FINAL REPORT

AIRPORT MASTER PLAN UPDATE

VOLUME 1 - TECHNICAL REPORT

FOR THE BOCA RATON AIRPORT AUTHORITY | NOVEMBER 2023



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BOCA RATON AIRPORT

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ABBREVIATIONS

A	
AAC	Aircraft Approach Category
AAM	advanced air mobility
AC	Advisory Circular
ACE	US Army Corps of Engineers
ACRP	Airport Cooperative Research Program
ADA	Americans with Disabilities Act
ADG	Airplane Design Group
ADIZ	Air Defense Identification Zones
ADO	Airport District Office
ADS-B	Automatic Dependent Surveillance - Broadcast
AEP	Airport Enhancement Plan
AF	Airfield
AGIS	Airports Geographic Information System
AGL	above ground level
AIG	Airport Infrastructure Grant
AIP	Airport Improvement Program
ALP	Airport Layout Plan
ANOMS	Airport Noise and Operations Monitoring System
AOA	Airport Operations Area
AOPA	Aircraft Owners and Pilots Association
APC	Aircraft Performance Comparator
ARC	Airport Reference Code
ARFF	Aircraft Rescue and Firefighting
ARRWR	Airport Recycling, Reuse, and Waste Reduction
ASDA	Accelerate-Stop Distance Available
ASO	Aviation and Spaceport Office
ASOS	automated surface observing system
ASV	Annual service volume
ATADS	Air Traffic Activity Systems
ATC	air traffic control
ATCT	Air Traffic Control Tower
ATP	Airport Terminal Program
ATR	automatic traffic recorder
Avgas	aviation gasoline
AWOS	automated weather observing system
B	
BAO	Boca Aircraft Owners
BCT or the Airport	Boca Raton Airport
BIL	Bipartisan Infrastructure Law
BRAA or the Authority	Boca Raton Airport Authority
C	
CAGR	Compound annual growth rate
CATEX	Categorical Exclusion
CBP	US Customs and Border Protection
CCTV	closed-circuit television

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIP	Capital Improvement Program
CMG	cockpit to main gear distance
CPI	consumer price index
CWA	Clean Water Act
CY	calendar year

D

dB	decibels
DCP	data collection platform
DNL	day-night average sound level
DOC	Department of Commerce
DOD	Department of Defense
DOT Act of 1966	US Department of Transportation Act of 1966

E

EA	Environmental Assessment
EB	Engineering Brief
EIS	Environmental Impact Statement
EMAS	Engineered Materials Arresting System
ERP	Environmental Resource Permit
EV	Electric vehicle
eVTOL	electric Vertical Takeoff-Landing

F

F45	North Palm Beach County General Aviation Airport
FAA	Federal Aviation Administration
FAC	Florida Administrative Code
FAU	Florida Atlantic University
FBO	Fixed Base Operator
FCMP	Florida Coastal Management Program
FCT	FAA Contract Tower
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FFWCC	Florida Fish and Wildlife Conservation Commission
FLL	Fort Lauderdale–Hollywood International Airport
FMP	Facilities Management Plan
FXE	Fort Lauderdale Executive Airport
FY	Fiscal year

G

GA	general aviation
GAMA	General Aviation Manufacturers Association
GDP	Gross Domestic Product
GIS	Geographic Information System
GPS	global positioning system
GRP	Gross Regional Product

H

HVAC	heating, ventilation, and air-conditioning

I

IFR	instrument flight rules
IMC	instrument meteorological conditions

J	
JACIP	Joint Automated CIP
K	
L	
LDA	Landing Distance Available
LED	light emitting diode
LEED	Leadership in Energy and Environmental Design
LNA	Palm Beach County Park Airport
LOA	Letter of Agreement
LOS	level of service
LPV	localizer performance with vertical guidance
LS	Landside Improvements
M	
MGW	outer main gear width
MIA	Miami International Airport
MIRL	medium-intensity runway edge lighting
MITL	medium-intensity taxiway edge lighting
MLW	maximum landing weight
MOS	Modifications of Standards
MPU	Master Plan Update
MSA	Metropolitan Statistical Area
MSW	municipal solid waste
MTOW	maximum takeoff weight
N	
NAD 83/90	North American Datum of 1983/1990
NAS	National Airspace System
NASA	National Aeronautics and Space Administration
NAVAIDs	navigational aids
NAVD 88	North American Vertical Datum of 1988
NEPA	National Environmental Policy Act
NGS	National Geodetic Survey
NHPA	National Historic Preservation Act
NM	nautical miles
NMFTS	Noise Monitoring and Flight Tracking System
NOAA	National Oceanic and Atmospheric Administration
NOTAMs	Notices to Airmen
NPDES	National Pollutant Discharge Elimination System
NPIAS	National Plan of Integrated Airport Systems
NPL	National Priority List
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWS	National Weather Service
O	
O&M	operation and maintenance
OE/AAA	Obstacle Evaluation / Airport Airspace Analysis
OFA	object-free area
OFZ	obstacle free zone
P	
PAPI	precision approach path indicator
PBI	Palm Beach International Airport

PCI	pavement condition index
PCPI	Per Capita Personal Income
PHK	Palm Beach County Glades Airport
PMAD	peak month average day
PMP	Pavement Management Program
POTUS	President of the United States
Premier Aviation	Premier Aviation of Boca Raton
PS	Planning Study

Q

R

RAM	Regional Air Mobility
RCRA	Resource Conservation and Recovery Act
RDC	Runway Design Code
REIL	Runway end identifier light
RMO	Recyclable Material Offset
RNAV	area navigation
ROFA	runway object free area
ROM	rough-order-of-magnitude
RPZ	Runway protection zone
RSA	runway safety area

S

SAPMP	Statewide Airfield Pavement Management Program
SDWA	Safe Drinking Water Act
SE	Security
SF	Support Facility
SFWMD	South Florida Water Management District
SIDs	standard instrument departures
SMP	Sustainable Management Plan
SOP	Standard Operating Procedure
SPCC	Spill Prevention Control and Countermeasures
STARs	standard terminal arrivals
SWA	Solid Waste Authority

T

TAC	Technical Advisory Committee
TAF	Terminal Area Forecast
TDG	Taxiway Design Group
TERPS	United States Standard for Terminal Instrument Procedures
TESM	taxiway edge safety margin
TFMSC	Traffic Flow Management System Counts
TFR	temporary flight restriction
TIITF	Trustees of the Internal Improvement Trust Fund
TMC	turning movement count
TODA	Takeoff Distance Available
TOFA	taxiway object free area
TORA	Takeoff Run Available
TRACON	Terminal Radar Approach Control
TRB	Transportation Research Board

U

U.S.C.	United States Code
UAM	Urban Air Mobility
UAS	unmanned aircraft systems
USEPA	US Environmental Protection Agency

USFWS	US Fish and Wildlife Service

V

VFR	visual flight rules
VHF	very high frequency
VIP TFR or POTUS TFR	Mar-A-Lago Presidential TFR
VMC	visual meteorological conditions
VTOL	Vertical takeoff and landing

W

WM	Waste Management
WTE	waste-to-energy

X-Y-Z

1. INTRODUCTION/OVERVIEW

The Boca Raton Airport (BCT or the Airport) is a public use, general aviation (GA) airport that serves the recreational, corporate, and flight training needs of the South Florida region. BCT is classified as a GA reliever facility in the Federal Aviation Administration's (FAA's) National Plan of Integrated Airport Systems (NPIAS). Within this role, BCT serves GA aircraft that would otherwise utilize larger commercial service airports, such as Fort Lauderdale–Hollywood International Airport (FLL) or Palm Beach International Airport (PBI). This segregation of GA aircraft from larger air carrier and cargo aircraft enhances the efficiency and operational safety of the local air transportation system.

In September 2020, the Boca Raton Airport Authority (BRAA or the Authority) initiated this Master Plan Update (MPU) for BCT. The MPU serves as a roadmap for implementing incremental airport improvements necessary to serve the aviation demand and needs of the South Florida Region as well as preserve and maintain BCT's existing infrastructure. This MPU provides an inventory of the existing conditions, develops aviation activity forecasts and subsequent capacity requirements, undertakes an alternatives analysis for airport development, and culminates with the recommended airport improvement plan that includes project timing, justification, and cost estimates.

Additionally, the accompanying Airport Layout Plan (ALP) and Capital Improvement Program (CIP) are essential for regulatory compliance and to support federal and state grant requests. While the CIP provides a phased approach for funding future capital expenditures, an FAA-approved ALP is required to secure funding through the FAA's Airport Improvement Program (AIP). Future airport development projects must also be depicted on the FAA-approved ALP prior to initiating federal environmental processing through the National Environmental Policy Act (NEPA).

1.1 CHANGES SINCE PREVIOUS MASTER PLAN

The last comprehensive master plan for BCT was completed in 1993. Since that time, the airport industry, the city of Boca Raton, and the Airport have experienced significant changes. To account for changes, the Airport has completed several planning projects to ensure compliance with the evolving regulatory landscape and to guide airport development needs. Notably, an Airport Enhancement Plan (AEP) was completed in 2004 that developed a 5-year CIP, reviewed the impacts to airfield design standards attributed to aircraft fleet evolution, and produced an ALP update, which was approved in 2006. Subsequent ALP updates were completed in 2012, 2014, 2018, and 2019. This MPU is needed to reassess future airport activity forecasts, including the type of aircraft likely to operate at the Airport on a regular basis, reflect facilities and improvements constructed since the 2004 AEP, and plan for an appropriate mix of land uses to support aviation activity forecasts and non-aviation needs.

BCT has completed a number of airport improvement projects since the 2004 AEP, including, but not limited to the following:

- Airport Road and beautification improvements – 2022
- widening of Taxiways F and P4, relocation of Taxiways B and C – 2022
- widening of Taxiways P5, C, P9, P10 – 2020
- stormwater drainage systems upgrades – 2020
- construction of United States (US) Customs and Border Protection (CBP) facility – 2018

- runway rejuvenation project – 2018
- installation of Runway 23 departure end engineered materials arresting system (EMAS) – 2017
- installation of Runway 5 departure end EMAS – 2016
- runway and taxiway safety area improvements – 2016
- construction of BRAA Administration building – 2015
- construction of jet blast deflector – 2014
- air traffic control tower (ATCT) improvements – various

1.2 STRATEGIC INITIATIVES AND MASTER PLAN UPDATE GOALS

The BRAA completed a Strategic Business Plan in 2020 that was the result of a collaborative effort between internal and external stakeholders to define the mission and vision for BCT. The Strategic Business Plan is a guidebook to assist in day-to-day management and facilitate long-term decisions to ensure future development is consistent with the Airport's vision. The strategic initiatives outlined in the Strategic Business Plan focused on the core themes of financial resiliency, land use management, operational integrity, and infrastructure preservation. These themes were used to inform the MPU's goals established at the onset of the project and were used to guide the development of subsequent deliverables. The MPU's goals are:

- to evaluate the fleet of business jet aircraft that operate at the airport;
- to define, evaluate, and recommend safety, capacity, and operational enhancements for BCT;
- to establish a 10-year CIP for the Airport that is cohesive as well as demand-driven; and
- to establish a plan that optimizes the use of BCT's limited land assets.

In addition to the stated goals, the following FAA requirements have also been incorporated:

- Prepare an FAA-approved activity forecast to support BCT's capital and financial investments.
- Obtain aerial imagery and photogrammetrical surveys in accordance with FAA standards and upload data through the Airport Geographic Information System (AGIS) web portal.
- Prepare a complete ALP drawing set, along with supporting documents in accordance with Standard Operating Procedure (SOP) 2.00, *Standard Procedures for FAA Review and Approval of ALPs*.
- Formulate a CIP that outlines project sequencing, justification, and funding eligibility for FAA and state grants.

1.3 OVERVIEW OF MASTER PLAN PROCESS AND DELIVERABLES

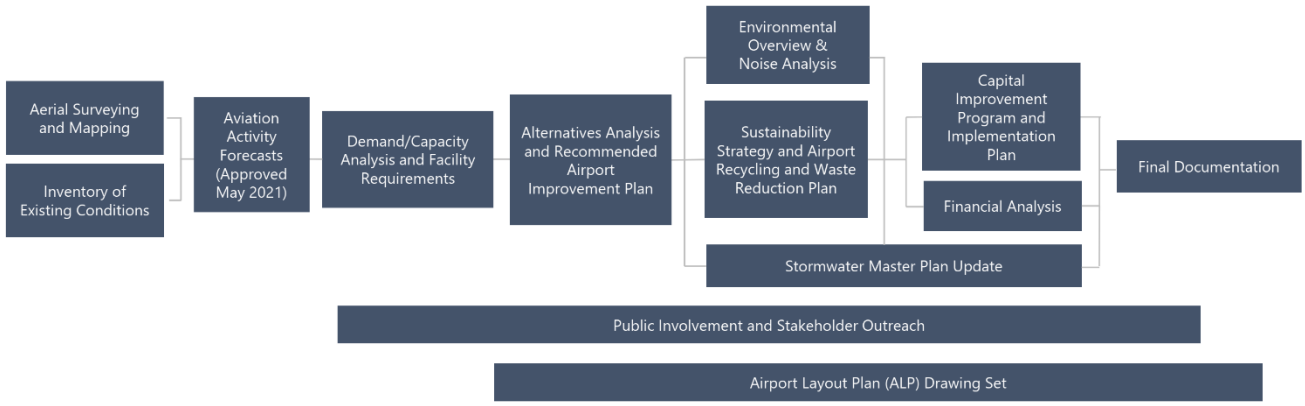
The MPU provides a development program to meet the short-, intermediate-, and long-term air transportation needs for a variety of users and stakeholders. BRAA will leverage this MPU to focus attention and investments on improvements or development necessary to serve the current and future needs of Airport users, as well as to promote an efficient and dynamic operation over the 20-year planning horizon.

