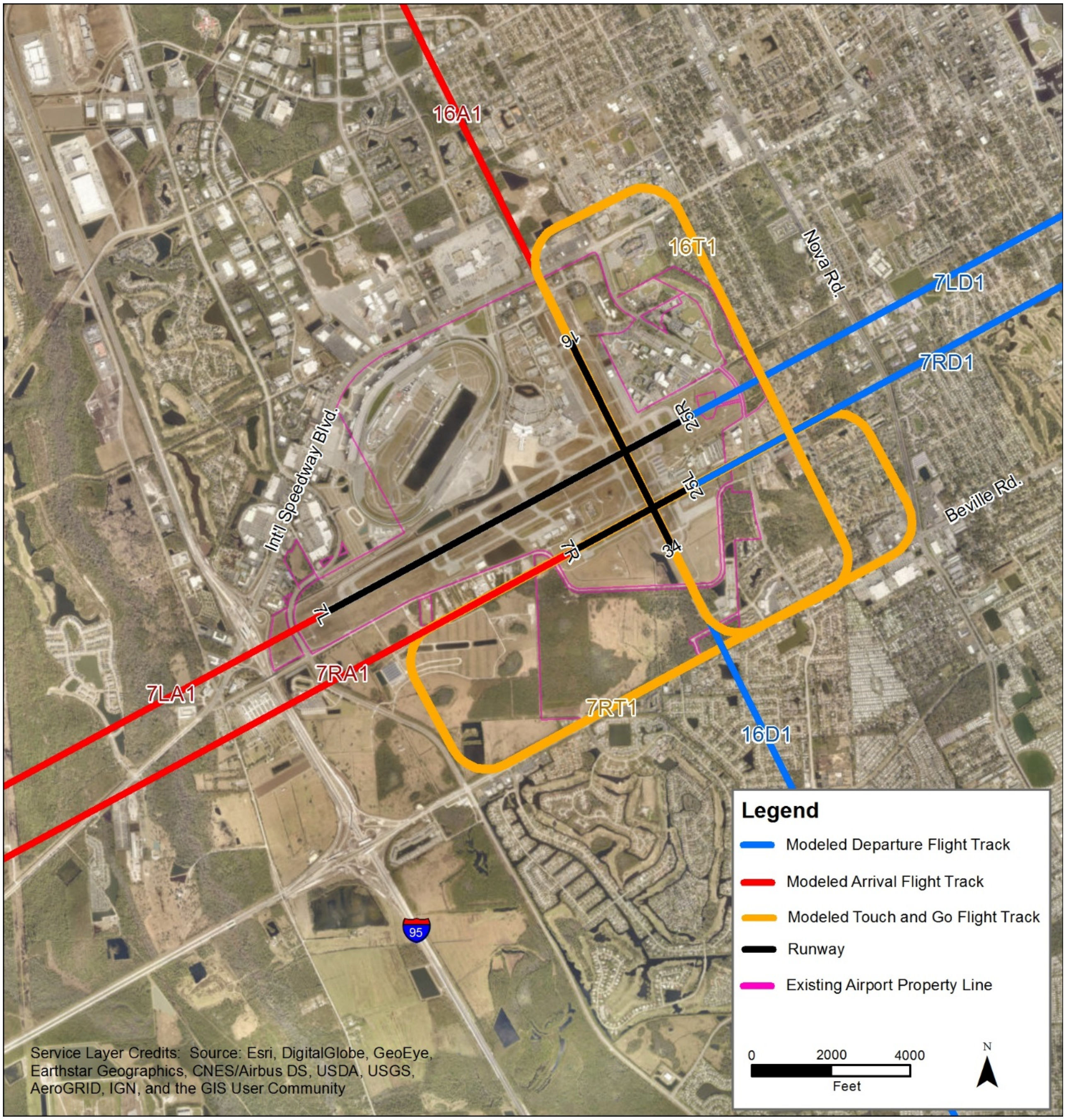
The 2017 65-75 DNL contours are provided on **Exhibit 7.8**. **Table 7.5** identifies the areas within the DNL contour ranges. As shown in the table, the total area within 65 DNL contour is approximately 506 acres. The 65 DNL contour primarily remains within the limits of the Airport property boundary. Notably, there are no noise sensitive land uses or other noise sensitive structures within the 2017 65 DNL contour.

Table 7.5 - 2017 DNL Contour Areas

DNL	Area (Acres)
65 to <70	290
70 to <75	135
75 and greater	81
Total	506

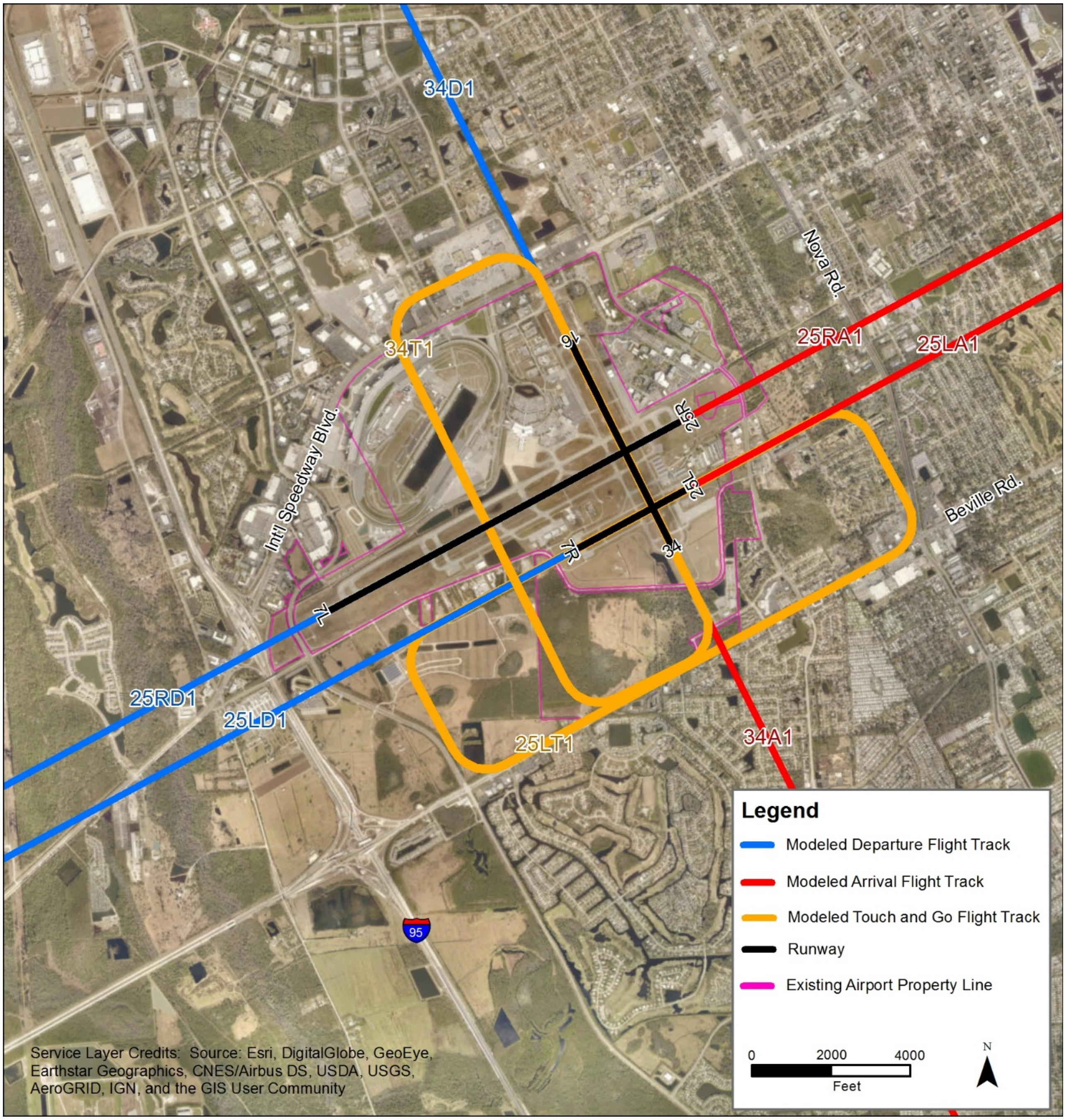
Source: KB Environmental Sciences, Inc.

Exhibit 7.6 - Modeled Flight Tracks – East Flow



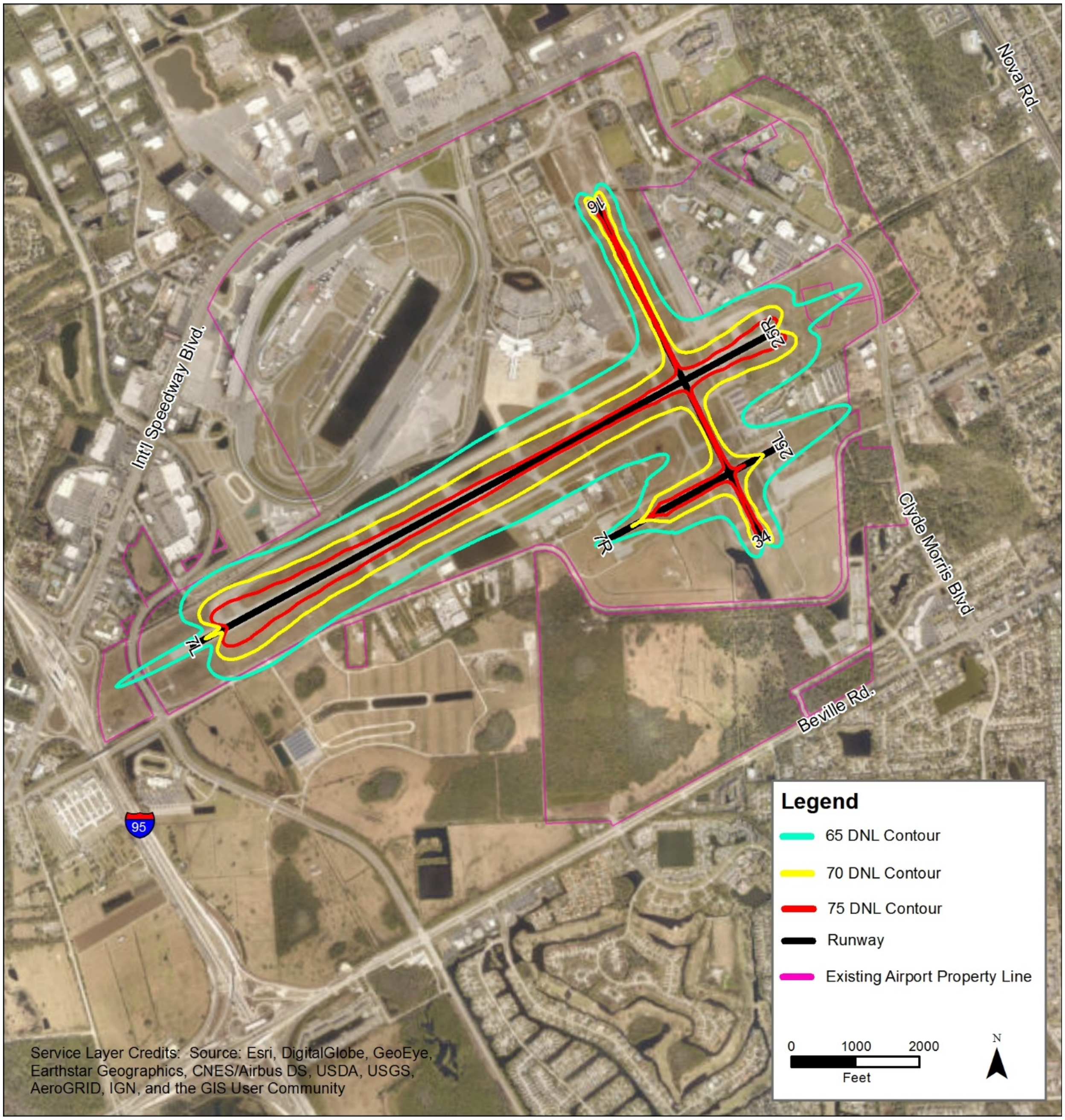
Source: *KB Environmental Sciences, Inc.*

Exhibit 7.7 - Modeled Flight Tracks – West Flow



Source: *KB Environmental Sciences, Inc.*

Exhibit 7.8 - 2017 DNL Contours



Source: *KB Environmental Sciences, Inc.*

7.15.3. FUTURE NOISE EXPOSURE

This section included the future 2027 and 2037 DNL contours, the data used to develop the contours, and any noise sensitive land uses located within the limits of the 65 DNL.

7.15.3.1. 2027 Noise Exposure

According to the forecasts, aircraft operations are projected to total 335,812 annual operations in 2027 (an average of approximately 920 operations per day). The 2027 annual aircraft operations by category is provided in **Table 7.6.**

Table 7.6 - 2027 Annual Aircraft Operations

Year	Air Carrier	General Aviation Itinerant	General Aviation Local	Military	Total
2027	8,111	173,098	153,502	1,100	335,812

Source: Kimley-Horn.

The 2027 air carrier aircraft fleet mix was developed using data from the projected fleet mix found in Chapter 2. The GA fleet mix was determined by multiplying the percentages by aircraft type that occurred in 2017 by the total GA operations forecast to occur in 2027. The 2027 average-day aircraft fleet for itinerant and local operations are provided in **Table 7.7**.

7.15.3.2. Runway Use and Flight Tracks

The runway use percentages and flight tracks modeled for the 2027 condition were the same as the existing 2017 condition.

Table 7.7 - 2027 Average-Day Aircraft Operations						
	Category	**Aircraft Type(s)**	**AEDT ANP ID**	**Day**	**Night**	**Total**
Itinerant	Air Carrier	Bombardier CRJ-700/900	CRJ9-ER	6.68	1.88	8.56
		Boeing 737-800/900	737800	5.78	1.02	6.79
		Bombardier CS-100/300 (A220)	737700	2.44	0.43	2.87
		Airbus A320-NEO	A320-211	2.11	0.37	2.48
		Boeing 737-700	737700	1.20	0.21	1.41
		Embraer ERJ190	EMB190	0.08	0.01	0.10
	Piston	Cessna 152 / 172	CNA172	288.05	22.35	310.40
		Baron 58, Diamond Twin Star, Cessna 414	BEC58P	81.97	4.22	86.20
		Piper 28 Cherokee, DA40 Diamond Star	PA28	24.13	1.24	25.37
		Cirrus SR20/22	COMSEP	19.03	0.98	20.01
		Piper PA-24/32, Mooney M20, Cessna 206	GASEPV	9.97	0.51	10.48
	Turboprop	Raytheon King Air 90, Super King Air 200/350	DHC6	2.15	0.11	2.26
		Saab 340	SF340	1.66	0.09	1.75
		Pilatus PC-12, Cessna 208, Beech Bonanza	CNA208	1.93	0.10	2.03
		Piper PA46-TP Meridian, Cessna 441 Conquest	CNA441	0.44	0.02	0.46
	GA Jet	Citation II/Bravo, Phenom 100/300	CNA55B	2.04	0.10	2.14
		Cessna 750 Citation X, Dassault Falcon 50/900/2000	CNA750	1.70	0.09	1.79
		Hawker 700/800, Gulfstream 150/280	IA1125	1.65	0.09	1.74
		Learjet 31/35/45/75, Dassault Falcon/Mystère 10	LEAR35	1.56	0.08	1.64
		Cessna 560 Citation XLS	CNA560XL	1.38	0.07	1.45
		Bombardier Challenger 300 / 600	CL600	1.27	0.07	1.33
		Cessna Citation Sovereign/ Latitude	CNA680	1.26	0.07	1.33
		Cessna Citation CJ1/CJ2/CJ3/CJ4	CNA500	1.19	0.06	1.25
		Raytheon Premier 1, Beechjet 400	MU3001	0.84	0.04	0.88
		Cessna III/VI/VII	CIT3	0.40	0.02	0.42
		Gulfstream GV/G500, Global Express	GV	0.35	0.02	0.37
		Cessna 560 Citation V/Ultra	CNA560U	0.34	0.02	0.36
		Gulfstream III/GIV/G400	GIV	0.22	0.01	0.23
		Cessna Citation Mustang	CNA510	0.18	0.01	0.19
		Eclipse 500, Cirrus SF50	ECLIPSE500	0.16	0.01	0.16
	Military	SH-60 Seahawk	S70	0.88	0.03	0.90
		Texan	GASEPF	0.88	0.03	0.90
		C-130	C130E	0.58	0.02	0.60
		F-18/F16	F16PW0	0.58	0.02	0.60
		Itinerant Total		**465.08**	**34.40**	**499.48**
Local	Piston	Cessna 172	CNA172	339.60	357.47	17.87
		Baron 58, Diamond Twin Star	BEC58P	59.93	63.08	3.15
		Local Total		**399.53**	**21.03**	**420.55**
All Total				**864.61**	**55.43**	**920.03**

Source: Kimley-Horn analysis; FAA TSFMC; KB Environmental Sciences, Inc.

7.15.3.3. 2027 DNL Contours

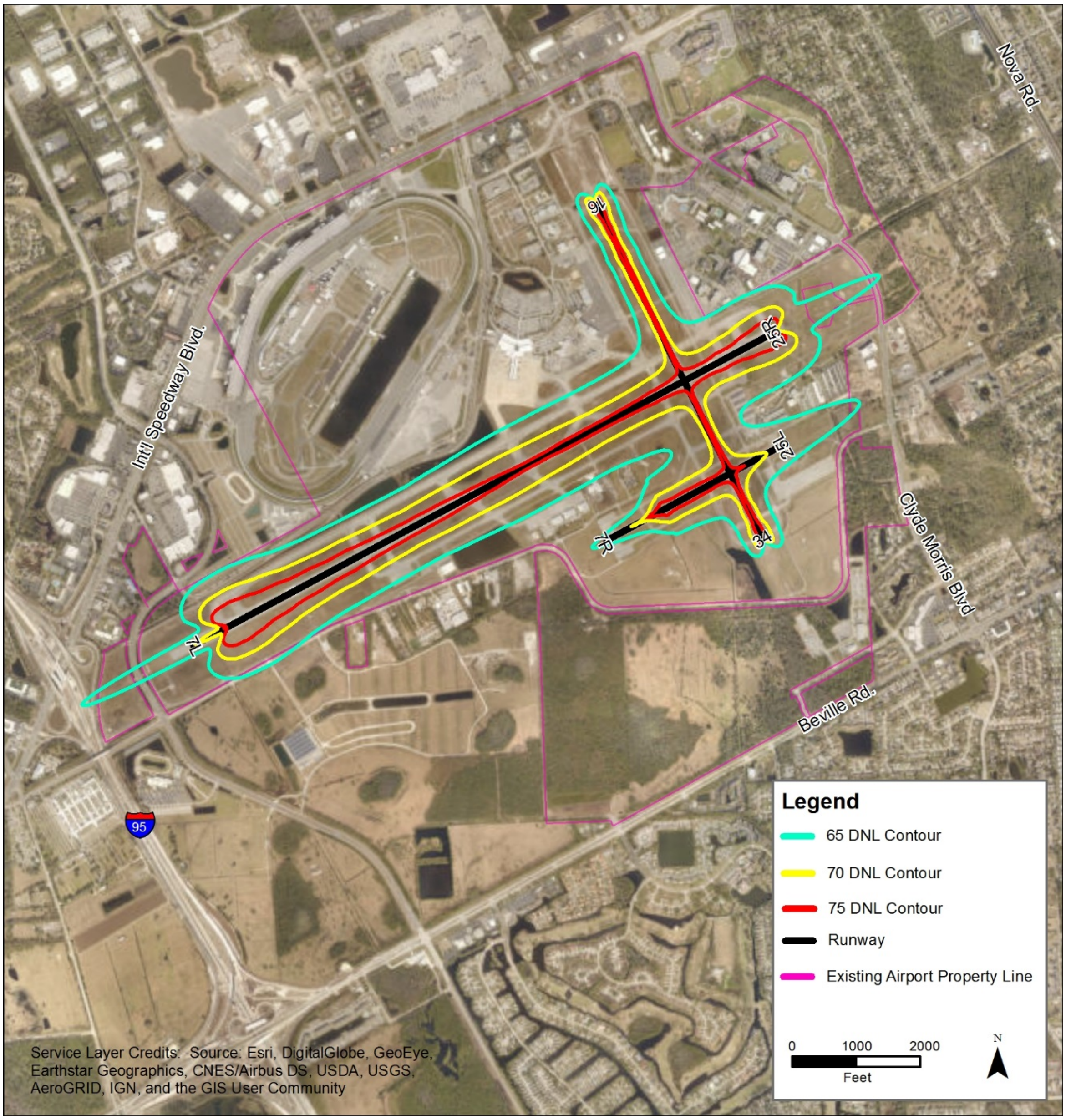
Table 7.8 identifies the areas within the 2027 DNL contour ranges and the 2027 65-75 DNL contours are provided on **Exhibit 7.9**. As shown in the table, the total area within the 65 DNL and greater contour is approximately 511 acres. The 65 DNL contour primarily remains within the limits of the Airport property boundary. Notably, there are no noise sensitive land uses or other noise sensitive structures within the 2027 65 DNL contour.

Table 7.8 - 2027 DNL Contour Areas

DNL	Area (Acres)
65 to <70	298
70 to <75	134
75 and greater	79
Total	511

Source: KB Environmental Sciences, Inc.

Exhibit 7.9 - 2027 65-75 DNL Contours



Source: *KB Environmental Sciences, Inc.*

7.15.3.4. 2037 Noise Exposure

According to the forecasts in Chapter 2, aircraft operations are projected to increase to 364,633 annual operations in 2037 (an average of approximately 999 operations per day). The 2037 annual aircraft operations by category is provided in **Table 7.9.**

Table 7.9 - 2037 Annual Aircraft Operations					
Year	**Air Carrier**	**General Aviation Itinerant**	**General Aviation Local**	**Military**	**Total**
2037	9,844	187,455	166,234	1,100	364,633
Source: Kimley-Horn analysis.					

The 2037 air carrier aircraft fleet mix was developed using the forecasted fleet mix data in Chapter 2. The GA fleet mix was determined by multiplying the percentages by aircraft type that occurred in 2017 by the total GA operations forecast to occur in 2037. The 2037 average-day aircraft fleet for itinerant and local operations are provided in **Table 7.10**.

7.15.3.5. Runway Use and Flight Tracks

The runway use percentages and flight tracks modeled for the 2037 condition were the same as the existing 2017 condition.

	Category	Aircraft Type(s)	AEDT ANP ID	Day	Night	Total
Itinerant	Air Carrier	Bombardier CRJ-700/900	CRJ9-ER	7.95	2.24	10.19
		Boeing 737-800/900	737800	7.44	1.31	8.75
		Bombardier CS-100/300 (A220)	737700	2.96	0.52	3.49
		Airbus A320-NEO	A320-211	2.30	0.41	2.71
		Boeing 737-700	737700	1.46	0.26	1.72
		Embraer ERJ190	EMB190	0.10	0.02	0.12
	Piston	Cessna 152 / 172	CNA172	311.94	24.20	336.14
		Baron 58, Diamond Twin Star, Cessna 414	BEC58P	88.77	4.57	93.35
		Piper 28 Cherokee, DA40 Diamond Star	PA28	26.13	1.35	27.47
		Cirrus SR20/22	COMSEP	20.61	1.06	21.67
		Piper PA-24/32, Mooney M20, Cessna 206	GASEPV	10.80	0.56	11.36
	Turboprop	Raytheon King Air 90, Super King Air 200/350	DHC6	2.32	0.12	2.44
		Saab 340	SF340	1.80	0.09	1.89
		Pilatus PC-12, Cessna 208, Beech Bonanza	CNA208	2.09	0.11	2.20
		Piper PA46-TP Meridian, Cessna 441 Conquest	CNA441	0.48	0.02	0.50
	GA Jet	Citation II/Bravo, Phenom 100/300	CNA55B	2.21	0.11	2.32
		Cessna 750 Citation X, Dassault Falcon 50/900/2000	CNA750	1.84	0.09	1.93
		Hawker 700/800, Gulfstream 150/280	IA1125	1.79	0.09	1.88
		Learjet 31/35/45/75, Dassault Falcon/Mystère 10	LEAR35	1.69	0.09	1.78
		Cessna 560 Citation XLS	CNA560XL	1.50	0.08	1.58
		Bombardier Challenger 300 / 600	CL600	1.37	0.07	1.44
		Cessna Citation Sovereign/ Latitude	CNA680	1.37	0.07	1.44
		Cessna Citation CJ1/CJ2/CJ3/CJ4	CNA500	1.29	0.07	1.36
		Raytheon Premier 1, Beechjet 400	MU3001	0.91	0.05	0.95
		Cessna III/VI/VII	CIT3	0.43	0.02	0.45
		Gulfstream GV/G500, Global Express	GV	0.38	0.02	0.40
		Cessna 560 Citation V/Ultra	CNA560U	0.37	0.02	0.39
		Gulfstream III/GIV/G400	GIV	0.24	0.01	0.25
		Cessna Citation Mustang	CNA510	0.20	0.01	0.21
		Eclipse 500, Cirrus SF50	ECLIPSE500	0.17	0.01	0.18
	Military	SH-60 Seahawk	S70	0.88	0.03	0.90
		Texan	GASEPF	0.88	0.03	0.90
		C-130	C130E	0.58	0.02	0.60
		F-18/F16	F16PW0	0.58	0.02	0.60
		Itinerant Total		**505.81**	**37.75**	**543.56**
Local	Piston	Cessna 172	CNA172	367.76	19.36	387.12
		Baron 58, Diamond Twin Star	BEC58P	64.90	3.42	68.32
		Local Total		**432.66**	**22.77**	**455.44**
		All Total		**938.48**	**60.52**	**998.99**

Table 7.10 - 2037 Average-Day Aircraft Operations

Source: Kimley-Horn; FAA TSFMC; KB Environmental Sciences, Inc.

7.15.3.6. 2037 DNL Contours

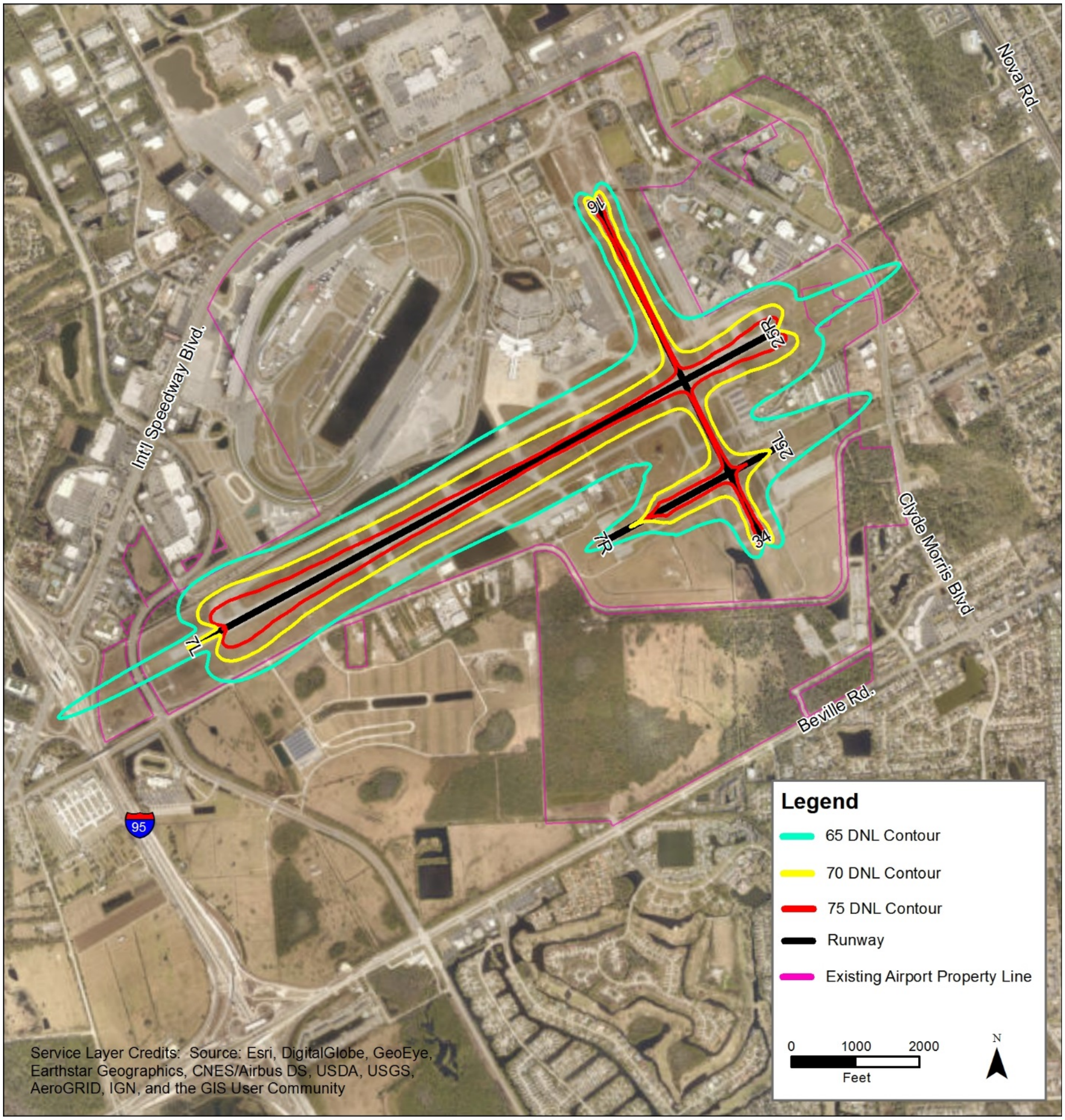
Table 7.11 identifies the areas within the 2037 DNL contour ranges and the 2037 65-75 DNL contours are provided in **Exhibit 7.10**. As shown in the table, the total area within the 65 DNL and greater contour is approximately 556 acres. The 65 DNL contour primarily remains within the limits of the Airport property boundary. Notably, there are no noise sensitive land uses or other noise sensitive structures within the 2037 65 DNL contour.

Table 7.11 - 2027 DNL Contour Areas

DNL	Area (Acres)
65 to <70	328
70 to <75	142
75 and greater	86
Total	556

Source: KB Environmental Sciences, Inc.

Exhibit 7.10 - 2037 65-75 DNL Contours



Source: KB Environmental Sciences, Inc.

APPENDIX 1

Stormwater Master Plan (Abridged)

Daytona Beach International Airport Master Drainage Plan

Daytona Beach, FL

Prepared by:

Kimley-Horn and Associates, Inc.
Orlando, Florida
149792000

June 30, 2018

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Daytona Beach International Airport Master Drainage Plan

Daytona Beach, FL

Prepared for:

Daytona Beach International Airport

Prepared by:

Kimley-Horn and Associates, Inc.
Orlando, Florida
149792000

June 30, 2018

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[2] See final master drainage report for the Appendix C proposed condition calculations and ICPR analysis.

1 SUMMARY

This report documents the conceptual drainage design of the Daytona Beach International Airport (DAB) Stormwater/Drainage Master Plan (SWMP). The DAB property is bounded by W. International Boulevard to the north, Beville Road to the south, S. Clyde Morris Boulevard to the east, and S. Williamson Boulevard to the west. This SWMP serves as an update to the Camp Dresser & McKee Inc. (CDM) model last modified in December 2011 with a follow-up supplement in November 2012.

Included within this model is a revised existing conditions model and proposed conditions model. The revised existing conditions model accounts for increased impervious surfaces related to development since the 2011 CDM model was completed. The proposed conditions model will incorporate the changes associated with the 2017 Airport Master Plan Update (AMPU). The 2017-2018 AMPU changes include development of the southern Beville Road parcels; filling of the South Pond adjacent to Runway 16-34; and 7 anticipated sites to be used for miscellaneous, general aviation, and apron purposes. ***Appendix A*** of this report includes a general location map with the project limits superimposed, an aerial photograph, the USGS Quad map, and Map No. 12127C0366H of the FEMA Flood Insurance Rate Map (FIRM), effective date February 19, 2014.

The elevations discussed throughout this report and depicted in the supporting calculations and plans are relative to the North American Vertical Datum of 1988 (NAVD 88). The proposed stormwater systems have been designed to meet or exceed all the requirements of St. Johns River Water Management District (SJRWMD).

2 EXISTING CONDITIONS

The existing conditions analysis utilizes previous St. Johns River Water Management District (SJRWMD) permits, survey data provided by Zev Cohen & Associates, Inc., 2006 Light Distance and Ranging (LiDAR) data, 2017 LiDAR data, aerial photographs, and site visits.

2.1 SOILS

The majority of the site consists of soil series “71 – Urban Land”, “31 – Malabar Fine Sand”, and “29 – Immokalee Sand” as mapped by the United States Department of Agriculture, Natural Resources Conservation Service. Various other outcrops of hydrologic soil groups exist through the site. ***Appendix A*** contains the project limits superimposed on the soils map. When available, the existing conditions model utilizes the soil specifications referenced in the most recently permitted SJRWMD calculations.

2.2 WETLANDS

Wetlands exist within the southern portion of the DAB property. Two (2) wetland areas within the southern Beville Road parcels will be preserved for attenuation. Seasonal high water elevations were established within the southern Beville Road parcel wetlands to remain during a site visit with SJRWMD staff. Further details on the DAB South Parcels wetlands are presented in **Section 3.4**.

2.3 EXISTING DRAINAGE

The existing site drains via interconnected stormwater management systems which utilize ditches, stormwater management ponds, storm pipes, and structures to convey flows to 8 outfalls surrounding the site. Outfall “98S” routes drainage south to the B-19 Canal. Outfalls “98W”, “98NW”, “98N”, “US-92N-A-Post”, “US-92N-B-Post”, and “98BF” route flows west to the Tomoka River. Outfall “98E” routes drainage east to the Navy Canal.

2.3.1 BASINS

The existing conditions basins are modeled using most recent SJRWMD permit data, where available. In cases where permit data is not available, LiDAR data in conjunction with as-builts and survey data was used to delineate basins. The revised existing conditions model has been designed to provide further basin detail throughout the model to better illustrate how the overall system will behave under various storm events. See ***Appendix A*** for the existing conditions basin map.

2.3.2 CN CALCULATIONS

When available, existing condition curve number (CN) figures are based on the most recent SJRWMD permit values. In cases where previous permit data is not available, CN values were calculated based on data provided by the United States Department of Agriculture, Natural Resources Conservation Service, Websoil Survey and aerial imagery to estimate land cover. The CN calculations for the existing conditions model can be found in ***Appendix B*** of the final master drainage report.