1.3.1 MASTER PLAN PROCESS

The MPU was completed in accordance with federal and state guidelines found in FAA Advisory Circular 150/5070-6, *Airport Master Plans* and the Florida Department of Transportation (FDOT) *Guidebook for Airport Master Planning*.

The MPU was tailored to BCT's specific needs. **Exhibit 1-1** illustrates the master plan process developed for BCT's MPU.

EXHIBIT 1-1 AIRPORT MASTER PLAN PROCESS



SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5070-6B, *Airport Master Plans*, July 2019; Florida Department of Transportation, *Guidebook for Airport Master Planning*, 2021 - 2022; Ricondo & Associates, Inc., July 2020.

The MPU identifies and analyzes improvements to the airfield, landside, tenant and GA facilities, and support facilities necessary to efficiently accommodate growth in aviation activity forecasts. An environmental overview was developed to identify any potential environmental impacts associated with the proposed development. The CIP and financial analyses describe the timing of proposed improvements, anticipated development costs, proposed funding sources, and the overall affordability of the recommended program. The ALP provides a graphical depiction of BCT's future vision and proposed development identified in the MPU.

In addition to traditional master planning tasks prescribed by FAA and FDOT, a stormwater master plan was also completed as a part of this MPU. The stormwater master plan was developed to resolve existing drainage issues and outline ways to meet future stormwater needs. This study established strategies and conceptual plans for managing stormwater within the Airport property and documented potential improvements to stormwater and drainage infrastructure. A copy of the stormwater master plan is included in **Appendix K.**

BRAA will continue to periodically update the MPU to ensure its compatibility with aviation industry trends and local area changes.

1.3.2 MASTER PLAN DELIVERABLES

This MPU's documentation provides the sources of data collected, assumptions, technical analyses, findings, conclusions, and recommendations that form the basis for the preferred development program. The document is presented in the following sections and supporting appendices:

- Chapter 1: Introduction/Overview
- Chapter 2: Inventory of Existing Conditions

- Chapter 3: Aviation Activity Forecasts
- Chapter 4: Demand/Capacity Analysis and Airport Requirements
- Chapter 5: Alternatives Analysis and Recommended Airport Improvement Plan
- Chapter 6: Environmental Overview
- Chapter 7: Sustainability Strategy and Airport Recycling, Reuse and Waste Reduction Plan
- Chapter 8: Capital Improvement Program and Implementation Plan
- Chapter 9: Financial Analysis
- Chapter 10: Airport Layout Plan
- Appendix A: Stakeholder Engagement and Public Outreach Program
- Appendix B: Airplane Design Group III Operational Procedure Correspondence
- Appendix C: Summary of Socioeconomic Variables
- Appendix D: Federal Aviation Administration Forecast Approval Letter
- Appendix E: Critical Aircraft Analysis
- Appendix F: Modification of Standard Forms
- Appendix G: Airport Road Traffic Counts
- Appendix H: Aircraft Noise Analysis
- Appendix I: Airport Layout Plan Review Checklist
- Appendix J: Exhibit 'A' Airport Property Inventory Map
- Appendix K: Stormwater Master Plan (Note, the Stormwater Master Plan is currently under development. The existing conditions report was finalized on October 31, 2023. The future stormwater model will be finalized in early 2024).

1.4 STAKEHOLDER ENGAGEMENT AND PUBLIC OUTREACH PROGRAM

The purpose of the stakeholder engagement and public outreach program was to obtain meaningful input from key stakeholder groups or members of the public that may be affected by or have a vested interest in the outcomes of the MPU. The outreach program was designed to be inclusive and create an environment that promotes meaningful dialogue and opportunities for stakeholders and the public to actively participate in the master plan process. The public outreach program had the following key objectives:

- Engage with key stakeholders so that significant issues are identified, and participants can provide input and comments.
- Enhance decision-making and build business and public confidence in the process and recommendations.
- Disseminate accurate, timely, and concise information to assist stakeholders in reaching and expressing informed opinions about the Airport development options.

The stakeholder engagement and public outreach program consisted of coordination with the BRAA Board and a Technical Advisory Committee (TAC). The project team engaged the BRAA Board with a project briefing in February

2021, followed by three workshops in May 2021, January 2023, and November 2023. The purpose of the project briefing was to introduce the project and planning team, review the master planning process, and present the draft aviation activity forecast. The workshops were conducted to present preliminary findings and provide a platform for the BRAA Board to provide input on the overall project direction. These workshops were critical to the planning process and ensured the recommended airport improvement plan aligned with BRAA's strategic initiatives and vision.

TAC meetings were held in April 2022 and October 2022 to provide a status of the MPU and obtaining feedback from BRAA staff, Airport tenants, representatives from nearby counties and municipalities, regulatory agencies, and public officials. The TAC informed the MPU process by providing facility and aircraft operation information, reviewing the project's technical analyses, and making recommendations to the planning team.

Copies of the presentations for each stakeholder meeting are included in **Appendix A**.

2. INVENTORY OF EXISTING CONDITIONS

The inventory chapter of the MPU provides information on the physical, operational, and functional characteristics of the Airport and surrounding environs. An overview of the Airport's surrounding airspace, meteorological conditions, baseline environmental conditions, existing sustainability policies, and regional setting are included within the inventory chapter. This information was obtained from a variety of sources, including previous studies and leasehold documents provided by BRAA. A site visit and interview with BCT management and operations staff was conducted on September 17, 2020, to verify or supplement the available documented information.

The last comprehensive Airport Master Plan for BCT was initiated in 2001 and completed in 2004. The study, titled Airport Enhancement Plan, included an ALP drawing set that was approved by the FAA in 2006. Subsequent ALP updates were completed in 2012, 2014, 2018, and 2019. Since the completion of the 2004 Airport Enhancement Plan, the aviation industry has evolved, federal and state regulations have changed, and several improvement projects have been completed at the Airport to accommodate increased aviation demand and improve the existing airfield.

BRAA has completed numerous studies since the 2004 Airport Enhancement Plan. These studies are useful in defining the baseline conditions for this MPU and to inform and guide this planning effort. These studies include:

- 2006 Airfield Capacity Overview
- 2012 Operational Needs Assessment and Runway Safety Area Study
- 2015 Wildlife Hazard Assessment
- 2016 Airspace Atlas and Obstruction Study
- 2017 Aircraft Noise Exposure Contours
- 2018 Wildlife Hazard Management Plan
- 2019 Facilities Management Plan
- 2020 Strategic Business Plan

This chapter also summarizes the on-Airport development that has occurred since the completion of the 2004 Airport Enhancement Plan, most notably including:

- BRAA Administration Building
- US CBP facility
- EMASs on the Runways 5 and 23 ends
- Fixed base operator (FBO) facilities - 12-acre development presently occupied by Signature Flight Support
- Nonaeronautical development (City Furniture/Ashley Home Store)

This chapter of the MPU is organized under the following headings:

- Airport Overview and History
- Inventory of Airport Physical Facilities
- Airspace
- Meteorological Conditions
- Environmental Conditions
- Existing Sustainability Policies and Opportunities
- Regional Setting and Land Use

2.1 AIRPORT OVERVIEW AND HISTORY

The Airport is located in Boca Raton, Florida, in Palm Beach County near the southeastern county boundary, as illustrated on **Exhibit 2-1**. BCT opened in 1936, serving as a local city airport before ownership was transferred to the US and the Airport transitioned into an Army Air Force base in 1942, during World War II.[1] The base was renamed Boca Raton Army Airfield; its primary mission was to train flight crews on the use of radar technology.

In December 1947, the base closed and the federal government transferred the Airport to the, then, Town of Boca Raton on December 29, 1948, with the provision that the Airport be used for the benefit of the public. The Airport was renamed as the Boca Raton Airport.

In the 1950s, ownership was transferred to the State of Florida. The BRAA was created by state legislature in 1983 to control the Airport under a 90-year lease agreement with the Board of Trustees of the State of Florida Internal Improvement Trust Fund for Airport Property. The 90-year land lease is set to expire on January 22, 2073. As of October 2023, legislation is currently being considered by the State of Florida to transfer ownership of the Airport to the BRAA.

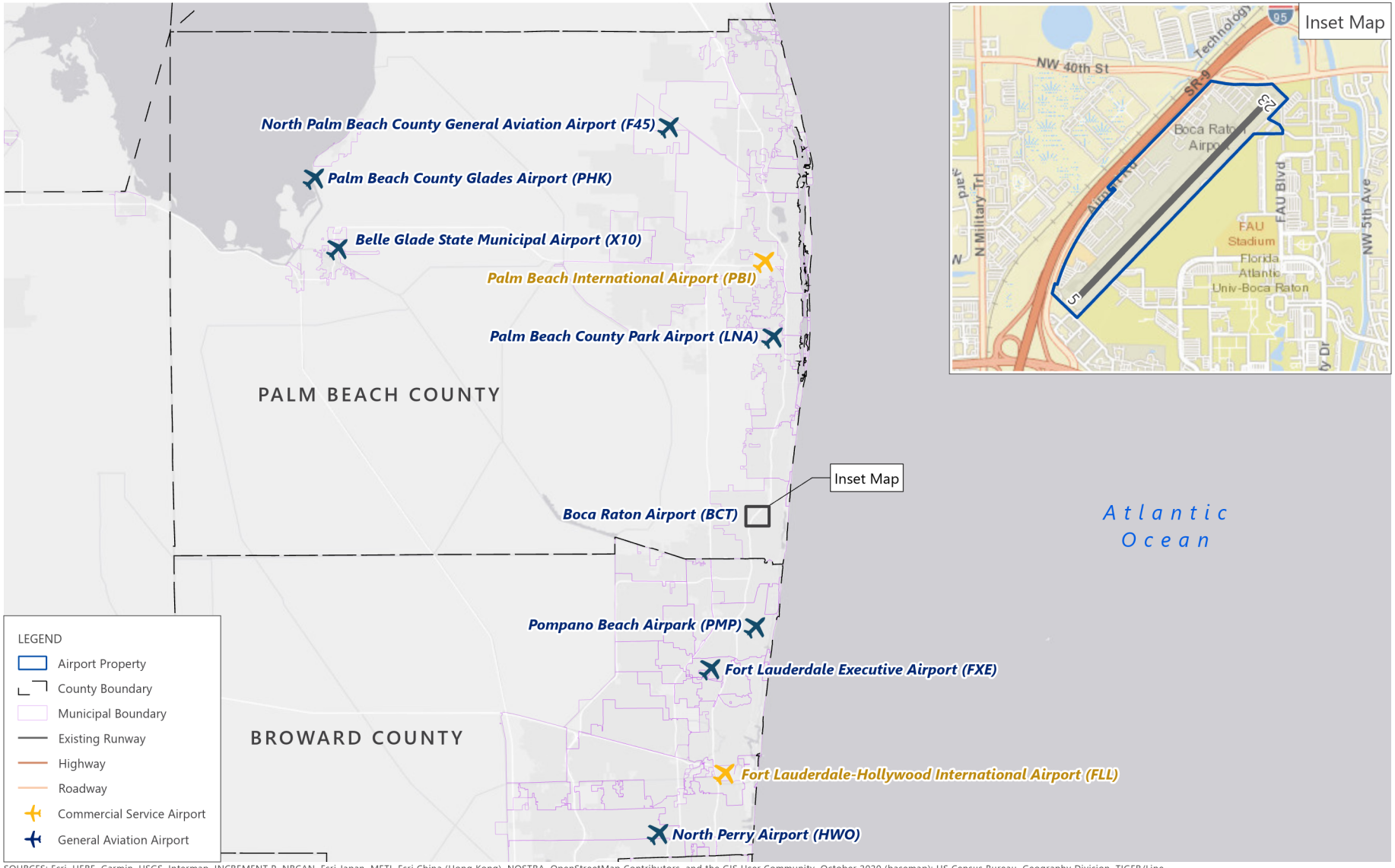
Exhibit 2-2 illustrates select historical milestones for BCT.

2.1.1 AIRPORT GOVERNANCE AND ADMINISTRATION

The BRAA Board comprises seven members. Five members are appointed by the Boca Raton City Council and two members are appointed by the Palm Beach County Commission. The positions on the BRAA Board are: Chair, Vice Chair, Secretary/Treasurer, and four Board Members. Together, the Board members are responsible for providing oversight and policy direction on all matters pertaining to the management and development of the Airport.

The Executive Director of BCT is employed by the BRAA and is responsible for the daily operation of the Airport. There are currently (as of October 2020) seven full-time positions and a part-time position under the management of the Executive Director.

[1] Boca Raton Airport Authority, Boca Raton Airport, History, https://bocaairport.com/about/history/ (accessed October 20, 2020).