2.3.3 TIME OF CONCENTRATION

Existing conditions times of concentration were calculated using 2006 and 2017 LiDAR data along with recent aerials to estimate an appropriate land cover. In the event SJRWMD permit data aligned with the current basin conditions, the time of concentration provided in the calculations was used. The existing conditions times of concentration calculations can be found in ***Appendix B*** of the final master drainage report.

2.3.4 TAILWATER CONDITION

Tailwater conditions “98N”, “98W”, “98E”, “98S”, and “98NW” use the original CDM model data created for the DBIA drainage basin. The CDM boundary conditions used in this model have been converted from NGVD29 to NAVD88 using the -1.17 conversion factor specified by the National Geodetic Survey Vertcon application provided by NOAA. Tailwater conditions “US-92N-A-Post”, “US-92N-B-Post”, and “99BF” are based on calculations from SJRWMD Permit No. 29905-36. These additional basin condition elevations have also been converted from NGVD29 to NAVD88 using the Vertcon -1.17 conversion factor.

2.3.5 EXISTING DEVELOPMENT RUNOFF

Existing condition runoff was determined using Advanced Interconnected Channel & Pond Routing (ICPR Ver. 4.03.02) by Streamline Technologies, Inc. Please refer to ***Appendix B*** of the final master drainage report for the input report, basin summary, and drainage analysis summaries.

3 PROPOSED CONDITIONS

The DAB SWMP project proposes the development of the southern Beville Road parcels; filling of the South Pond; and 7 sites anticipated to be used for miscellaneous, general aviation, and apron purposes. The following details the stormwater management systems that will be used to manage these future areas.

3.1 REQUIRED PERMITS AND REVIEWS

- St. Johns River Water Management District (SJRWMD) Conceptual Environmental Resource Permit.

3.2 STORMWATER MANAGEMENT

Three (3) stormwater management ponds (Ponds 18A.1, 18A.2, & 18A.3) are proposed to serve the southern parcels along Beville Road. Ponds 18A.1 and 18A.2 are interconnected via three (3) 72" reinforced concrete pipes (RCP). The two (2) drawdown devices associated with these interconnected ponds will discharge into the conveyance ditch to the west and the 5' x 7' box culverts draining to Tributary No. 7 of the B-19 Canal. Pond 18A.3 drawdown drainage will be routed to the conveyance ditch along the southern site boundary along Beville Road.

The ponds proposed for the Beville Road parcels utilize the two (2) existing wetland systems to remain attenuation. Two-stage weirs proposed for each pond allow the wetlands to remain hydrated under mean annual storm events and higher flow rates into the wetlands under larger storm events, keeping the post-condition flow rates offsite below pre-condition. The wetlands ultimately discharge into the B-19 Canal and Tributary No. 7 of the B-19 Canal via control structures with tops set to the seasonal high-water elevation within each system.

The South Pond, located within Basin 16R, will be filled during proposed Beville Road parcel activities. This pond was originally permitted under SJRWMD Permit No. 22729-3 to provide 4.85ac-ft of treatment volume for the 58 acres of upstream airfield and general aviation area. An additional 4.85 ac-ft of treatment volume has been included within the proposed Beville Road Parcels ponds to account for the filling of the South Pond.

Tables 1 and 2 below summarize the parameters of the stormwater management ponds proposed under the potential development area activities.

Table 1: Proposed Pond Design

Post-Development Pond	Top of Pond Elevation (ft.) (NAVD 88)	Slope	Control Elevation (ft.) (NAVD 88)	Bottom of Pond Elevation (ft.) (NAVD 88)	Discharge Location
Site 1 – SS 26I	26.75	4:1	23.50	14.75	Conveyance ditch west of Thames Road
Site 2 – SS 4B	30.00	4:1	23.83	18.00	Ex. Storm manhole east of Innovation Way
Site 3 – Pond 9B.1 & Pond 9B.2	30.00	4:1	29.30 (9B.1) 29.28 (9B.2)	27.00 (9B.1) 26.00 (9B.2)	Ex. ERAU conveyance ditch
Site 4 – SS 2B.2	29.00	4:1	26.75	25.50	Conveyance ditch north of perimeter access road
Site 7 – SS 23H.2	30.00	4:1	22.60	18.00	Ex. conveyance ditch south of Bellevue Avenue
Pond 18A.1	31.00	4:1	26.60	19.00	Conveyance ditch south of site
Pond 18A.2	31.00	4:1	26.60	19.00	5’ x 7’ Box culverts under Beville Rd. draining to Trib. No. 7 of B-19 Canal
Pond 18A.3	31.00	4:1	26.60	19.00	5’ x 7’ Box culvert draining to southern conveyance ditch

Source: Prepared by Kimley-Horn & Associates, Inc.

Table 2: Control Structure Design for Proposed Ponds

Control Structure	Orifice Type	Orifice Size (ft.)	Orifice/ Control Elevation (ft.) (NAVD88)	Weir Dimensions (ft.)	Weir Elevation (ft.) (NAVD88)	Structure Type	Top of Structure Elevation (ft.) (NAVD88)
Site 1 – DCS 26I>26M	Circular	0.375’	23.50	3.75	24.10	Type-D Str.	25.75
Site 2 – DCS SS 4B>MH 4.3	Circular	0.425’	23.83	3.75	24.40	Type-D Str.	29.00
Site 3 – DCS 9B.1>9B.1A & Weir 9B.2>9B1A	N/A	N/A	N/A	Irregular w/ 104.06’ bottom (9B.2)	29.28 (9B.2)	Type-E Str. (9B.1)	29.30 (9B.1)
Site 4 – DCS 2B.2>2C	N/A	N/A	N/A	3.083	26.75	Type-C Str.	29.00
Site 7 – DCS SS 23H.2>SS 23H.3	Circular	0.4583’	22.60	4.00	23.17	Type-D Str.	29.00
DCS Pond 18A.1>SS 22B	Rectangular	0.5’x1.0’	26.60	N/A	N/A	Type-H (4-Grate Str.)	29.34
DCS Pond 18A.2>MH 18A.2	Rectangular	1.0’x7.0’	26.60	N/A	N/A	Type-H (4-Grate Str.)	29.34
DCS Pond 18A.3>MH 18A.3	Circular	.375’	26.60	N/A	N/A	Type-D Str.	29.18
Pond 18A.1 Concrete Weir	Trapezoidal	N/A	N/A	135’ bottom width w/ 1.5’ secondary weir	27.28 & 28.50	Concrete Weir	31.00
Pond 18A.2 Concrete Weirs (2)	Trapezoidal	N/A	N/A	155’ bottom width w/ 7.5’ secondary weir	27.41 & 28.50	Concrete Weir	31.00
Pond 18A.3 Concrete Weir	Trapezoidal	N/A	N/A	38’ wide bottom width w/ 1.0’ secondary weir	27.38 & 28.50	Concrete Weir	31.00

Source: Prepared by Kimley-Horn & Associates, Inc.

Site No. 1 as depicted in Figure 10 is served by one (1) wet pond. The pond utilizes a Type-D control structure with 24” RCP outfall to the conveyance ditch along Thames Road. Drainage from the site ultimately discharges into the Tomoka River. Design of the site assumes 70% of the developable area will be impervious. Design of any additional pre-treatment required for this basin will be considered during final construction permits.

Site No. 2 as shown in Figure 10 is served by one (1) wet pond. The proposed pond will route drainage to the existing double 72” RCP system which currently collects runoff from the Parking Lot Pond originally permitted in SJRWMD Permit No. 22729-3. Combined flows from the proposed system and the Parking Lot Pond will be routed to the conveyance swale located immediately north of Taxiway W. Drainage from Site No. 2 ultimately discharges into the Navy Canal. Design of the site assumes 70% of the developable area will be impervious.

Site No. 3 as shown in Figure 10 is assumed to be composed of Parcels 59, 63, 64 and the northern portion of Parcel 13. Based on SJRWMD Permits 68391-10, 68391-14 and 68391-16, 1.47ac-ft of treatment volume is required for current conditions and 2.81ac-ft of volume is provided. To reach 60% impervious area, 4.33ac of impervious area will be added to the site. The impervious area within Parcels 63 and 64 originally permitted under SJRWMD Permit 68391-16 was brought from 0.267ac to 4.595ac. The pond within Parcel 59 was expanded into Parcel 64 to create a stormwater management system shared by Parcels 59, 63 and 64. Under proposed conditions, the site will drain to the conveyance swale north of Taxiway E which ultimately outfalls to the Navy Canal.

For convenience, the remainder of this report refers to “Site 3 South” and “Site 3 North.” Site 3 South is composed of Basin 9B.2 (Parcel 13 North) and no changes are proposed for this area. Site 3 North is composed of Basins 9A.1 and 9B.1 (Parcels 59, 63 & 64).

Site No. 4 as shown in Figure 10 is served by a dry pond to be located north of the perimeter service road directly east of Taxiway P. Assumptions for the 100% impervious apron areas were based on the Phase 3 (Base Bid) and Phase 4 (Bid Alternative) values provided within SJRWMD Permit 22729-20. The proposed dry pond will use a Type-C control structure to route water through a 24” RCP to a conveyance swale along the eastern basin boundary. Runoff from this site will ultimately discharge to the Navy Canal.

Site No. 5 as shown in Figure 10 is not anticipated to require the design of additional stormwater facilities. Under permitted conditions (SJRWMD Permit No. 22729-7) the site requires 0.66ac-ft of treatment volume and 1.19ac-ft of treatment volume is provided. An additional 1.2667ac of impervious area within the basin doesn’t increase the amount of required treatment volume as the calculated amounts are based on the overall basin area. The assumed 1.2667ac increase of impervious area is handled within the existing stormwater treatment facilities as permitted.

Site No. 6 as shown in Figure 10 was originally served by the South Pond as permitted in SJRWMD Permit No. 22729-3. The site boundary is assumed to be Parcel 61B. Approximately 1.437ac of impervious area exists under existing conditions. 2.4906ac of impervious area is added to the parcel to bring the overall percentage to 70%. Proposed treatment for the additional impervious area will need to be addressed within Pond 18A.2 of the Beville Road Parcels.

Site No. 7 as shown in Figure 10 is to be serviced by a wet pond. Offsite flows which originally drained through this portion of the site will be re-routed to the downstream 6’x7’ CMP via box culverts. The proposed pond will utilize a Type-D control structure to route water through a 24” RCP which drains to the 6’x7’ CMP at the north end of the site. Drainage from this site ultimately drains to the Navy Canal.

3.2.1 BASINS

The on-site, post-development drainage conditions have been analyzed using revised drainage basin boundaries. The Beville Road Parcels are broken into 3 individual basins (Basins 18A.1, 18A.2, 18A.3) while the 7 additional potential sites utilize basin linework provided by DAB staff. Please refer to the following table for basin breakdown. Refer to ***Appendix A*** for the post-development drainage basin map, and ***Appendix C*** of the final master drainage report for detailed basin area calculations.

Table 3: Proposed Basin Summary Table

Sub-Basin Name	Area (ac.)	CN	T_c (min)
SITE 1 – Basin 26I	10.68	93.7	10
SITE 2 – Basin 4B	17.00	93.7	10
SITE 3 – Basins 9A.1, 9B.1 & 9B.2	19.56	90.8	-
SITE 4 – Basin 2B.2	8.27	93.8	10
SITE 5 – Basin 16Q.2	7.87	91.0	39.2
SITE 6 – Basin 16Q.1	14.79	90.7	84.5
SITE 7 – Basin 23H.2	19.13	93.7	10
Basin 18A.1	88.70	91.7	10
Basin 18A.2	224.15	91.7	10
Basin 18A.3	12.37	91.7	10

Source: Prepared by Kimley-Horn & Associates, Inc.

3.2.2 CN CALCULATIONS

The site contains mostly “A/D” soils. The CN calculations for the post-development conditions can be found in ***Appendix C*** of the final master drainage report. Additionally, please refer to the Post-Development Drainage Basin Map in ***Appendix A***.

3.2.3 TIME OF CONCENTRATION

Time of concentration (‘Tc’) for the post-development drainage basins was determined to be the minimum of 10 minutes where historic permit data was not available. In the case of Basins 16Q.1 and 16Q.2, the modifications proposed for the basin were not assumed to change the existing time of concentration. Please refer to the Post-Development Drainage Basin Map in ***Appendix A***.

3.2.4 CONTROL ELEVATIONS

Control/Normal water level (NWL) elevations for the Beville Road Parcels were determined using geotechnical soil boring data and wetland antecedent data. NWL elevations for the proposed future sites that propose ponds utilize historic permit data. See Table 4 below for the NWL elevations used for each of the proposed sites. See ***Appendix D*** for the site soil boring data and wetland antecedent results.

Table 4: Utilized Control Elevations

Node	Control Elevation (ft.) (NAVD 88)	SJRWMD Permit Reference
SITE 1 – Basin 26I	23.50	131850-1
SITE 2 – Basin 4B	23.83	22729-3 (Reflects “Parking Lot Pond”)
SITE 3 – Basins 9A.1, 9B.1 & 9B.2	29.30	68391-10 (ERAU West Parking Lot Pond)
SITE 4 – Basin 2B.2	26.75	22729-20 (Itinerant Aircraft Parking Apron Dry Pond)
SITE 5 – Basin 16Q.2	29.23	22729-7 (Landside Pond)
SITE 6 – Basin 16Q.1	-	-
SITE 7 – Basin 23H.2	22.60	133702-1 (Proposed “Pond A”)
Pond 18A.1	26.60	-
Pond 18A.2	26.60	-
Pond 18A.3	26.60	-
Wetland 18A.1	26.78	-
Wetland 18A.2	26.73	-

Source: Prepared by Kimley-Horn & Associates, Inc.

3.2.5 TAILWATER CONDITIONS

The post conditions model utilizes the same conditions used in the pre-condition scenario.

3.2.6 WATER QUALITY (TREATMENT VOLUME)

Wet detention ponds will be utilized as the Best Management Practice (BMP) to reduce the discharge of pollutants associated with stormwater runoff from the Beville Road Parcels, Site 1, Site 2 and Site 7. The wet ponds proposed within the Beville Road Parcels will be used to treat runoff from Site 6. The following standards were utilized for the treatment volume requirements for a wet detention pond:

The Greater of:

1” of runoff over the Basin
OR
2.5” times the percentage of imperviousness

Please see ***Appendix B*** of the final master drainage report for the Water Quality Calculations and Pond Stage/Storage calculations, and ***Table 5*** below for a summary of the required vs proposed treatment volume for the site.

Table 5: Wet Treatment Volume Required vs. Provided

Pond	Drainage Area (acres)	% Imp. Area (excluding pond and roof area) (acres)	1" Over Basin	2.5" times % Impervious	Greater Required Water Quality	Total Required Water Quality	Provided TV
Site 1 – Pond 26I	10.68	5.98	0.89 ac-ft.	1.25 ac-ft.	1.25 ac-ft.	1.25 ac-ft.	**1.35 ac-ft.**
Site 2 – Pond 4B	17.00	9.52	1.42 ac-ft.	1.98 ac-ft.	1.98 ac-ft.	1.98 ac-ft.	**2.00 ac-ft.**
Site 7 – Pond 23H.2	19.13	10.71	1.59 ac-ft.	2.23 ac-ft.	2.23 ac-ft.	2.23 ac-ft.	**2.23 ac-ft.**
Pond 18A.1	88.70	55.83	7.39 ac-ft.	11.63 ac-ft.	11.63 ac-ft.	11.63 ac-ft.	**11.63 ac-ft.**
Pond 18A.2	224.15	141.09	18.68 ac-ft.	29.39 ac-ft.	29.39 ac-ft.	29.39 ac-ft.	**34.24 ac-ft.***
Pond 18A.3	12.37	7.78	1.03 ac-ft.	1.62 ac-ft.	1.62 ac-ft.	1.62 ac-ft.	**1.62 ac-ft.**

* Pond 18A.2 provides additional volume to account for the filling of the South Pond.

Source: Prepared by Kimley-Horn & Associates, Inc.

Dry retention ponds will be utilized as the BMP to reduce the discharge of pollutants associated with stormwater runoff from Site 3, Site 4, and Site 5. The following standards were utilized for the treatment volume requirements for a dry retention pond:

The Greater of:
0.5” of runoff over the Basin
OR
1.25” of runoff over the impervious area
PLUS
0.5” of additional runoff over the basin if treatment volume is online

See ***Appendix B*** for the Water Quality Calculations and Pond Stage/Storage calculations, and ***Table 6*** below for a summary of the required vs proposed treatment volume for the site.

Table 6: Dry Treatment Volume Required vs. Provided

Pond	Drainage Area (acres)	Impervious Area (acres)	0.5" Over Basin	1.25" times % Impervious	Add’l 0.5" Over Basin	Total Required Water Quality	Provided TV
Site 3 North – Basins 9A.1 & 9B.1	12.48	7.46	0.52 ac-ft.	0.78 ac-ft.	0.52 ac-ft.	1.30 ac-ft.	**1.30 ac-ft.**
Site 4 – Pond 2B.2	8.27	6.32	0.34 ac-ft.	0.66 ac-ft.	0.34 ac-ft.	1.00 ac-ft.	**1.00 ac-ft.**
Site 5 – Pond 16Q.2	7.87	2.66	0.33 ac-ft.	0.28 ac-ft.	0.33 ac-ft.	0.66 ac-ft.	**1.19 ac-ft.**

Source: Prepared by Kimley-Horn & Associates, Inc.

3.2.7 TREATMENT VOLUME RECOVERY (BLEED DOWN)

SJRWMD requires that the wet and dry detention systems must recover half of the required treatment volume within 24 to 30 hours via draw down device. No more than half of the wet detention treatment volume will be recovered within the first 24 hours.

Recovery analyses have been completed for the Beville Road Parcels stormwater management system and included within this report. Recovery analyses for the remaining future proposed sites are to be completed during permitting of final construction documents. Refer to ***Table 2*** above for a summary of the control structure designs and refer to ***Appendix C*** of the final master drainage report for the detailed Beville Road Parcels recovery calculations using Advanced Interconnected Channel & Pond Routing (ICPR Ver. 4.03.02) by Streamline Technologies, Inc.

3.2.8 PROPOSED DEVELOPMENT RUNOFF

A pre versus post development runoff analysis was completed for the Beville Road Parcels. The stormwater runoff from the post-development basin was determined using Advanced Interconnected Channel & Pond Routing (ICPR Ver. 4.03.02) by Streamline Technologies, Inc. Pre versus post development analyses are to be completed for Sites 1 through 7 during final construction documents. Refer to ***Appendix A*** for the nodal diagram and ***Appendix C*** of the final master drainage report for the input report and summary of results.

Table 7: Beville Road Parcels Runoff Analysis

Storm Event	Existing Master System Q (CFS)	
	Pre	Post
	Outfall 98S	
Mean Annual	204.14	107.95
25yr-24hr	365.05	206.28

Table 8: Proposed Pond Max Stages

Storm Event	Pond 18A.1 Max. Stage (ft.) (NAVD 88)	Pond 18A.2 Max. Stage (ft.) (NAVD 88)	Pond 18A.3 Max. Stage (ft.) (NAVD 88)	Site 1 – Pond 26I (ft.) (NAVD 88)	Site 2 – Pond 4B (ft.) (NAVD 88)	Site 3 North – Pond 9B.1 (ft.) (NAVD 88)	Site 4 – Pond 2B.2 (ft.) (NAVD 88)	Site 7 – Pond 23H.2 (ft.) (NAVD 88)
10yr-24hr	28.65	28.65	28.70	25.29	26.66	28.84	28.56	24.85
25yr-24hr	28.87	28.87	28.86	25.63	27.33	28.97	28.93	25.40
100yr-24hr	29.33	29.33	29.26	26.43	28.52	29.29	29.69	26.57
T.O.B.	31.00	31.00	31.00	26.75	30.00	30.00	29.00	30.00

3.3 100-YEAR FLOODPLAIN COMPENSATION

100-year floodplain impacts proposed under the Beville Road Parcels will be compensated by designing the stormwater facilities to discharge no more than the 100-year pre-condition volume. See ***Table 9*** below for the pre and post 100 year discharge volumes for outfall 98S and ***Appendices B*** and ***C*** for the ICPR analysis. In the event 100-year floodplain impacts are to occur under the remaining 7 sites, compensation measures will be considered during final construction documents.

Table 9: 100yr Storm Discharge Volumes

Storm Event	100yr Storm Discharge Volume (ac-ft)	
	Pre	**Post**
Outfall 98S		
100yr-24hr	433.55	414.64

3.4 WETLAND IMPACTS/MITIGATION

There are multiple wetlands throughout the Beville Road Parcels that will be impacted due to proposed activities (see environmental narrative in ***Appendix D*** for further details). The pre and post condition hydroperiods of the two (2) wetlands to remain were modeled to investigate the effects of the site on the systems over a 36-hour period. The proposed drainage design allows the post condition wetlands to function similar to pre-condition to avoid adverse impacts. See ***Appendices B*** and ***C*** for the pre and post condition wetland hydroperiod data. In the event wetland impacts are to occur under the 7 remaining sites, mitigation measures are to occur during final construction documents.

3.5 CONCLUSION

The design of the proposed stormwater management system meets or exceeds all the requirements of SJRWMD by providing sufficient treatment and attenuation volumes within the wet detention ponds. Recovery criteria has been met for the Beville Road Parcels. Recovery calculations will be completed for the remaining proposed sites at the time of final construction documents.

APPENDICES

FIGURES.. APPENDIX A

Figure 1	General Location Map
Figure 2	Aerial Photograph
Figure 3	USGS Quad Map
Figure 4	FEMA F.I.R.M.
Figure 5A	SCS Soil Survey
Figure 5B	SCS Soil Survey
Figure 6	Pre-Development Drainage Basin Map
Figure 7	Pre-Development Nodal Diagram
Figure 8	Post-Development Drainage Basin Map
Figure 9	Post-Development Nodal Diagram
Figure 10	Potential Development Area Sites

EXISTING CONDITIONS CALCULATIONS & ICPR ANALYSIS ....[3]APPENDIX B

**POST-DEVELOPMENT DRAINAGE CALCULATIONS
AND ICPR ANALYSIS...[4]APPENDIX C**

ENVIRONMENTAL REPORT .... APPENDIX D

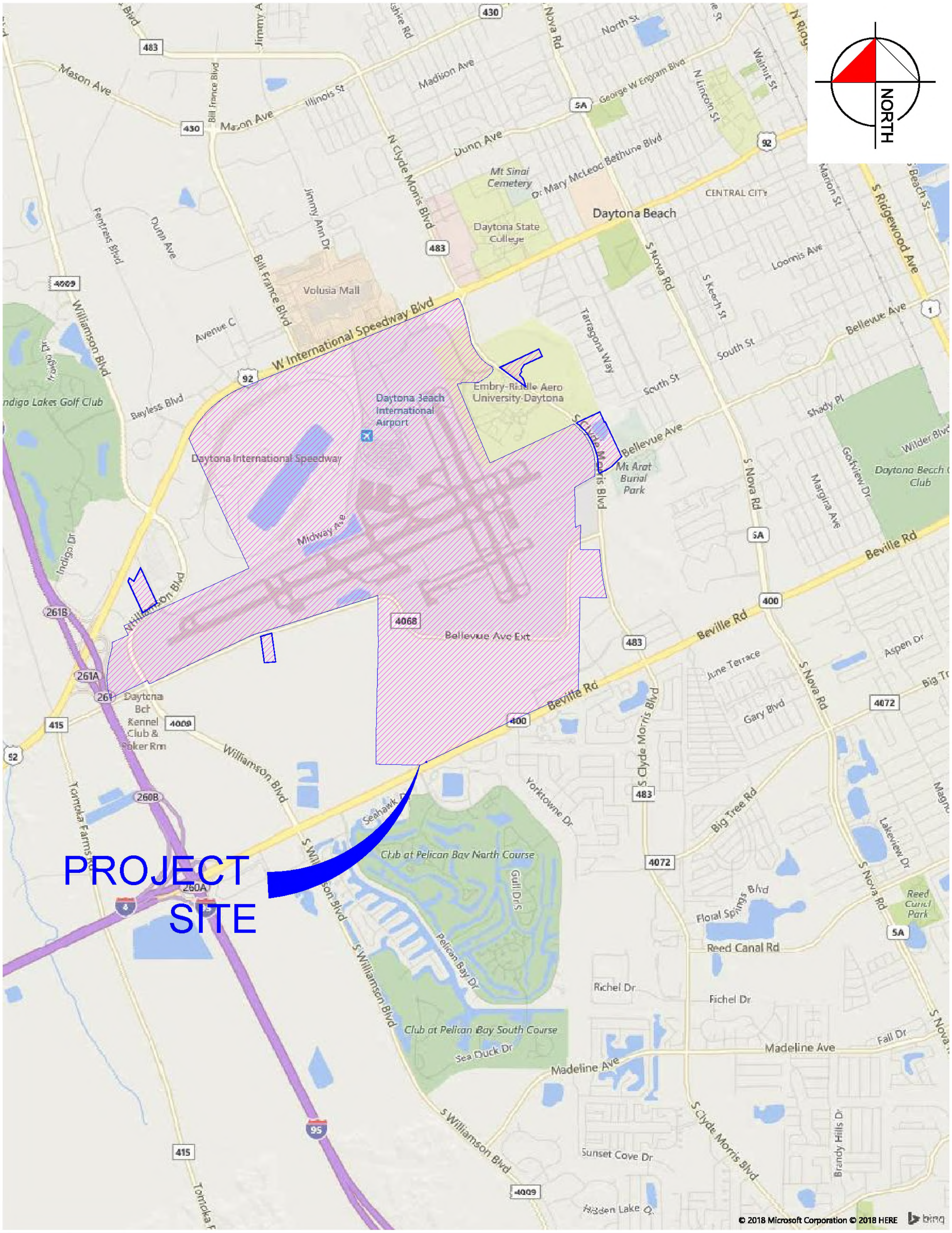
GEOTECHNICAL REPORT... APPENDIX E

[3] See final master drainage report for the Appendix B existing condition calculations and ICPR analysis.
[4] See final master drainage report for the Appendix C proposed condition calculations and ICPR analysis.

APPENDIX A

FIGURES

General Location Map
Aerial Photograph
USGS Quad Map
FEMA F.I.R.M.
SCS soil survey
Pre-Development Drainage Basin Map
Pre-Development Nodal Diagram
Post-Development Drainage Basin Map
Post-Development Nodal Diagram
Potential Development Area Sites



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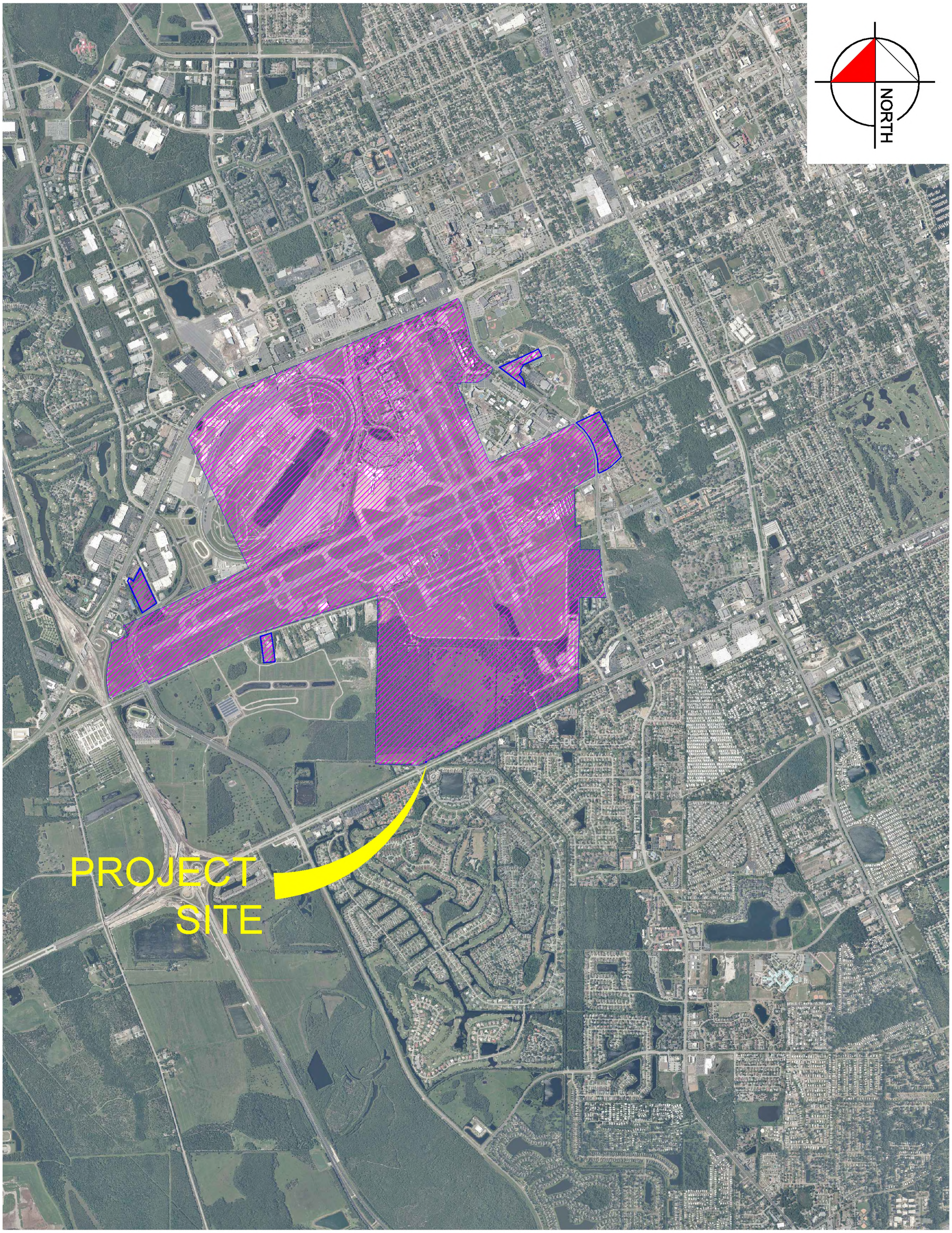

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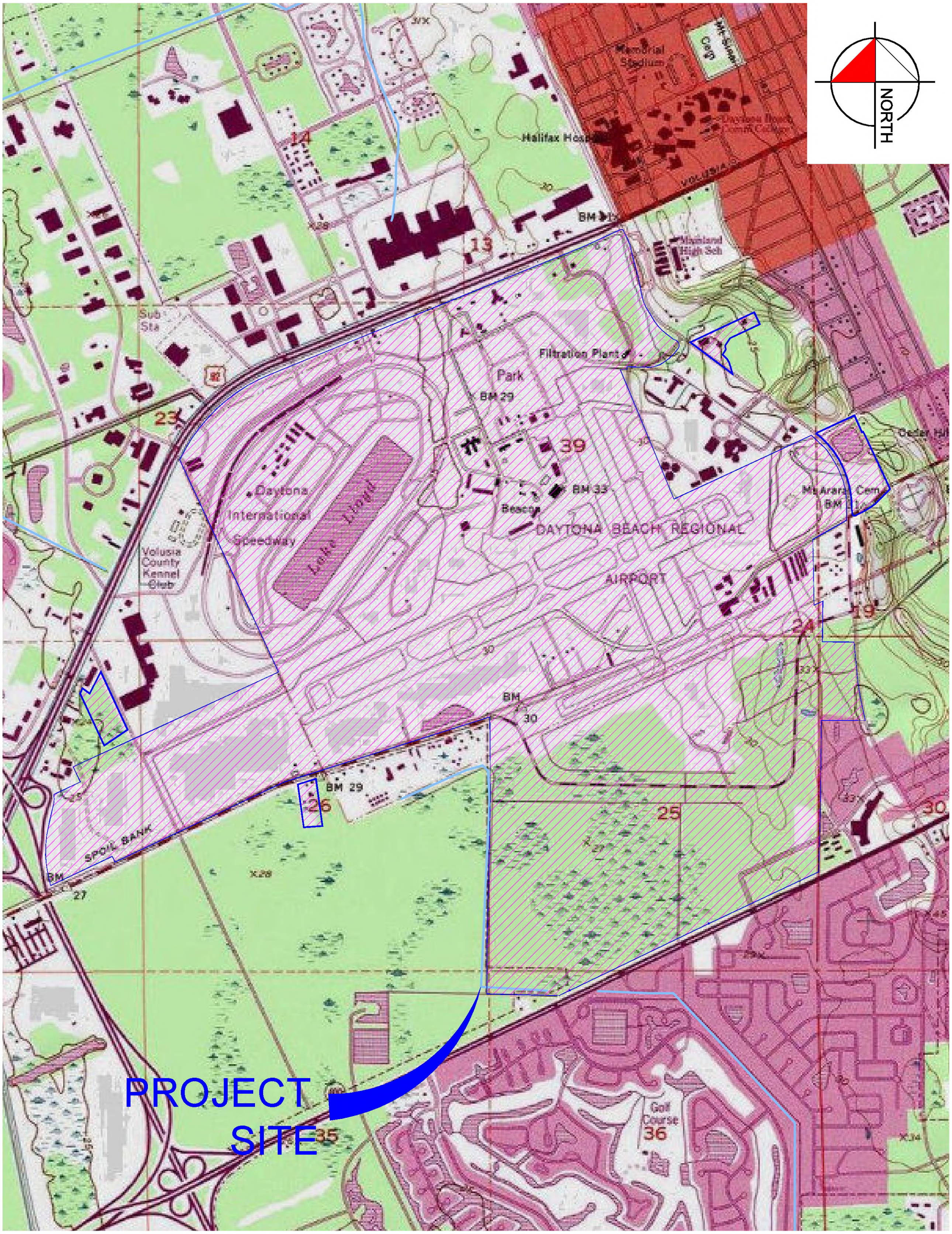