SOURCES: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCAN, Esri Japan, METI, Esri China (Hong Kong), NOSTRA, OpenStreetMap Contributors, and the GIS User Community, October 2020 (basemap); US Census Bureau, Geography Division, TIGER/Line Shapefile, 2017 (counties); Florida Geographic Data Library (FGDL), 2015 (municipal boundary); Federal Aviation Administration-Aeronautical Information Services Open Data, May 2020 (airports); Boca Raton Airport Authority, 2017 (Airport property).

EXHIBIT 2-1

AIRPORT LOCATION MAP

P:\GIS\Projects\BCT\MXD\BCT_MasterPlanUpdate_20230420.aprx

EXHIBIT 2-2 HISTORICAL MILESTONES FOR BOCA RATON AIRPORT

1936 – Boca Raton Airport opened

1941 – Established as a U.S. Army Air Base

1948 – Airport transferred to the town of Boca Raton for public use



1983 – Boca Raton Airport Authority established

2000 – Airport Traffic Control Tower (ATCT) constructed



2004 – Airport Enhancement Plan (Master Plan) completed

2005 – Second fixed base operator opens (currently Signature Flight Support facilities)

2015 – Airport Administration Building opened



2016 – Runway 5 departure end Engineering Materials Arresting System (EMAS) installed



2017 – Runway 23 departure end EMAS installed



2018 – U.S. Customs and Border Protection facility opened

SOURCES: Boca Raton Airport Authority, Boca Raton Airport, https://bocaairport.com/about/history/ (accessed October 2020); Ricondo & Associates, Inc., October 2020.

2.1.2 AERONAUTICAL ROLE

The FAA designates the Airport as a GA reliever airport within NPIAS. The FDOT Aviation and Spaceport Office (ASO) also categorizes BCT as a GA reliever airport. BCT relieves aircraft traffic from PBI, a medium-hub commercial airport located 18.3 nautical miles (NM) north of BCT, and FLL, a large-hub commercial airport located 18.5 NM south of BCT.

In May 2012, the FAA published a study, *General Aviation Airports: A National Asset*, that assessed the aviation activity and functionality of GA airports within the NPIAS. Four classifications were developed as part of the study, which classified BCT as a National Airport. National Airports are located in metropolitan areas near major business centers; they have high levels of activity by jet and multi-engine aircraft, are home to large numbers of based aircraft, and provide communities with access to national and international markets. BCT is one of nine National Airports in the state of Florida.

2.1.3 LAND HOLDINGS AND EXISTING LEASEHOLDS

The Airport encompasses 215 acres. The BRAA leases approximately 95 acres to aeronautical and nonaeronautical tenants. The prime aeronautical tenants are Atlantic Aviation, Premier Aviation of Boca Raton (Premier Aviation), and Boca Aircraft Owners (BAO). Atlantic Aviation and Premier Aviation sublease Airport facilities to several aeronautical businesses. These tenants and subtenants provide the following:

- aircraft storage (hangars and tie-downs) and parking
- aircraft maintenance and repair
- flight training
- aircraft fueling
- aircraft sales
- air charter

Atlantic Aviation and Premier Aviation also sublease portions of their leasehold to nonaeronautical businesses, including Fairfield Inn & Suites (hotel) and Mattress Firm (retailer). Premier Aviation has leased to restaurant operators in the past; however, its restaurant space is vacant as of November 2020.

In addition to the prime aeronautical tenants at BCT, there are three prime nonaeronautical tenants that offer goods and services in the retail and entertainment industries. The prime nonaeronautical tenants are:

- Apex Parks Group, LLC (Boomers!) – recreational complex
- iStar Florida 2015 Cinemas, LLC (Cinemark Theatres sublease) – movie theater
- City Furniture/Ashley Home Store (City Furniture) – furniture retailer

Exhibit 2-3 illustrates the leasehold boundaries of the prime aeronautical and nonaeronautical tenants. **Table 2-1** summarizes the aeronautical and nonaeronautical leasehold facilities.



SOURCES: Boca Raton Airport Authority, *Airport Tenant Leasehold Boundaries*, January 2020; Boca Raton Airport Authority, *Airport Layout Plan*, March 2012.

NORTH 0 800 ft

EXHIBIT 2-3

PRIMARY TENANT LEASEHOLDS

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\3. Inventory of Existing Conditions\AutoCAD\Exhibit 2-3_BCT_Primary Tenant Leaseholds.dwgLayout: 8.5X11L Map Plotted: Oct 31, 2023, 09:08AM

TABLE 2-1 LEASEHOLD INVENTORY

PRIMARY TENANT	LEASEHOLD SIZE (ACRES)	LEASE TERM DATE	SUBTENANTS	TYPE OF BUSINESS
Atlantic Aviation	40.9	6/30/2033	Reliable Jet Maintenance	Aeronautical
			Privaira	Aeronautical
			Lynn University Flight School	Aeronautical
			Global Wings	Aeronautical
			Runway 5-23 Hangar Condominium Association	Aeronautical
			Journey Aviation	Aeronautical
			Southern Jet	Aeronautical
			Fairfield Inn and Suites	Nonaeronautical
Premier Aviation of Boca Raton	14.7	9/26/2035	Signature Flight Support	Aeronautical
			Boca Aircraft Maintenance	Aeronautical
			Vida Jets	Aeronautical
			Mattress Firm	Nonaeronautical
			Restaurant (vacant)	Nonaeronautical
Boca Aircraft Owners	9.3	9/30/2031	N/A	Aeronautical
Apex Parks Group, LLC (Boomers!)	9.9	5/31/2041	N/A	Nonaeronautical
iStar Florida 2015 Cinemas, LLC (Cinemark Theatres)	14.9	3/1/2032	N/A	Nonaeronautical
City Furniture/Ashley Home Store	4.8	11/30/2038	N/A	Nonaeronautical

NOTE:
N/A – Not Applicable
SOURCE: Boca Raton Airport Authority, January 2020; Ricondo & Associates, Inc., November 2020.

2.2 INVENTORY OF AIRPORT PHYSICAL FACILITIES

2.2.1 AIRFIELD

The following subsections describe the existing runway, taxiway system, hold pads, and navigational aids (NAVAIDS), as well as the existing airfield design criteria, operational procedures, and pavement conditions.

The FDOT completed a Statewide Airfield Pavement Management Program (SAPMP) in 2019 that summarizes airfield pavement conditions at Florida airports. Pavement conditions were assessed using the pavement condition index (PCI) methodology defined in FAA Advisory Circular (AC) 150/5380-7B, *Airport Pavement Management Program (PMP)*. The PCI is a numerical indicator that reflects the structural integrity and operational condition of a pavement. The PCI values range from 0, representing failed pavement, to 100, representing new pavement. The range of PCI values, along with the general condition of the pavement are as follows:

- PCI Values 0 -10 - Failed
- PCI Values 11 – 25 - Serious

- PCI Values 26 – 40 - Very Poor
- PCI Values 41-55 - Poor
- PCI Values 56-70 - Fair
- PCI Values 71-85 - Satisfactory
- PCI Values 86 – 100 - Good

PCI values provide an indication of the degree of maintenance, repair, or rehabilitation that will be necessary to sustain functional pavement. According to the SAPMP, corrective actions include the following at the various PCI values:

- PCI Values 0 – 39 – Major reconstruction
- PCI Values 40 – 64 – Major rehabilitation such as pavement mill and overlay or partial full depth reconstruction
- PCI Values 65-85 – Surface treatments such as crack sealing, thin overlays, or joint sealing
- PCI Values 86 – 100 – Periodic joint/crack sealing and local patching

According to the SAPMP, the airfield pavement system at BCT is in good condition overall, with an average PCI value of 90. **Exhibit 2-4** illustrates the pavement condition and the PCI ranges for each subsection of pavement at BCT. Details regarding airfield pavement condition are also included in the following subsections.

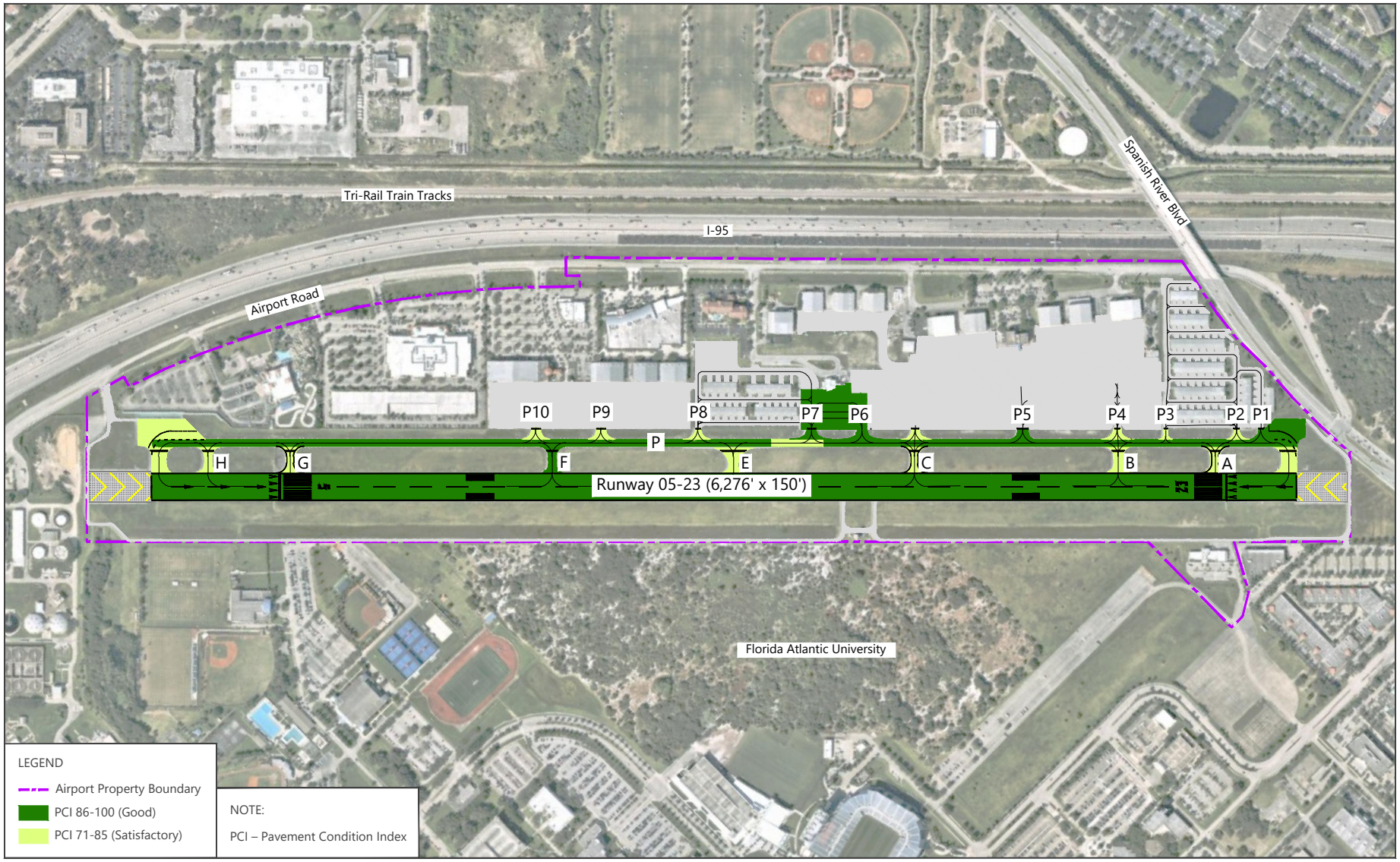
2.2.1.1 RUNWAY

Runway 5-23 is constructed of asphalt concrete and is 6,276 feet long and 150 feet wide. The runway does not have shoulders. The landing thresholds of Runways 5 and 23 are displaced by 696 feet and 378 feet, respectively, reducing the landing distance available for each runway end. The runway was milled and resurfaced in 2009, and a rejuvenator, a thin layer of asphalt sealant, was applied in 2018. According to the SAPMP, the runway pavement is in good condition with a PCI value of 92.

The ends of Runway 5-23 are equipped with EMAS designed to protect aircraft during overruns and increase operational safety. The EMAS is a high energy absorbing material that will reliably and predictably deform under the weight of an aircraft that overruns or undershoots the runway. The EMAS located at the departure end of Runway 5 (Runway 23 approach end) was installed in 2016, and the EMAS located at the departure end of Runway 23 (Runway 5 approach end) was installed in 2017. The EMASs at BCT also serve as blast pads designed to prevent erosion from aircraft jet blast.

The airfield signage system was installed in 2008 and is in poor condition. The airfield signage requires ongoing maintenance, including the replacement of sign bases, panels, and electrical components.

Table 2-2 presents the general characteristics of the Airport's runway. In addition to the runway's physical characteristics, this table summarizes the runway's load bearing capacity, effective gradient, pavement markings, and associated lighting system.



SOURCES: Florida Department of Transportation, Aviation and Spaceport Office, *Statewide Airfield Pavement Management Program*, November 2019; Boca Raton Airport Authority, *Airport Layout Plan*, March 2012.