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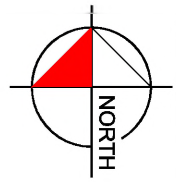
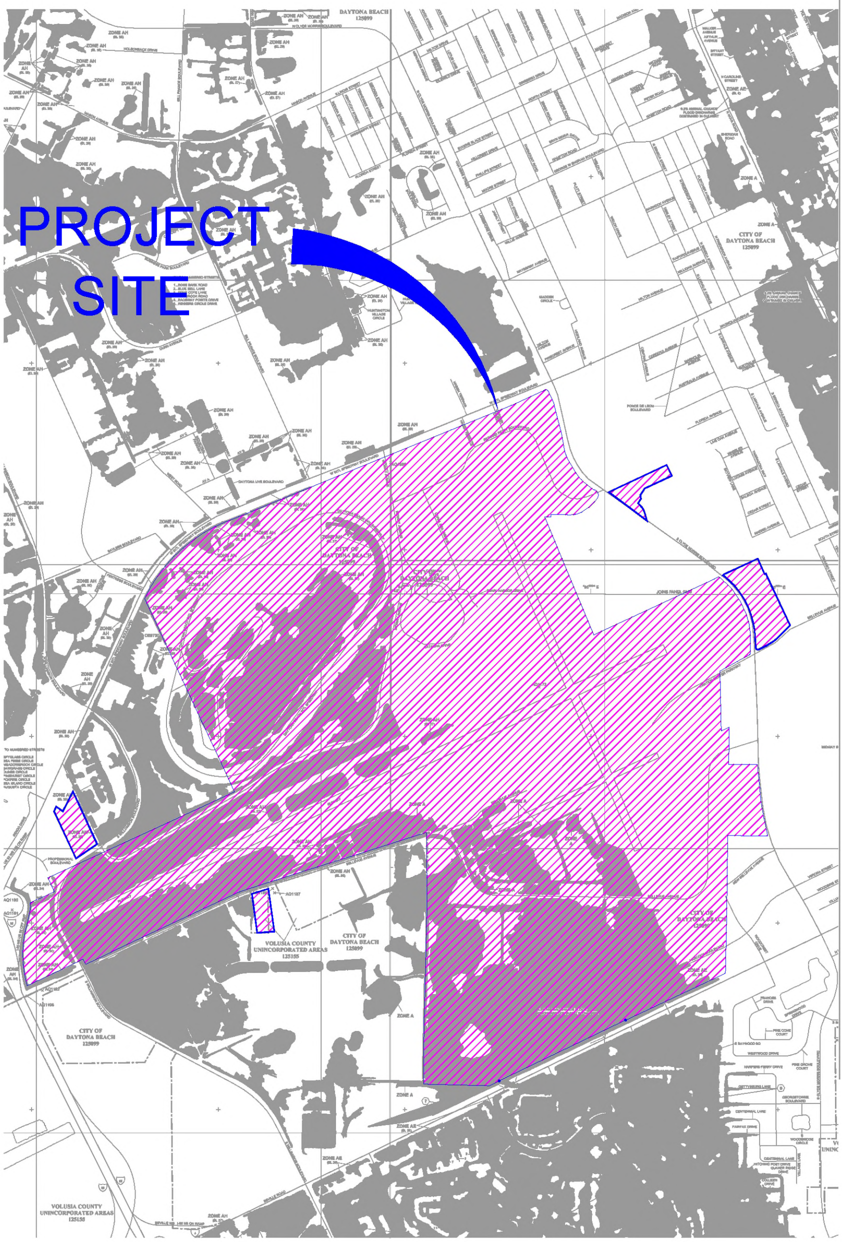
DESIGNED BY	© 2018 KIMLEY-HORN AND ASSOCIATES, INC.	PROJECT NO. 149792000	DAYTONA BEACH, FL	FLORIDA P.E. LICENSE NUMBER:	FIGURE 3
DRAWN BY	189 South Orange Ave., Suite 1000, Orlando, FL 32803		QUAD MAP		
CHECKED BY	PHONE (407) 898-1511 FAX (407) 894-4791 WWW.KIMLEY-HORN.COM CA 00000696				





LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain Boundary
- Floodway Boundary
- Zone D Boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Limit of Moderate Wave Action

513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A —— A	Cross section line
23 - - - - 23	Transect line
	Culvert
	Bridge
	Footbridge
45° 02' 08", 93° 02' 12"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
4989000m N	1000-meter Universal Transverse Mercator grid ticks, zone 17
4989000FT	5000-foot grid values: Florida State Plane coordinate system, East zone (FIPS Zone 0901), Lambert Conformal Conic
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
APRIL 15, 2002
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

February 19, 2014 - to update corporate limits, to reflect updated topographic information, to add and change Base Flood Elevations, to add floodways, to add and change Special Flood Hazard Areas, to incorporate previsously issued Letters of Map Revision, and to change zone designations.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12127C0366H
MAP REVISED
FEBRUARY 19, 2014

Federal Emergency Management Agency

SCALE AS NOTED	Kimley»Horn	DATE 03/26/2018	DAB MASTER DRAINAGE PLAN DAYTONA BEACH, FL FEMA F.I.R.M.	DESIGN ENGINEER:	SHEET NUMBER
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DRAWN BY	189 South Orange Ave., Suite 1000, Orlando, FL 32803	PROJECT NO.		FLORIDA P.E. LICENSE NUMBER:	FIGURE 4
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Drawing name: K:\ORL_Aviation\149792000-DAB MPU\Civil\CADD\EXHIBITS\Drainage Report Exhibits\DAB MPU – MAP EXHIBITS.dwg FEMA MAP Jul 05, 2018 10:03am by: Marcus.Geiger
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Drawing name: K:\ORL_Aviation\149792000-DAB MPU\Civil\CADD\EXHIBITS\Drainage Report Exhibits\DAB MPU - MAP EXHIBITS.dwg SOIL MAP Jul 05, 2018 10:06am by: Marcus.Geiger

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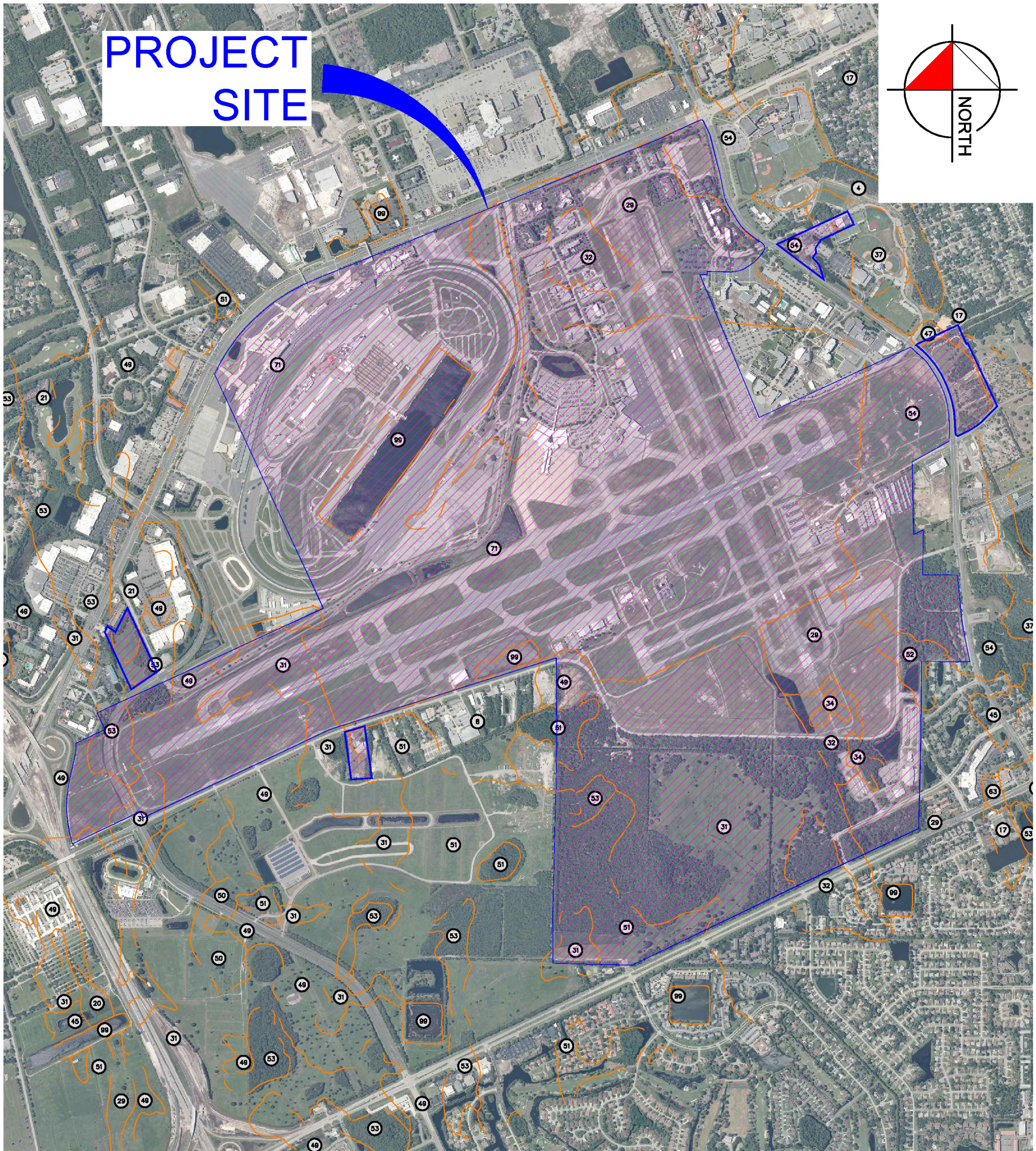

SCALE AS NOTED	Kimley»Horn	DATE 05/17/2017	DAB MASTER DRAINAGE PLAN	DESIGN ENGINEER:	SHEET NUMBER
DESIGNED BY	© 2018 KIMLEY-HORN AND ASSOCIATES, INC.		DAYTONA BEACH, FL		
DRAWN BY	189 South Orange Ave., Suite 1000, Orlando, FL 32803	PROJECT NO.	SCS SOIL SURVEY	FLORIDA P.E. LICENSE NUMBER:	FIGURE 5A
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USDA – SCS SOIL TYPES FOUND WITHIN PROJECT LIMITS

4 ASTATULA FINE SAND, 0 TO 8 PERCENT SLOPES (HYDROLOGIC GROUP A)

5 ASTATULA FINE SAND, 8 TO 17 PERCENT SLOPES (HYDROLOGIC GROUP A)

8 BASINGER FINE SAND DEPRESSIONAL, 0 TO 1 PERCENT SLOPES (HYDROLOGIC GROUP A/D)

17 DAYTONA SAND, 0 TO 5 PERCENT SLOPES (HYDROLOGIC GROUP B)

20 EAUGALLIE FINE SAND (HYDROLOGIC GROUP B/D)

21 EAUGALLIE FINE SAND, DEPRESSIONAL (HYDROLOGIC GROUP B/D)

29 IMMOKALEE SAND (HYDROLOGIC GROUP A/D)

31 MALABAR FINE SAND (HYDROLOGIC GROUP B/D)

32 MYAKKA–MYAKKA, WET, FINE SANDS, 0 TO 2 PERCENT SLOPES (HYDROLOGIC GROUP A/D)

34 MYAKKA–ST. JOHNS COMPLEX (HYDROLOGIC GROUP B/D)

37 ORSINO FINE SAND, 0 TO 5 PERCENT SLOPES (HYDROLOGIC GROUP B/D)

42 PAOLA FINE SAND, 0 TO 8 PERCENT SLOPES (HYDROLOGIC GROUP A)

44 PAOLA–URBAN LAND COMPLEX, 0 TO 8 PERCENT SLOPES (HYDROLOGIC GROUP A)

45 PINEDA FINE SAND (HYDROLOGIC GROUP B/D)

47 PITS

49 POMONA FINE SAND (HYDROLOGIC GROUP B/D)

50 POMONA FINE SAND, DEPRESSIONAL, 0 TO 2 PERCENT SLOPES (HYDROLOGIC GROUP B/D)

51 POMONA–ST. JOHNS COMPLEX (HYDROLOGIC GROUP B/D)

52 POMPANO FINE SAND (HYDROLOGIC GROUP A/D)

53 POMPANO–PLACID COMPLEX (HYDROLOGIC GROUP A/D)

54 QUARTZIPSAMMENTS, GENTLY SLOPING

55 RIVIERA FINE SAND (HYDROLOGIC GROUP B/D)

63 TAVARES FINE SAND, 0 TO 5 PERCENT SLOPES (HYDROLOGIC GROUP A)

64 TEQUESTA MUCK, FREQUENTLY PONDED, 0 TO 1 PERCENT SLOPES (HYDROLOGIC GROUP B/D)

69 TUSCAWILLA FINE SAND (HYDROLOGIC GROUP D)

70 TUSCAWILLA–URBAN LAND COMPLEX

71 URBAN LAND

72 VALKARIA FINE SAND, 0 TO 2 PERCENT SLOPES (HYDROLOGIC GROUP B/D)

99 WATER

Drawing name: K:\ORL_Aviation\149792000-DAB MPU\Civil\CADD\EXHIBITS\Drainage Report Exhibits\DAB MPU – MAP EXHIBITS.dwg SOIL MAP (2) Jul 05, 2018 10:06am by: Marcus.Geiger

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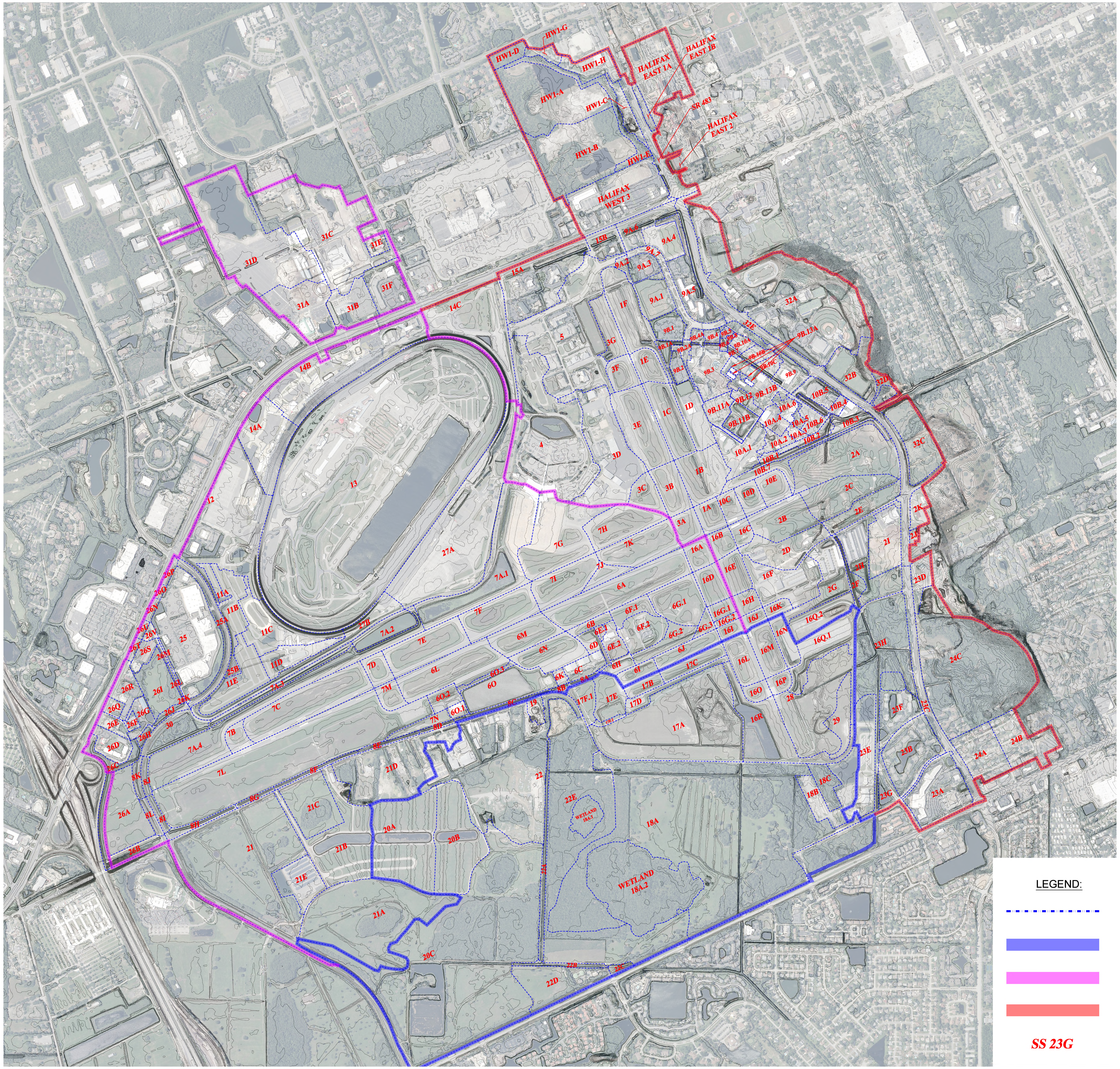

NORTH

GRAPHIC SCALE IN FEET
0 375 750 1500

LEGEND:

- SUB BASIN BOUNDARY
- B-19 CANAL DRAINAGE BASIN
- TOMOKA RIVER DRAINAGE BASIN
- NAVY CANAL DRAINAGE BASIN
- SS 23G — BASIN ID

No.	REVISIONS	DATE	BY

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LICENSED PROFESSIONAL

DATE:

KHA PROJECT

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EXISTING CONDITIONS DRAINAGE BASIN MAP

DAB MASTER DRAINAGE PLAN

SHEET NUMBER
FIGURE 6

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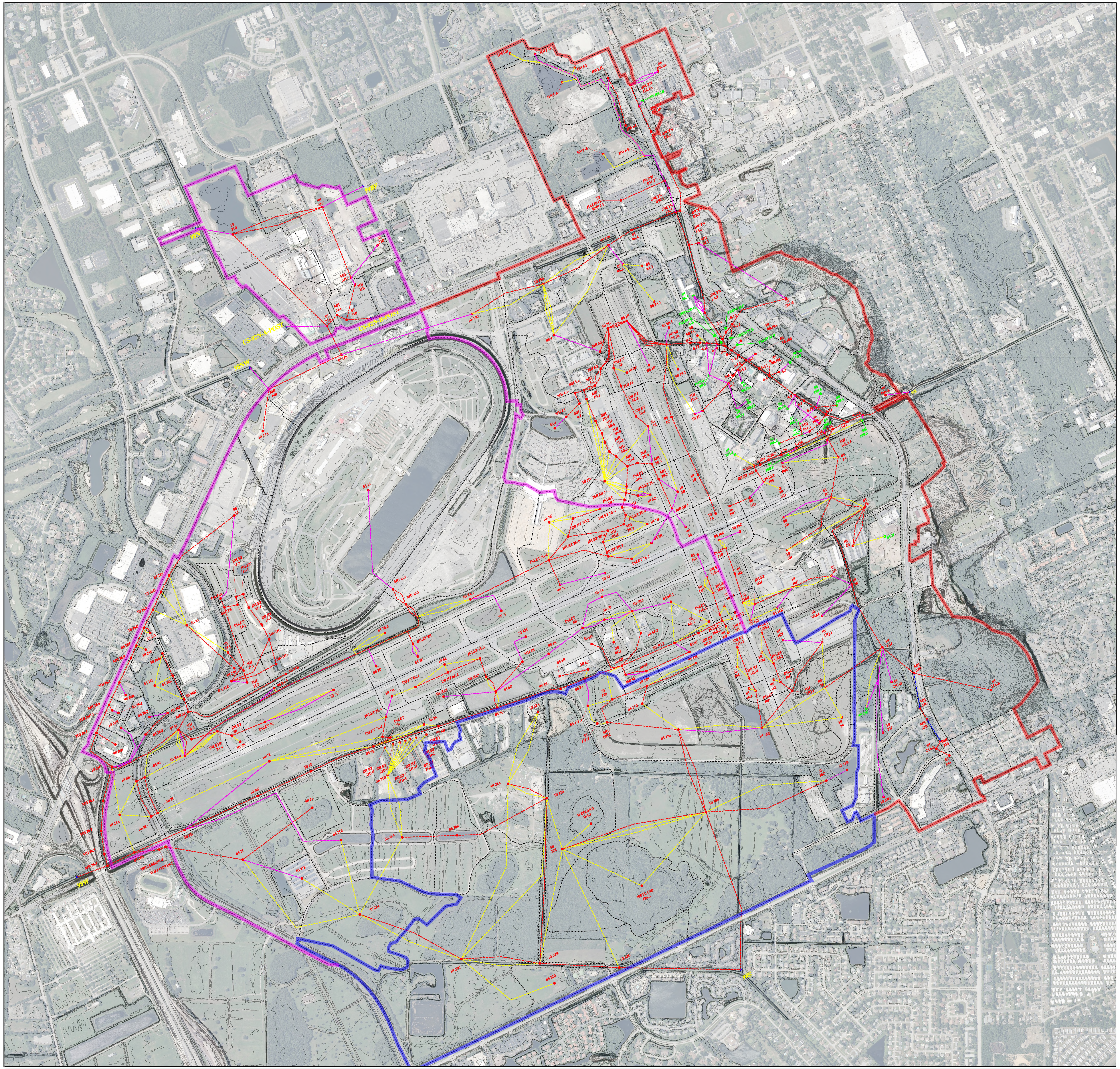

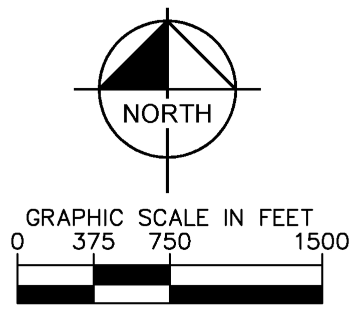

LEGEND:

- STAGE AREA NODE
- STAGE VOLUME NODE
- TIME STAGE NODE
- CHANNEL LINK
- WEIR LINK
- PIPE LINK
- DROP STRUCTURE LINK
- OVERALL CONTRIBUTING BASIN BOUNDARY

No.	REVISIONS	DATE	BY

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EXISTING CONDITIONS NODAL DIAGRAM

DAB MASTER DRAINAGE PLAN

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FIGURE 7

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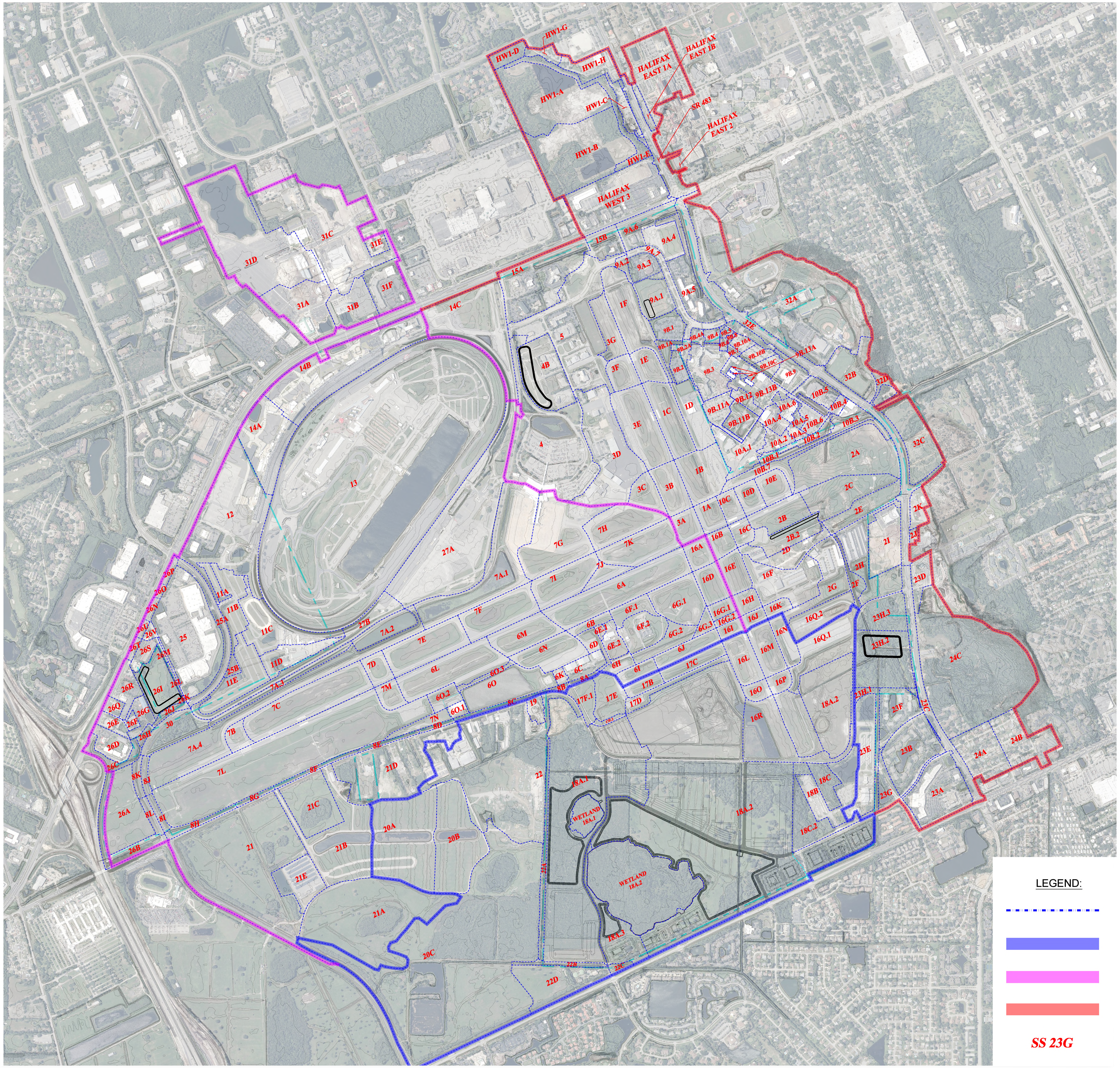

NORTH

GRAPHIC SCALE IN FEET

0 375 750 1500

LEGEND:

	SUB BASIN BOUNDARY
	B-19 CANAL DRAINAGE BASIN
	TOMOKA RIVER DRAINAGE BASIN
	NAVY CANAL DRAINAGE BASIN
SS 23G	BASIN ID

No. | REVISIONS | DATE | BY

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PROPOSED CONDITIONS DRAINAGE BASIN MAP

DAB MASTER DRAINAGE PLAN

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FIGURE 8

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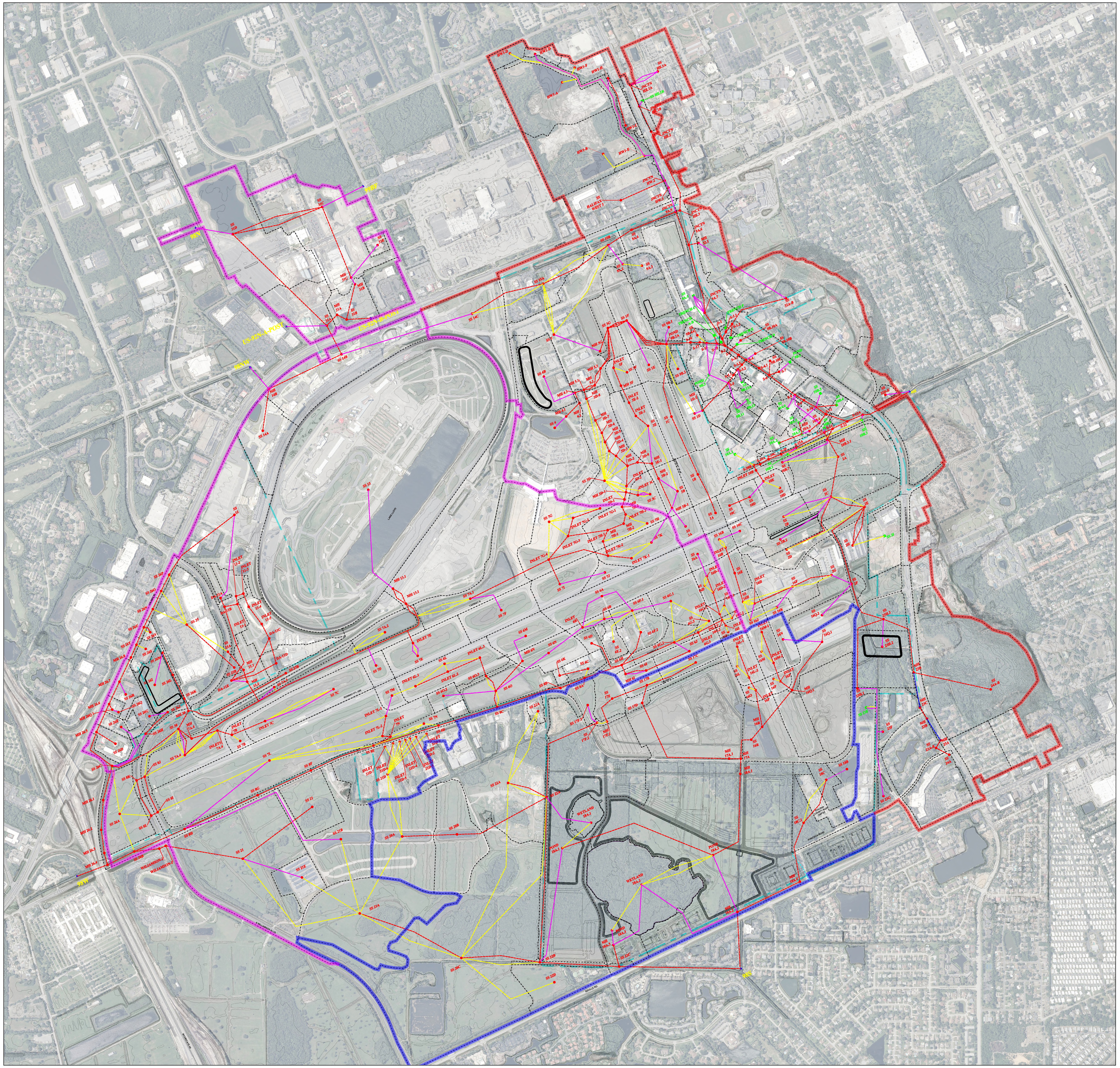

NORTH

GRAPHIC SCALE IN FEET
0 375 750 1500

LEGEND:

STAGE AREA NODE

STAGE VOLUME NODE

TIME STAGE NODE

CHANNEL LINK

WEIR LINK

PIPE LINK

DROP STRUCTURE LINK

OVERALL CONTRIBUTING BASIN BOUNDARY

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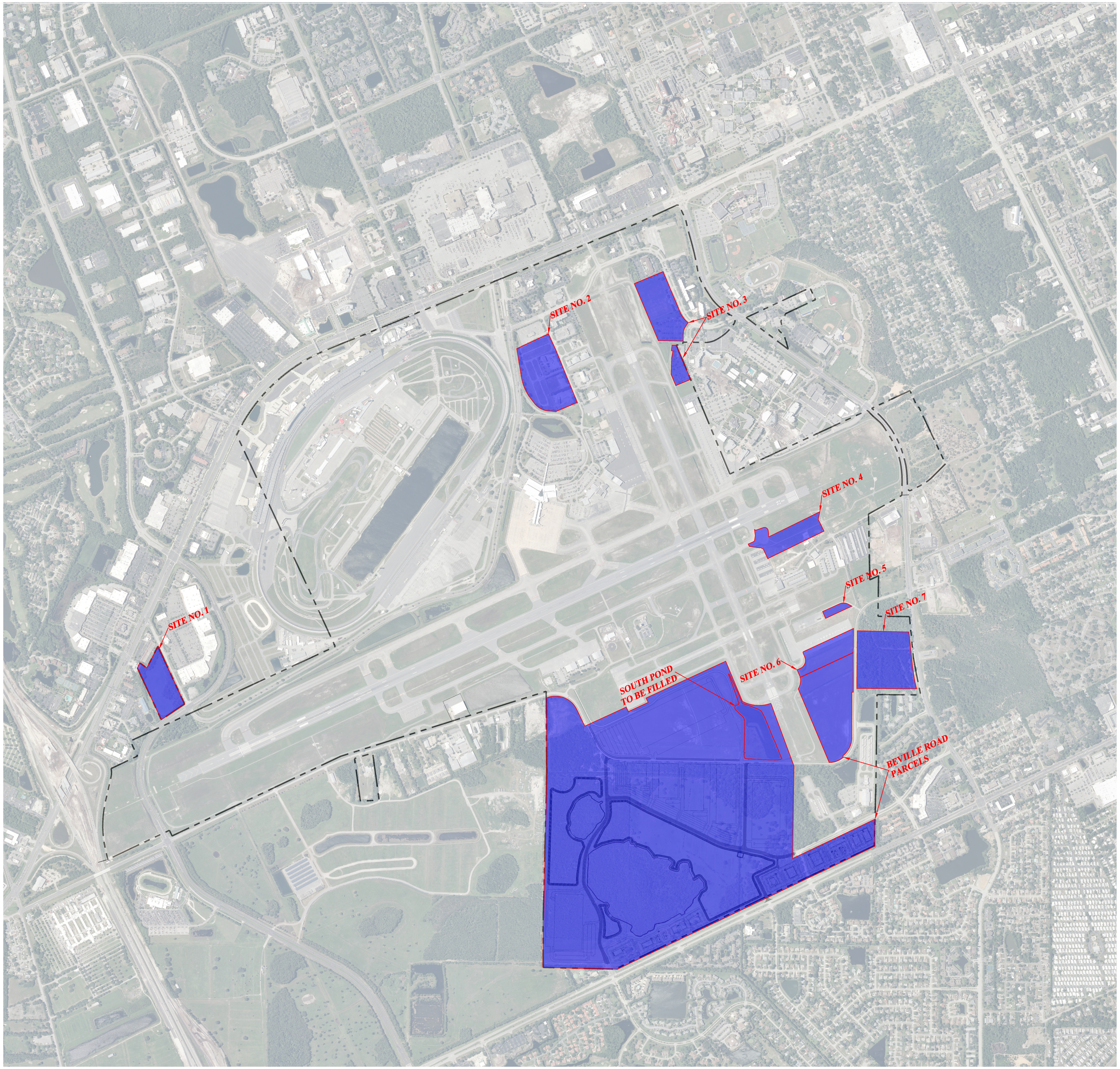
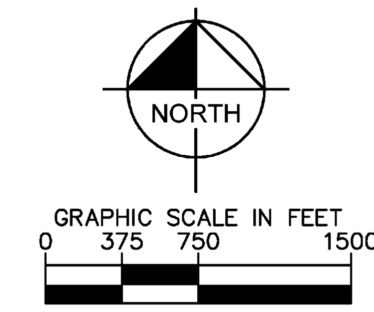
PROPOSED CONDITIONS NODAL DIAGRAM

DAB MASTER DRAINAGE PLAN

SHEET NUMBER
FIGURE 9





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POTENTIAL DEVELOPMENT AREA SITES

DAB MASTER DRAINAGE PLAN

SHEET NUMBER

FIGURE 10

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APPENDIX B

Existing Conditions Calculations & ICPR Analysis

SEE THE FINAL MASTER DRAINAGE REPORT FOR THE EXISTING CONDITIONS APPENDIX B CALCULATIONS AND ANALYSES.

APPENDIX C

Post-Development Drainage Calculations and ICPR Analysis

SEE THE FINAL MASTER DRAINAGE REPORT FOR THE PROPOSED CONDITIONS APPENDIX C CALCULATIONS AND ANALYSES.