EXHIBIT 2-4

AIRFIELD PAVEMENT CONDITION

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\3. Inventory of Existing Conditions\AutoCAD\Exhibit 2-4_BCT_Airfield Pavement Conditions.dwgLayout: 8.5x11L Plotted: Oct 31, 2023, 09:10AM

TABLE 2-2 RUNWAY CHARACTERISTICS AND SUPPORTING INFRASTRUCTURE

CHARACTERISTICS	RUNWAY 5	RUNWAY 23
Length (feet)	6,276	6,276
Width (feet)	150	150
Length of Displaced Threshold (feet)	696	378
Declared Distances (feet):		
Takeoff Run Available (TORA)	6,276	6,276
Takeoff Distance Available (TODA)	6,276	6,276
Accelerate-Stop Distance Available (ASDA)	6,276	6,276
Landing Distance Available (LDA)	5,580	5,898
Pavement Markings	Non-Precision	Non-Precision
Pavement Marking Condition	Fair	Fair
Pavement Condition (Failed–Good)	Good	Good
Pavement Condition Index (0–100)	92	92
Pavement Condition Number (PCN)	32	32
Runway Composition	Asphalt – Grooved	Asphalt – Grooved
Effective Gradient (Percentage)	0.01	-0.01
Load Bearing Capacity (pounds):		
Single Wheel	66,000	66,000
Double Wheel	95,000	95,000
Blast Pad		
Length (feet)	339.7	278.0
Width (feet)	190.1	184.0
Runway Edge Lights	MIRLs (incandescent)	MIRLs (incandescent)
Approach Aids	REILs / PAPI	REILs / PAPI
Engineered Materials Arresting System[1]		
Length (feet)	243.1	303.7
Width (feet)	162.0	170.1

NOTES:
MIRLs – Medium Intensity Runway Lights
REILs – Runway End Identifier Lights
PAPI – Precision Approach Path Indicator
1 The Engineered Materials Arresting System length and width noted are for the departure end of the runway.
SOURCES: US Department of Transportation, Federal Aviation Administration, Airport Data and Information Portal, https://adip.faa.gov/agis/public/#/airportData/BCT (accessed September 2020); Ch2M Hill, Inc., *Engineer's Design Report Boca Raton Airport Runway 23 Departure End EMAS*, October 2016; Florida Department of Transportation, Aviation and Spaceport Office, *Statewide Airfield Pavement Management Program District 4*, November 2019.

2.2.1.2 TAXIWAYS

Taxiway P, located northwest of Runway 5-23, is a 40-foot-wide full-length parallel taxiway that provides access between the runway and various aviation facilities. Taxiways A, B, C, E, F, G, and H are runway exit taxiways that provide access/egress between Runway 5-23 and parallel Taxiway P. The runway exit taxiways are 40 feet wide, except for Taxiways B and E, which are 50 feet wide. Taxiways P1 through P10 vary in width from 25 feet to approximately 70 feet and provide access/egress between parallel Taxiway P and the aviation-related facilities northwest of Runway 5-23.

Parallel Taxiway P and Taxiways P1 through P10 were milled and resurfaced in 2009 and vary in condition between satisfactory and good. The width of Taxiways P5, C, P9, and P10 was increased in November 2020 to approximately 70 feet to comply with the FAA's airfield geometry standards, specifically the turning radius, for Taxiway Design Group (TDG) 2.

Table 2-3 summarizes the characteristics of the taxiway system at BCT, including taxiway width dimensions, pavement condition, and areas of the airfield that each taxiway serves. **Exhibit 2-5** illustrates the location of the taxiways at BCT.

2.2.1.3 HOLD PADS

Hold pads are located near the ends of Runways 5 and 23, adjacent to Taxiway P. Aircraft awaiting air traffic clearance and/or conducting engine runups occupy the hold pads while allowing aircraft that are ready for takeoff to bypass them. The hold pad at the Runway 5 end is in good condition with PCI values of 79 and 80. The hold pad at the Runway 5 end is equipped with a jet blast deflector to redirect high energy exhaust from jet engines and prevent damage to on- and off-Airport facilities. The hold pad at the Runway 23 end is also in good condition with a PCI value of 88. Maintenance runups are prohibited in the hold pads between 8:00 p.m. and 8:00 a.m.

2.2.1.4 AIRFIELD DESIGN CRITERIA

This subsection discusses the airfield design criteria established for the Airport and reflected on the FAA-approved ALP.

Airport Reference Code

The Airport Reference Code (ARC) is a designation indicating the most demanding aircraft or grouping of aircraft that regularly operate at an airport in terms of approach speed and physical aircraft design. The ARC is expressed as an alphanumeric identifier, comprising the Aircraft Approach Category (AAC), representative of aircraft approach speeds, and Airplane Design Group (ADG), representative of aircraft wingspan and tail height.

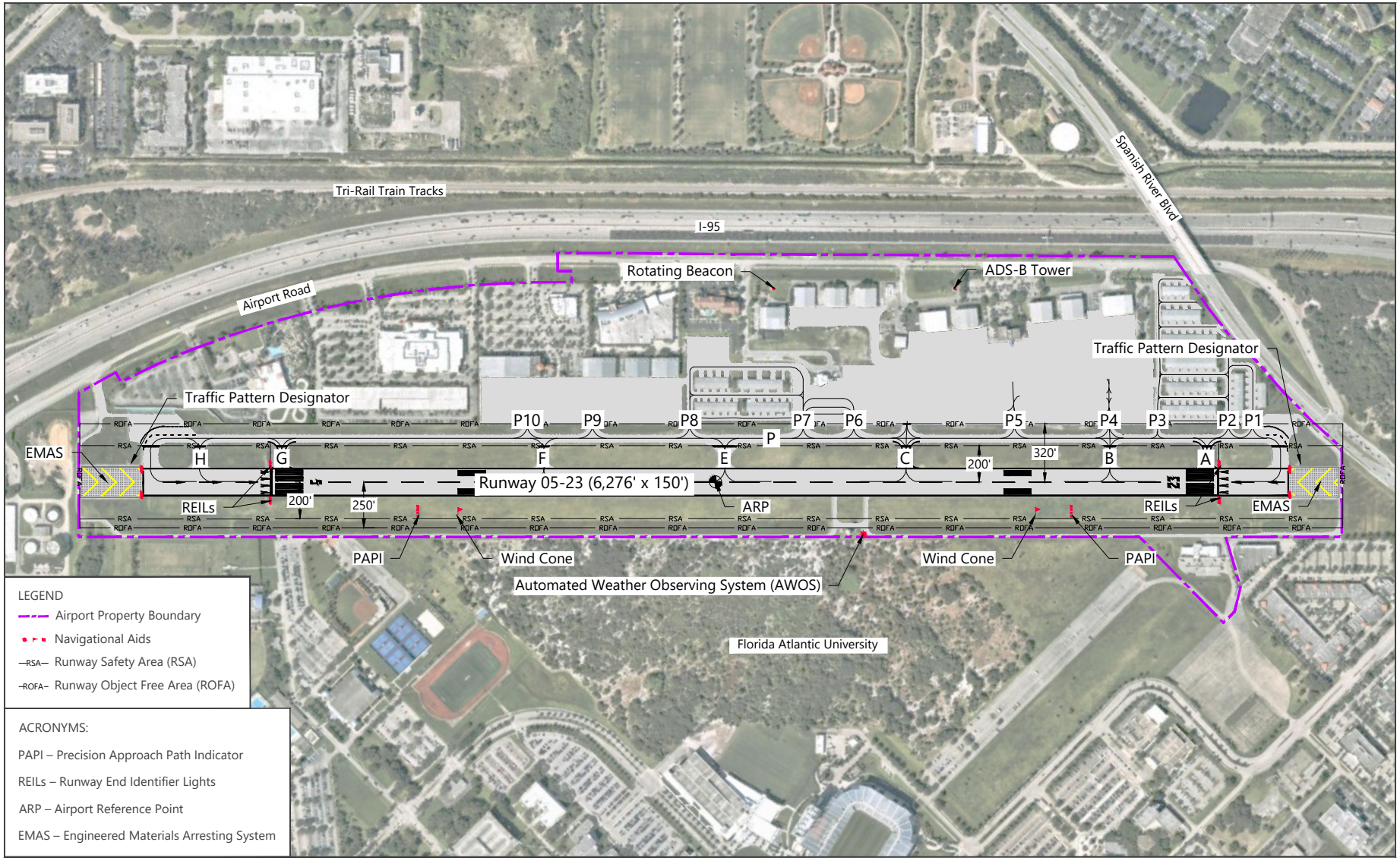
Approach categories A and B typically include small piston engine and turboprop aircraft, as well as small business jets. Conversely, approach categories C and D consist of medium to large business jets, as well as larger jet and propeller aircraft that are generally associated with commercial and/or military use.

The FAA-approved ALP lists the ARC for BCT as C-II. The ARC is used for planning and design only and does not limit the aircraft that may be able to operate safely at an airport. AAC and ADG criteria are prescribed in AC 150/5300-13A, Change 1, *Airport Design*, and detailed in **Table 2-4**.

TABLE 2-3 TAXIWAY SYSTEM INVENTORY

TAXIWAY NAME	TAXIWAY WIDTH (FEET)	PAVEMENT CONDITION	PAVEMENT CONDITION INDEX	TAXIWAY LIGHTING	AREAS SERVED
A	40	Satisfactory	81	MITLs	Runway 5-23 / Taxiway P
B	50	Satisfactory	85	MITLs	Runway 5-23 / Taxiway P
C	40–70	Satisfactory	82	MITLs	Runway 5-23 / Taxiway P
E	50	Satisfactory	71	MITLs	Runway 5-23 / Taxiway P
F	40	Good	86	MITLs	Runway 5-23 / Taxiway P
G	40	Satisfactory	85	MITLs	Runway 5-23 / Taxiway P
H	40	Satisfactory	82	MITLs	Runway 5-23 / Taxiway P
P	40-85[1]	Satisfactory to Good	80–90	MITLs	Runway 5-23 / Various GA and FBO Areas
P1	25	Satisfactory	88	MITLs	Boca Aircraft Owners T-Hangars
P2	25	Satisfactory	83	MITLs	Boca Aircraft Owners T-Hangars
P3	20	Satisfactory	77	MITLs	Boca Aircraft Owners T-Hangars; Lynn University Facilities
P4	25	Satisfactory	85	MITLs	Atlantic Aviation; Lynn University Facilities; Reliable Jet Maintenance
P5	70	Good	88	MITLs	Atlantic Aviation; Lynn University Facilities; Reliable Jet Maintenance
P6	50	Good	100	MITLs	Atlantic Aviation; CBP Facility; Runway 5-23 Hangar Condominium Association T-Hangars; Lynn University Facilities
P7	50	Good	100	MITLs	CBP Facility; Runway 5-23 Hangar Condominium Association T-Hangars
P8	25	Satisfactory	84	MITLs	Runway 5-23 Hangar Condominium Association
P9	70	Satisfactory	85	MITLs	Signature Flight Support
P10	70	Satisfactory	81	MITLs	Signature Flight Support

NOTES:
GA – General Aviation
FBO – Fixed Base Operator
MITLs – Medium Intensity Taxiway Lights
CBP – Customs and Border Protection
1 The width of Taxiway P, parallel to Runway 5-23, is 40 feet; however, the width of Taxiway P increases to 80 feet near the Runway 5 end and 85 feet near the Runway 23 end (the segments connecting parallel Taxiway P to the runway ends).
SOURCES: Florida Department of Transportation, *Statewide Airfield Pavement Management Program Summary Report*, Volume 2, November 2019; Google Earth Pro, 2020; Ricondo & Associates, Inc., *Airport Layout Plan*, June 2018.



SOURCES: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, January 2020 (aerial imagery); Boca Raton Airport Authority, *Airport Layout Plan*, March 2012.

EXHIBIT 2-5

EXISTING AIRFIELD

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TABLE 2-4 AIRPORT REFERENCE CODE SYSTEM

AIRCRAFT APPROACH CATEGORY (AAC)	
AAC	APPROACH SPEED
A	Approach speed less than 91 knots
B	Approach speed 91 knots or more, but less than 121 knots
C	**Approach speed 121 knots or more, but less than 141 knots**
D	Approach speed 141 knots or more, but less than 166 knots
E	Approach speed 166 knots or more

AIRPLANE DESIGN GROUP (ADG)		
ADG	WINGSPAN (FEET)	TAIL HEIGHT (FEET)
I	<49	<20
II	**49 to <79**	**20 to <30**
III	79 to <118	30 to <45
IV	118 to <171	45 to <60
V	171 to <214	60 to <66
VI	214 to <262	66 to <80

SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, *Airport Design*, February 26, 2014; Ricondo & Associates, Inc., *Airport Layout Plan*, June 2018.

Modifications of Standards

Modifications of Standards (MOS) are granted by the FAA to airports for applicable airport design standard deviations. MOS are not applicable for runway safety areas (RSAs). BCT has a substandard runway to taxiway centerline separation distance and runway object free area (ROFA) length and width. In May 2004, the Orlando Airports District Office (ADO) approved two MOS for BCT, addressing the deficiencies. **Table 2-5** describes the two MOS.

TABLE 2-5 MODIFICATIONS OF STANDARDS

STANDARD MODIFIED	FAA STANDARD (FEET) FOR C-II	EXISTING CONDITION (FEET)	DATE APPROVED
Runway Centerline to Parallel Taxiway Centerline Separation Distance	300	240	May 5, 2004
ROFA Length Beyond the Runway End and Width	Length: 1,000 Width: 800	RWY 5 Length: 350 RWY 23 Length: 300 Width: 570[1]	May 5, 2004

NOTES:
FAA – Federal Aviation Administration
ROFA – Runway Object Free Area
1 The overall width of the ROFA is 570 feet. The ROFA, however, is not centered on the runway centerline. The ROFA extends 320 feet from the centerline on the west side of Runway 5-23 and 250 feet from the centerline on the east side of Runway 5-23.
SOURCES: Ricondo & Associates, Inc., *Airport Enhancement Plan*, May 2004; Ricondo & Associates, Inc., *Airport Layout Plan*, June 2018.