APPENDIX D

Beville Road Parcels Environmental Report

BIOLOGICAL CONSULTING SERVICES, INC.

ENDANGERED and THREATENED SPECIES SURVEY REPORT

DAYTONA BEACH INTERNATIONAL AIRPORT
SOUTH PARCELS

For Submittal to:

St. Johns River Water Management District
Palm Bay Service Center
525 Community College Parkway, S.E.
Palm Bay, Florida 32909

Prepared for:

Kimley-Horn & Associates, Inc.
3660 Maguire Boulevard, Suite 200
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By:

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208 Rush Street
New Smyrna Beach, Florida 32168

April 2018

Joe H. Young III, President
Principal Field Biologist

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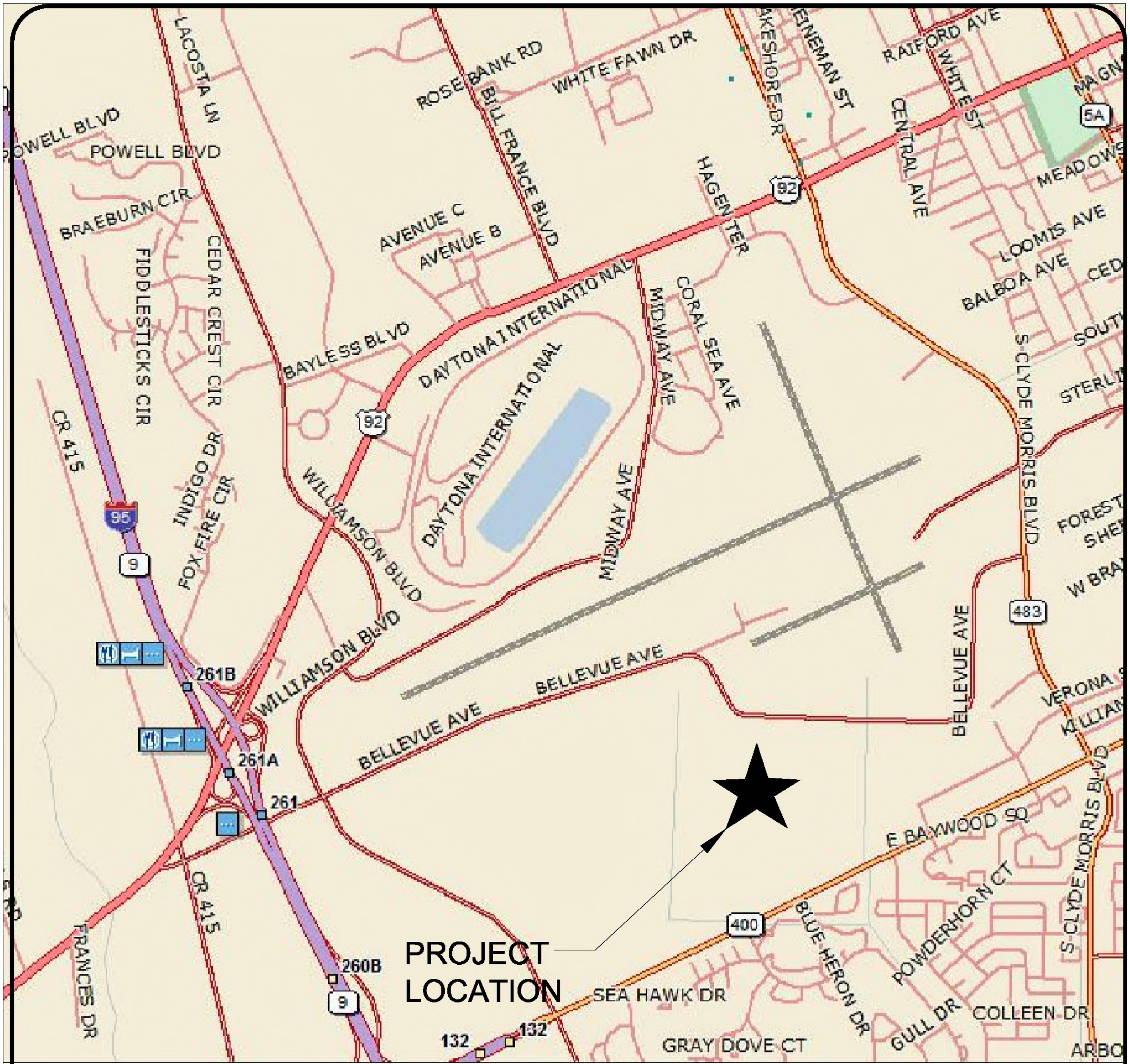
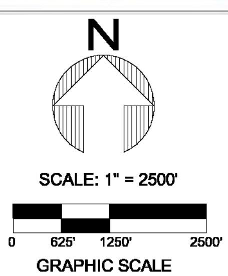
1.0 SITE LOCATION AND DESCRIPTION

The Daytona Beach International Airport South Parcels site is located south of Bellevue Avenue, north of Beville Road (SR 400), west of Clyde Morris Boulevard and east of Williamson Boulevard in Sections 25 & 36, Township 15 South, and Range 32 East in Volusia County, Florida. The site consists of approximately 268± acres.

Currently, the site is in natural vegetation consisting mostly of pasture and forested lands with adjacent land uses consisting of vacant land in natural vegetation, single and multifamily home sites, transportation facilities and the Daytona Beach International Airport. The site topography is characterized as being relatively flat with elevations ranging on site from the 27’ contour within the uplands on site down to the 25’ contour within the existing wetland on site. There are also a series of ditches throughout the site where the existing elevations on site range from the 25’ contour down to the 22’ contour.

Pedestrian field surveys were conducted on November 17, 2017, February 19 and 28, 2018 and April 4, 2018 to determine the potential occurrence of state and federally listed threatened and endangered species, to identify vegetative communities that occur on the property, and review the physical features (soils and topography). Plant communities were subsequently mapped and community types were classified utilizing the Florida Land Use, Cover and Forms Classification System (FLUCCS) (Florida Department of Transportation, 1999).





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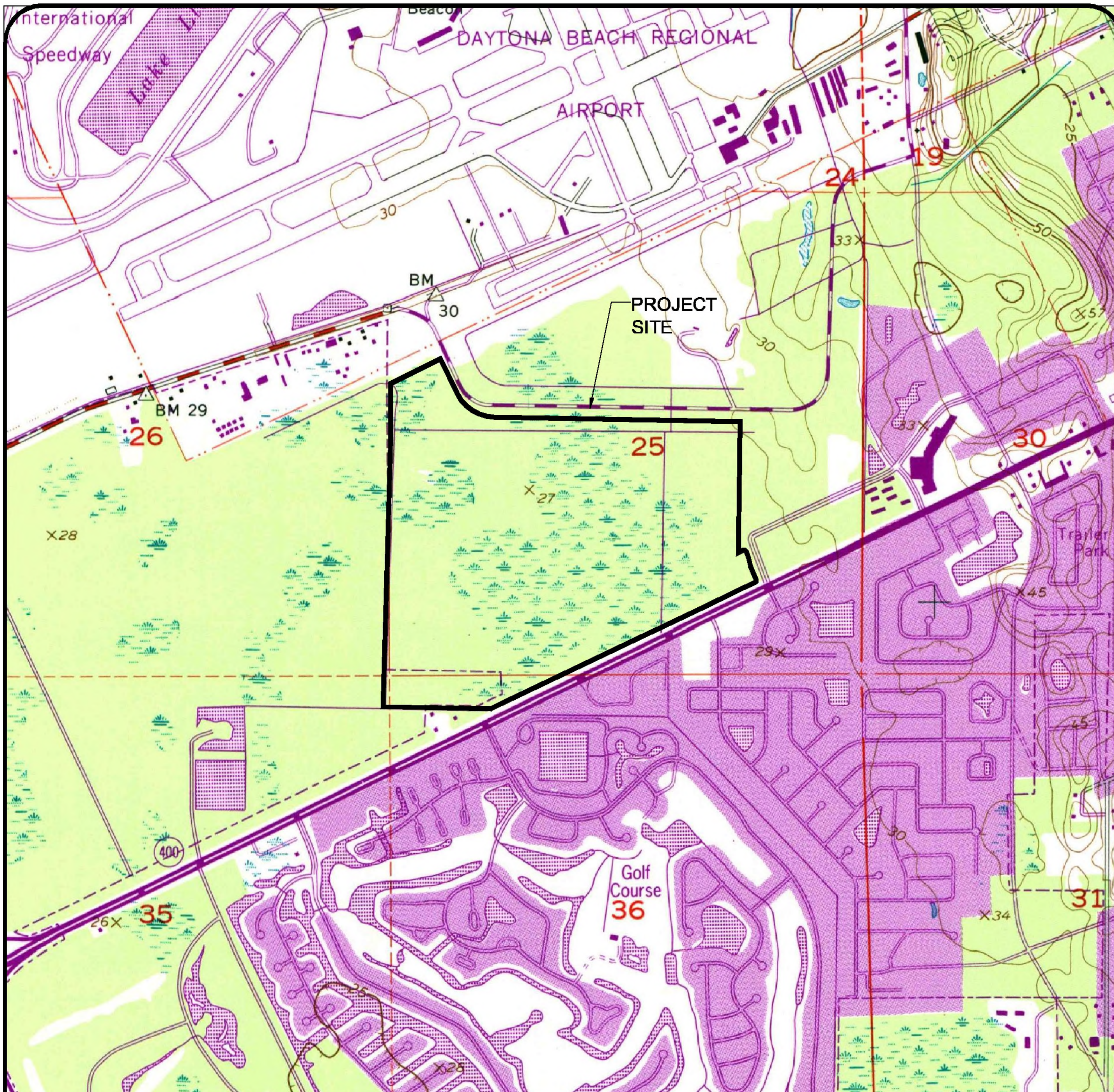
LOCATION MAP

DAYTONA BEACH
INTERNATIONAL AIRPORT



N

SCALE: 1" = 1500'

0 375' 750' 1500'

GRAPHIC SCALE

MAP ADAPTED FROM
DIGITAL QUAD MAP

DAYTONA BEACH, FL
1952
REVISED 1993

SCALE MAY
VARY SLIGHTLY

PROJECT LOCATED IN
SEC. 25 & 36 TWP.15 S. RNG 32 E.

APPROXIMATE CENTER OF SITE
LAT. 29° 10' 12.45" N.,
LONG. 81° 03' 16.15" W.

SITE AREA = 268.036 ±ACRES

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QUADRANGLE MAP

DAYTONA BEACH
INTERNATIONAL AIRPORT

NOTES:
1 - BOUNDARY AND SURVEY INFORMATION ADAPTED FROM AUTOCAD FILES PROVIDED BY SLIGER AND ASSOCIATES, INC. AND UPHAM, INC.
2 - AERIAL PHOTO INSERTED FROM GOOGLE EARTH, INC. (DATED 2017). SCALE IS APPROXIMATE.
3 - WETLANDS AND SURFACE WATER LIMITS REVIEWED AND APPROVED BY SJRWMD REPRESENTATIVES THROUGH THE FORMAL WETLANDS DETERMINATION PROCESS. PLEASE SEE FORMAL PETITION NUMBERS: 65141-7, 65141-8, 16-127-132350-1,

AERIAL EXHIBIT

DAYTONA BEACH
INTERNATIONAL AIRPORT

drawn JPC
date 04/18/18
scale (size B) 1"= 500'
job no. 17-11109

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N

SCALE: 1" = 500'

0 125' 250' 500'

GRAPHIC SCALE

2.0 SOIL SURVEY

The Natural Resources Conservation Service Web Soil Survey (websoilsurvey.nrcs.usda.gov) indicates that the following soil types are found in this area. Normally vegetation within these soil types indicates hydric *(wetland)* or non-hydric *(non-wetland)* characteristics.

31 Malabar Fine Sand (Hydric)
32 Myakka Fine Sand (Non-Hydric)
49 Pomona Fine Sand (Non-Hydric)
51 Pomona-St. Johns Complex (Hydric)
53 Pompano-Placid Complex (Hydric)

The soil survey is fairly accurate in the typing of soils; however, boundaries of the soils are sometimes poorly indicative of site conditions. Please review the Soils Map for soil type boundaries and the chart below for soil type/vegetation correlation for this site.

UPLAND SOILS	**WETLAND SOILS**
32 – Myakka Fine Sand	31 – Malabar Fine Sand
49 – Pomona Fine Sand	51 – Pomona-St. Johns Complex
	53 – Pompano-Placid Complex

Malabar fine sand soil (31) is defined as a poorly drained, nearly level soil typically found in broad low flats. The water table is within a depth of 10 inches for 2 to 6 months and is within 40 inches for about 6 months. Permeability is rapid to a depth of about 42 inches and moderate below. **Category: Hydric**

Myakka Fine Sand soil (32) is characterized as a nearly level, poorly drained soil, typically found in flatwoods. The water table is within 12 inches of the surface from June to November and typically within 40 inches of the surface the rest of the year. Permeability is rapid in the surface layer and moderate in the subsoil layers. **Category: Non-hydric**

Pomona fine sand soil (49) is defined as a poorly drained, nearly level soil which occurs in low, broad areas within the flatwoods. The water table is within a depth of 10 inches for 1 to 3 months and within 40 inches for about 6 months during most years. Permeability is rapid to about 18 inches, moderate from 18 to 33 inches, rapid from 33 to 50 inches, and moderately slow from 50 to 60 inches. **Category: Non-hydric**

Pomona - St. Johns Complex soil (51) is defined as nearly level, poorly drained Pomona and St. Johns soils that are covered with standing water for long periods. These soils occur in drainage ways and broad depressions in flatwoods, with St. Johns soils making up about 40% of the mapped area and Pomona soils making up about 60%. The water table rises as much as 10 inches above the soil surface at times, and the soil is always saturated within 10 inches of the surface year round. Permeability is rapid in the surface layer and moderately rapid in the subsoil. **Category: Hydric**

Pompano - Placid complex soil (53) consists of nearly level, poorly drained Pompano soils and very poorly drained Placid soils in depressions in the flatwoods. The water table is less than 6 inches above the soil surface or is saturated within 10 inches of the surface in summer and fall, and permeability is very rapid. **Category: Hydric**

There are three (3) hydric soils listed for this site: Malabar fine sand soil (31), Pomona - St. Johns Complex soil (51) and Pompano - Placid complex soil (53). The remaining soils listed for the site have been classified as upland soils. However, numerous areas on site where hydric soils where mapped had upland characteristics, and field reviews verified upland species were the dominant vegetation indicating non-hydric conditions. Please see the attached mapping for the locations of the existing vegetative classifications on site.

The depth to water table attribute for the soils was analyzed using the Natural Resource Conservation Service Web Soil Survey for this site (www.websoilsurvey.usda.nrcs.gov). The depth to water table is defined as the distance below grade that the saturated zone of the soil can be found within a specific soil type. Below is a chart that lists the existing soils on site and the corresponding depth to water table.

SOILS ON SITE	DEPTH TO WATER TABLE
31 - Malabar Fine Sand	5 cm (2 inches)
32 - Myakka Fine Sand	31 cm (1.0 foot)
49 - Pomona Fine Sand	25 cm (10 inches)
51 - Pomona-St. Johns Complex	0 cm (0 feet)
53 - Pompano-Placid Complex	0 cm (0 feet)

N

SCALE: 1" = 1000'

0 250' 500' 1000'

GRAPHIC SCALE

SOIL TYPE ON SITE:

31 MALABAR FINE SAND-hydric
32 MYAKKA FINE SAND-non-hydric
49 POMONA FINE SAND-non-hydric
51 POMONA-ST. JOHNS COMPLEX-hydric
53 POMPANO-PLACID COMPLEX-hydric

NOTES:

1 - SOILS MAPPING ADAPTED FROM INFORMATION FOUND ON THE NATURAL RESOURCES CONSERVATION SERVICE WEB SOIL SURVEY. (websoilsurvey.nrcs.usda.gov)

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drawn JPC	SOILS MAP
date 04/18/18	
scale (size A) 1"= 1000'	DAYTONA BEACH INTERNATIONAL AIRPORT
job no. 17-11109	

3.0 FLORIDA LAND USE COVER & FORMS CLASSIFICATION SYSTEM

The vegetative communities and land uses on the project site were field verified, and the site was mapped utilizing the Florida Land Use, Cover and Forms Classification System (FLUCCS, FDOT, 1999). Ten (10) land use and cover types were identified in and around the project site.

211 Improved Pasture
411 Pine Flatwoods
414 Pine-Mesic Oak
427 Live Oak
510 Streams and Waterways
617 Mixed Wetland Hardwoods
620 Wetland Coniferous Forests
621 Cypress
625 Hydric Pine Flatwoods
643 Wet Prairie

The following section presents a brief description of the land use and cover classes mapped for the project area.

3.1 VEGETATIVE COMMUNTIES

The vegetative communities encountered on the site with the dominant vegetative cover are listed below:

211 – Improved Pasture: This category is composed of land which has been cleared, tilled, reseeded with grass and may be periodically improved with brush control and fertilizer applications.

411 – Pine Flatwoods: This community is found over a portion the uplands on site, and is dominated by **Slash Pine** (*Pinus elliottii*) in the canopy. The subcanopy consists of a mix of **Wax Myrtle** (*Myrica cerifera*), **Cabbage Palm** (*Sabal palmetto*), and juvenile canopy species. The groundcover is dominated by **Saw Palmetto** (*Serenoa repens*), with other components of **Gallberry** (*Ilex glabra*), **Bracken Fern** (*Pteridium aquilinum*), and juvenile canopy and subcanopy species.

414 – Pine-Mesic Oak: This community is found in a portion of the uplands on the northern portion of the site. The canopy is dominated by a mix of **Slash pine** (*Pinus elliottii*), **Live oaks** (*Quercus virginiana*) and **Laurel Oaks** *(Quercus laurifolia).* The subcanopy is dominated by a mix of **Cabbage palm** (*Sabal palmetto*), **Yaupon Holly** (*Ilex vomitoria*), and **Wax Myrtle** (*Myrica cerifera*). The groundcover is dominated by juvenile **Cabbage palm** and **Saw Palmetto** *(Serenoa repens)*, **Gallberry** *(Ilex glabra)*, **Bracken fern** (*Pteridium aquilinum*), and juvenile canopy and subcanopy species.

427 - Live Oak: This community is found over a portion of the uplands that are on site, and is dominated by mature **Live Oaks** (*Quercus virginiana*) and **Laurel Oaks** *(Quercus laurifolia)* in the canopy. There are some minor amounts of other species also present in this community, which includes **Pignut Hickory** (*Carya glaba*), and **Southern Magnolia** (*Magnolia grandiflora*). The subcanopy consists of **Cabbage Palm** (*Sabal palmetto*), **Yaupon Holly** (*Ilex vomitoria*), and **Wax Myrtle** (*Myrica cerifera*). The groundcover is scattered with **Saw Palmetto** *(Serenoa repens)*, **Gallberry** *(Ilex glabra)*, **Bracken Fern** (*Pteridium aquilinum*), and juvenile canopy and subcanopy species.

510 – Streams and Waterways: This classification is for the series of ditches that occur on site. These areas have been classified as surface waters. The ditches are primarily drainage ways with minimal vegetation.

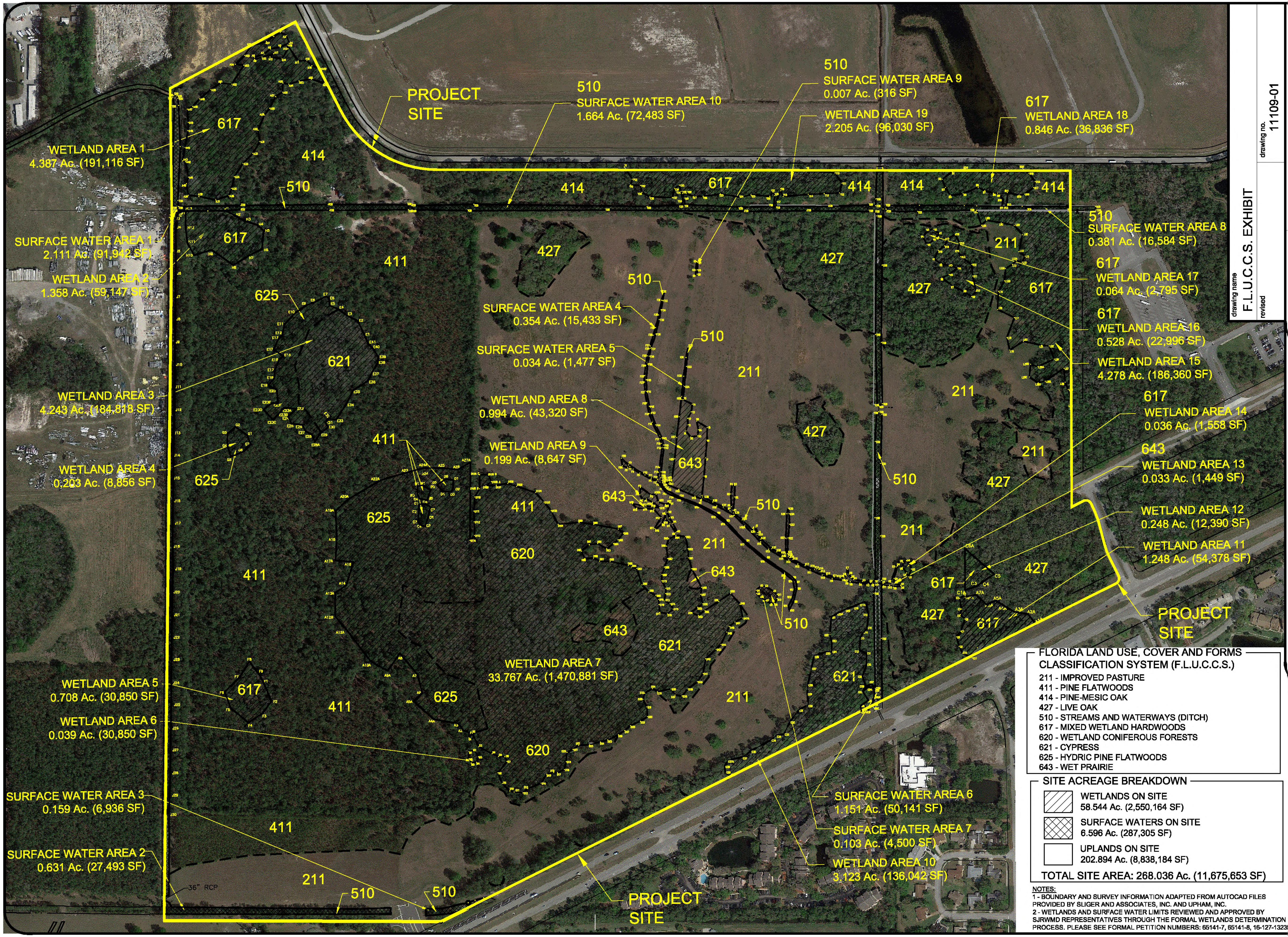
617 – Mixed Wetland Hardwoods: This community is found over a portion of the wetlands that occur on site. This system is dominated by a mix of various forested species in the canopy such as **Red maple** (*Acer rubrum*), **Sweetgum** (*Liquidambar styraciflua*), **Sugarberry** (*Celtis laevigata*), **Dahoon Holly** (*Ilex cassine)* and **Swamp Tupelo** *(Nyssa sylvatica)*. The groundcover is dominated by various ferns such as **Netted Chain Fern** (*Woodwardia areolata)*, **Virginia Chain fern** (*Woodwardia virginica*), and **Cinnamon fern** (*Osmunda cinnamomea*).

620 - Wetland Coniferous Forests: This community is found over a portion of the wetlands that occur on site. This system is dominated by a mix of **Slash pine** and **Bald Cypress** *(Taxodium distichum)* and the subcanopy is dominated by young **Slash pine** and **Bald Cypress** mixed with **Wax myrtle**. The groundcover mainly consists of **St. Johns wort** *(Hypericum fasciculatum),* **Blue maidencane** *(Amphicarpum muhlenbergianum),* **Red root** *(Lachnanthes caroliniana),* **Bog buttons** *(Eriocaulon spp.),* and **Yellow-eyed grass** *(Xyris spp.).*

621 - Cypress: This community occurs in the deeper parts of the wetlands, and is dominated by Cypress in the canopy, with juvenile **Cypress**, **Tupelo** *(Nyssa sylvatica),* **Dahoon holly** *(Ilex cassine),* and **Wax myrtle** in the subcanopy. The groundcover is dominated by a mix of various wetland plants including several species of **Rushes** *(Juncus spp.),* **Sedges** *(Carex spp.),* **Panic grasses** *(Panicum spp.),* **Beakrushes** *(Rhynchospora spp.),* **St. Johns wort** *(Hypericum spp.),* and other supporting wetland species.

625 – Hydric Pine Flatwoods: This community is found over a portion of the wetlands that occur on site. This system is dominated by **Slash pine** and the subcanopy is dominated by young **Slash pine** mixed with **Wax myrtle**. The groundcover mainly consists of **St. Johns wort** *(Hypericum fasciculatum),* **Blue maidencane** *(Amphicarpum muhlenbergianum),* **Red root** *(Lachnanthes caroliniana),* **Bog buttons** *(Eriocaulon spp.),* and **Yellow-eyed grass** *(Xyris spp.).*

643 – Wet Prairies: This community is found small areas adjacent to the existing larger wetland systems on site. Most of these areas are herbaceous or mainly herbaceous, dominated by **St. Johns wort** and other supporting groundcover species (grasses, sedges, and rushes). Some of the areas have minor amounts of juvenile **Slash pine** mixing with **Wax myrtle**.



FLORIDA LAND USE, COVER AND FORMS CLASSIFICATION SYSTEM (F.L.U.C.C.S.)

211 - IMPROVED PASTURE
411 - PINE FLATWOODS
414 - PINE-MESIC OAK
427 - LIVE OAK
510 - STREAMS AND WATERWAYS (DITCH)
617 - MIXED WETLAND HARDWOODS
620 - WETLAND CONIFEROUS FORESTS
621 - CYPRESS
625 - HYDRIC PINE FLATWOODS
643 - WET PRAIRIE

SITE ACREAGE BREAKDOWN

WETLANDS ON SITE
58.544 Ac. (2,550,164 SF)

SURFACE WATERS ON SITE
6.596 Ac. (287,305 SF)

UPLANDS ON SITE
202.894 Ac. (8,838,184 SF)

TOTAL SITE AREA: 268.036 Ac. (11,675,653 SF)

NOTES:
1 - BOUNDARY AND SURVEY INFORMATION ADAPTED FROM AUTOCAD FILES PROVIDED BY SLIGER AND ASSOCIATES, INC. AND UPHAM, INC.
2 - WETLANDS AND SURFACE WATER LIMITS REVIEWED AND APPROVED BY SJRWMD REPRESENTATIVES THROUGH THE FORMAL WETLANDS DETERMINATION PROCESS. PLEASE SEE FORMAL PETITION NUMBERS: 65141-7, 65141-8, 16-127-132350-1,

drawing name: F.L.U.C.C.S. EXHIBIT
drawing no.: 11109-01
revised

ENDANGERED AND THREATENED SPECIES SJRWMD SUPPORT DOCUMENT

DAYTONA BEACH INTERNATIONAL AIRPORT

drawn: JPC
date: 04/18/18
scale (size B): 1"= 400'
job no.: 17-11109

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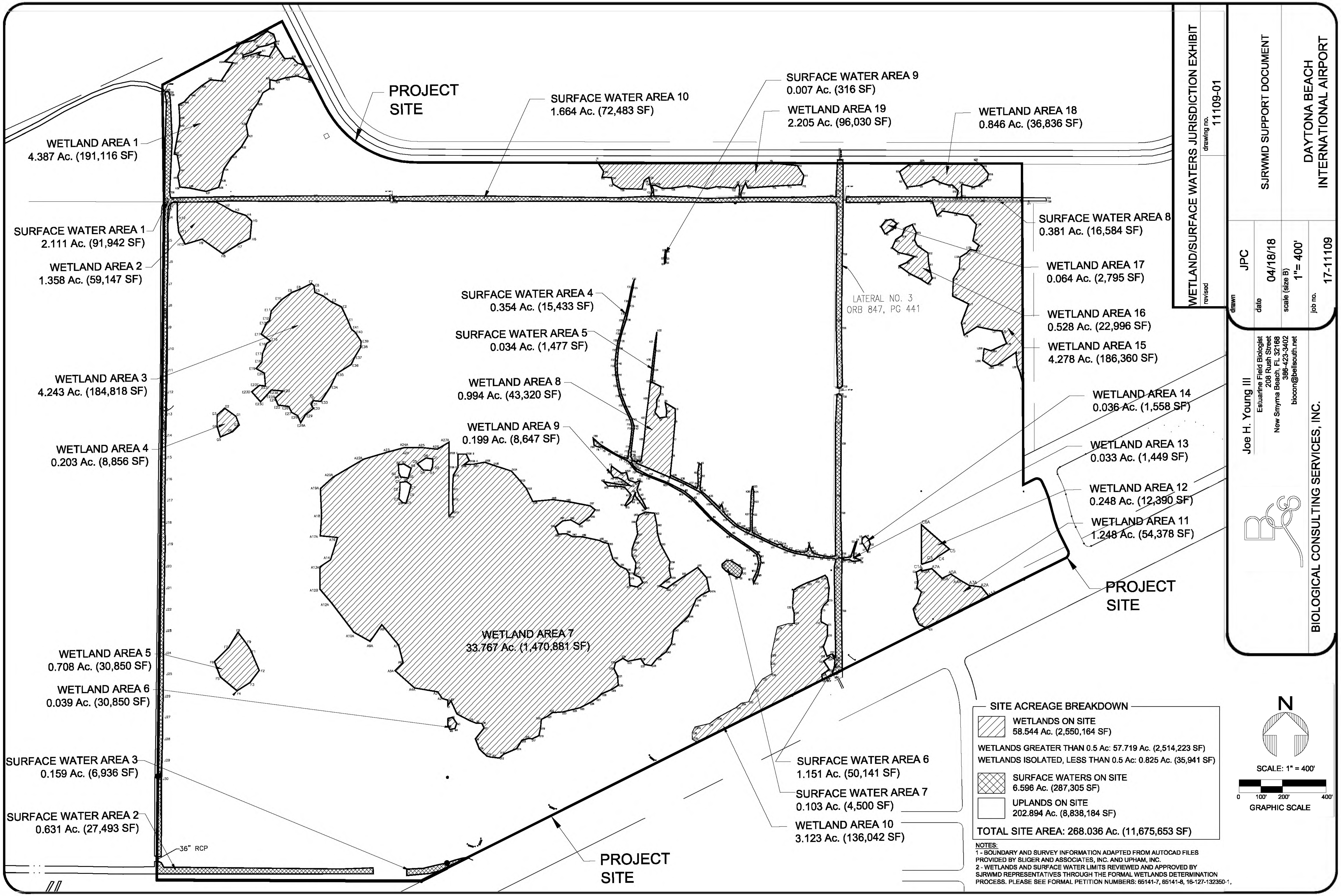

PROJECT SITE
WETLAND AREA 1
4.387 Ac. (191,116 SF)
SURFACE WATER AREA 10
1.664 Ac. (72,483 SF)
SURFACE WATER AREA 9
0.007 Ac. (316 SF)
WETLAND AREA 19
2.205 Ac. (96,030 SF)
WETLAND AREA 18
0.846 Ac. (36,836 SF)
SURFACE WATER AREA 1
2.111 Ac. (91,942 SF)
WETLAND AREA 2
1.358 Ac. (59,147 SF)
SURFACE WATER AREA 8
0.381 Ac. (16,584 SF)
WETLAND AREA 17
0.064 Ac. (2,795 SF)
SURFACE WATER AREA 4
0.354 Ac. (15,433 SF)
LATERAL NO. 3
ORB 847, PG 441
WETLAND AREA 16
0.528 Ac. (22,996 SF)
SURFACE WATER AREA 5
0.034 Ac. (1,477 SF)
WETLAND AREA 15
4.278 Ac. (186,360 SF)
WETLAND AREA 3
4.243 Ac. (184,818 SF)
WETLAND AREA 8
0.994 Ac. (43,320 SF)
WETLAND AREA 14
0.036 Ac. (1,558 SF)
WETLAND AREA 9
0.199 Ac. (8,647 SF)
WETLAND AREA 4
0.203 Ac. (8,856 SF)
WETLAND AREA 13
0.033 Ac. (1,449 SF)
WETLAND AREA 12
0.248 Ac. (12,390 SF)
WETLAND AREA 11
1.248 Ac. (54,378 SF)
PROJECT SITE
WETLAND AREA 7
33.767 Ac. (1,470,881 SF)
WETLAND AREA 5
0.708 Ac. (30,850 SF)
WETLAND AREA 6
0.039 Ac. (30,850 SF)
SURFACE WATER AREA 6
1.151 Ac. (50,141 SF)
SURFACE WATER AREA 3
0.159 Ac. (6,936 SF)
SURFACE WATER AREA 7
0.103 Ac. (4,500 SF)
SURFACE WATER AREA 2
0.631 Ac. (27,493 SF)
WETLAND AREA 10
3.123 Ac. (136,042 SF)
36" RCP
PROJECT SITE
SITE ACREAGE BREAKDOWN
WETLANDS ON SITE
58.544 Ac. (2,550,164 SF)
WETLANDS GREATER THAN 0.5 Ac: 57.719 Ac. (2,514,223 SF)
WETLANDS ISOLATED, LESS THAN 0.5 Ac: 0.825 Ac. (35,941 SF)
SURFACE WATERS ON SITE
6.596 Ac. (287,305 SF)
UPLANDS ON SITE
202.894 Ac. (8,838,184 SF)
TOTAL SITE AREA: 268.036 Ac. (11,675,653 SF)
N
SCALE: 1" = 400'
0 100' 200' 400'
GRAPHIC SCALE
NOTES:
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4.0 ENDANGERED AND THREATENED SPECIES ANALYSIS

Site reviews were conducted on November 17, 2017, February 19 and 28, 2018 and April 4, 2018 by BCS, Inc. staff to determine the potential occurrence of endangered and threatened species listed by the Florida Fish and Wildlife Conservation Commission (FFWCC) and the U.S. Fish and Wildlife Service (USFWS). The vegetative composition on site mainly consists of the Improved Pasture (#211), Pine Flatwoods (#411), Pine-Mesic Oak (#414), Live Oak (#427), Mixed Wetland Hardwoods (#617), Wetland Coniferous Forests (#620), Cypress (#621), Hydric Pine Flatwoods (#625) and Wet Prairie (#643) vegetative communities. Major emphasis was given to the protected species that might inhabit these vegetative cover types.

A list of species with the potential for occurrence on-site and which are afforded protection by the FFWCC and the USFWS was compiled prior to the protected species survey, based on a literature review of geographic range and preferred habitat. The protected species distribution chart contains the designated status of protected wildlife species with the potential for occurrence on this project.

4.1 PROTECTED SPECIES DISTRIBUTION CHART

COMMON NAME	*SCIENTIFIC NAME*	STATUS	POTENTIAL OF OCCURANCE
MAMMALS			
Florida Black Bear	*Ursus americanus floridanus*	delisted	Minor habitat available not observed on site
Florida Panther	*Felis concolor coryi*	FE	Minor habitat available not observed on site
Sherman's Fox Squirrel	*Sciurus niger shermani*	SSC	Minor habitat available not observed on site
BIRDS			
Audubon's Crested caracara	*Caracara plancus audubonii*	FT	Minor habitat available not observed on site
Bald Eagle	*Haliaeetus leucocephalus*	delisted	Minor habitat available not observed on site
Florida Burrowing Owl	*Athene cunicularia floridana*	ST	Minor habitat available not observed on site
Florida Sandhill Crane	*Grus canadensis pratensis*	ST	Minor habitat available not observed on site
Little Blue Heron	*Egretta caerulea*	ST	Minor habitat available not observed on site
Red-cockaded Woodpecker	*Picoides borealis*	FE	Minor habitat available not observed on site
Roseate Spoonbill	*Ajaia ajaja*	ST	Minor habitat available not observed on site
Southeastern American Kestrel	*Falco sparverius paulus*	ST	Minor habitat available not observed on site
Tricolored Heron	*Egretta tricolor*	ST	Minor habitat available not observed on site
Whooping Crane	*Grus americana*	FXN	Minor habitat available not observed on site
Wood Stork	*Mycteria americana*	FT	Minor habitat available not observed on site
AMPHIBIANS & REPTILES			
American Alligator	*Alligator mississippiensis*	FT (S/A)	Minor habitat available not observed on site
Eastern Indigo Snake	*Drymarchon corais couperi*	FT	Minor habitat available not observed on site
Florida Pine Snake	*Pituophis melanoleucus mugitus*	ST	Minor habitat available not observed on site
Gopher Tortoise	*Gopherus polyphemus*	ST	Minor habitat available Burrows observed on site
PLANTS		**FDA**	
American chaffseed	*Schwalbea americana*	E	Minor habitat available not observed on site
Angle-pod	*Matelea gonocarpos*	T	Minor habitat available not observed on site

COMMON NAME	*SCIENTIFIC NAME*	STATUS	POTENTIAL OF OCCURANCE
PLANTS continued		**FDA**	
Auricled spleenwort	*Asplenium erosum*	E	Minor habitat available not observed on site
Bird's nest spleenwort	*Asplenium serratum*	E	Minor habitat available not observed on site
Blue flowered butterwort	*Pinguicula caerulea*	T	Minor habitat available not observed on site
Brittle maidenhair fern	*Adiantum tenerum*	E	Minor habitat available not observed on site
Catesby's lily	*Lilium catesbaei*	T	Minor habitat available not observed on site
Celestial lily	*Nemastylis floridana*	E	Minor habitat available not observed on site
Chapman's sedge	*Carex chapmanii*	T	Minor habitat available not observed on site
Cinnamon Fern	*Osmunda cinnamomea*	CE	Minor habitat available not observed on site
Common wild pine	*Tillandsia fasciculata*	E	Minor habitat available not observed on site
Coontie (all native species)	*Zamia spp.*	CE	Minor habitat available not observed on site
Curtiss' milkweed	*Asclepias curtissii*	E	Minor habitat available not observed on site
Dwarf spleenwort	*Asplenium pumilum*	E	Minor habitat available not observed on site
Easter-lily	*Zephyranthes treatiae*	T	Minor habitat available not observed on site
Erect prickly pear	*Opuntia stricta*	T	Minor habitat available not observed on site
Flatwoods sunflower	*Helianthus carnosus*	E	Minor habitat available not observed on site
Florida beargrass	*Nolina atopocarpa*	T	Minor habitat available not observed on site
Florida butterfly orchid	*Encyclia tampensis*	CE	Minor habitat available not observed on site
Florida jointtail grass	*Coelorachis tuberculosa (Manisuris tuberculosa)*	T	Minor habitat available not observed on site
Florida lantana	*Lantana depressa*	E	Minor habitat available not observed on site
Florida mountain-mint	*Pycnanthemum floridanum*	T	Minor habitat available not observed on site
Garberia	*Garberia heterophylla*	T	Minor habitat available not observed on site
Giant orchid	*Pteroglossaspis ecristata (Eulophia ecristata)*	T	Minor habitat available not observed on site
Godfrey's sandwort	*Minuartia godfreyi*	E	Minor habitat available not observed on site

COMMON NAME	***SCIENTIFIC NAME***	**STATUS**	**POTENTIAL OF OCCURANCE**
PLANTS continued		**FDA**	
Great wild pine	*Tillandsia utriculata*	E	Minor habitat available not observed on site
Green-fly orchid	*Epidendrum conopseum*	CE	Minor habitat available not observed on site
Hand Fern	*Ophioglossum palmatum*	E	Minor habitat available not observed on site
Hartwrightia	*Hartwrightia floridana*	T	Minor habitat available not observed on site
Hooded pitcherplant	*Sarracenia minor*	T	Minor habitat available not observed on site
Indian plantain	*Arnoglossum diversifolium*	T	Minor habitat available not observed on site
Indian pumpkin (Okeechobee gourd)	*Cucurbita okeechobeensis*	E	Minor habitat available not observed on site
Indian River fragrant prickly-apple	*Harrisia eriophora (Cereus eriophorus var. fragrans)*	E	Minor habitat available not observed on site
Lace-lip ladies' tresses	*Spiranthes laciniata*	T	Minor habitat available not observed on site
Large flowered rosemary	*Conradina grandiflora*	T	Minor habitat available not observed on site
Leafless beaked orchid	*Stenorrhynchos lanceolatus (Spiranthes lanceolata)*	T	Minor habitat available not observed on site
Low pepperomia	*Peperomia humilis*	E	Minor habitat available not observed on site
Nodding club-moss	*Lycopodium cernuum (Lycopodiella cernua)*	CE	Minor habitat available not observed on site
Pigmy-pipes	*Monotropsis oderata*	E	Minor habitat available not observed on site
Pine pinweed	*Lechea divaricata*	E	Minor habitat available not observed on site
Pineland butterfly pea	*Centrosema arenicola*	E	Minor habitat available not observed on site
Plume polypody	*Polypodium plumula*	E	Minor habitat available not observed on site
Rainlily	*Zephyranthes atamasca*	T	Minor habitat available not observed on site
Rose pogonia	*Pogonia ophioglossoides*	T	Minor habitat available not observed on site
Royal fern	*Osmunda regalis*	CE	Minor habitat available not observed on site
Simpson zephyr lily	*Zephyranthes simpsonii*	T	Minor habitat available not observed on site
Small ladies tresses	*Spiranthes brevilabris*	E	Minor habitat available not observed on site
Snowy orchid	*Platanthera nivea (Habenaria nivea)*	T	Minor habitat available not observed on site

COMMON NAME	*SCIENTIFIC NAME*	STATUS	POTENTIAL OF OCCURANCE
PLANTS continued		**FDA**	
Southern tubercled orchid	*Platanthera flava*	T	Minor habitat available not observed on site
Swamp plume polypody	*Polypodium ptilodon*	E	Minor habitat available not observed on site
Tampa vervain	*Verbena tampensis (Glandularia tampensis)*	E	Minor habitat available not observed on site
Water sundew	*Drosera intermedia*	T	Minor habitat available not observed on site
Widespread polypody	*Polypodium dispersa*	E	Minor habitat available not observed on site
Yellow flowered butterwort	*Pinguicula lutea*	T	Minor habitat available not observed on site
Yellow fringed orchid	*Platanthera ciliaris*	T	Minor habitat available not observed on site
Yellow star anise	*Illicium parviflorum*	E	Minor habitat available not observed on site

LEGAL STATUS LEGEND

STATE AND FEDERAL STATUS (FAUNA ONLY)

CODE	**DEFINITION**
FE	Federally-designated Endangered
FT	Federally-designated Threatened
FXN	Federally-designated Threatened Nonessential Experimental Population
FT(S/A)	Federally-designated Threatened species due to similarity of appearance
ST	State-designated Threatened
SSC	State-designated Species of Special Concern

FDA STATUS (FLORA ONLY)

CODE	**DEFINITION**
E	Endangered
T	Threatened
CE	Commercially Exploited

4.2 Mammals

The endangered **Florida Panther** *(Felis concolor coryi)* is found in a wide variety of habitat types, but requires a large range and substantial food source to survive. Due to the development nature of the surrounding lands, this site does not offer a substantial food source or range for the panther. The **Florida Black Bear** (*Ursus americanus floridanus*) is known to inhabit community types that occur on-site, but they require a large range to support the necessary food supply. Given the amount of development and activity in the area, the potential for utilization is low. The species of special concern **Sherman's Fox Squirrel** (*Sciurus niger shermani)* can be found in oak communities when there is a sufficient food source and nesting trees.

None of these species or any signs of their utilization were observed during the site reviews.

4.3 Amphibians and Reptiles

The threatened **Gopher Tortoise** (*Gopherus polyphemus*) was a species of concern because some of the site could potentially provide habitat for this species.

The site was reviewed extensively through the transect methodology outlined in the Florida Game and Fresh Water Fish Commission (FFWCC) Gopher Tortoise Permitting Guidelines (April 2008, Revised January 2017). Per the Guidelines, a burrow survey covering a minimum of 15% of the potential gopher tortoise habitat to be impacted by development activities (including staging areas for heavy equipment) is required in order to apply for a relocation permit.

During the review of the site, six (6) Gopher Tortoise burrows were found out of the 58.996± acres of habitat that was reviewed on site. A number of commensal species are known to inhabit Gopher Tortoise burrows such as the threatened **Eastern Indigo Snake** (*Drymarchon corais couperi*) and threatened **Florida Pine Snake** *(Pituophis melanoleucus mugitus*).

The existing wetlands and ditches on site could provide habitat for the threatened **American Alligator** *(Alligator mississippiensis).*

No protected amphibians or reptiles or signs of their utilization were noted on the site during the review, other than the gopher tortoise burrows.

4.4 Invertebrates

Very few invertebrates are listed by the State of Florida as Endangered or Threatened, and of the species listed, none occur within the habitat found on this project site.

4.5 Fish

No protected fish species were observed on the site in the area of proposed impact due to the lack of their specific habitat type.

4.6 Birds

There are a moderate number of birds that could potentially utilize the habitat available on the site. The Live oak community could provide foraging habitat for the threatened **Audubon's Crested Caracara** *(Polyborus plancus audubonii)*. However, this site is north of the Caracara's known range and distribution. Utilization of the site by this species is unlikely and no evidence of use by this species was observed by BCS, Inc. staff. The Pine Flatwoods community could provide nesting and foraging habitat for the endangered **Red-cockaded Woodpecker** *(Picoides borealis)* and the **Bald Eagle** (*Haliaeetus leucocephalus*). The existing improved pasture lands could provide foraging habitat for the threatened **Florida Sandhill Crane** *(Grus canadensis pratensis)* and the threatened **Southeastern American Kestrel** (*Falco sparverius paulus*)

The wetland and surface water communities on site could provide nesting and foraging habitat for the threatened **Little Blue Heron** (Egretta caerulea), the threatened **Tricolored Heron** *(Egretta tricolor),* the threatened **Roseate Spoonbill** *(Ajaia ajaja)* and the threatened **Wood Stork** *(Mycteria americana*).

No protected birds or signs of their utilization of the site were observed on site during the field reviews. A search of the FFWCC Bald Eagle Nest Locator for documented bald eagle nesting territories revealed no documented nests are located within 660' of the project site. Additionally, no eagle nest was observed during the reviews of the site.

4.7 Plants

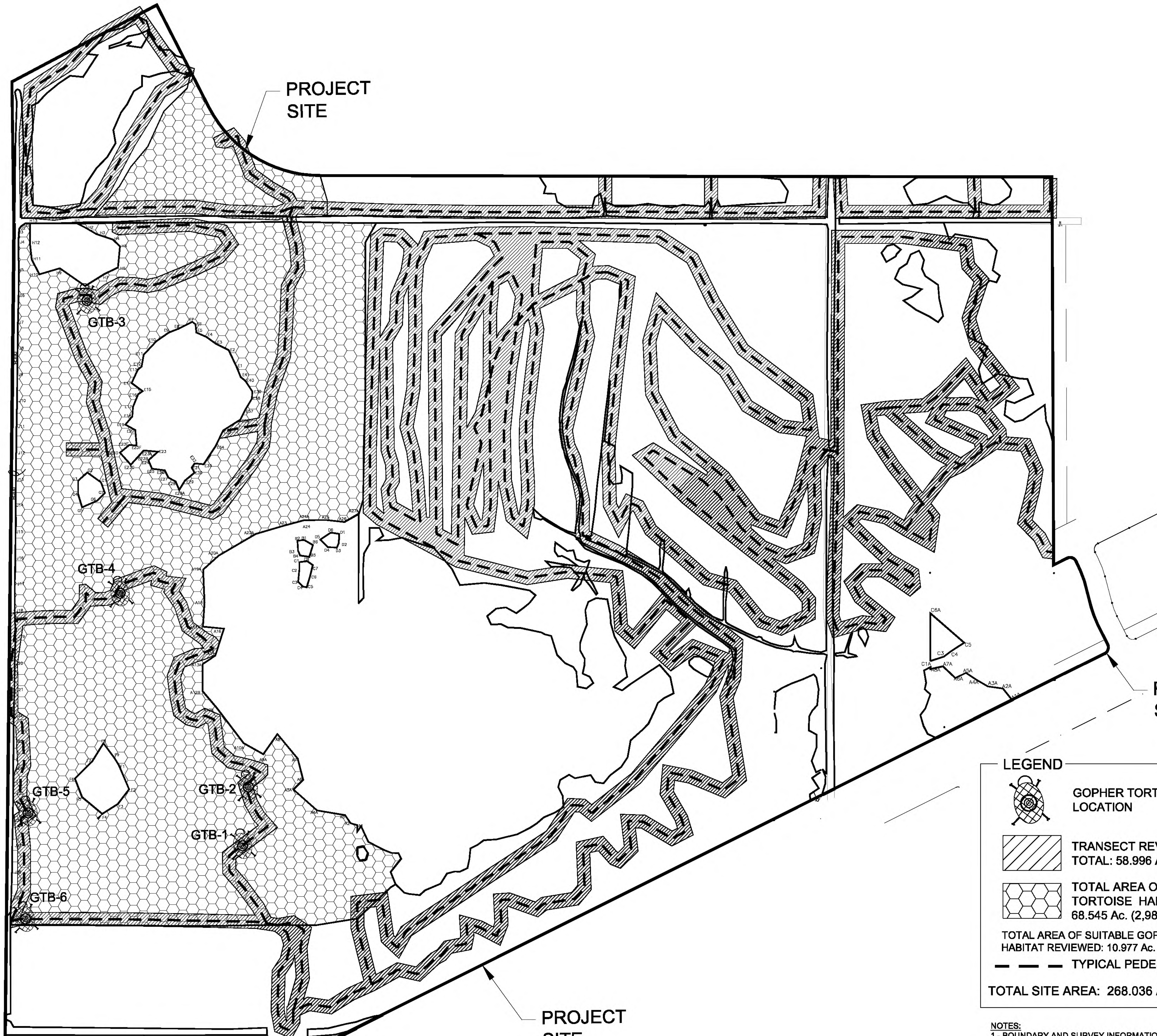
The vegetative communities on site could provide habitat for a number of protected plants. This plant listing can be found in the Protected Species Distribution List. No listed species were observed on-site during the review. According to Section 581.185 (8), Florida Statutes, certain exemptions apply to the clearing and removal of protected plant species on lands that will be utilized for silvicultural or agricultural uses, fire control measures, or required mining assessment work. The clearing or removal of regulated plants from canals, ditches, survey lines, building sites or roads or other right-of-ways by the landowner or his or her agent is also exempt on privately owned lands. On utility areas, the clearing of land by a public agency or a publicly or privately owned utility when acting in the performance of its obligation to provide a service to the public is also exempt. Listed plant species found on this site (if any) fall under one of the exemptions listed above and may be removed if needed.

5.0 PROCESS OF REVIEW

Literature research utilizing the previously listed references was conducted to determine potential species distribution. Utilization of aerials, soils maps, and topographical surveys *(USGS quadrangle)* were combined to assess the physical parameters of the site for habitat evaluation. The site was reviewed by pedestrian field surveys on November 17, 2017, February 19 and 28, 2018 and April 4, 2018 for the purpose of reviewing all aspects of the project and observations were made in reference to the potential presence of protected species.

The Endangered and Threatened Species survey conducted for this report can be described as a "Transect Line" method where directional lines through a habitat are created and information, data and observations are recorded by the reviewer. Through this surveying method, a sample of the potential species utilizing the site is collected and calculations that are computed from the observations are an <u>estimate or approximation</u> of the number of individuals or population utilizing the area. This surveying method is not a 100% survey of the entire habitat on site and does not give a full accounting of potential species utilizing the area where transect line observations were not conducted.

The site was reviewed extensively through the transect methodology outlined in the Florida Game and Fresh Water Fish Commission (FFWCC) Gopher Tortoise Permitting Guidelines (April 2008, Revised January 2017). Per the Guidelines, a burrow survey covering a minimum of 15% of the potential gopher tortoise habitat to be impacted by development activities (including staging areas for heavy equipment) is required in order to apply for a relocation permit. The suitable gopher tortoise habitat on site was reviewed extensively through a transect gopher tortoise burrow survey. This site has a total of 202.894± acres of potential upland habitat with a total of 68.545± acres of upland habitat determined to be suitable for gopher tortoise utilization. The total review of this site covered 58.996± acres *(10.977± acres in suitable gopher tortoise habitat)*. During our review, six (6) gopher tortoise burrows were observed on site. The locations of the gopher tortoise burrows can be found on the Transect Review Areas Map. The method of evaluation for all potential species was accomplished by pedestrian and vehicular observation.



LEGEND

GOPHER TORTOISE BURROW LOCATION

TRANSECT REVIEW AREAS
TOTAL: 58.996 Ac. (2,568,546 SF)

TOTAL AREA OF SUITABLE GOPHER TORTOISE HABITAT:
68.545 Ac. (2,985,820 SF)

TOTAL AREA OF SUITABLE GOPHER TORTOISE HABITAT REVIEWED: 10.977 Ac. (478,146 SF)

TYPICAL PEDESTRIAN TRANSECT

TOTAL SITE AREA: 268.036 Ac. (11,675,653 SF)

N

SCALE: 1" = 400'

0 100' 200' 400'

GRAPHIC SCALE

NOTES:
1 - BOUNDARY AND SURVEY INFORMATION ADAPTED FROM AUTOCAD FILES PROVIDED BY SLIGER AND ASSOCIATES, INC. AND UPHAM, INC.

TRANSECT REVIEW AREAS EXHIBIT

revised

drawing no. 11109-03

ENDANGERED & THREATENED SPECIES SJRWMD SUPPORT DOCUMENT

DAYTONA BEACH INTERNATIONAL AIRPORT

drawn JPC

date 04/18/18

scale (size B) 1"= 400'

job no. 17-11109

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6.0 CONCLUSIONS AND RECOMMENDATIONS

In conclusion, the main issue that needs to be addressed is the presence of the gopher tortoise burrows and any potential occupants that occur on site. During the site review, six (6) Gopher Tortoise burrows were found over the 68.545± acres of suitable gopher tortoise habitat found on site. This indicates a gopher tortoise density of 0.27 gopher tortoises per acre of habitat (*6 burrows x 0.50 = 3.0 gopher tortoises per 10.977 acres or 0.27 gopher tortoises per acre*). This density results in an **estimated** population of nineteen (19) gopher tortoises for the suitable habitat existing on site *(0.27 gopher tortoises per acre x 68.545± acres of total suitable habitat)*.

No impacts are expected to occur to the other listed species included in the protected species distribution chart (located within Section 4.1 of this report). While habitat is available on site for these species, no individuals or signs of their utilization were observed on site.

There are four available options to address the presence of gopher tortoises on lands slated for development: avoid development in the area occupied by tortoises, develop as to avoid gopher tortoise burrows by avoiding concentrations of burrows altogether and/or staying at least 25 feet from entrances of individual gopher tortoise burrows, relocate the gopher tortoises out of the way of construction either on-site or relocate the gopher tortoises off-site.

The avoidance of the burrows requires a 25' radius from the mouth of the burrow to be preserved. This option often limits development plans to the extent that it is not feasible.

If ten or fewer gopher tortoise burrows (and the number of tortoises occupying those burrows) will be impacted by construction, the site would qualify for a Gopher Tortoise Ten or Fewer Burrows Relocation Permit where the tortoises can be relocated on-site to suitable habitat not proposed for construction or off-site to a protected certified recipient area. If more than ten gopher tortoise burrows (and the number of tortoises occupying those burrows) will be impacted by construction, a Gopher Tortoise Conservation Permit would be required and the tortoises relocated off-site to a protected certified recipient area.

The FFWCC requires that a mitigation contribution be made for all relocation permits. Currently, a flat mitigation contribution of $208.00 from each applicant applies to the first 10 burrows (up to 5 tortoises for conservation permits) impacted on each project site. These contributions are assessed by determining the estimated number of tortoises to be impacted (the number of potentially occupied tortoise burrows to be impacted, divided by two). A variable scale for these additional contributions is based on the overall conservation value of the action being permitted and the estimated number of gopher tortoises being impacted by the project. Relocation of tortoises to long-term protected lands (public or private), requires a lower contribution per tortoise than relocations to short-term protected or unprotected lands. The additional mitigation contribution for a conservation permit where the tortoises are relocated to a long-term protected area is $313.00 for each additional tortoise (over the first 5 tortoises). The additional mitigation contribution for a conservation permit where the tortoises are relocated to a short-term protected area is $3,127.00 for each additional tortoise (over the first 5 tortoises). The mitigation contribution for a conservation permit where the tortoises are relocated to an *unprotected area* is $3,127.00 for each tortoise.

The Florida Fish and Wildlife Conservation Commission's current policy allows gopher tortoise relocations throughout the year. However, tortoises shall only be relocated when the low temperature at the recipient site is forecasted by the National Weather Service to be above 50º Fahrenheit for three consecutive days after release (including the day of relocation). Prior to any relocation effort, all federal, state and local permits must be obtained.

Once the construction commencement timeframe has been established and the project is within 90 days of construction, a 100% gopher tortoise burrow survey of the suitable habitat on site must be conducted in order to determine the exact location and number of burrows existing on site. Once completed, the appropriate relocation permit (Ten or Fewer Burrows Relocation Permit or Conservation Relocation Permit) may be applied for from the Florida Fish and Wildlife Conservation Commission. The results of the burrow survey conducted on April 4, 2018 are valid for 90 days, per the FFWCC requirement that gopher tortoise surveys be conducted no more than 90 days prior to submittal of an application for gopher tortoise relocation. Once the relocation permit has been obtained, and local government approval has been granted (clearing/grading permit) the relocation of the tortoises can take place.

Biological Consulting Services has two (2) FFWCC Authorized Gopher Tortoise Agents on staff, Joe H. Young III (GTA-09-00127F) and Joanna Crawford (GTA-15-00071A) qualified to provide gopher tortoise relocation permitting and to conduct gopher tortoise relocations.

7.0 REGULATIONS AND ENFORCEMENT OF TAKING OF GOPHER TORTOISE BY DEVELOPMENT ACTIVITIES UNDER EXISTING RULES OF THE FLORIDA GAME AND FRESH WATER FISH COMMISSION

Chapter 68A-27.003 Designation of Endangered Species; Prohibitions

Subparagraph 68A-27.003 (2)(d)3 F.A.C. states: *The gopher tortoise (Gopherus polyphemus) is hereby declared to be State-designated Threatened Species and shall be afforded the protective provisions specified in this subparagraph. No person shall take, attempt to take, pursue, hunt, harass, capture, possess, sell or transport any gopher tortoise or parts thereof or their eggs, or molest, damage, or destroy gopher tortoise burrows, except as authorized by Commission permit or when complying with Commission approved guidelines for specific actions which may impact gopher tortoises and their burrows. A gopher tortoise burrow is a tunnel with a cross-section that closely approximates the shape of a gopher tortoise. Permits will be issued based upon whether issuance would further management plan goals and objectives.*

There are four available options to address the presence of gopher tortoises on lands slated for development:

1. Avoid developing in the area occupied by tortoises;
2. Develop as to avoid gopher tortoise burrows by avoiding concentrations of burrows altogether and/or staying at least 25 feet from entrances of individual burrows, provided that such activities do not harm gopher tortoise or violate rules protecting gopher tortoises;
3. Relocate tortoises on-site (permit required); or
4. Relocate tortoises off-site (permit required).

8.0 REFERENCES

1. Florida's Endangered Species, Threatened Species, and Species of Special Concern, Updated January 2017, Florida Game and Fresh Water Fish Commission
2. 26 Ecological Communities of Florida, Soil Conservation Service
3. Web Soil Survey, United States Department of Agriculture, National Resources Conservation Service, http://websoilsurvey.nrcs.usda.gov
4. Ecology and Habitat Protection Needs of Gopher Tortoise Populations, James Cox, et al., December 1987.
5. Rare and Endangered Biota of Florida, Volume I., Mammals, Edited by Stephen R. Humphrey, Ray E. Ashton, Jr., SERIES EDITOR
6. Rare and Endangered Biota of Florida, III, Amphibians and Reptiles, Edited by Paul E. Moler, Ray E Ashton, Jr., SERIES EDITOR
7. Rare and Endangered Biota of Florida, Volume IV, Invertebrates, Edited by Mark Deyrup and Richard Franz, Ray E. Ashton, Jr., SERIES EDITOR
8. Rare and Endangered Biota of Florida, Volume V, Birds, Edited by James A. Rodgers, Jr., Herbert W. Kale II and Henry T. Smith, Ray E. Ashton, Jr., SERIES EDITOR
9. Rare and Endangered Biota of Florida, Volume Five, Plants, Edited by Daniel B. Ward, Peter C.H. Pritchard, SERIES EDITOR
10. Florida Land Use, Cover and Forms Classification System, Florida Department of Transportation, 1999.
11. County Distribution and Habitats of Rare and Endangered Species in Florida, Florida Natural Areas Inventory, March 1997.
12. Notes on Florida's Endangered and Threatened Plants, Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Nancy Coile and Mark A. Garland, 2003.
13. Gopher Tortoise Permitting Guidelines, Florida Fish and Wildlife Conservation Commission, April 2008 (Revised January 2017).
14. Atlas of Florida Vascular Plants, University of South Florida, Institute for Systemic Botany, http://www.plantatlas.usf.edu.

APPENDIX

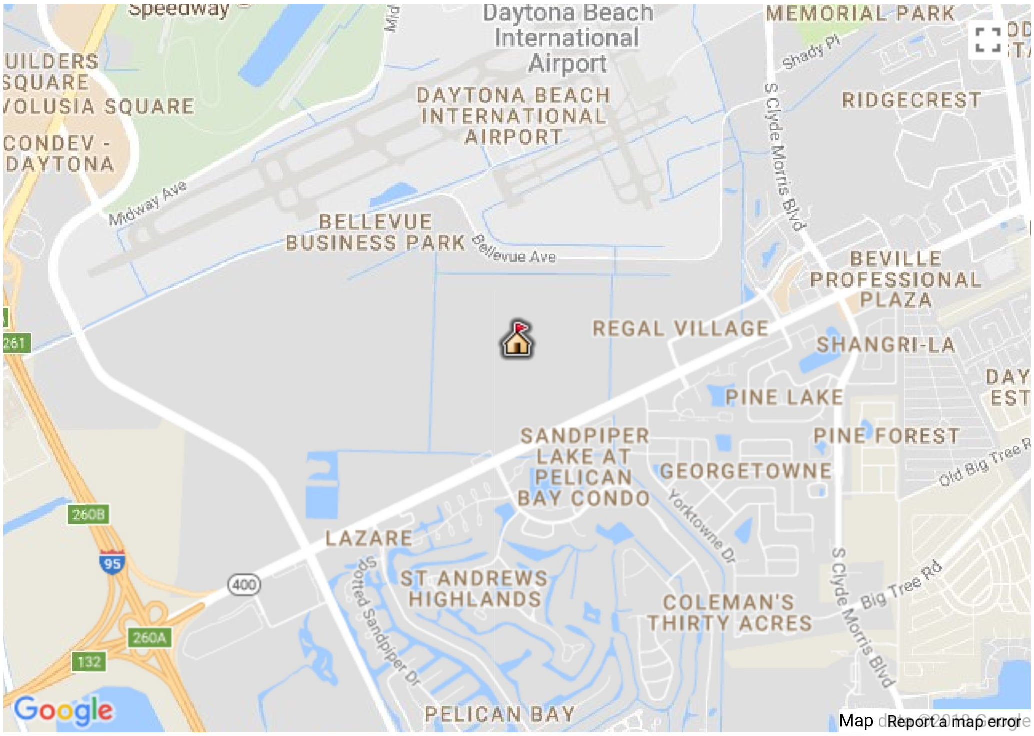
Eagle Nest Locator Search Results

This report was generated using the bald eagle nest locator at https://public.myfwc.com/FWRI/EagleNests/nestlocator.aspx on 4/20/2018 1:54:56 PM.

Search Entered: Within 1 miles of latitude 29.16775 and longitude -81.0558888888889; All Search Results

0 record(s) were found; 0 record(s) are shown

Bald Eagle Nest Map:



Bald Eagle Nest Data Search Results:

Results per page: All

"Y" denotes an active nest
"N" denotes an inactive nest
"-" denotes an unobserved nest
"U" denotes a nest that was visited but status was undetermined
"*" denotes a nest that was not surveyed

APPENDIX E

Beville Road Parcels Geotechnical Report

UNIVERSAL
ENGINEERING SCIENCES
Consultants In: Geotechnical Engineering • Environmental Sciences
Geophysical Services • Construction Materials Testing • Threshold Inspection
Building Inspection • Plan Review • Building Code Administration

LOCATIONS:
- Atlanta
- Daytona Beach
- Fort Myers
- Fort Pierce
- Gainesville
- Jacksonville
- Kissimmee
- Leesburg
- Miami
- Ocala
- Orlando (Headquarters)
- Palm Coast
- Panama City
- Pensacola
- Rockledge
- Sarasota
- Tampa
- West Palm Beach

January 30, 2018

Mr. David Mathias
Daytona Beach International Airport
700 Catalina Drive
Daytona Beach, Florida 32114

Reference: **BORROW PIT SUITABILITY EVALUATION**
Daytona Beach International Airport Borrow Pits
Daytona Beach, Volusia County, Florida
UES Project No. 0430.1700238.0000 and Report No. 132890

Dear Mr. Mathias:

Universal Engineering Sciences (UES) has completed the subsurface evaluation for the subject project located in Daytona Beach, Florida. We understand the subsurface conditions within the parcel adjacent to the Daytona International Airport needs to be evaluated for borrow suitability purposes. This letter presents the results of our field exploration and our recommendations for fill soil borrow suitability. We were provided with a site plan for the project which shows the layout of the proposed borrow pit areas.

FIELD EXPLORATION

As requested, twenty (20) Auger Borings to a depth of approximately 20 feet each below existing grade and twenty (20) Auger borings to a depth of approximately 5 feet each below existing grade were performed at the requested locations shown on the attached Boring Location Plan. The Auger Borings were performed in accordance with the procedures of ASTM D-1452. The borings were located using a GPS locating device and should only be considered accurate according to the method used. The soil samples recovered from the soil test borings were returned to our laboratory and a UES Engineer visually examined and reviewed the field descriptions. The samples were visually classified in accordance with the Unified Soil Classification System (USCS).

FINDINGS

SUBSURFACE CONDITIONS

The results of the borings generally indicated the presence of fine sand (SP), and fine sand with silt (SP-SM) in the upper approximate 5 feet underlain by intermittent layers of fine sand (SP) fine sand with silt (SP-SM), fine sand with clay (SP-SC), clayey fine sand (SC) silty fine sand (SM), and fine sand with silt and some roots (PT) to the borings termination depths.

GROUNDWATER

We recorded groundwater subsequent to drilling, at depths of approximately 0.6 to 4.5 feet below the ground surface. It should be noted our water levels were recorded subsequent to relatively extended periods of rainfall which is not typical of this time of year. As an exception, groundwater was not encountered within the vertical extent of Boring AB-25. Based on available published literature, existing site features, and the results of the borings, we estimate the normal seasonal high groundwater level to be approximately at the measured levels. It should also be noted the estimated seasonal high water level does not provide any assurance that groundwater level will not exceed these estimated levels during any given year in the future. Should impediments to surface water drainage be present, or should rainfall intensity and duration, or total rainfall quantities, exceed the normally anticipated rainfall quantities, groundwater levels might once again exceed our seasonal high estimates. The depths of the groundwater levels encountered at the boring locations are presented on the Subsurface Profiles.

BORROW SUITABILITY

The borings were performed, to provide an indication of the suitability of excavated soils from the proposed borrow areas for use as structural fill soil. Based on the boring results and classification of the soil samples, the fine sand (SP), the fine sand with silt (SP-SM), and fine sand with clay (SP-SC) as encountered at the boring locations, are suitable for use as structural fill soil. The silty fine sand (SM), clayey fine sand (SC), and fine sand with silt and some roots (PT) as encountered, are generally not considered suitable for use as fill due to their fines content making it difficult to place and compact. Because the fine sand with silt (SP-SM) and fine sand with clay (SP-SC) significantly retains moisture, strict moisture control may be required during placement and compaction operations to avoid moisture related instability. The silty fine sand (SM) and clayey fine sand (SC), as encountered in the boring locations, can be used for road base stabilization material (LBR 40); however, this is not recommended in areas where the road base elevation is in close proximity to the groundwater table. It should be anticipated the soils in the proposed borrow pit areas that are below the groundwater level will have moisture contents in excess of the Modified Proctor optimum moisture content and will require stockpiling or spreading to bring the moisture content within 2 percent of the soil's optimum moisture content corresponding to the required degree of compaction.

CLOSURE

We appreciate the opportunity to have worked with you on this project and look forward to a continued association. Please do not hesitate to contact us if you should have any questions, or if we may further assist you as your plans proceed.