2.2.1.5 OPERATIONAL PROCEDURES

Airplane Design Group III Procedures

Operational procedures are established at BCT due to the substandard runway centerline to taxiway centerline distance. The operational procedures are necessary to protect the Runway 5-23 RSA and runway obstacle free zone while the runway or parallel Taxiway P is being used by aircraft having a wingspan larger than ADG II. The operational procedures established in a 2004 Letter of Agreement (LOA) between the Airport and ATCT were as follows:

- No aircraft shall operate on Taxiway P while an ADG III or an AAC D aircraft operates on Runway 5-23.
- No aircraft shall arrive or depart on Runway 5-23 while an ADG III aircraft is operating on Taxiway P.

The LOA was revised in February 2012 and replaced in January 2016 with a SOP. The SOP states that ADG III aircraft will not be permitted to land or depart on Runway 5-23 while another ADG III aircraft uses Taxiway P. A copy of the correspondence summarizing the SOP can be found in **Appendix B**.

Noise Abatement

BCT has a noise abatement and pilot education program that was developed as part of the FAA-approved 14 Code of Federal Regulations (CFR) Part 150 Study published in 2001.[2] The noise abatement program is closely tied to the Airport's community engagement efforts. The noise abatement program consists of the following elements:

- noise abatement procedures for pilots, including recommended noise abatement flight paths
- a citizen input and noise abatement hotline
- internet-based flight tracking system
- noise abatement flight cards for pilots
- noise monitoring and flight tracking system (NMFTS) with seven permanent noise monitors throughout the community

The noise abatement program contains voluntary flight and operational restrictions, including the following:

- nighttime curfew between 10:00 p.m. and 7:00 a.m.
- touch-and-go operation confinement in effect Mondays through Fridays between 9:00 a.m. and 5:00 p.m.
- discouraged stop-and-go activities and midfield departures
- high-power maintenance runups prohibited at night (between 8:00 p.m. and 8:00 am)

[2] Boca Raton Airport Authority, Boca Raton Airport, Noise Abatement, https://bocaairport.com/noise-abatement/ (accessed October 2020).

2.2.1.6 NAVIGATIONAL AIDS

NAVAIDS are visual or electronic devices that provide aircraft operators with approach information, weather data, traffic pattern advisories, and airport and facility location information. NAVAIDS can include lighting, aviation weather equipment, and electronic equipment for aircraft guidance. The location of NAVAIDs at BCT are illustrated on Exhibit 2-5.

Rotating Beacon

The rotating beacon projects an oscillating white and green light every 180 degrees, indicating the location of the Airport and signaling that BCT is a civilian land airport. The beacon is operational from sunset to sunrise and during inclement weather conditions. The rotating beacon is located northwest of Runway 5-23, near the intersection of Airport Road and the access road to the US CBP facility. The beacon was installed in 1990 and repaired in 2005 after suffering damage during Hurricane Wilma. Airport staff noted the rotating beacon is in poor condition.

Precision Approach Path Indicators

Runway 5 is equipped with a precision approach path indicator (PAPI), a visual glide slope indicator that provides vertical descent guidance for landing aircraft. The PAPI is located on the right side of the runway, approximately 800 feet northeast of the Runway 5 displaced threshold. Similarly, Runway 23 is equipped with a PAPI located approximately 800 feet southwest of the Runway 23 displaced threshold. The PAPI that serves Runway 23 is located on the left side of the runway. The PAPIs are scheduled to be replaced in November 2020 with light emitting diode (LED) PAPIs.

Runway End Identifier Lights

Runway end identifier lights (REILs) aid pilots in the identification of the runway ends in areas surrounded by a significant amount of lighting (other than airfield lights). Additionally, REILs help identify runways during periods of reduced visibility and when runways lack contrast with surrounding terrain. REILs are synchronized flashing white lights that are aimed outward from the runway thresholds into the approach. Both runway ends at BCT are equipped with REILs positioned at the corners of the displaced thresholds. The REILSs are in excellent condition and were replaced with LED fixtures in 2019.

Wind Cones / Traffic Indicators

At BCT, two lighted wind cones provide pilots a visual cue of the prevailing wind direction. One is located immediately north of the Runway 5 PAPI, and the other is located immediately south of the Runway 23 PAPI. The wind cones are in poor condition and are not surrounded by a segmented circle. Traffic pattern designators are located adjacent to the approach ends of Runways 5 and 23. Exhibit 2-5 illustrates the location of the wind cones and traffic pattern indicators.

Automated Weather Observing System

Wind data are currently recorded and reported by an automated weather observing system (AWOS) III located northeast of the ATCT. The AWOS wind sensor is located atop the catwalk of the ATCT. The AWOS III at BCT was installed in 2013 and records and reports the following data:

- wind direction, speed, and gusts
- visibility (reported in statute miles)
- temperature and dewpoint

- altimeter setting
- precipitation
- cloud height
- pertinent remarks relative to operating environment, including nearby obstructions, and the airfield

Weather data reported by the AWOS III are retrievable via the designated very high frequency (VHF), 121.125, or via phone at (561) 391-2696.

Automatic Dependent Surveillance – Broadcast Ground Station

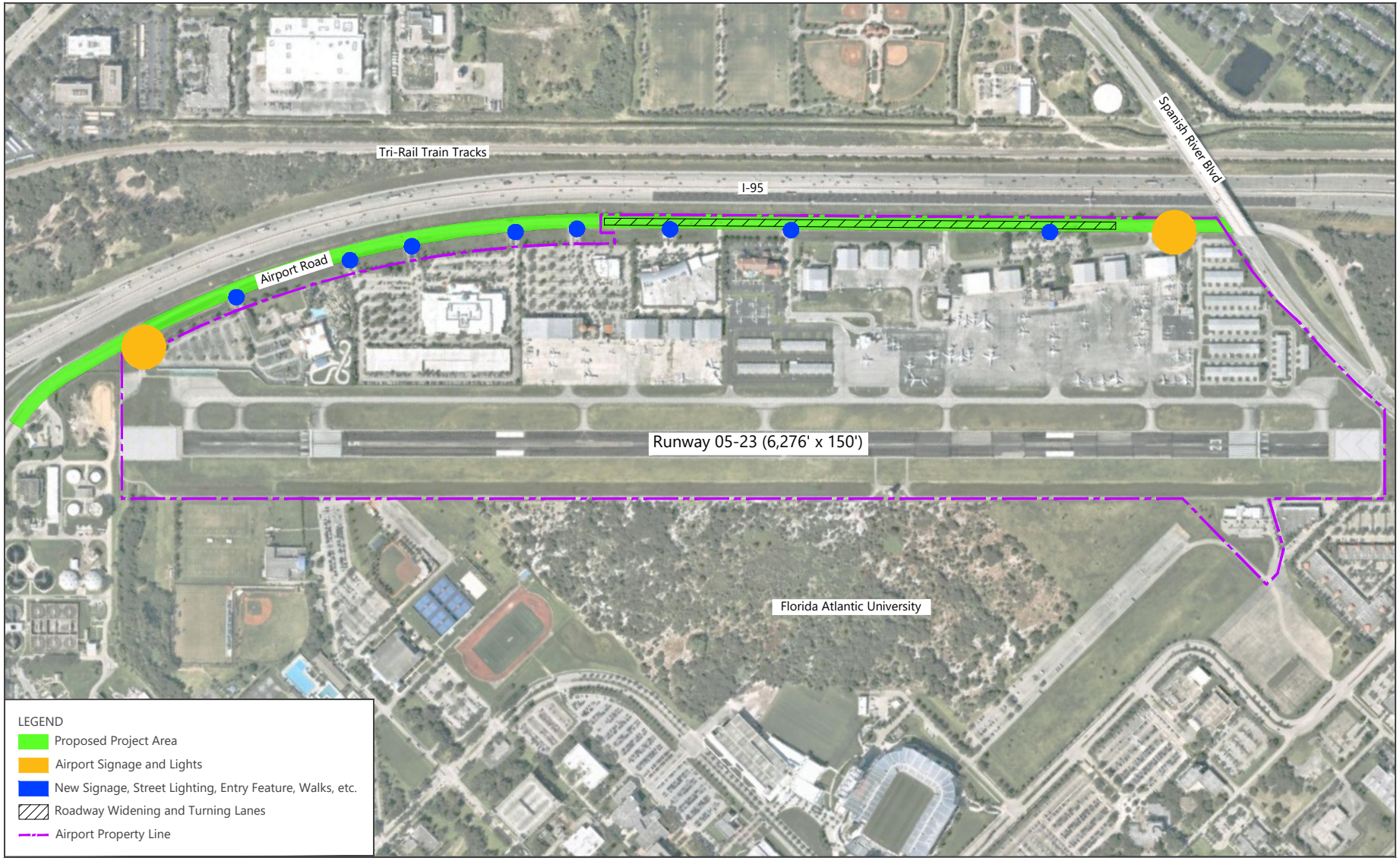
Automatic Dependent Surveillance – Broadcast (ADS-B) technology is a component of the FAA's NextGen program that uses satellite-based global positioning system (GPS) to track aircraft in real time and improve situational awareness. ADS-B also provides properly equipped aircraft with weather and air traffic information. ADS-B requires a network of ground-based stations to communicate with satellites and other technologies used by controllers and pilots. BCT has an ADS-B ground station (located atop a tower) northwest of Runway 5-23, near Atlantic Aviation. The ADS-B tower location is illustrated on Exhibit 2-5.

2.2.2 LANDSIDE ACCESS

The aeronautical and nonaeronautical facilities, located west of Runway 5-23 and adjacent to Interstate 95, are accessible via Airport Road. Airport Road varies between two and four lanes to accommodate vehicular traffic and turning movements from its northern terminus at Spanish River Boulevard and at the southern terminus at Glades Road. Turning lanes are also provided in front of the entrances to Signature Flight Support, Boomers!, Mattress Firm, and Cinemark Theatres.

The BRAA initiated a beautification project to enhance the aesthetics along Airport Road. The project includes plantings of royal palms and native grasses on and off Airport property. Also included as part of the project are roadway improvements, including the addition of turning lanes and medians, as well as the relocation of power lines underground. Portions of the existing sidewalk will be widened, and two new BCT monument signs will be installed. The location and type of improvements of the beautification project along Airport Road are illustrated on **Exhibit 2-6**. A sample rendering of the proposed improvements, including the addition of a median and turning lane, landscape improvements, and signage and lighting is illustrated on **Exhibit 2-7**.

The BRAA Administration Building and ATCT, located on the eastern side of the airfield, are accessible via Northwest 8th Avenue. A main thoroughfare of the Florida Atlantic University (FAU) campus, Northwest 8th Avenue varies between five and six lanes.



SOURCE: Boca Raton Airport Authority, *Airport Layout Plan*, March 2012.

EXHIBIT 2-6

AIRPORT ROAD AND BEAUTIFICATION IMPROVEMENTS

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\3. Inventory of Existing Conditions\AutoCAD\Exhibit 2-6_BCT_Airport Access Road and Beautification Project.dwgLayout: 8.5X11L Map Plotted: Oct 31, 2023, 09:19AM



SOURCE: Hauber Fowler & Associates, LLC, *Airport Road and Beautification Rendering*, October 2018.

EXHIBIT 2-7

AIRPORT ROAD AND BEAUTIFICATION PROJECT RENDERING

0 Not To Scale

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\3. Inventory of Existing Conditions\AutoCAD\Exhibit 2-7_BCT_Airport Access Road and Beautification Rendering.dwgLayout: 8.5X11L Map Plotted: Oct 31, 2023, 09:23AM

2.2.3 FIXED BASE OPERATOR AND GENERAL AVIATION FACILITIES

There are two FBOs that operate at BCT, Atlantic Aviation and Signature Flight Support, and one GA tenant, BAO. **Exhibit 2-8** illustrates the FBOs and GA tenant, along with their associated aeronautical facilities, which are described in the following subsections.

2.2.3.1 ATLANTIC AVIATION

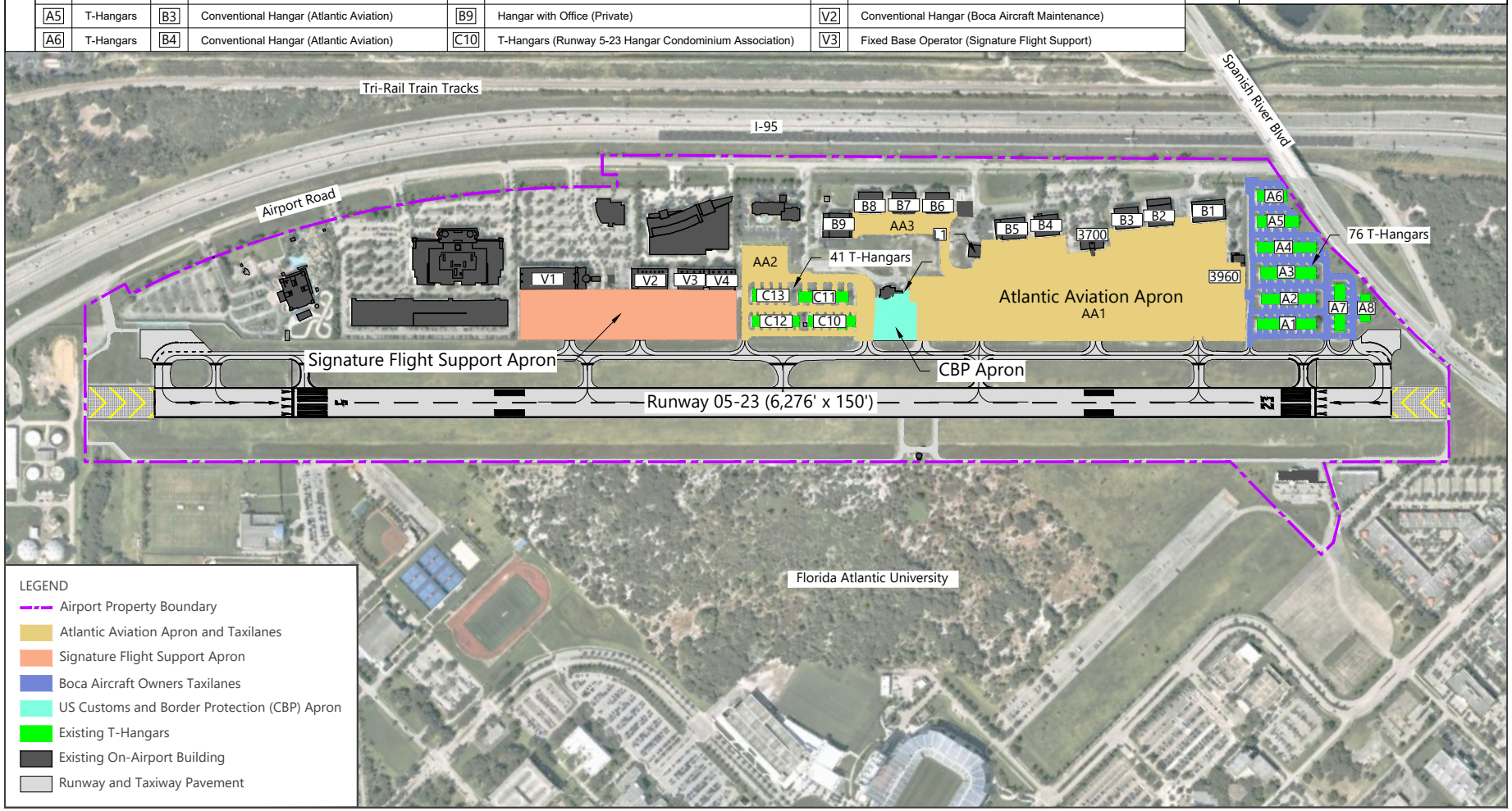
Atlantic Aviation is a full-service FBO providing ramp, aircraft fueling, and crew and passenger services. Atlantic Aviation owns Hangars B5, C10, C11, C12, and C13 and leases Hangars B1, B2, B3, B4, B6, B7, B8, and B9 from the BRAA. The main Atlantic Aviation facility, Building 3700, is a four-story building with approximately 7,000 square feet per floor. The building includes space for crew and passenger lounges, conference rooms, and office space.

Atlantic Aviation subleases hangar space, offices, and aircraft parking apron areas to various GA subtenants offering maintenance, charter operations, and pilot training and education services. The subtenants, along with a summary of their offerings and facilities, are as follows:

- **Reliable Jet Maintenance** is an FAA-certified repair station that offers airframe and powerplant repair services to Gulfstream, Challenger, Learjet, Hawker, Cessna, Beechcraft, Dassault, and Israel Aircraft Industries aircraft. Reliable Jet Maintenance subleases Hangar B1 and the collocated office space.
- **Privaira** is a private charter company that operates a range of turboprop aircraft and small to midsize jet aircraft at BCT, including Hawker 400 XP and 850 XP, Cessna Citation Jet CJ4, and Falcon 50 and 2000. Privaira occupies Hangar B9 and the collocated office space.
- **Runway 5-23 Hangar Condominium Association** is located approximately midfield with four T-hangar facilities (C10, C11, C12, and C13), occupying 100,000 square feet of land and consisting of 41 individual hangars for the storage of based aircraft.
- **Journey Aviation** is an on-demand charter operator that provides domestic and international private charter flights utilizing an aircraft fleet consisting of mid-size jets, including a Hawker 4000, Falcon 2000, and three Gulfstream 400 series aircraft. Journey Aviation also specializes in aircraft sales and management.
- **Global Wings** specializes in charter brokerage, aircraft sales, and charter operator management.
- **Lynn University** operates a Part 141 flight training facility at the Airport, occupying the 3960 Lynn Building, as illustrated on Exhibit 2-8. The university operates a fleet of Cessna 172s and Diamond DA42s.
- **Southern Jet** is an FAA certified Part 135 charter operator that conducts charter flights throughout North and South America utilizing a fleet of midsize jets, including two Learjet 60 aircraft, a Challenger 300, and a Hawker 800XP. Southern Jet also offers management and aircraft acquisition consulting services to clients.

Table 2-6 details the facilities leased and sublet by Atlantic Aviation. Exhibit 2-6 illustrates the aprons within the Atlantic Aviation leasehold. Apron AA1 is approximately 775,000 square feet and accommodates the daily operations of the Atlantic Aviation FBO, Reliable Jet Maintenance, Lynn University, and Journey Aviation, including transient and based aircraft parking, aircraft fueling, and passenger boarding and deplaning. Atlantic Aviation utilizes Apron AA2, west of the Runway 5-23 Hangar Condominium Association T-hangars, for based aircraft parking. Apron AA2 is approximately 32,000 square feet. Apron AA3 is used by Atlantic Aviation and Privaira operations, including aircraft maintenance, based aircraft parking, and boarding and deplaning of passengers. Apron AA3 is approximately 55,500 square feet.

Identifier											
BUILDING TABLE											
A1	T-Hangars	A7	T-Hangars	B5	Hangar with Office (Atlantic Aviation)	C11	T-Hangars (Runway 5-23 Hangar Condominium Association)	V4	Fixed Base Operator (Signature Flight Support)		
A2	T-Hangars	A8	T-Hangars	B6	Conventional Hangar (Atlantic Aviation)	C12	T-Hangars (Runway 5-23 Hangar Condominium Association)	L1	Hangar with Office		
A3	T-Hangars	B1	Hangar with Office (Reliable Jet Maintenance)	B7	Conventional Hangar (Atlantic Aviation)	C13	T-Hangars (Runway 5-23 Hangar Condominium Association)	3700	Fixed Base Operator (Atlantic Aviation Offices)		
A4	T-Hangars	B2	Hangar with Office (Atlantic Aviation)	B8	Conventional Hangar (Atlantic Aviation)	V1	Fixed Base Operator (Signature Flight Support and Vida Jets)	3960	Lynn Building (Office/Flight School)		
A5	T-Hangars	B3	Conventional Hangar (Atlantic Aviation)	B9	Hangar with Office (Private)	V2	Conventional Hangar (Boca Aircraft Maintenance)				
A6	T-Hangars	B4	Conventional Hangar (Atlantic Aviation)	C10	T-Hangars (Runway 5-23 Hangar Condominium Association)	V3	Fixed Base Operator (Signature Flight Support)				



SOURCES: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, January 2020 (aerial imagery); Boca Raton Airport Authority, *Airport Layout Plan*, March 2012.

EXHIBIT 2-8

NORTH 0 800 ft.

FIXED BASE OPERATOR AND GENERAL AVIATION FACILITIES

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\3. Inventory of Existing Conditions\AutoCAD\Exhibit 2-8_BCT_FBO and GA Facilities.dwgLayout: Without ROFA and RSA Plotted: Oct 31, 2023, 09:26AM

TABLE 2-6 ATLANTIC AVIATION FACILITIES

HANGAR/BUILDING	TYPE	AREA (SQUARE FEET)[1]	OWNER	ATLANTIC AVIATION SUBTENANT
B1	Conventional Hangar w/ Office	17,000	BRAA	Reliable Jet Maintenance
B2	Conventional Hangar w/ Office	15,000	BRAA	N/A
B3	Conventional Hangar	12,000	BRAA	N/A
B4	Conventional Hangar	12,000	BRAA	N/A
B5	Conventional Hangar w/ Office	15,000	Atlantic Aviation	N/A
B6	Conventional Hangar	12,000	BRAA	N/A
B7	Conventional Hangar	12,000	BRAA	N/A
B8	Conventional Hangar	12,000	BRAA	N/A
B9	Conventional Hangar w/ Office	15,000	BRAA	Privaira
C10	T-Hangar	12,000	Atlantic Aviation	Runway 5-23 Hangar Condominium Association
C11	T-Hangar	12,000	Atlantic Aviation	Runway 5-23 Hangar Condominium Association
C12	T-Hangar	12,000	Atlantic Aviation	Runway 5-23 Hangar Condominium Association
C13	T-Hangar	12,000	Atlantic Aviation	Runway 5-23 Hangar Condominium Association
L1 Blue Hangar	Conventional Hangar w/ Office	3,600	BRAA	N/A
3700 Building	FBO with Office Space	28,000	BRAA	N/A
3960 Lynn Building	Office/Flight School	2,725	BRAA	Lynn University

NOTES:
FBO – Fixed Base Operator
BRAA – Boca Raton Airport Authority
N/A – Not Applicable
1 Approximate values.
SOURCE: Boca Raton Airport Authority, September 2020.

2.2.3.2 SIGNATURE FLIGHT SUPPORT

Signature Flight Support is a full-service FBO providing ramp, aircraft fueling, and crew and passenger services. Signature Flight Support subleases Hangars V1, V3, and V4 from Premier Aviation. Hangar V1 is 48,000 square feet and includes 31,000 square feet of aircraft parking space and 17,000 square feet of FBO administrative space. The FBO administrative space includes a crew and passenger lounge, business center, snooze room, and shower facilities. Hangars V3 and V4 are utilized by the FBO for based and transient aircraft storage.

As a part of Signature Flight Support's FBO operation, Premier Aviation also subleases hangar space, offices, and aircraft parking areas to the following primary businesses:

- **Boca Aircraft Maintenance** is an FAA-certified repair station that offers airframe and engine maintenance and inspection, as well as avionics installation and repair. Boca Aircraft Maintenance services Gulfstream, Learjet, Falcon, Eclipse, and Hawker aircraft. Boca Aircraft Maintenance subleases Hangar V2 for its operation.

- **Vida Jets** is an on-demand air charter company with access to a fleet of helicopters, turboprop aircraft, and jet aircraft ranging from very light jets to ultra-long-range jets. Vida Jets subleases space in Hangar V1.

Table 2-7 lists the various facilities associated with the Signature Flight Support FBO and their approximate size.

TABLE 2-7 SIGNATURE FLIGHT SUPPORT FACILITIES

HANGAR/BUILDING	TYPE	AREA (SQUARE FEET)[1]	OWNER	SUBTENANT[2]
V1	Conventional Hangar and FBO Facility	48,000	Premier Aviation of Boca Raton	Signature Flight Support and Vida Jets
V2	Conventional Hangar with Office	22,000	Premier Aviation of Boca Raton	Boca Aircraft Maintenance
V3	Conventional Hangar	15,000	Premier Aviation of Boca Raton	Signature Flight Support
V4	Conventional Hangar	15,000	Premier Aviation of Boca Raton	Signature Flight Support

NOTES:
FBO – Fixed Base Operator
1 Approximate values.
2 Signature Flight Support, Boca Aircraft Maintenance, and Vida Jets are subtenants of the prime leasehold between Premier Aviation of Boca Raton and the Boca Raton Airport Authority.
SOURCE: Boca Raton Airport Authority, September 2020.

The Signature Flight Support aircraft parking apron is approximately 272,000 square feet. The apron is used for transient and based aircraft parking, aircraft fueling, and boarding and deplaning of passengers.

2.2.3.3 BOCA AIRCRAFT OWNERS

BAO has operated at the Airport since October 1983; it occupies eight buildings (each with multiple T-hangars) located northwest of the Runway 23 approach end. In total, Hangars A1 through A8 occupy 101,500 square feet of land and consist of 76 individual hangars and 14 aviation storage units, each individually equipped with electricity, lighting, and a water hose bib. The BRAA owns Hangars A1 through A6. Hangars A7 and A8 are owned by BAO. The T-hangars accommodate a variety of small single and twin-engine aircraft with wingspans up to 43 feet (ARC A-I and B-I). **Table 2-8** lists the BAO hangars, along with their square footage and owner.

TABLE 2-8 BOCA AIRCRAFT OWNERS HANGAR FACILITIES

HANGAR/BUILDING	TYPE	AREA (SQUARE FEET)[1]	OWNER
A1	T-Hangar	15,500	BRAA
A2	T-Hangar	14,500	BRAA
A3	T-Hangar	17,000	BRAA
A4	T-Hangar	15,500	BRAA
A5	T-Hangar	12,700	BRAA
A6	T-Hangar	7,900	BRAA
A7	T-Hangar	12,200	BAO
A8	T-Hangar	6,200	BAO

NOTES:
BRAA – Boca Raton Airport Authority
BAO – Boca Aircraft Owners
1 Approximate value represent the size of the entire hangar.
SOURCE: Boca Raton Airport Authority, September 2020.