Respectfully submitted,

UNIVERSAL ENGINEERING SCIENCES

Michael Mohney
Project Manager

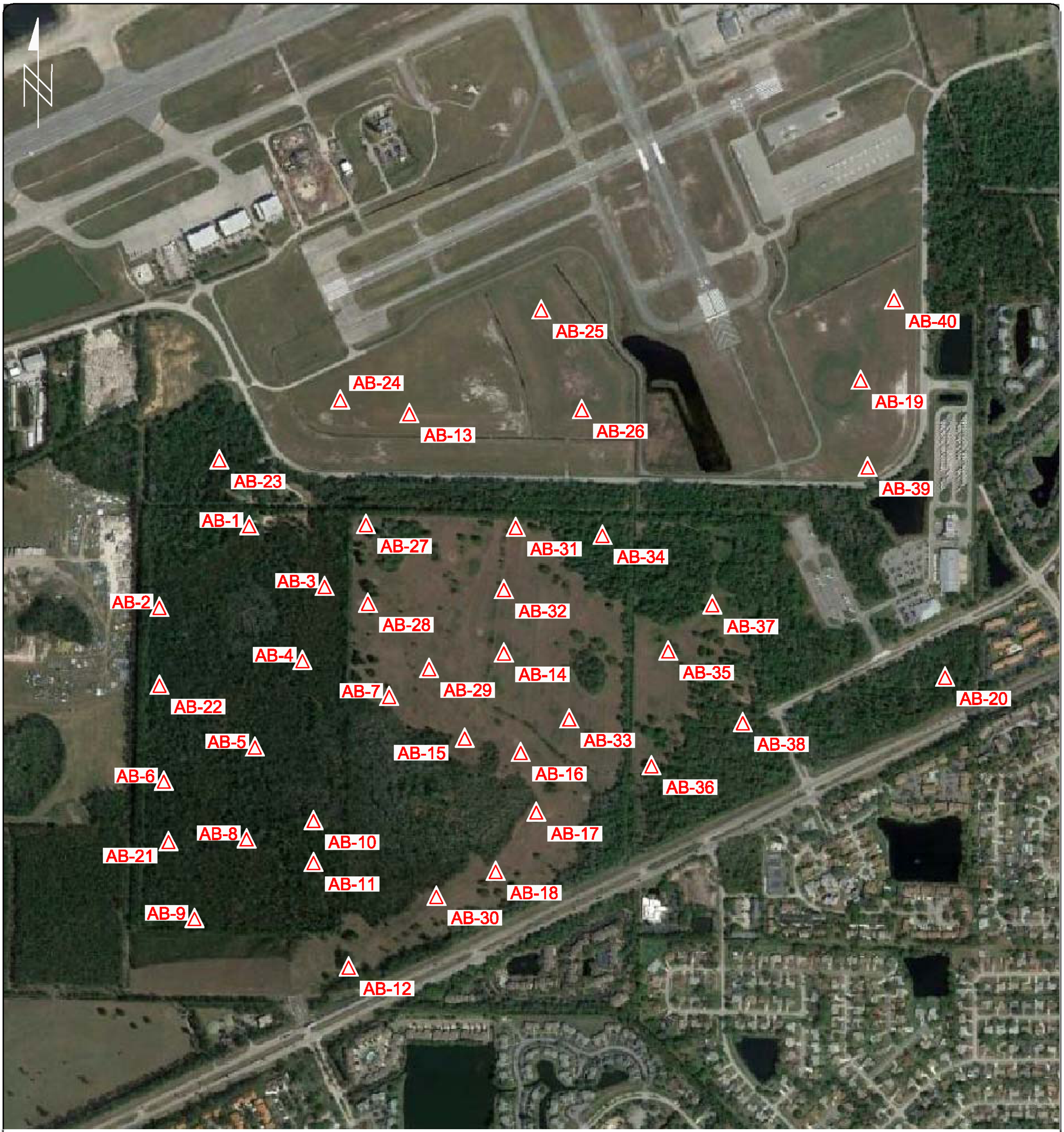
Brian C. Pohl, P.E.
Branch Manager
P.E. Number 60216

BRIAN C. POHL
LICENSE
No 60216
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

Cc: Mr. Marcus Geiger, E.I.: Kimley-Horn & Associates

Attachments

MM/BCP/cme



LEGEND

△ APPROXIMATE LOCATION OF AUGER BORING

GRAPHIC SCALE

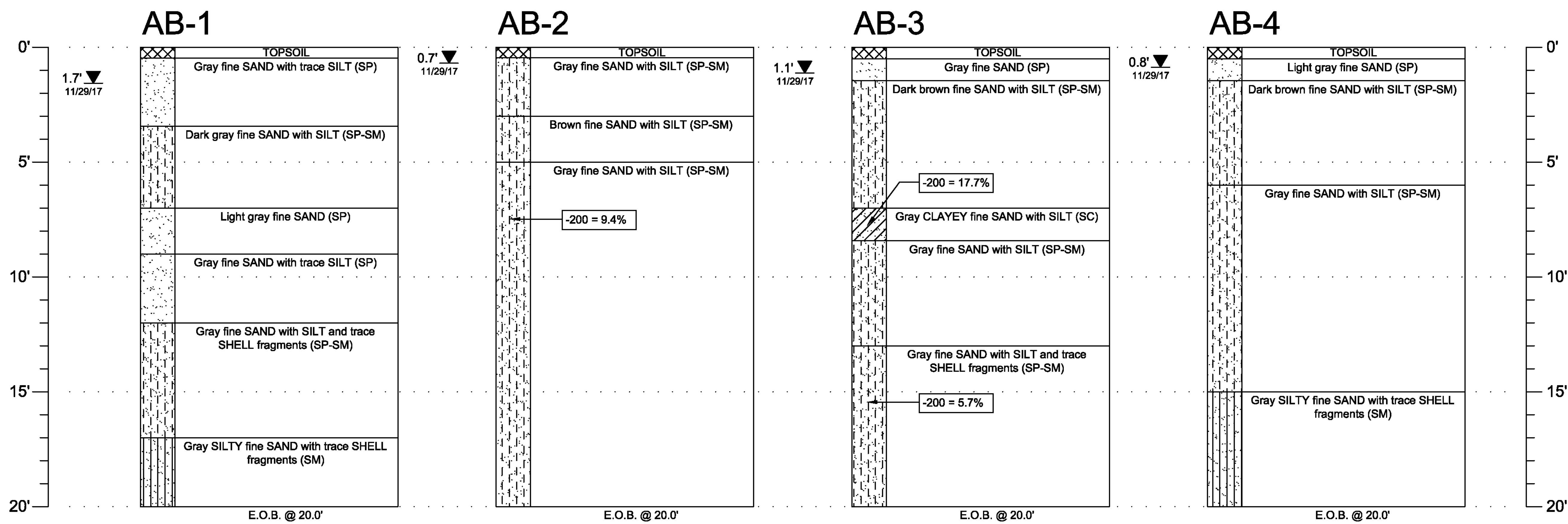
0 400 800

(IN FEET)

1 INCH ≈ 800 ft.

UNIVERSAL ENGINEERING SCIENCES

TITLE: BORING LOCATION PLAN			SCALE: 1" ≈ 800'
PROJECT: GEOTECHNICAL EVALUATION DAYTONA BEACH INTERNATIONAL AIRPORT BORROW PITS DAYTONA BEACH, FLORIDA			PAGE/FIG. NO.: A-1
DRAWN BY: MKL	DATE: 12/27/17	PROJECT NO.: 0430.1700238.0000	
CHECKED BY: BP	DATE: 12/27/17	REPORT NO.: 132890	



Fine SAND (SP)

Fine SAND with SILT (SP-SM)

SILTY fine SAND (SM)

CLAYEY fine SAND (SC)

Topsoil (PT) ... some to many ORGANICS (PT), sometimes DEBRIS

NOTES:

▼ Measured Groundwater Level 24 (+) Hours Subsequent to Time of Drilling
(SP) Unified Soil Classification System
EOB End of Boring
-200 % Passing No. 200 Sieve

UNIVERSAL ENGINEERING SCIENCES

PROJECT:
GEOTECHNICAL EVALUATION
DAYTONA BEACH INTERNATIONAL AIRPORT BORROW PITS
DAYTONA BEACH, FLORIDA

TITLE:
SUBSURFACE PROFILES

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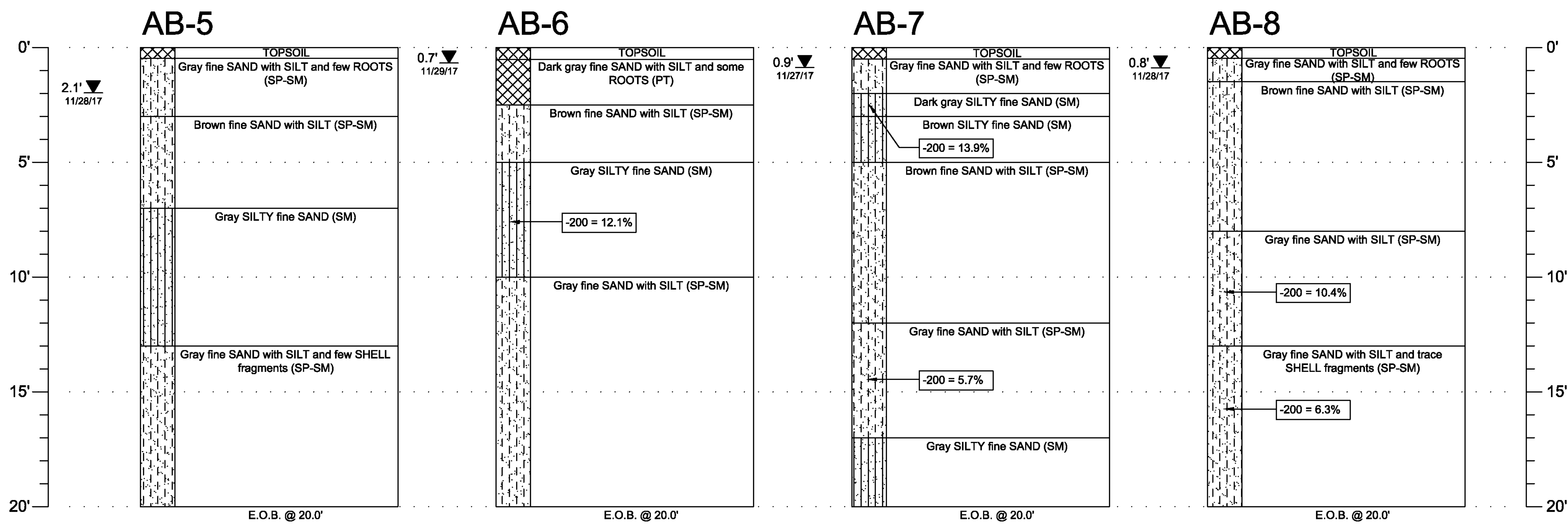
CHECKED BY: BP	DATE: 01/22/18	REPORT NO.: 132890		



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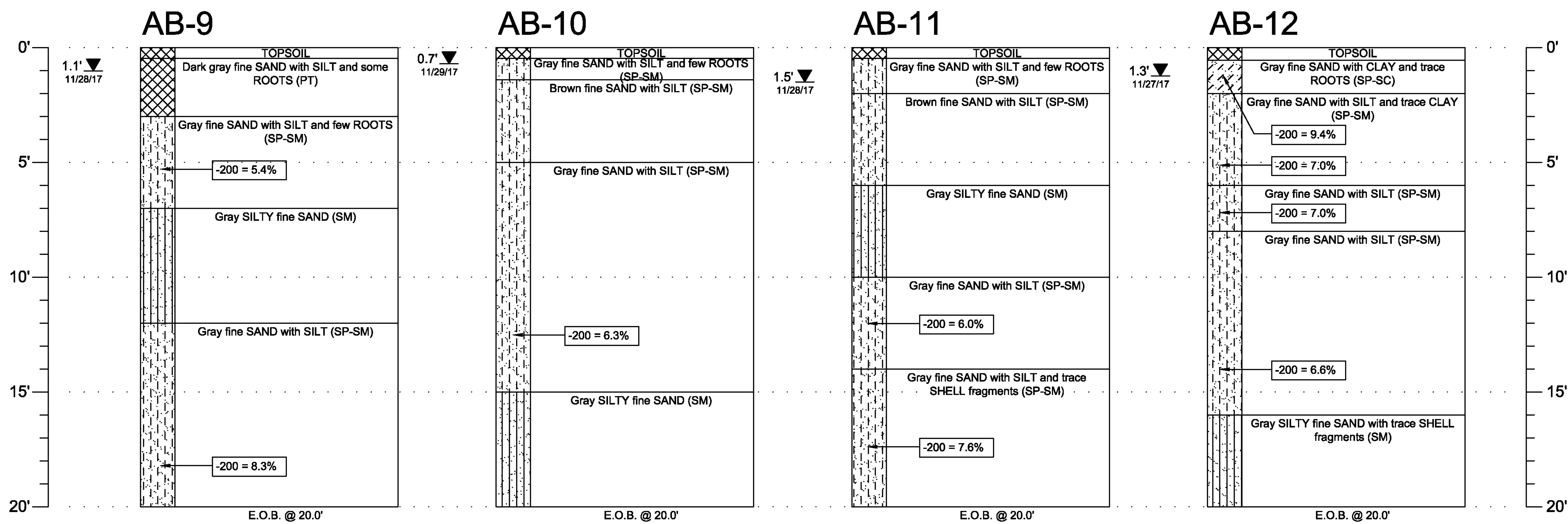
▼ Measured Groundwater Level 24 (+) Hours Subsequent to Time of Drilling
(SP) Unified Soil Classification System
EOB End of Boring
-200 % Passing No. 200 Sieve

UNIVERSAL
ENGINEERING SCIENCES

PROJECT: GEOTECHNICAL EVALUATION DAYTONA BEACH INTERNATIONAL AIRPORT BORROW PITS DAYTONA BEACH, FLORIDA				TITLE: SUBSURFACE PROFILES	
DRAWN BY: MKL	DATE: 01/22/18	PROJECT NO.: 0430.1700238.0000		SCALE: NA (in feet)	PAGE/FIG. NO.: A-3
CHECKED BY: BP	DATE: 01/22/18	REPORT NO.: 132890			



Fine SAND (SP)

Fine SAND with SILT (SP-SM)

SILTY fine SAND (SM)

Fine SAND with CLAY (SP-SC)

CLAYEY fine SAND (SC)

TOPSOIL

NOTES:

▼	Measured Groundwater Level 24 (+) Hours Subsequent to Time of Drilling
(SP)	Unified Soil Classification System
EOB	End of Boring
-200	% Passing No. 200 Sieve

UNIVERSAL
ENGINEERING SCIENCES

PROJECT:
GEOTECHNICAL EVALUATION
DAYTONA BEACH INTERNATIONAL AIRPORT BORROW PITS
DAYTONA BEACH, FLORIDA

TITLE:
SUBSURFACE PROFILES

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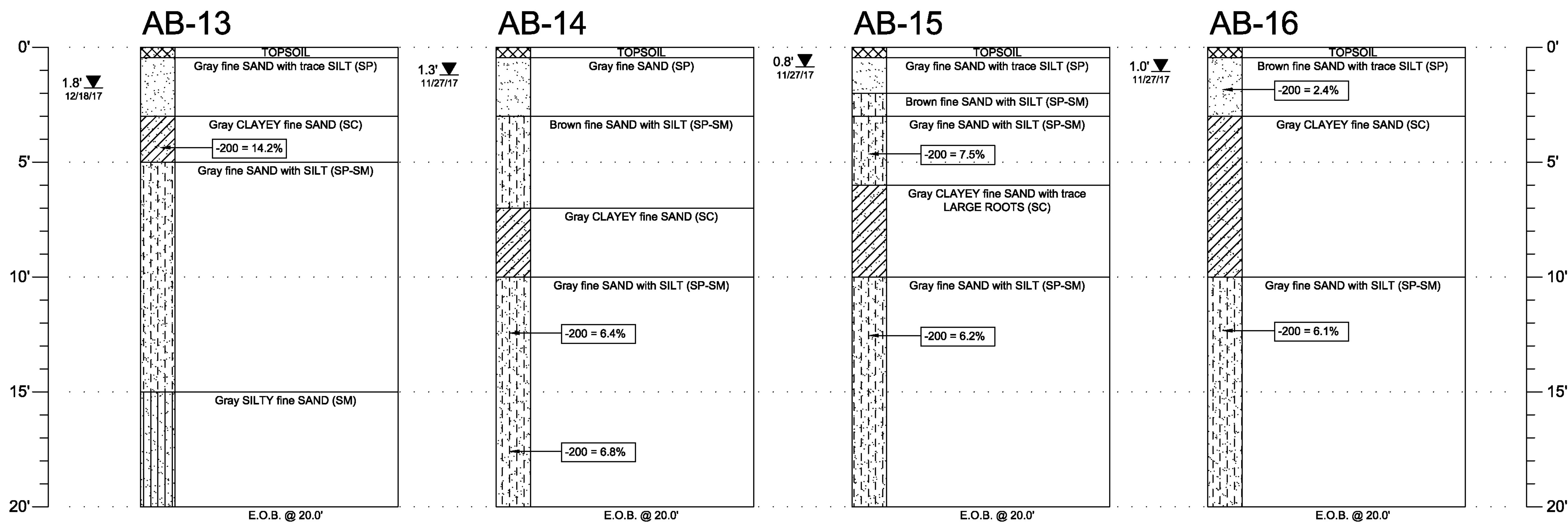
CHECKED BY:	BP	DATE:	01/22/18	REPORT NO.:	132890		



Fine SAND (SP)

Fine SAND with SILT (SP-SM)

SILTY fine SAND (SM)

Fine SAND with CLAY (SP-SC)

CLAYEY fine SAND (SC)

TOPSOIL

NOTES:

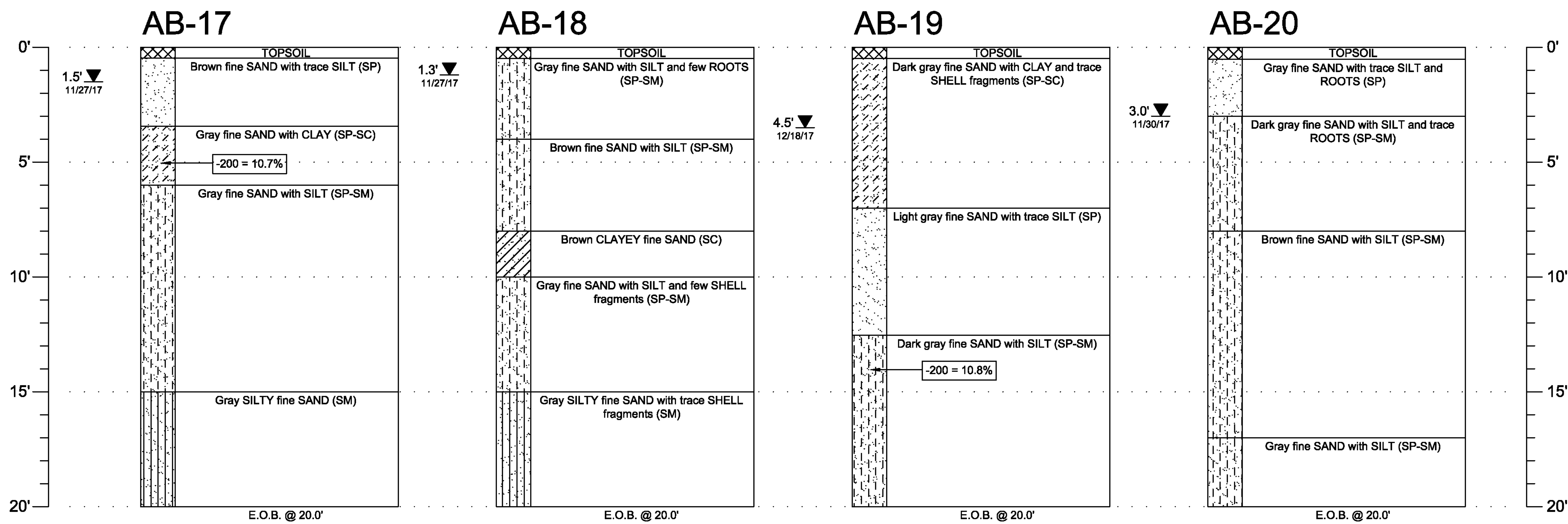
▼	Measured Groundwater Level 24 (+) Hours Subsequent to Time of Drilling
(SP)	Unified Soil Classification System
EOB	End of Boring
-200	% Passing No. 200 Sieve

UNIVERSAL
ENGINEERING SCIENCES

PROJECT:
GEOTECHNICAL EVALUATION
DAYTONA BEACH INTERNATIONAL AIRPORT BORROW PITS
DAYTONA BEACH, FLORIDA

TITLE:
SUBSURFACE PROFILES

DRAWN BY:	MKL	DATE:	01/22/18	PROJECT NO.:	0430.1700238.0000	SCALE:	PAGE/FIG. NO.:
CHECKED BY:	BP	DATE:	01/22/18	REPORT NO.:	132890	NA (in feet)	A-5



	Fine SAND (SP)
	Fine SAND with SILT (SP-SM)
	SILTY fine SAND (SM)
	Fine SAND with CLAY (SP-SC)
	CLAYEY fine SAND (SC)
	TOPSOIL

NOTES:

▼	Measured Groundwater Level 24 (+) Hours Subsequent to Time of Drilling
(SP)	Unified Soil Classification System
EOB	End of Boring
-200	% Passing No. 200 Sieve

UNIVERSAL ENGINEERING SCIENCES

PROJECT: GEOTECHNICAL EVALUATION DAYTONA BEACH INTERNATIONAL AIRPORT BORROW PITS DAYTONA BEACH, FLORIDA						TITLE: SUBSURFACE PROFILES	
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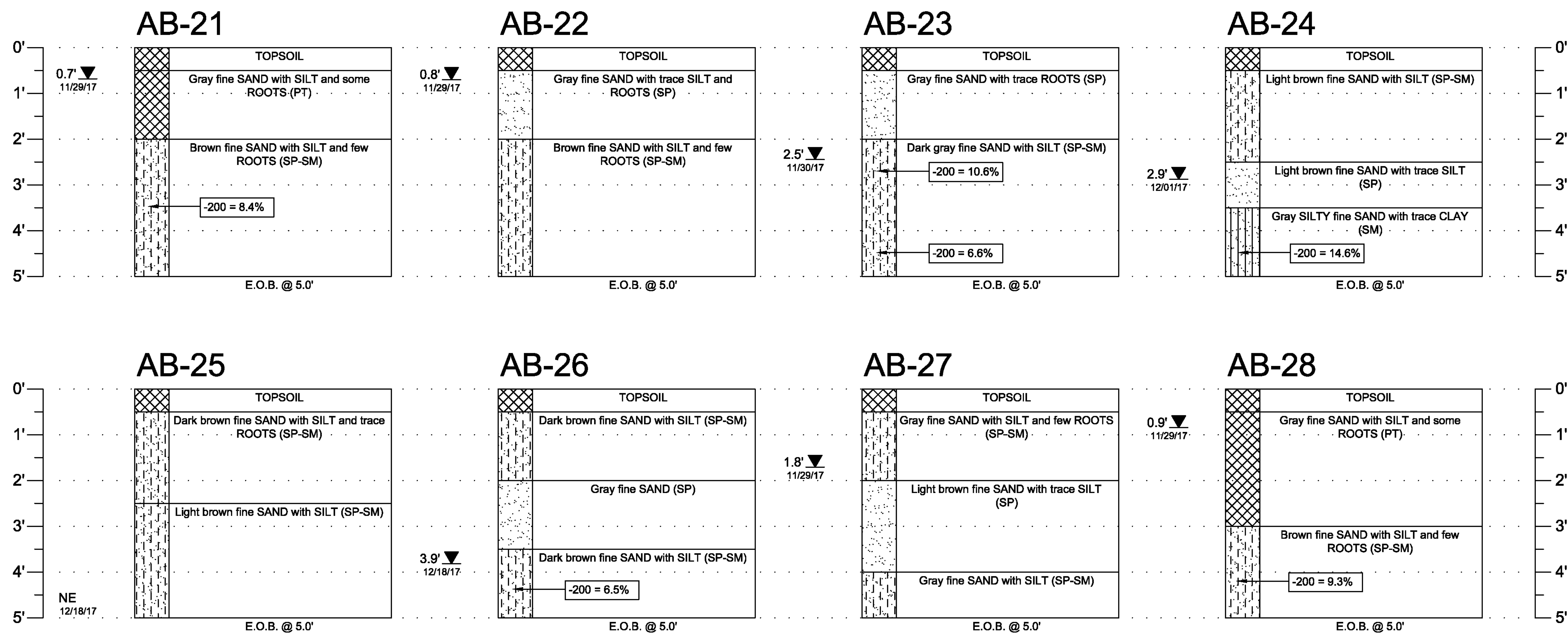

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SILTY fine SAND (SM)

CLAYEY fine SAND (SC)

TOPSOIL

NOTES:

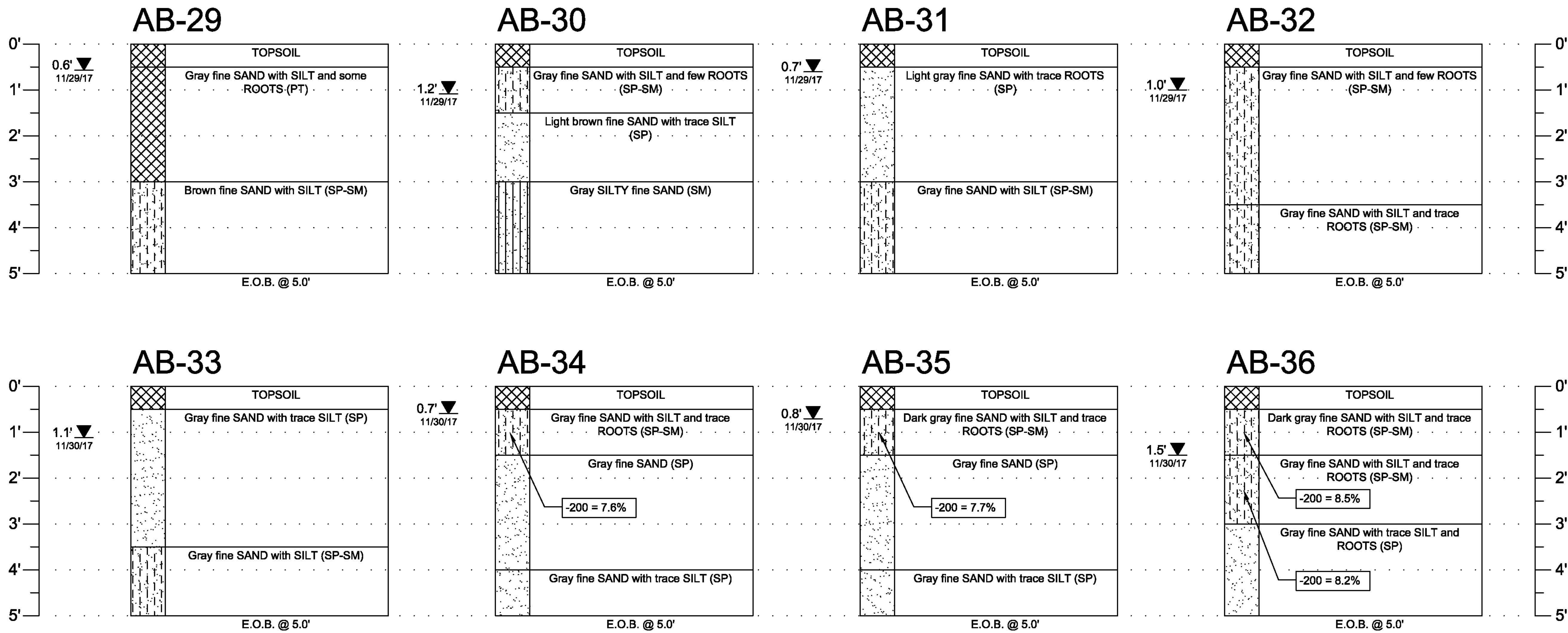
▼	Measured Groundwater Level 24 (+) Hours Subsequent to Time of Drilling
(SP)	Unified Soil Classification System
EOB	End of Boring
-200	% Passing No. 200 Sieve
NE	Groundwater Not Encountered

UNIVERSAL ENGINEERING SCIENCES

PROJECT:
GEOTECHNICAL EVALUATION
DAYTONA BEACH INTERNATIONAL AIRPORT BORROW PITS
DAYTONA BEACH, FLORIDA

TITLE: SUBSURFACE PROFILES

DRAWN BY:	MKL	DATE:	01/22/18	PROJECT NO.:	0430.1700238.0000	SCALE:	PAGE/FIG. NO.:
CHECKED BY:	BP	DATE:	01/22/18	REPORT NO.:	132890	NA (in feet)	A-7



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CLAYEY fine SAND (SC)

TOPSOIL

NOTES:

▼ Measured Groundwater Level 24 (+) Hours Subsequent to Time of Drilling
(SP) Unified Soil Classification System
EOB End of Boring
-200 % Passing No. 200 Sieve

UNIVERSAL ENGINEERING SCIENCES

PROJECT: GEOTECHNICAL EVALUATION DAYTONA BEACH INTERNATIONAL AIRPORT BORROW PITS DAYTONA BEACH, FLORIDA					TITLE: SUBSURFACE PROFILES
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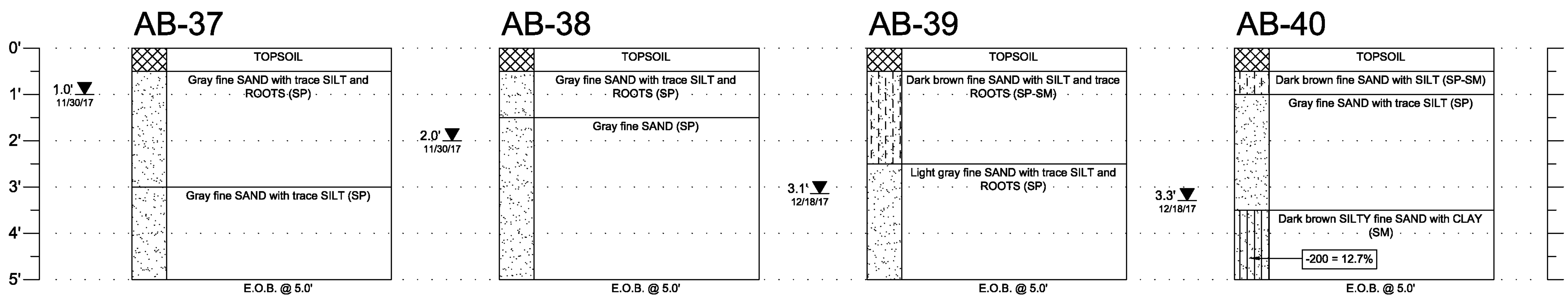

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CLAYEY fine SAND (SC)

TOPSOIL

NOTES:

▼	Measured Groundwater Level 24 (+) Hours Subsequent to Time of Drilling
(SP)	Unified Soil Classification System
EOB	End of Boring
-200	% Passing No. 200 Sieve
NE	Groundwater Not Encountered

UNIVERSAL ENGINEERING SCIENCES

PROJECT: GEOTECHNICAL EVALUATION DAYTONA BEACH INTERNATIONAL AIRPORT BORROW PITS DAYTONA BEACH, FLORIDA			TITLE: SUBSURFACE PROFILES	
DRAWN BY: MKL	DATE: 01/22/18	PROJECT NO.: 0430.1700238.0000	SCALE: NA (in feet)	PAGE/FIG. NO.: A-9
CHECKED BY: BP	DATE: 01/22/18	REPORT NO.: 132890		

Universal Engineering Sciences, Inc.
GENERAL CONDITIONS

SECTION 1: RESPONSIBILITIES

1.1 *Universal Engineering Sciences, Inc*., ("UES"), has the responsibility for providing the services described under the Scope of Services section. The work is to be performed according to accepted standards of care and is to be completed in a timely manner. The term "UES" as used herein includes all of *Universal Engineering Sciences, Inc's* agents, employees, professional staff, and subcontractors.

1.2 The Client or a duly authorized representative is responsible for providing UES with a clear understanding of the project nature and scope. The Client shall supply UES with sufficient and adequate information, including, but not limited to, maps, site plans, reports, surveys and designs, to allow UES to properly complete the specified services. The Client shall also communicate changes in the nature and scope of the project as soon as possible during performance of the work so that the changes can be incorporated into the work product.

1.3 The Client acknowledges that UES's responsibilities in providing the services described under the Scope of Services section is limited to those services described therein, and the Client hereby assumes any collateral or affiliated duties necessitated by or for those services. Such duties may include, but are not limited to, reporting requirements imposed by any third party such as federal, state, or local entities, the provision of any required notices to any third party, or the securing of necessary permits or permissions from any third parties required for UES's provision of the services so described, unless otherwise agreed upon by both parties.

1.4 Universal will not be responsible for scheduling our services and will not be responsible for tests or inspections that are not performed due to a failure to schedule our services on the project or any resulting damages.

1.5 **PURSUANT TO FLORIDA STATUTES §558.0035, ANY INDIVIDUAL EMPLOYEE OR AGENT OF UES MAY NOT BE HELD INDIVIDUALLY LIABLE FOR NEGLIGENCE.**

SECTION 2: STANDARD OF CARE

2.1 Services performed by UES under this Agreement will be conducted in a manner consistent with the level of care and skill ordinarily exercised by members of UES's profession practicing contemporaneously under similar conditions in the locality of the project. No other warranty, express or implied, is made.

2.2 The Client recognizes that subsurface conditions may vary from those observed at locations where borings, surveys, or other explorations are made, and that site conditions may change with time. Data, interpretations, and recommendations by UES will be based solely on information available to UES at the time of service. UES is responsible for those data, interpretations, and recommendations, but will not be responsible for other parties' interpretations or use of the information developed.

2.3 Execution of this document by UES is not a representation that UES has visited the site, become generally familiar with local conditions under which the services are to be performed, or correlated personal observations with the requirements of the Scope of Services. It is the Client's responsibility to provide UES with all information necessary for UES to provide the services described under the Scope of Services, and the Client assumes all liability for information not provided to UES that may affect the quality or sufficiency of the services so described.

2.4 Should UES be retained to provide threshold inspection services under Florida Statutes §553.79, Client acknowledges that UES's services thereunder do not constitute a guarantee that the construction in question has been properly designed or constructed, and UES's services do not replace any of the obligations or liabilities associated with any architect, contractor, or structural engineer. Therefore it is explicitly agreed that the Client will not hold UES responsible for the proper performance of service by any architect, contractor, structural engineer or any other entity associated with the project.

SECTION 3: SITE ACCESS AND SITE CONDITIONS

3.1 Client will grant or obtain free access to the site for all equipment and personnel necessary for UES to perform the work set forth in this Agreement. The Client will notify any and all possessors of the project site that Client has granted UES free access to the site. UES will take reasonable precautions to minimize damage to the site, but it is understood by Client that, in the normal course of work, some damage may occur, and the correction of such damage is not part of this Agreement unless so specified in the Proposal.

3.2 The Client is responsible for the accuracy of locations for all subterranean structures and utilities. UES will take reasonable precautions to avoid known subterranean structures, and the Client waives any claim against UES, and agrees to defend, indemnify, and hold UES harmless from any claim or liability for injury or loss, including costs of defense, arising from damage done to subterranean structures and utilities not identified or accurately located. In addition, Client agrees to compensate UES for any time spent or expenses incurred by UES in defense of any such claim with compensation to be based upon UES's prevailing fee schedule and expense reimbursement policy.

SECTION 4: SAMPLE OWNERSHIP AND DISPOSAL

4.1 Soil or water samples obtained from the project during performance of the work shall remain the property of the Client.

4.2 UES will dispose of or return to Client all remaining soils and rock samples 60 days after submission of report covering those samples. Further storage or transfer of samples can be made at Client's expense upon Client's prior written request.

4.3 Samples which are contaminated by petroleum products or other chemical waste will be returned to Client for treatment or disposal, consistent with all appropriate federal, state, or local regulations.

SECTION 5: BILLING AND PAYMENT

5.1 UES will submit invoices to Client monthly or upon completion of services. Invoices will show charges for different personnel and expense classifications.

5.2 Payment is due 30 days after presentation of invoice and is past due 31 days from invoice date. Client agrees to pay a finance charge of one and one-half percent (1 ½ %) per month, or the maximum rate allowed by law, on past due accounts.

5.3 If UES incurs any expenses to collect overdue billings on invoices, the sums paid by UES for reasonable attorneys' fees, court costs, UES's time, UES's expenses, and interest will be due and owing by the Client.

SECTION 6: OWNERSHIP AND USE OF DOCUMENTS

6.1 All reports, boring logs, field data, field notes, laboratory test data, calculations, estimates, and other documents prepared by UES, as instruments of service, shall remain the property of UES.

6.2 Client agrees that all reports and other work furnished to the Client or his agents, which are not paid for, will be returned upon demand and will not be used by the Client for any purpose.

6.3 UES will retain all pertinent records relating to the services performed for a period of five years following submission of the report, during which period the records will be made available to the Client at all reasonable times.

6.4 All reports, boring logs, field data, field notes, laboratory test data, calculations, estimates, and other documents prepared by UES, are prepared for the sole and exclusive use of Client, and may not be given to any other party or used or relied upon by any such party without the express written consent of UES.

SECTION 7: DISCOVERY OF UNANTICIPATED HAZARDOUS MATERIALS

7.1 Client warrants that a reasonable effort has been made to inform UES of known or suspected hazardous materials on or near the project site.

7.2 Under this agreement, the term hazardous materials include hazardous materials (40 CFR 172.01), hazardous wastes (40 CFR 261.2), hazardous substances (40 CFR 300.6), petroleum products, polychlorinated biphenyls, and asbestos.

7.3 Hazardous materials may exist at a site where there is no reason to believe they could or should be present. UES and Client agree that the discovery of unanticipated hazardous materials constitutes a changed condition mandating a renegotiation of the scope of work. UES and Client also agree that the discovery of unanticipated hazardous materials may make it necessary for UES to take immediate measures to protect health and safety. Client agrees to compensate UES for any equipment decontamination or other costs incident to the discovery of unanticipated hazardous waste.

7.4 UES agrees to notify Client when unanticipated hazardous materials or suspected hazardous materials are encountered. Client agrees to make any disclosures required by law to the appropriate governing agencies. Client also agrees to hold UES harmless for any and all consequences of disclosures made by UES which are required by governing law. In the event the project site is not owned by Client, Client recognizes that it is the Client's responsibility to inform the property owner of the discovery of unanticipated hazardous materials or suspected hazardous materials.

7.5 Notwithstanding any other provision of the Agreement, Client waives any claim against UES, and to the maximum extent permitted by law, agrees to defend, indemnify, and save UES harmless from any claim, liability, and/or defense costs for injury or loss arising from UES's discovery of unanticipated hazardous materials or suspected hazardous materials including any costs created by delay of the project and any cost associated with possible reduction of the property's value. Client will be responsible for ultimate disposal of any samples secured by UES which are found to be contaminated.

SECTION 8: RISK ALLOCATION

8.1 Client agrees that UES's liability for any damage on account of any breach of contract, error, omission or other professional negligence will be limited to a sum not to exceed $50,000 or UES's fee, whichever is greater. If Client prefers to have higher limits on contractual or professional liability, UES agrees to increase the limits up to a maximum of $1,000,000.00 upon Client's written request at the time of accepting our proposal provided that Client agrees to pay an additional consideration of four percent of the total fee, or $400.00, whichever is greater. The additional charge for the higher liability limits is because of the greater risk assumed and is not strictly a charge for additional professional liability insurance.

SECTION 9: INSURANCE

9.1 UES represents and warrants that it and its agents, staff and consultants employed by it, is and are protected by worker's compensation insurance and that UES has such coverage under public liability and property damage insurance policies which UES deems to be adequate. Certificates for all such policies of insurance shall be provided to Client upon request in writing. Within the limits and conditions of such insurance, UES agrees to indemnify and save Client harmless from and against loss, damage, or liability arising from negligent acts by UES, its agents, staff, and consultants employed by it. UES shall not be responsible for any loss, damage or liability beyond the amounts, limits, and conditions of such insurance or the limits described in Section 8, whichever is less. The Client agrees to defend, indemnify and save UES harmless for loss, damage or liability arising from acts by Client, Client's agent, staff, and other UESs employed by Client.

SECTION 10: DISPUTE RESOLUTION

10.1 All claims, disputes, and other matters in controversy between UES and Client arising out of or in any way related to this Agreement will be submitted to alternative dispute resolution (ADR) such as mediation or arbitration, before and as a condition precedent to other remedies provided by law, including the commencement of litigation.

10.2 If a dispute arises related to the services provided under this Agreement and that dispute requires litigation instead of ADR as provided above, then:

(a) the claim will be brought and tried in judicial jurisdiction of the court of the county where UES's principal place of business is located and Client waives the right to remove the action to any other county or judicial jurisdiction, and

(b) The prevailing party will be entitled to recovery of all reasonable costs incurred, including staff time, court costs, attorneys' fees, and other claim related expenses.

SECTION 11: TERMINATION

11.1 This agreement may be terminated by either party upon seven (7) days written notice in the event of substantial failure by the other party to perform in accordance with the terms hereof. Such termination shall not be effective if that substantial failure has been remedied before expiration of the period specified in the written notice. In the event of termination, UES shall be paid for services performed to the termination notice date plus reasonable termination expenses.

11.2 In the event of termination, or suspension for more than three (3) months, prior to completion of all reports contemplated by the Agreement, UES may complete such analyses and records as are necessary to complete its files and may also complete a report on the services performed to the date of notice of termination or suspension. The expense of termination or suspension shall include all direct costs of UES in completing such analyses, records and reports.

SECTION 12: ASSIGNS

12.1 Neither the Client nor UES may delegate, assign, sublet or transfer their duties or interest in this Agreement without the written consent of the other party.

SECTION 13. GOVERNING LAW AND SURVIVAL

13.1 The laws of the State of Florida will govern the validity of these Terms, their interpretation and performance.

13.2 If any of the provisions contained in this Agreement are held illegal, invalid, or unenforceable, the enforceability of the remaining provisions will not be impaired. Limitations of liability and indemnities will survive termination of this Agreement for any cause.

SECTION 14. INTEGRATION CLAUSE

14.1 This Agreement represents and contains the entire and only agreement and understanding among the parties with respect to the subject matter of this Agreement, and supersedes any and all prior and contemporaneous oral and written agreements, understandings, representations, inducements, promises, warranties, and conditions among the parties. No agreement, understanding, representation, inducement, promise, warranty, or condition of any kind with respect to the subject matter of this Agreement shall be relied upon by the parties unless expressly incorporated herein.

14.2 This Agreement may not be amended or modified except by an agreement in writing signed by the party against whom the enforcement of any modification or amendment is sought.

APPENDIX 2

South Development Area Market Assessment

DAYTONA BEACH INTERNATIONAL AIRPORT

Master Plan Update

South Development Area Market Assessment

December 2018

C&S COMPANIES®

Prepared by C&S Companies

Introduction

As part of the Daytona Beach International Airport Master Plan Update, Airport leadership identified approximately 350 acres of airport property to be evaluated for potential to generate and diversify revenue streams in support of sustainable airport operations.

This land, referred to as the South Development Area (SDA) or "subject property," is not needed for aeronautical facilities and could be available for commercial and/or aviation-related development.

To understand the South Development Area's development potential, this study assesses market demand for various commercial uses and evaluates aviation-related and aerospace industry alignments for on-airport development opportunity. A number of local stakeholders participated by providing input about development of this airport property as a community asset and its potential to promote new economic development.

The results of this study will support and inform airport master planning activities underway and decision-making regarding future development of this site.

Project Context

Approach & Context

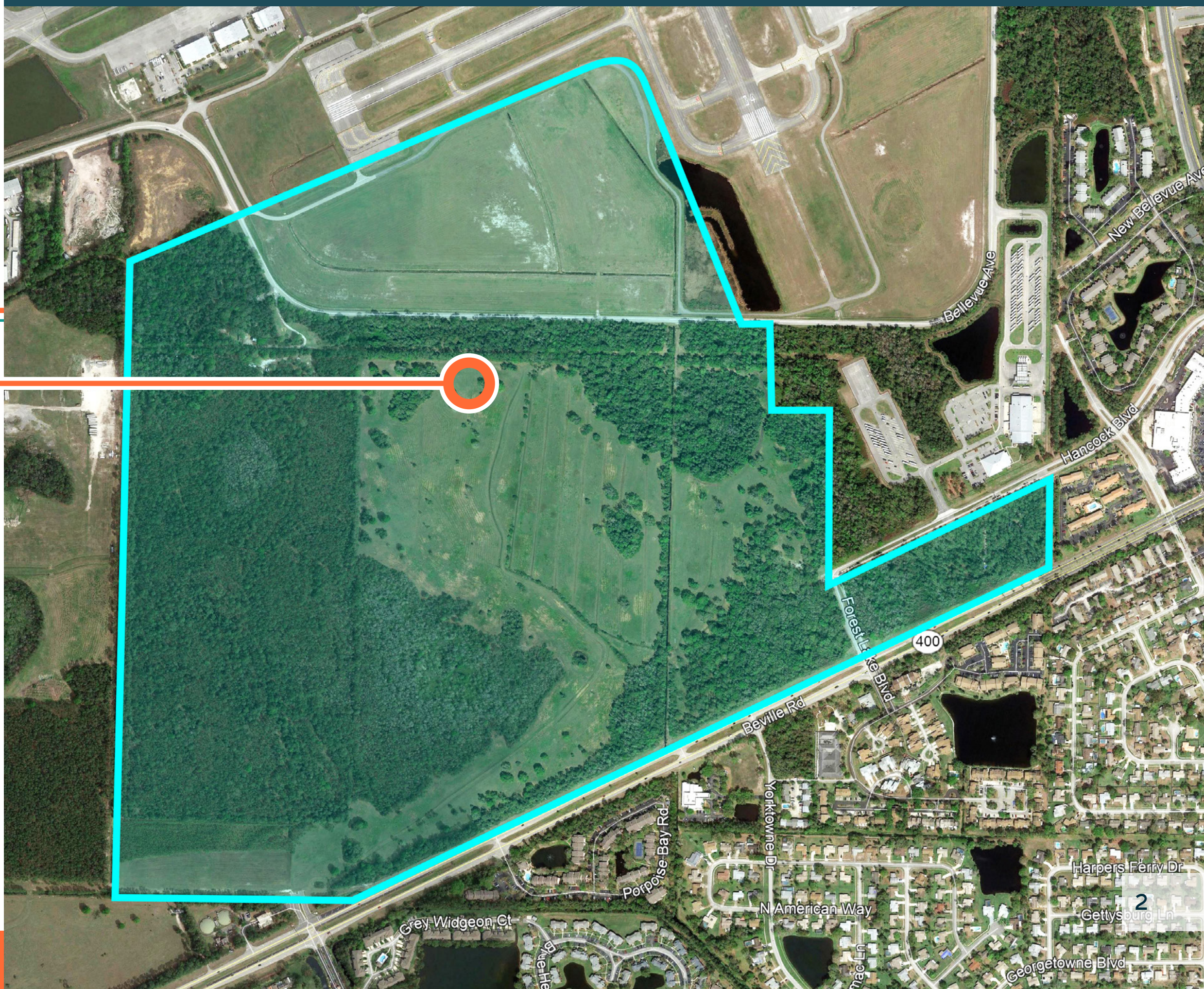
- Client and Master Plan team work sessions
- Reviewed past studies and other DAB-provided information
- Stakeholder engagement
- Local fieldwork, market research
- Market demand assessment:
  - Office
  - Industrial & flex
  - Retail, restaurant, services
  - Hospitality
- Aerospace & aviation-related industry research, benchmarking and evaluation
- Competitive context benchmarking
- Conceptual site layouts
- Forward strategy

South Development Area Characteristics

- 350± acres of undeveloped land
- Airport Property zoning
- ¾ mile of frontage along Beville Road
- Northernmost area has access to DAB airfield
- Bellevue Ave. Ext. runs through northern portion
- 100+ acres of wetlands
- Stormwater issues being examined as part of airport master plan

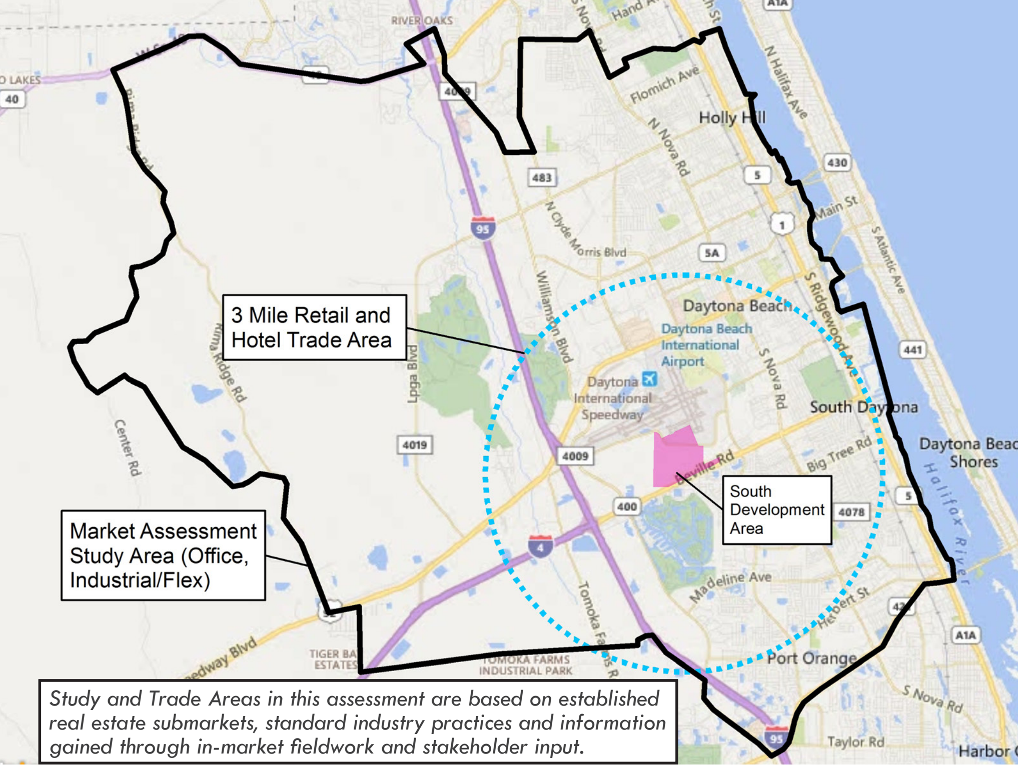
Data Sources

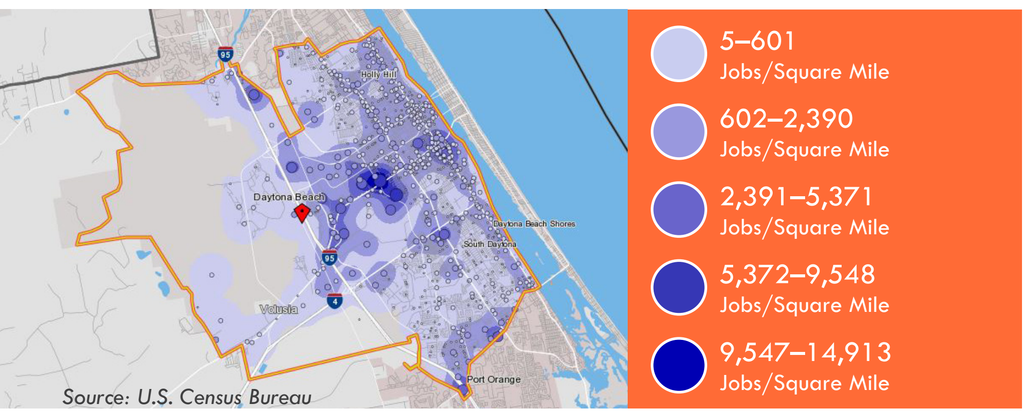
- Daytona Beach International Airport (DAB)
- Past reports and current master plan update and stormwater study underway
- Third party data providers including CoStar Group, ESRI, Woods & Poole Economics
- Zoning Codes for Volusia County, City of Daytona Beach
- Volusia County staff
- State of Florida:
  - Space Florida
  - Enterprise Florida
  - Department of Economic Opportunity
  - Department of Transportation
- Business journals, industry associations, commercial brokerage reports and interviews, other publications and agencies.
- Federal Sources:
  - US Census Bureau:
    - Center for Economic Studies
    - American Community Survey
    - Economic Census
  - Bureau of Labor Statistics
  - FAA
  - TRB
  - ACRP



C&S COMPANIES

Project Context





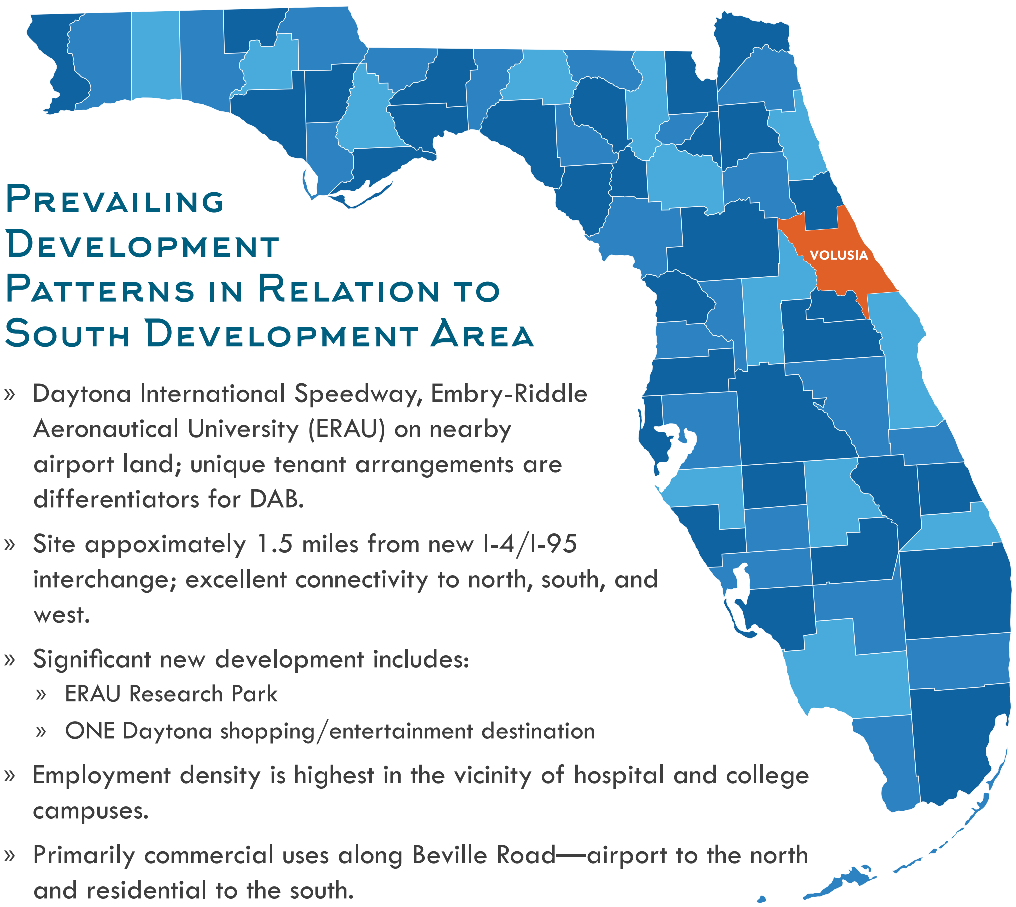
Source: U.S. Census Bureau

Building Inventory by Use—Reference Market and Study Area

Use	Reference Market* Properties	Study/ Trade Area Properties	Reference Market Building SF	Study/ Trade Area Building SF	Study/Trade Area % of Reference Market Inventory by SF
Office	1,741	551	11,450,000	4,950,000	43%
Industrial/Flex	1,474	564	21,100,000	8,750,000	41%
Retail	3,250	511	34,630,000	7,900,000	23%
Hotel	316	30	15,630,000	520,000	3%

**Reference market includes Volusia County; study area is 6% of reference market by area.*

Prevailing Development Patterns in Relation to South Development Area



» Daytona International Speedway, Embry-Riddle Aeronautical University (ERAU) on nearby airport land; unique tenant arrangements are differentiators for DAB.

» Site appoximately 1.5 miles from new I-4/I-95 interchange; excellent connectivity to north, south, and west.

» Significant new development includes:
   » ERAU Research Park
   » ONE Daytona shopping/entertainment destination

» Employment density is highest in the vicinity of hospital and college campuses.

» Primarily commercial uses along Beville Road—airport to the north and residential to the south.

» Focused growth area to the north along LPGA Blvd. as Latitude Margaritaville and Tanger Outlets provide critical mass to stimulate additional development.

» Beachfront market east of Halifax River functions mostly independently of locations to the west.

» Density of development increases to the east; low density and expansive undeveloped areas along and west of I-95 corridor.

Stakeholder Engagement

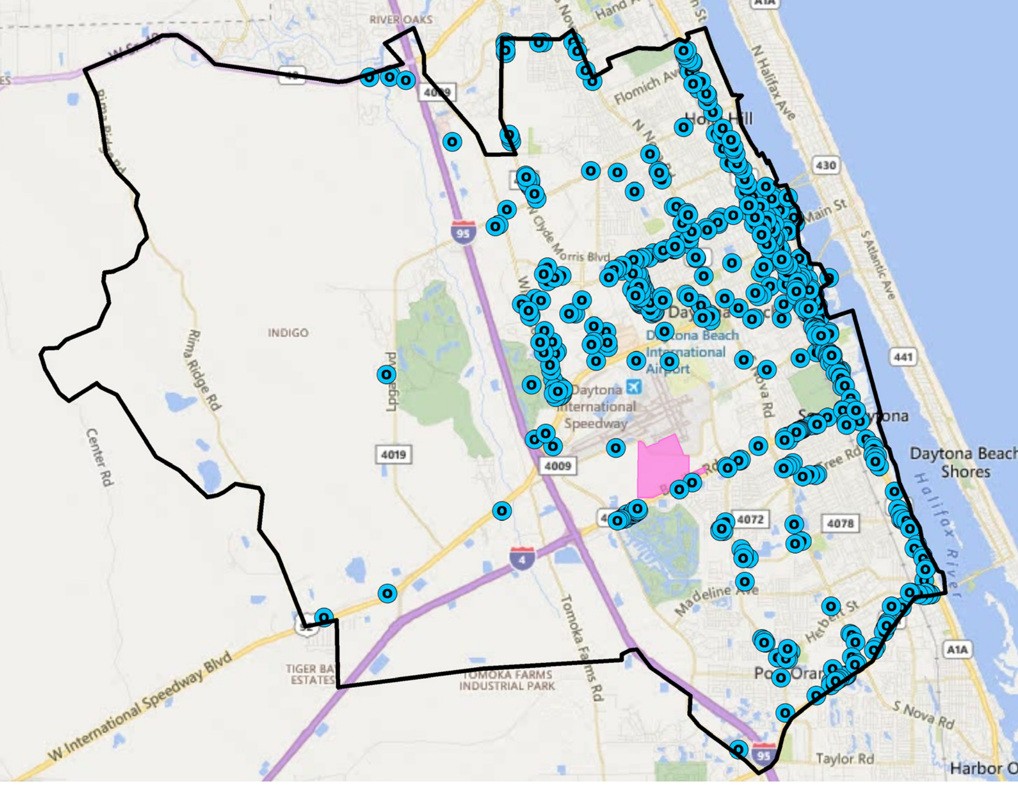
Key Themes

» DAB is essential to the area's economic development strategy and success.

- Attracting high-quality, high-wage jobs to the community—and this site—is a priority.
- Aviation and aerospace are widely agreed to be ideal uses for the South Development Area. Stakeholders also noted other uses of interest, including warehousing/distribution, research & development, retail, corporate office, manufacturing, and others.
- "The right project" was a common refrain, reflecting agreement that the subject property can benefit the community and region.
- Revenue production in the short term is needed; could lead to pressure to consider uses that are less than optimal in the long term.
- Site preparation is needed; however, opinions vary on what is appropriate and feasible (both financially and politically). The County must move quickly and nimbly to close deals.
- For aviation and aerospace, workforce is an advantage and opportunity regionally, but a limitation locally.
- Must attract and retain young people, including graduates of local colleges and universities.
- Site access and location is favorable because of recent transportation improvements such as new interchange.
- ERAU is a differentiator. Relationship between ERAU and DAB is consistently seen as complementary.
- Optimism that ERAU's focus on research capacity, graduate programs, and investments in Research Park and other facilities will lead to industry growth.
- South Development Area could host spinoff manufacturing or expansion as Research Park tenants succeed.
- A strong, collaborative relationship exists between the City of Daytona Beach and Volusia County, and will ensure that economic development manages concerns of airport-adjacent community.
- Economic development agencies are working hard to ensure the region is business-friendly with incentives to attract new development.
- The community features a number of cost-of-living and quality-of-life benefits.
- Many economic development and business success stories; residential expansion underway; reinvestment and redevelopment; updating reputation and evolving attitudes about community.

The project team held meetings with representatives from the following agencies and organizations to discuss their perspectives regarding future development of the subject property, the Airport, and community context.

Organization	Representatives
Volusia County	» Daytona Beach International Airport » Economic Development » Office of the County Manager » Growth and Resource Management
Daytona International Speedway Corporation & ONE Daytona	» Chief Operating Officer » Corporate Development » Sales & Marketing
Embry-Riddle Aeronautical University	» University Administration & Planning » College of Engineering » Eagle Flight Research Center
City of Daytona Beach	» Office of the Deputy Manager
Space Florida	» Chief Operating Officer » Business Development
CEO Business Alliance	» President
Team Volusia Economic Development	» President & CEO



Market Snapshot—Office

Sources of Demand

- 1.3% projected annual growth for office-based employment through 2037
- Inventory replacement from elsewhere in market
- Expansion of existing businesses
- Strategic relocations

Key Market Metrics, Study Area	Office
Total inventory	4,950,000 SF
Average building size	9,000 SF
Average building size, past 10 years	20,000 SF
Average age	46 years
Typical parcel size	1-4 acres
Prevailing scale of development	.2–.25 FAR*
Annualized delivery	55,000 SF
Prevailing market occupancy rates	Stabilized ↔
Prevailing market rental rates	Improving ↑

**FAR (floor area ratio)—the ratio of building area to overall site area, used as a measure of density*

Results on Site

No on-site capture of office development is projected in the near term (2018-2022). Potential to capture 50,000–60,000 square feet in the mid term (2023-2027) and 160,000–190,000 square feet in the long term (2028-2037).

Observations & Findings

- 5 million square feet of office space in study area.
- Downtown has highest concentration of office properties, but most are small and aging.
- Medical-related concentration in vicinity of Halifax Health complex.
- Office vacancy is low and stabilized at ~5%.
- Average office building delivered in past 10 years is 20,000 square feet—more than double the overall average of 9,000 square feet.
- Average annual delivery of office space is 55,000 square feet, which is nearly 3 new average-sized buildings yearly.
- 7 office buildings totaling 115,000 square feet are planned, proposed or under construction.
- Regional center for medical uses to serve expanding senior population.
- The ERAU Research Park positioned to capture office-based aviation/aerospace and tech in nearer term.
- Abundant supply of competitive fee-simple property, including professional office parks and vacant sites to the north.
- Guarded outlook in office market due to widespread industry trends:
  - Reduced square feet/employee ratios.
  - Remote employment.
- Likely better positioned for the next economic cycle (timing uncertain) than the current cycle.
  - Site-readiness status.
  - General consensus that economy is currently on the back side of growth cycle.
- FAA requirements present additional hurdles (ground lease and term limits, fair market value, FAA approval)

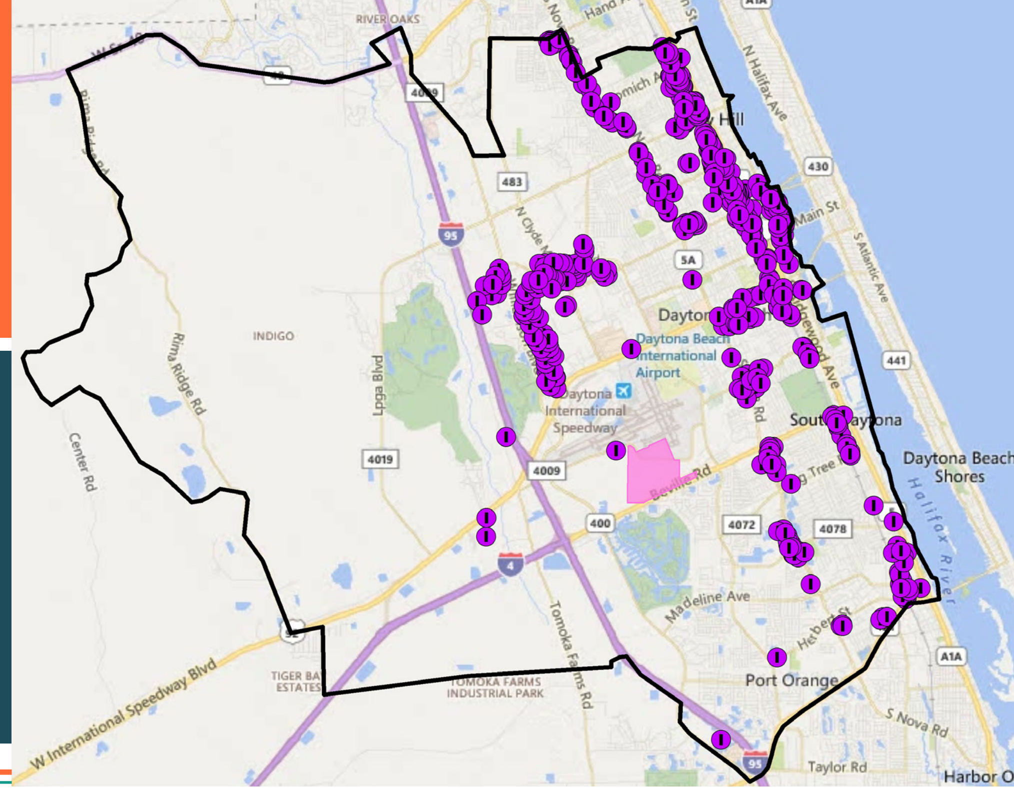
Market Snapshot—Industrial & Flex

Sources of Demand

- 1.3% projected annual growth for industrial-based employment through 2037
- Inventory replacement from elsewhere in market
- Expansion of existing businesses
- Strategic relocations

Results on Site

No on-site capture of industrial/flex development is projected in the near term (2018-2022). Potential to capture 200,000–300,000 square feet in the mid term (2023-2027) and 250,000–400,000 square feet in the long term (2028-2037).



Observations & Findings

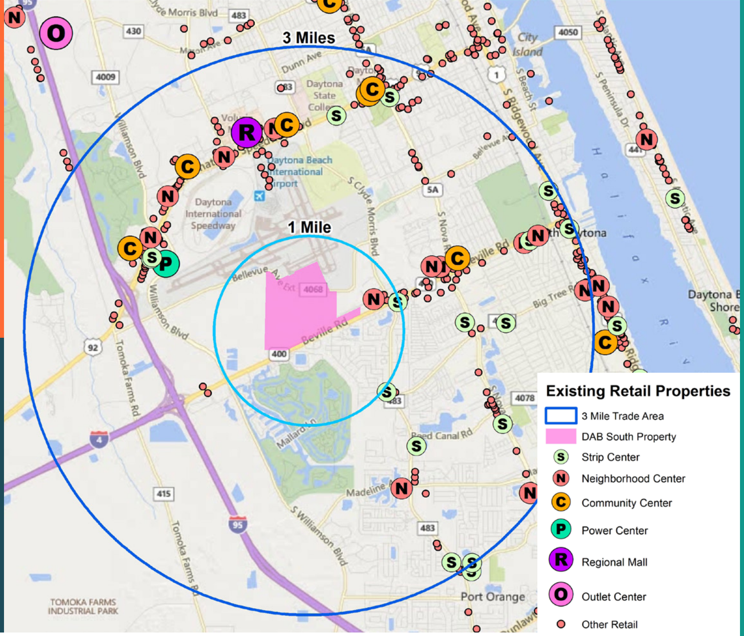
- 8.8 million square feet industrial/flex space in study area.
- Newer industrial development in locations with access to I-95; formats include stand-alone industrial and commerce park settings.
- Industrial vacancy is very low and stabilized at ~2%.
- Flex represents 7% of inventory, which is less prevalent than in many markets.
- Average building size over past 10 years is 100,000 square feet—much larger than 15,000 square feet overall average.
- 148,000 square feet average annual delivery of industrial/flex space; equates to roughly 3 new average-sized buildings every two years.
- 9 industrial buildings totaling 1.3 million square feet currently planned, proposed or under construction.
- New I-4/I-95 interchange may stimulate distribution-related development.
- ERAU Research Park is positioned for R&D or other specialized uses in flex format
- Community sensitivity exists regarding the nature and form of industrial use on SDA.
- Abundant supply of competitive fee-simple property available for industrial/flex uses, along I-95 corridor and to the south and west of subject property.
- Likely better positioned for next economic cycle (timing uncertain) than current cycle.
- FAA requirements present additional hurdles (ground lease and term limits, fair market value, FAA approval)

Key Market Metrics, Study Area	Industrial	Flex
Total inventory	8,140,000 SF	610,000 SF
Average building size	16,000 SF	14,000 SF
Average building size, past 10 years	148,000 SF	26,000 SF
Average age	43 years	23 years
Typical parcel size	2–5 acres	1–3 acres
Prevailing scale of development	.23–.28 FAR	.2–.25 FAR
Annualized delivery	130,000 SF	18,000 SF
Prevailing market occupancy rates	Stabilized ↔	Improving ↑
Prevailing market rental rates	Stabilized ↔	Stabilized ↔

Market Snapshot—Retail

Results on Site

Projected 5,000–7,000 square feet of retail may be captured in the near term (2018-2022). Potential to capture 25,000–30,000 square feet in the mid term (2023-2027) and 50,000–60,000 square feet in the long term (2028-2037).