2.2.4 SUPPORT FACILITIES

Airport support facilities at BCT include the fuel farm facilities, the ATCT, the US CBP facility, and the BRAA Administration Building. **Exhibit 2-9** illustrates the support facilities.

2.2.4.1 FUEL FARM FACILITIES

Fuel farm facilities at BCT are operated by the FBOs, Atlantic Aviation and Signature Flight Support. The BRAA constructed the fuel farm operated by Atlantic Aviation. Premier Aviation constructed and owns the fuel farm facilities operated by Signature Flight Support. The fuel farm facilities consist of aboveground and underground storage tanks. **Table 2-9** details the fuel farm storage capacities at the Airport.

TABLE 2-9 FUEL STORAGE CAPACITIES

	JET A			AVGAS		
OPERATING FBO	NUMBER OF TANKS	TANK TYPE	TANK CAPACITY	NUMBER OF TANKS	TANK TYPE	TANK CAPACITY
Atlantic Aviation	2	Aboveground	30,000	1	Aboveground	15,000
Signature Flight Support	3	Underground	12,000	1	Underground	12,000

NOTE: FBO – Fixed Base Operator
SOURCE: Boca Raton Airport Authority, September 2020.

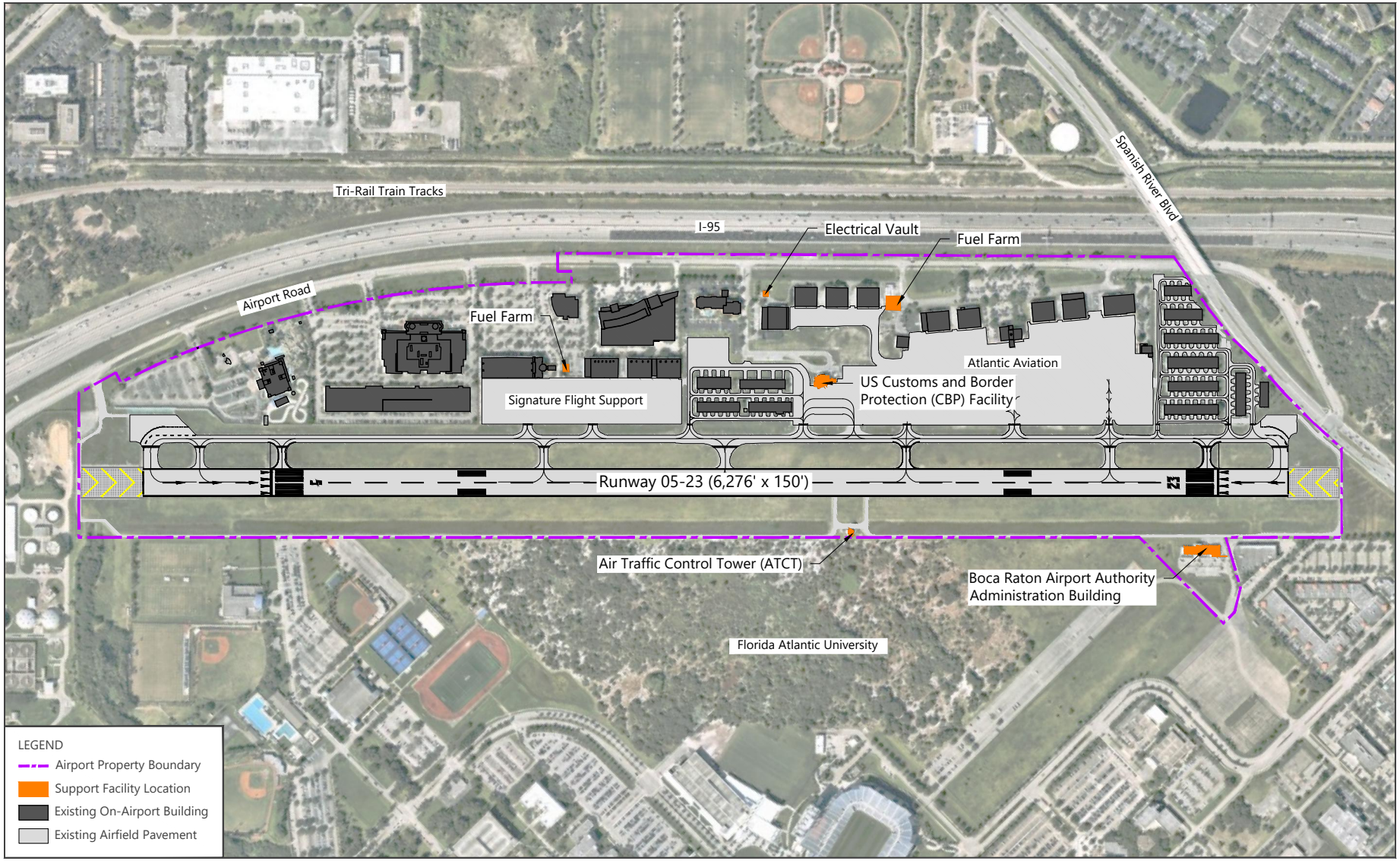
2.2.4.2 AIR TRAFFIC CONTROL TOWER

Various ATCT facilities provide air traffic services to aircraft arriving or departing the Airport or overflying the immediate area. The Miami Air Route Traffic Control Center, located in Miami, Florida, provides air traffic control (ATC) services to aircraft operating on instrument flight rules (IFR) flight plans within controlled airspace during the enroute phase of flight. The enroute phase of flight is generally when aircraft are operating between departure and destination terminal areas.

BCT is located north of the boundary between PBI Terminal Radar Approach Control (TRACON) airspace and Miami International Airport (MIA) TRACON airspace. The PBI ATCT is equipped with TRACON that provides radar ATC services to aircraft arriving and departing BCT and other public and private-use airports in the terminal area. Additionally, the PBI TRACON provides ATC services to aircraft operating under visual flight rules (VFR), that are enroute to or from BCT, and transitioning to or from the Class C airspace associated with PBI.

ATC services to aircraft operating in the immediate vicinity and on the airfield are provided by the BCT ATCT located east of Runway 5-23, as illustrated on Exhibit 2-9. The BCT ATCT, which is part of the FAA Contract Tower (FCT) Program, opened in 2000 and is owned and maintained by the BRAA. In addition to the tower, the BRAA maintains certain ATC equipment including the radios; very high frequency (VHF) transmitters, receivers, and antennas; ATC voice switching consoles; a digital recorder; and flight data input/output system. The following improvements to the ATCT were completed in 2016:

- installation of a new roof; heating, ventilation, and air-conditioning (HVAC) system; and plumbing and fixtures
- replacement of certain doors and hatches
- replacement of bathroom flooring
- interior painting



SOURCES: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, January 2020 (aerial imagery); Boca Raton Airport Authority, *Airport Layout Plan*, March 2012.

NORTH 0 800 ft.

EXHIBIT 2-9

SUPPORT FACILITIES

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\3. Inventory of Existing Conditions\AutoCAD\Exhibit 2-9_BCT_Support Facilities.dwgLayout: Without ROFA and RSA Plotted: Oct 31, 2023, 09:27AM

The ATCT is operated under a contract with Robinson Aviation, Inc., and is open daily, between 7:00 a.m. and 11:00 p.m. Communications with the BCT ATCT are conducted on the 118.425 VHF. The ATCT is 63.6 feet above ground level (AGL) and is equipped with six cameras mounted atop the facility that monitor the entire airfield.

2.2.4.3 US CUSTOMS AND BORDER PROTECTION FACILITY

On May 31, 2018, BCT began accepting international arrivals at a newly constructed CBP facility. The facility is a one-story, 4,550-square-foot building (see **Exhibit 2-10**) certified by the US Green Building Council as Leadership in Energy and Environmental Design (LEED). The CBP facility is owned by the BRAA and is located immediately north of the Runway 5-23 Hangar Condominium Association T-hangars.

As of August 2020, 3,136 aircraft and 14,159 passengers had been processed at the BCT CBP facility since its opening in 2018. Origin destinations included Canada, Bahamas, Dominican Republic, Italy, and England. Additionally, 50 vessels have been processed at the facility.

EXHIBIT 2-10 US CUSTOMS AND BORDER PROTECTION FACILITY



SOURCE: Ricondo & Associates, Inc., September 2020.

The CBP facility is a user-fee facility open Thursday through Monday between 10:30 a.m. and 6:30 p.m., with after-hour processing available upon request. Kiosks located in the pre-processing area are designed to process user fee payments.

The BCT CBP facility has a processing capacity of 20 persons at a time for both passengers and crew of aircraft and boats. Aircraft processed at the facility range from single-engine piston aircraft to large jets, with medium-size jets accounting for the highest percentage of processed aircraft.

The major features of the facility and passenger processing flow are described as follows:

- The pre-processing waiting area is equipped with a kiosk, form counter, seating, and restrooms for passengers awaiting screening.

- The passenger processing area is equipped with a counter serviced by up to two (typically one) inspection officers.
- An airside post-processing waiting area is available for cleared passengers and crew reboarding aircraft. Cleared passengers and crew whose destination is BCT exit the processing area to the post-processing passenger waiting area that is equipped with a kiosk, a transactional/processing window, and seating.
- Passengers and crew of vessels entering the US from an international place or port required to report to a CBP facility begin their clearing process in the post-processing passenger waiting area, utilizing the kiosk and transaction/processing window.
- Other support areas within the facility include rooms for holding, searching, and interrogation; a CBP agriculture laboratory; and office space for CBP personnel.
- The facility is equipped with an on-site incinerator for prohibited regulated garbage, as well as an emergency generator. The facility is also equipped with an airside pet relief area.

The CBP facility is in excellent condition according to the 2019 Facilities Management Plan. The CBP apron is located adjacent to the facility, is approximately 43,000 square feet and can accommodate simultaneous Cessna Citation X and smaller aircraft or a single large corporate jet such as the Gulfstream 650. The apron is in good condition with a PCI value of 100 according to the SAPMP.

Ground access to the facility is provided by an airport access road that branches east from Airport Road. Guest parking consists of 18 spaces, including one Americans with Disabilities Act (ADA) accessible space. Guest parking is located immediately west and south of the CBP facility.

2.2.4.4 BOCA RATON AIRPORT AUTHORITY ADMINISTRATION BUILDING

The BRAA Administration Building, located northeast of the ATCT, opened in 2015. The building is a 9,200-square-foot LEED silver facility certified by the US Green Building Council. According to the 2019 Facilities Management Plan, the facility is in excellent condition with no immediate maintenance recommendations or requirements.

The BRAA Administration Building comprises six offices, two conference rooms, a noise abatement office, and an operations staging area. Of the six offices, one is dedicated to the Airport Executive Director, while another is designed with an open concept and can seat multiple staff members. The noise abatement office houses flight tracking and noise monitoring hardware and software applications. Additionally, badging operations are conducted within the noise abatement office.

On the north side of the facility is an operations staging area outfitted with three garage bay doors. This area is dedicated to housing maintenance equipment, Airport operations vehicles, and construction staging and safety equipment. Other areas within the BRAA Administration Building include a break room, copy/file room, storage room, and a reception area. The building is accessible from Northwest 35th Street and is adjacent to 33 parking spaces for employees and guests.

2.2.4.5 AIRFIELD ELECTRICAL VAULT

The airfield electrical vault is a one-story masonry building that contains the airfield electrical regulators and equipment. The building was constructed in the 1990s and is 600 square feet. Approximately 300 square feet of the building was used to store airport files, records, and drawings, as well as maintenance tools and equipment prior to the construction of the BRAA Administration Building. The airfield electrical vault is in fair condition and is located adjacent to the rotating beacon and access road to the US CBP facility. The location is illustrated on Exhibit 2-9.

2.2.5 SECURITY FENCING AND GATES

The perimeter of the BCT aircraft operating area (AOA) is surrounded by an 8-foot-tall chain link fence. Angled at the top of the fence are three horizontal strands of barbed wire that measure 1 foot in length. Four feet of subsurface fencing is located along the eastern perimeter of the AOA adjacent to the wooded areas and the southern perimeter.

There are 17 airfield access gates at BCT, of which 8 are electronically controlled and 9 are manually operated. Four of the electronically controlled access gates are located near the FBOs and are for FBO customer and employee use, including two that are solely for exiting. Three electronic access gates with ingress/egress functionality are located near the BAO hangar facilities. The fourth electronic access gate is located adjacent to the BRAA Administration Building and is for the sole use of Airport staff.

The BRAA Administration Building is not completely located within the AOA, only the western half of the building is enclosed in the perimeter fencing. All electronically controlled access gates are accessible 24 hours a day via a proximity card system. Manually operated gates at the Airport are secured with manual locking devices. They are located at various locations along the fence and are accessible by Airport staff or their designees.

2.2.6 NONAERONAUTICAL FACILITIES

Currently, five tenants and subtenants operate nonaeronautical facilities that utilize Airport property: Boomers!, Cinemark Theatres, City Furniture/Ashley Home Store, Fairfield Inn & Suites, and Mattress Firm. **Exhibit 2-11** illustrates the location of the nonaeronautical tenants. **Table 2-10** details the facilities, including square footage and lessor.