Key Market Metrics, Study Area	All Retail	Retail < 25,000 SF
Total inventory	7,900,000 SF	2,560,000 SF
Average building size	15,000 SF	5,500 SF
Average building size, past 10 years	12,000 SF	5,600 SF
Average age	44 years	45 years
Typical parcel size	1-10+ acres	1-3 acres
Prevailing scale of development	.10–.20 FAR	.10–.20 FAR
Annualized delivery	170,000 SF	26,500 SF
Prevailing market occupancy rates	Stabilized ↔	Stabilized ↔
Prevailing market rental rates	Stabilized ↔	Improving ↑

Demographics	3-Mile Trade Area
Total Population (2017 / 2022)	60,158 / 63,856
% Population Growth 2017–2022	6.1%
Total Households (2017 / 2022)	27,103/ 28,778
% Household Growth (2017–2022)	6.2%
Average Household Size, 2017	2.1
Median Household Income (2017 / 2022)	\$32,282 / \$32,453
Average Household Income (2017 / 2022)	\$44,039 / \$44,761
% Owner-/Renter-Occupied Housing, 2017	55% / 45%
Median Home Value, 2017	\$110,207

Sources of Demand

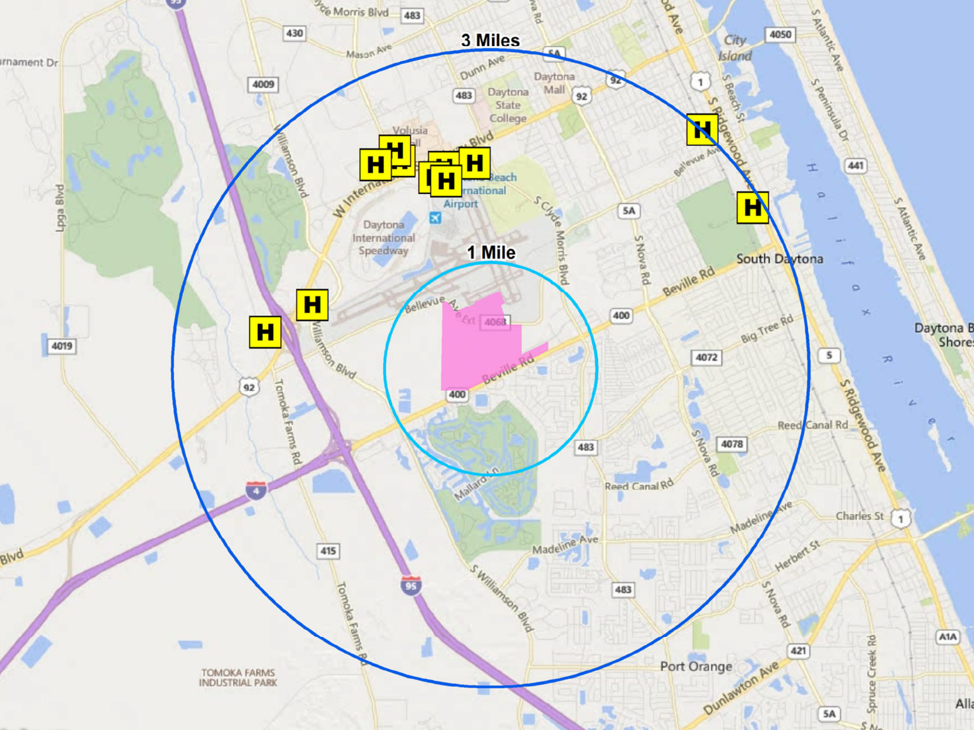
- 1.2% projected annual population growth
- Nearby residents, employees, and students
- Tourism (Speedway and other)
- Passerby and highway traffic

Market Considerations

- Analysis considers 25,000-square-foot maximum retail building size due to subject property's site depth (400 feet).
- Retail formats generally less than 25,000 square feet include:
  - Strip shopping centers
  - Small neighborhood shopping centers
  - Convenience, service-oriented, and other standalone retail
  - Restaurants

Observations & Findings

- 2.6 million square feet of retail space in the inventory considered; 7.9 million square feet total.
- Among the inventory considered, 26,500 square feet of retail space delivered annually; equal to about 5 new average-sized buildings each year.
- 9 retail buildings totaling 45,000 square feet planned, proposed or under construction.
- ONE Daytona retail and entertainment destination just completed.
- Major retail development north of the Trade Area; Tanger Outlets and Latitude Margaritaville stimulate growth.
- SDA frontage is generally favorable for retail; Beville Rd. traffic count is 29,000 trips/day.
- Significant supply of competitive fee-simple property within the Trade Area, including south and west along I-95 corridor, available outparcels and infill sites along high-volume roads.
- New I-4/I-95 interchange likely to attract new retail; however, several available properties are located closer to the interchange.Guarded outlook as the retail industry experiences disruption and change due to e-commerce.
- FAA requirements present additional hurdles (ground lease and term limits, fair market value, FAA approval)
- Median and average household income values are significantly lower than for Volusia County and Florida overall.



Key Market Metrics 3-Mile Trade Area	Hotels Competitive Set
Total inventory	1,014 rooms
Average building size	100 rooms
Average age	14 years
Typical parcel size	2-3 acres
Prevailing scale of development	~30 rooms/ acre
Annualized delivery	45 rooms (2000–present)

Sources of Demand

» Nearby attractions and events (Speedway, etc.)

» Business and university-related travel

» Tourism and highway travel; new I-4/I-95 Interchange

» Airport passengers (limited)

Market Considerations

» Competitive set for analysis includes 11 hotels built since 1980, located in 3-mile Trade Area.

» Subject property serves Speedway/airport/university/interstate hotel market; independent of beachfront and other hotels to the east.

Market Snapshot—Hotels

Observations & Findings

» 2 hotels currently under construction: 107-room Home2 Suites and 145-room Marriott Autograph Collection.

» No additional plans for new hotel development are known.

» More than 80% of competitive set has been built since 2000.

» Upper midscale, upscale, and economy hotels are most prevalent among the competitive set.

» 2 of 3 hotels most recently entering the market are upper midscale; other is upper upscale.

» Upward trend in hotel occupancy since 2009.

» Occupancy currently in 70% range, historically a threshold for new entry in this market.

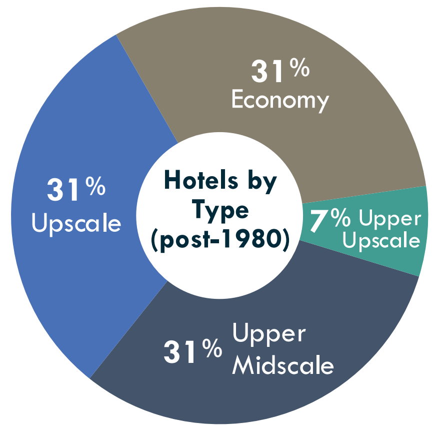
» Near-term occupancy likely to dip because of new hotels under construction, followed by period of absorption.

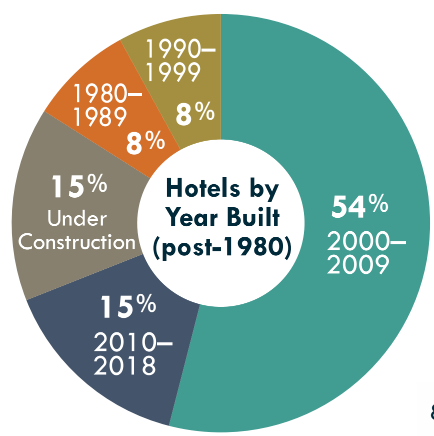
» Airport is among the second-tier drivers of hotel demand in the Trade Area.

» Competitive fee-simple property available in Trade Area.

Results on Site

No hotel capture is projected on the SDA in the near term (2018–2022). Potential to capture one hotel in the mid term (2023–2027) and an additional hotel in the long term (2028–2037).





Summary of Market Demand on Site

Market-driven opportunity for the SDA appears very limited over the near term (2018-2022). As site readiness efforts move forward and market conditions favor new entry, the subject property is likely positioned to attract various uses in the mid and long term. In total, the projected on-site capture of demand would require 53-85 acres of developable land in the SDA for market-driven uses through 2037.

Market-Driven Demand Projections for South Development Area

Land Use	Capture of Demand (SF or Rooms)				Developable Acres Required	Potential Real Estate Product Form
	2018–2022	2023–2027	2028–2037	Total		
Office	-	50,000–60,000	110,000–130,000	160,000–190,000	15–22	Corporate office, medical/ professional offices, small office park setting or standalone
Industrial & Flex	-	70,000–100,000	200,000–300,000	250,000–400,000	22–40	Planned industrial warehouse development, flex buildings in "business park" setting
Retail	5,000–7,000	25,000–30,000	50,000–60,000	80,000–90,000	10–15	Convenience-oriented retail, restaurants, retail-oriented services; strip center
Hotel (rooms)	-	100–125	100–125	200–250	6–8	Select service hotel, upper midscale to upscale
Totals *(not incl. hotel sf)*	-	145,000–190,000	360,000–490,000	510,000–680,000	53–85	-

Location Requirements and Characteristics

The following locational requirements generally apply to the respective uses indicated within the local marketplace.

Office

- Major transportation corridors
- Accessible to population centers
- Community amenities
- Part of planned business park-style developments

Industrial

- Major roadway access
- Possible airport connectivity needs
- Lower land cost basis
- Occasional rail access required (10–20%), lower land cost basis

Flex

- Roadway access
- Possible airport connectivity needs
- Substitution for office supply
- Mix of standalone and business park-like setting

Retail, Restaurant, & Services

- Visibility
- Access
- Transportation corridors
- Intersection proximity
- Near growing population centers
- Passerby traffic

Hotel

- Major transportation corridors and interchange locations
- Near attractions, employment centers, or airports
- Commonly located with outparcel frontage

Aviation & Aerospace Industry Trends

Aviation/ Aerospace Sub-industry	Description	Select Examples (operators* or product category)
Original Equipment Manufacturers (OEM)	Primary manufacturers of aircraft and engines.	**Aircraft:** Cessna | Embraer Gulfstream | Airbus **Engines:** GE Aviation Pratt & Whitney | Rolls-Royce
Supply Chain Manufacturing	Producers of aircraft components; referred to by tier with Tier 1 directly supplying OEMs and lower tiers supplying more basic components.	Tier 1: Fuselage sections, avionics, landing gear, interiors, wings, etc. Tier 2: Motors, controls, filtration, windows, sensors, pumps, interior components, etc. Tier 3+: Inputs to above
Maintenance, Repair and Overhaul (MRO)	Provide "aftermarket" services to aircraft in operation including structural or mechanical repair, and updates to aircraft systems or components.	ST Engineering Aerospace Boeing Global Services Avocet Aviation PEMCO World Air Services Rockford International
Commercial Space	Services currently include satellite deployment, research, remote sensing and imagery. The industry expects to expand into human travel (space tourism) in the near future.	SpaceX | Virgin Galactic Armadillo Aerospace Blue Origin | XCOR Aerospace
Defense	Suppliers of military/defense equipment including aircraft, radar and weapon systems, etc.	Lockheed Martin Northrop Grumman Raytheon | United Technologies

** Operators are listed for purposes of illustration and do not reflect any opinions or findings relative to market alignments with DAB. Many operators are active in multiple sub-industries.*

- Rapid growth in commercial and private aviation over the next 10-20 years with corresponding fleet expansion to meet demand.
  - Manufacturers focusing on production of "next generation" aircraft with substantial backlog for new builds.
  - Updates and conversion of existing aircraft.
  - Increased demand throughout supply chain and aircraft maintenance sectors.
- New technologies will become commonplace as innovative practices are scaled to production.
  - Examples include automated manufacturing, composite and other advanced materials, and additive manufacturing (3d printing).
  - As technologies emerge, the pace of development and frequency of upgrades will increase.
  - Workforce education and training are key as new technologies transform the industry.
  - Emphasis on flexibility for processes and facilities.
- The commercial space industry is taking off.
  - Well-established in Florida as a historic center for the space industry; growing in several other states and internationally.
  - Specialized, low-volume industry with unique material and skill set requirements.
- A workforce shortage exists throughout the aerospace industry—companies need more engineers and technicians.
- Anticipated innovations in air-based personal and public transportation.
- Aircraft and engine manufacturers (OEMs) are expanding into new markets to diversify and integrate vertically.
  - Boeing and Airbus entering the market for smaller, single-aisle regional aircraft.
  - OEMs expanding into MRO industry
    - OEMs likely to co-locate aftermarket operations with existing facilities.
    - Consolidation and intensifying competitive environment for smaller aftermarket/MRO operators.

Aviation & Aerospace Industry Benchmarking

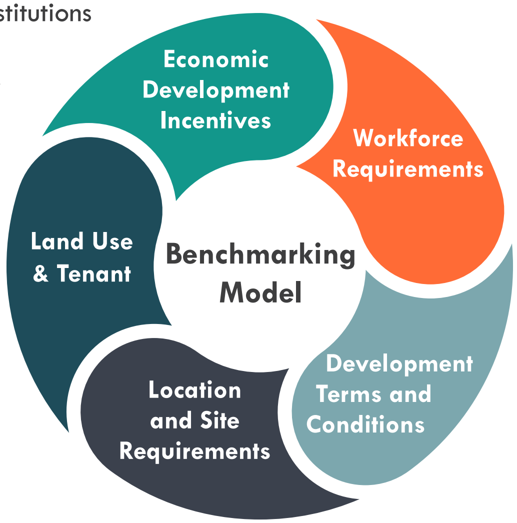
Benchmarking data were used to identify and examine numerous aerospace industry and related facilities located on airport-owned commercial properties nationwide. The prevailing characteristics of these facilities were studied to evaluate use formats and site requirements for potential application to the subject property.

Takeaways

- Aviation and aerospace related facilities on DAB property are generally limited to uses that require airfield access.
- Aircraft manufacturing, Tier 1 supply chain, and MRO operators are more likely to need airfield. Lower-tier supply chain producers generally do not.
- Established industry presence at other Florida airports.
- Florida's aviation and aerospace incentive programs are generally competitive with other states; Volusia County lags behind neighboring counties in attracting projects that receive state funding.
- Aviation-related industry clusters are often supported by key partnerships between educational institutions and private industry.

Spotlight: Higher Education / Operator Relationships

Benchmarking research reveals a growing trend of formal partnerships and other close relationships between educational institutions and nearby aviation/ aerospace operators or airparks.



The benefits of such arrangements can include:

- Workforce pipeline
- Ongoing training for employees
- R&D partnerships
- Shared facilities

Select benchmarking examples:

- Wichita State Tech / Spirit Aerosystems
  - WSU Tech manages the National Center for Aviation Training, which was funded and built by Sedgwick County (KS) for aviation-related workforce development
  - Classroom and hands-on training in laboratory and industrial settings
  - Graduates of high-demand programs receive guaranteed interview with Spirit Aerosystems
- Purdue University/Rolls Royce
- Georgia Tech/Gulfstream
- Eastern Florida State College/various Space Coast operators

Average Space Usage Requirements by Industry Sub-Sector

Use	Square Footage	Acreage
Aircraft Manufacturing—Commercial	500,000–1 million+	60–250
Aircraft Manufacturing—Regional/Business Jets	200,000–500,000	20–60
Aircraft Components Manufacturing	40,000–200,000	4–20
MRO—Commercial	250,000–1 million+	25–90
MRO—Regional Jet	75,000–400,000	6–40
MRO—Components/ Other	30,000–200,000	2–20
Education/Training Facility	25,000–200,000	2–15

State of Florida Economic Development Incentives

- According to Enterprise Florida data, 50 aviation and aerospace projects were awarded incentives totaling $148 million between 2013 and 2017.
  - Average incentive total was 10–15% of project cost.
  - 26 of the 50 projects (54%) are in neighboring Brevard, Orange, Osceola, and Seminole counties.

Aviation and Aerospace Industry Requirements Evaluation

This table presents a set of requirements and important factors which provide a basis for site selection decisions among aviation and aerospace industry operators. The SDA's position relative to these factors is evaluated to better understand its potential to accommodate types of aviation and aerospace users and at what scale.

Aerospace and Aviation Industry Requirements and South Development Area Evaluation

Requirement	Factors	DAB Evaluation
Workforce	» Possibly the most important factor, due to workforce shortages throughout the industry » Operators seek established A&A industry, related engineering and manufacturing, military presence » University and research institutions provide talent pipeline, training, and partnership opportunities » Community colleges support technical training	» A&A industry workforce is a regional advantage, but less concentrated in Volusia County than other area counties » Embry-Riddle is a major asset for A&A workforce development, although local retention of graduates is limited; university-affiliated R&D presents near-term opportunities » Daytona State College supports workforce development with regional orientation, but offerings for aviation-related training are limited (i.e., A&P certification)
Site Readiness	» Regulatory, environmental, infrastructure, components to site readiness » Development timeframe of under 1 year is preferred, including pre-development and construction » Uncertainty = risk; must have well-defined and efficient processes to facilitate development	» Stormwater facilities must be added and site raised » Site interior lacks access, utilities, and other infrastructure » Permits, review processes, FAA approval required before construction » Likely unable to meet accelerated timeframes with current site-readiness status
Location	» Operators require high-quality transportation infrastructure (air, highway, rail) and ease of access » Locations near major population centers are favored » Logistical connections and supply chain considerations—proximities and costs » Quality-of-life needs and amenities	» Subject property has excellent highway and air access » On a regional scale, the location is central to multiple population and aerospace hubs—but proximity is not immediate » An abundance of competitive sites exist in the broad region, including within the surrounding community
Business Climate	» Highly competitive to attract A&A industry; this is true at the state level, and among regions in a state » State tax policies play an important role in site selection » Generous economic development incentive packages are standard practice	» Florida ranks among the most business-friendly states » At the state level, Enterprise Florida and Space Florida actively work to develop A&A industry » Active economic development community in the Volusia County/Daytona region » Likely need to reach "above & beyond" to land the big fish
Site Characteristics	» Facility size and acreage requirements vary widely » Generally seek industrial park settings and infrastructure » Flexibility for expansion/renovations as needs evolve » Relatively few operators require on-airport locations	» SDA meets the size and configuration needs of average A&A operators, but not the largest operators in these industries » Stormwater facilities needs, wetland locations and Bellevue Ave. Ext. limit expansion potential for operators » On-airport location adds layers of approvals, regulations, time
Airfield Access	» Airfield access is required for a limited set of A&A industry operators—aircraft or engine manufacturing, large component suppliers, MROs » Significant area dedicated to apron/paved surfaces » The scale of a facility is driven by the type and size of aircraft or components being manufactured or serviced	» In its current configuration, the site has ~50 acres of "beachfront" property north of Bellevue Ave. Ext. with airfield access » The triangular shape of airfield-accessible property in the northern SDA may constrain the layout and size of A&A facilities » As currently configured, the northern SDA could likely accommodate a facility in the 200,000-250,000-square-foot range, and potentially up to 500,000 square feet, depending on user-specific needs and layout » Access and capacity considerations include taxiway width and volume of training use » Competitive sites exist at eastern/central Florida airports

Aviation & Aerospace Evaluation Summary

Challenges and Constraints

- Site Readiness
  - Stormwater, access and circulation, and utilities improvements/ investment
  - Time required to secure approvals and permits
  - Filling, grading and site preparation—timing and cost
- Airfield Suitability
  - Possible limitations related to taxiway access and width currently
  - High volume of existing training use
  - Site does not seem suited for large commercial aircraft
  - Site configuration could limit operator expansion possibilities
- Workforce
  - Lack of existing A&A industry in Volusia County
  - Highly skilled graduates tend to leave the region
- Competitive Sites
  - Abundance of available land for uses that do not require airfield access—both regionally and locally
  - Airports within the region offer a number of sites with and without airfield access
  - Airport locations are required for relatively few A&A supply chain producers

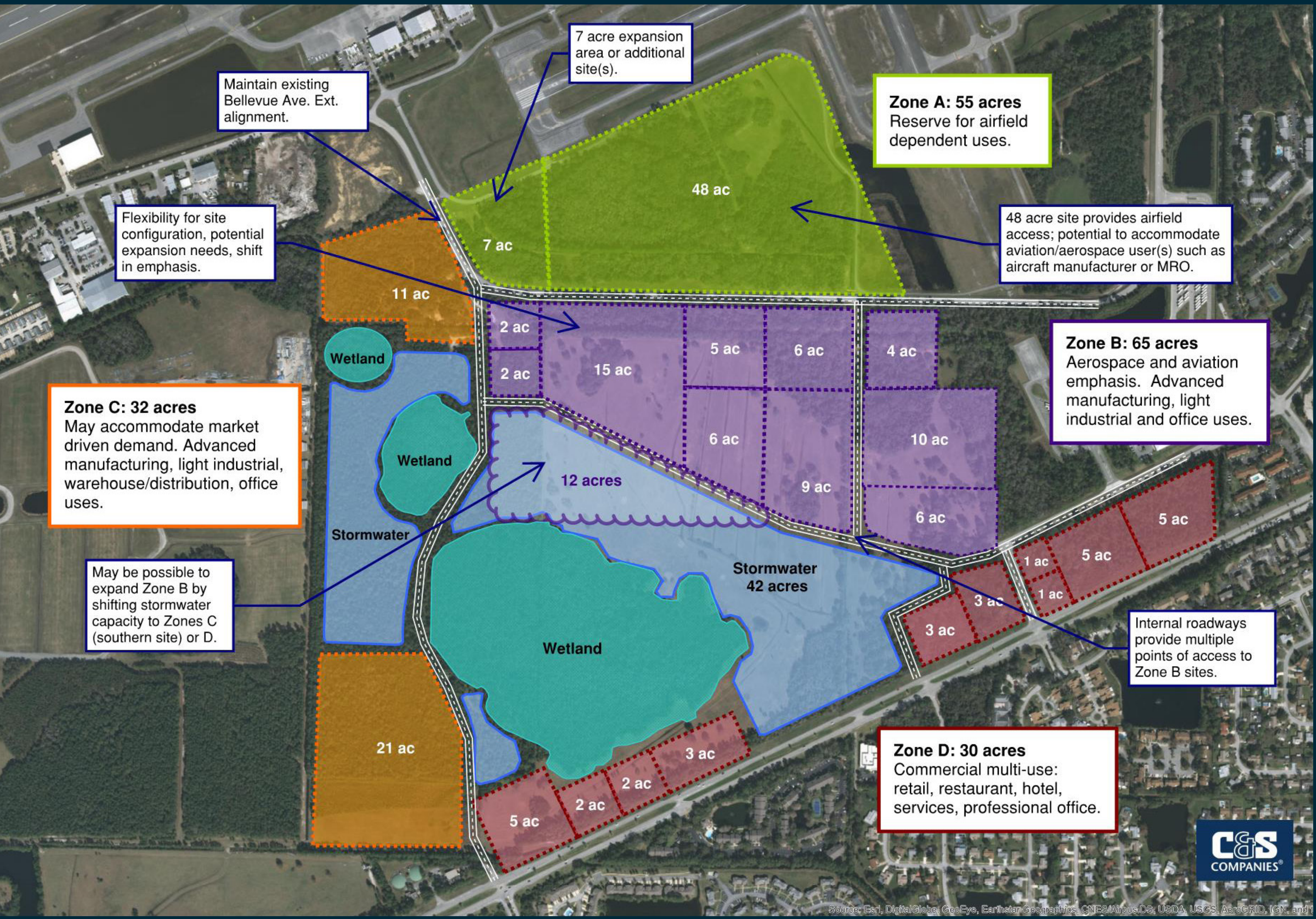
Advantages and Opportunities

- Industry Trends
  - Rapid expansion of aircraft manufacturing, service, and all related industries
  - Emerging technologies provide new opportunity
- Higher Education
  - Embry-Riddle Aeronautical University
    - Potential differentiator
    - Workforce pipeline
    - Corporate partnerships—R&D, training, shared facilities
    - Symbiotic relationship with ERAU Research Park
  - Daytona State College
    - Possible expansion of programs to support aviation-related industry and community development
- Location
  - Proximity and access to world-class aerospace industry cluster
  - Developing commercial space industry
  - Excellent transportation infrastructure
- On the Path to Preparedness!
  - Commitment and cooperation among community stakeholders
  - Stormwater assessments and permitting are underway
  - Aviation-related use of porperty may simplify FAA review and improve position to receive funding.
  - Master plan provides opportunity to set direction and advance projects

Potential Opportunities for Aviation and Aerospace Alignments on SDA

Aircraft Manufacturing	» Personal, business, and/or regional aircraft
MRO	» Regional facility, scaled to aircraft make and/or class » Heavy maintenance and modifications » Specialized components
Aerospace Supply Chain » **Components** » **Materials** » **Advanced or Additive Manufacturing**	» Traditional aviation or commercial space » Supplier relationships among on-site or regional operators » Emerging technologies and processes
"Landing site" as nearby startups expand operations	» Complements Research Park as production-oriented site

Concept A
Existing Alignment Scenario



Approach

- Maximizes site interior

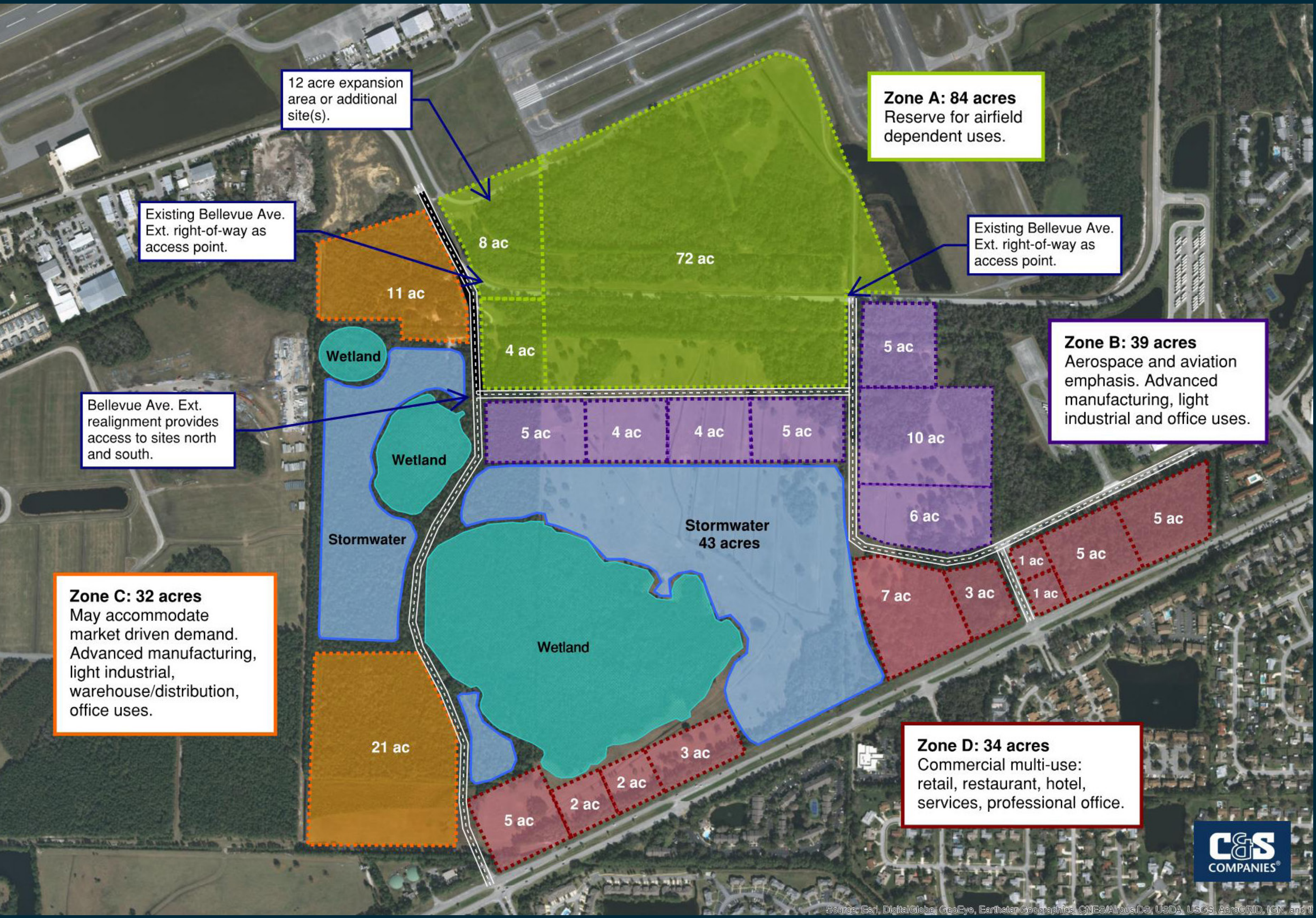
Advantages

- Utilizes existing road & site configuration
- Airfield access unnecessary for many A&A operators
- Maximizes interior site flexibility (size and configuration, emphasis)
- Balance of Zone A and B acreage promotes functional relationships

Challenges

- Requires additional internal roadway for site access
- Zone A site size and configuration limit flexibility to accommodate large operators and future expansion
- More FL airports have similar or larger airfield-access sites
- If airfield access is unnecessary, less reason to locate on airport – broadens set of competitive sites

Concept B
"Think Big!" Scenario



Approach

» Maximizes airfield access

Advantages

» Expands land availability with airfield access

» Enhanced flexibility to accommodate larger A&A users and future expansion needs in northern portion of site

» May improve competitive position among FL airports

» Existing Bellevue Ave. Ext. right-of-way for Zone A access

Challenges

» Requires relocation of Bellevue Ave. Extension

» Reduces interior site capacity and flexibility

» Less land, smaller parcels

» May affect potential supply chain relationships

» Site is configured to foster A&A alignments; limited number of operators and highly competitive to attract them

Site Readiness Checklist

Site & Access

- Site control and suitability for development.
- Minimum contiguous and developable acres.
- Site preparation and due diligence cost and timing.
- Utility and roadway infrastructure in place on-site or fully planned with reliable timeline for installation.
- Transportation network access and infrastructure—highway, airport and port. Airfield access may be needed.

Business Climate

- Taxes and labor structure.
- Leadership, political climate, local support and partnerships.
- Availability of financing opportunities.
- Economic development incentives and business assistance.
- Workforce—supply, quality, costs, training and retention programs.

Community

- Demographics and socio-economic characteristics.
- Education—K-12, vocational and technical post-secondary.
- Quality of life—cost-of-living, housing affordability and supply, quality medical care, commute distances, recreation, etc.
- City/County planning and coordination, regional initiatives and path of growth areas.

Yes No Partial

In Process Unclear

Recommendations

Phased Approach

- Prioritize investments to maximize returns and create catalytic effect.
- Start with Zone D because of potential to support market-driven demand in the nearer term and likely lower levels of investment for access and infrastructure.
- Promote Zone C (more ready access/infrastructure connection) for various uses, including market-driven, aviation-related, or other industries.
- Prioritize aviation and aerospace uses in Zone B interior; peripheral Zone B sites may be better for other uses. Zone B requires more investment, and central locations provide functional relationships to support Zone A.
- Reserve Zone A for aviation and aerospace uses that require airfield access; implement marketing approach for targeted (and possibly long-term) promotion.

Strategic Flexibility

- Determine preferred site layout and phasing.
- Position for priorities but maintain flexibility to consider various uses and formats within planned vision.
- Offer various/flexible site sizes and configurations within defined zones.
- Periodically evaluate strategy as markets and needs evolve; adjust as needed.

Site Readiness

- Design stormwater for development priorities and preferred layout.
- Identify utility and other infrastructure needs and associated costs.
- Define permitting and approval processes and timeframes so developers/operators understand process and timing up front.
- Measure investments in roads and infrastructure against returns (revenue, economic development, etc.) to determine timing and extent of improvements.
- Explore funding options to support site preparation. (FAA, state, local)

Strengthened Workforce

- Continue working closely with community partners to ensure that the airport is represented in community and economic development planning efforts, in support of aviation & aerospace industry and associated workforce development.
- Explore program development and/or expansion with Daytona State College to deepen aviation and aerospace labor force and enhance community-based educational opportunities.
- Establish formal partnerships/affiliations with local technical programs to facilitate ready connections between operators and workforce pipeline.

Key Partnerships

- Reinforce cohesive relationships within the community and unify vision and story about this site.
- Leverage unique opportunity for corporate partnerships with ERAU to promote complementary site development.
- Equip economic development partners with site vision and omni-channel marketing collateral to promote and pursue development opportunities with aligned industries.

Marketing Strategy

- Generate a compelling vision and develop specific branding to showcase opportunities and build interest among developers, operators, and community.
- Create omni-channel marketing approach (engaging across multiple platforms).
  - Standalone, mobile-responsive website highlighting development opportunities.
  - Expand online presence—site listings, social media, etc.
  - Printed materials (and printable from website).
  - Industry events and publications.
- Develop brokerage compensation policy to incentivize involvement by commercial real estate professionals.
- Hold open house for commercial brokers, operators, and developers to highlight commercial opportunities and explain on-airport development process.
- Conduct commercial developer and operator outreach to gauge interest in Zones A and B and understand needs and desired terms for investment.

Forward Strategy

Essential considerations for the Airport as it structures conversations and makes decisions about the future of the South Development Area:

Clarify goals

Pursue only "the right user" in aviation and aerospace, or accept nearer-term revenue production if opportunities emerge in other industries?

What does success look like?

Determine priorities

Maintain existing site configuration, or expand area with access to the airfield?

How to approach opportunities that may not align with long-term goals?

Decide on phased approach

What is the vision for this site, and how does that inform a preferred layout given stormwater needs?

What shorter-term actions can be undertaken to catalyze this longer-term play?

Identify "path to preparedness"

What levels of investment and risk are acceptable?

How much can be done upfront to prepare the site and when?

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