TABLE 2-10 INVENTORY OF NONAERONAUTICAL FACILITIES

BUILDING ID	TENANT / SUBTENANT	TYPE	FACILITY AREA (SQUARE FEET)[1]	LESSOR (TENANT OF BRAA)
3100	Boomers! (Tenant)	Recreation and Entertainment	23,000	Apex Parks Group, LLC (Boomers!)
M1	Cinemark Theatres (Subtenant)	Entertainment	113,300	iStar Florida 2015 Cinemas, LLC
M2	Cinemark Theatres (Subtenant)	Entertainment	103,500	iStar Florida 2015 Cinemas, LLC
3350	City Furniture/Ashley Home Store (Tenant)	Retail	95,000	City Furniture/Ashley Home Store
H1	Fairfield Inn & Suites (Subtenant)	Lodging	64,000	Atlantic Aviation
3320	Mattress Firm (Subtenant)	Retail	6,500	Premier Aviation of Boca Raton
3320	Vacant	Restaurant	8,700	Premier Aviation of Boca Raton

NOTE:
1 Approximate values.
SOURCE: Boca Raton Airport Authority, September 2020.



SOURCES: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, January 2020 (aerial imagery); Boca Raton Airport Authority, *Airport Layout Plan*, March 2012.

NORTH 0 800 ft.

EXHIBIT 2-11

NONAERONAUTICAL FACILITIES

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\3. Inventory of Existing Conditions\AutoCAD\Exhibit 2-11_Non-Aeronautical Facilities.dwgLayout: Without ROFA and RSA Plotted: Oct 31, 2023, 09:31AM

2.3 AIRSPACE

2.3.1 AIRSPACE CLASSIFICATION

The National Airspace System (NAS) is divided into three categories of airspace: controlled, uncontrolled, and special use. Classes A, B, C, D, and E are five subclassifications of controlled airspace that require aircraft operators to initiate and maintain two-way radio communication prior to entering and while within the confines of the controlled airspace in question. Unlike controlled airspace, uncontrolled airspace is solely comprised of Class G airspace that does not require aircraft operators to initiate or maintain two-way radio communications. Alert areas, prohibited areas, restricted areas, warning areas, military operating areas, and controlled firing areas are considered special use airspace with an array of operational restrictions and/or requirements per area. Alert areas serve as notification to nonparticipating aircraft operators that an area of high-density operations or unusual type of aerial activity is present.

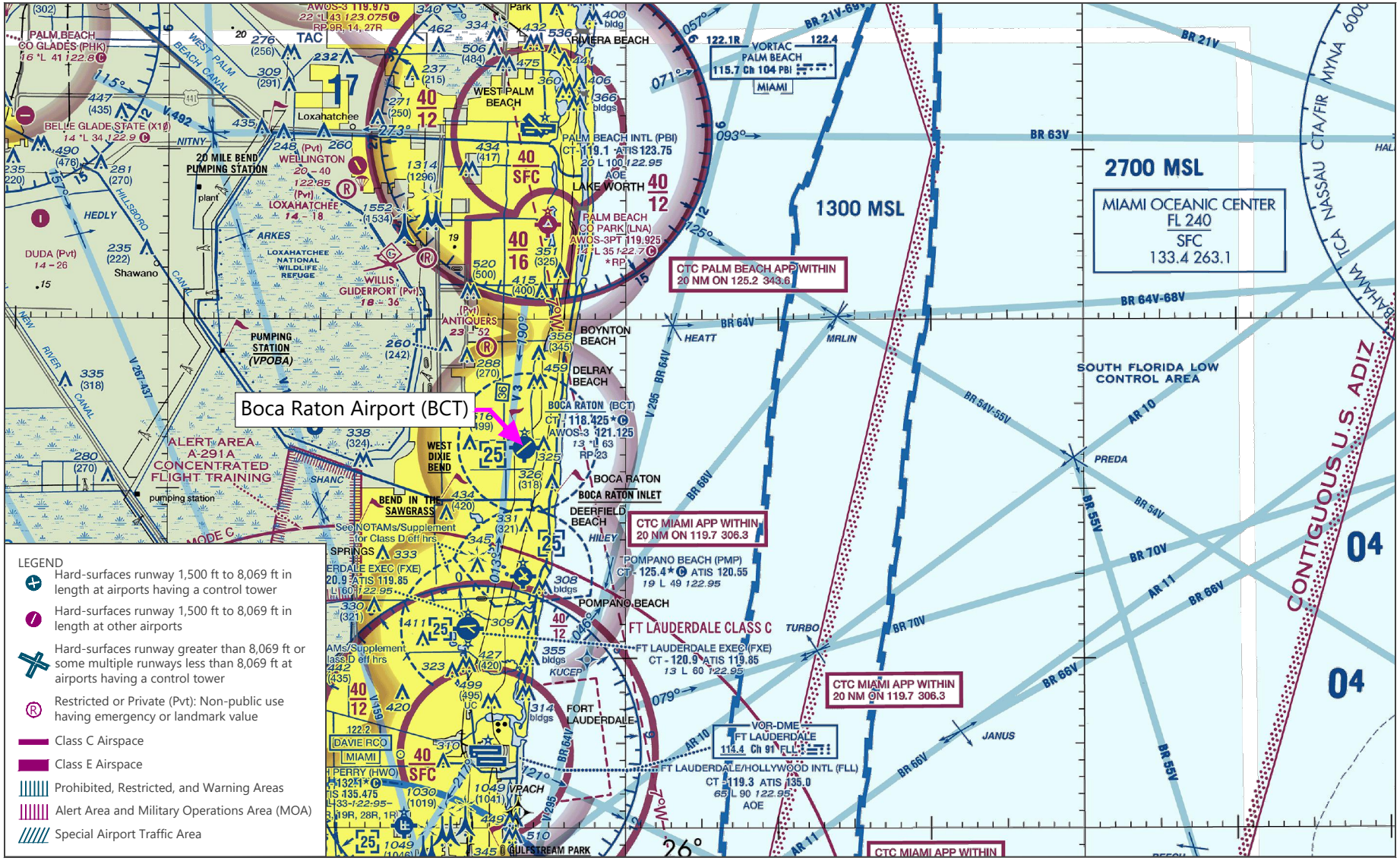
As illustrated on **Exhibit 2-12**, two commercial service airports, PBI and FLL, are within approximately 20 NM of BCT. Three GA airports are also within a 20 NM radius of BCT: Palm Beach County Park Airport (LNA), Pompano Beach Airpark, and Fort Lauderdale Executive Airport. The proximity of these airports contributes to a complex airspace where multiple airspace categories, including controlled, special use, and transitional airspace, surround BCT.

BCT is in a Class D airspace that originates from the surface to 2,500 feet above the Airport elevation. This Class D airspace is functional during the operational hours of the ATCT (7:00 a.m. to 11:00 p.m.). Upon closure of the ATCT, the Class D airspace reverts to Class G airspace originating at the surface and extending to, but not including, the base elevation of the overlying transitional Class E airspace originating at 700 feet AGL.

Air Defense Identification Zones (ADIZs) and temporary flight restriction (TFR) areas are not categorized as controlled, uncontrolled, or special use airspace. Establishment of the ADIZ requires aircraft registered in the United States and internationally to file and activate a flight plan with the appropriate aeronautical facility and to provide identification prior to entering or exiting the airspace of the United States. Aircraft operators must also close their flight plan once their trip has concluded. The corridor of the Contiguous US ADIZ is located east of BCT over the Atlantic Ocean.

2.3.2 TEMPORARY FLIGHT RESTRICTIONS

TFRs are designed to minimize and/or restrict flight operations within a certain area. BCT is located within the outer ring of the Mar-A-Lago Presidential TFR (VIP TFR or POTUS TFR), which is in effect only when President Trump is in residence at Mar-A-Lago. Mar-A-Lago is located approximately 2 NM east of PBI. The POTUS TFR has a 10 NM inner core and a 30 NM outer core centered around Mar-A-Lago. Aircraft operations are prohibited within the 10 NM inner core, unless special prerequisites are met. Aircraft operators that do not meet the special prerequisites must postpone, cancel, or reroute to an airport located outside the inner core radius. BCT is located 18 NM south of Mar-A-Lago and accommodates an influx of aircraft ranging in size when the TFR is active. In calendar year (CY) 2019, the Airport accommodated 8,793 operations during the Mar-A-Lago POTUS TFR periods. As of December 2020, it is unknown what the size, frequency, and/or restrictions associated with a TFR surrounding Mar-A-Lago will be when President Trump leaves office in January 2021.



SOURCE: National Oceanic and Atmospheric Administration, *Miami Sectional Chart*, September 2020.

EXHIBIT 2-12

NORTH 0 Not To Scale

VISUAL FLIGHT RULES SECTIONAL CHART

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\3. Inventory of Existing Conditions\AutoCAD\Exhibit 2-12_BCT_Visual Flight Rules Sectional Chart.dwgLayout: 8.5x11L Plotted: Oct 31, 2023, 09:33AM

Due to BCT's location within the 30 NM outer core, operational restrictions are imposed at the Airport. Touch-and-go, stop-and-go, and flight training operations are prohibited at BCT while the Mar-A-Lago POTUS TFR is in effect. Aircraft operations within the 30 NM outer ring are limited to arriving and departing traffic, unless authorized by ATCT. Arriving and departing traffic must fly with an active VFR or IFR flight plan, have an assigned transponder code, and remain in contact with the ATCT.

Aircraft parking at BCT is limited during the Mar-A-Lago VIP TFR periods, requiring transient aircraft to obtain permission from either FBO to park prior to departure. Notices to Airmen (NOTAMs) are issued for the duration of all TFRs, including the VIP TFR.

2.3.3 INSTRUMENT PROCEDURES

Runway 5-23 is currently served by approaches utilizing area navigation (RNAV) technology. As part of the FAA's NextGen Program, the implementation of satellite-based GPS procedures have been established. In lieu of ground-based NAVAIDS, RNAV routes rely on GPS satellites. **Table 2-11** lists standard terminal arrivals and instrument approach procedures for each runway at BCT.

TABLE 2-11 INSTRUMENT APPROACH PROCEDURES

	INSTRUMENT APPROACH PROCEDURES	
STANDARD TERMINAL ARRIVALS	TYPE AND RUNWAY	VISIBILITY MINIMUMS
CAYSL FOUR (RNAV)	RNAV (GPS) RWY 05	7/8 mile
PRRIE FIVE (RNAV)	RNAV (GPS) Y RWY 23	7/8 mile
TUXXI THREE	RNAV (RNP) Z RWY 23	1 3/8 mile

NOTES:
RNAV – Area Navigation
GPS – Global Positioning System
RNP – Required Navigation Performance
SOURCE: US Department of Transportation, Federal Aviation Administration, https://aeronav.faa.gov/upload_313-d/terminal/2020-09-10/SE3.pdf (accessed October 2020).

2.3.4 FEDERAL AVIATION ADMINISTRATION METROPLEX INITIATIVES

The FAA defines a metroplex as a geographic area covering several GA and commercial service airports that serve major metropolitan areas and a diversity of aviation stakeholders, such as airport operators, pilots, the FAA, the businesses within the metroplex area, and more. The FAA has established 11 metroplexes within the United States with the purpose of optimizing the airspace within the areas to improve efficiency. Current reductions in efficiency are partially caused by congested airspace due to activity at airports within close proximity. Part of the optimization process includes enhancing arrival and departure IFR procedures to improve the flow of air traffic into and out of the airports that comprise a metroplex.

BCT is located within the South-Central Florida Metroplex, consisting of 21 airports, including PBI, FLL, and MIA. The FAA conducted an Environmental Assessment (EA) to document the potential environmental effects associated with the proposed optimization of aircraft routes and arriving and departing IFR procedures. In October 2020, the FAA issued a Finding of No Significant Impact and Record of Decision for the proposed action of the South-Central Florida Metroplex project which determined that the project would not significantly affect the quality of the human environment.

The South-Central Florida Metroplex project includes 106 new and existing standard instrument departures (SIDs) and standard terminal arrivals (STARs) and 11 T-routes. **Table 2-12** details new SIDs and STARs to and from BCT. The new T-routes will serve all the south Florida airports, including BCT. The South-Central Florida Metroplex project also incorporates 42 new and existing RNAV (satellite-based) and instrument landing system (ground-based) instrument approach procedures. There are no new instrument approach procedures proposed for BCT as part of the Metroplex EA.

TABLE 2-12 SOUTH-CENTRAL FLORIDA METROPLEX PROPOSED PROCEDURES

PROPOSED PROCEDURE(S) TITLE	PROPOSED PROCEDURE TYPE	REPLACED ROUTE
CAPTN	STAR (RNAV)	CAYSL FOUR (RNAV)
CLMNT	STAR (RNAV)	CAYSL FOUR (RNAV)
RASAE	STAR (RNAV)	CAYSL FOUR (RNAV)
FEBAD	STAR (RNAV)	PRRIE FIVE (RNAV)
SHRVY	STAR (RNAV)	PRRIE FIVE (RNAV)
MELBOURNE	STAR (Route defined by ground-based NAVAIDs)	TUXXI THREE (Route defined by ground-based NAVAIDs)
STOOP	STAR (Route defined by ground-based NAVAIDs)	TUXXI THREE (Route defined by ground-based NAVAIDs)
MAHHI	STAR (RNAV)	N/A
MYZNR	SID (RNAV)	N/A
TTYLR	STAR (Route defined by ground-based NAVAIDs)	N/A
TURPS	SID (RNAV)	N/A

NOTES:
RNAV – Area Navigation
STAR – Standard Terminal Arrival
N/A – Not Applicable
SID – Standard Instrument Departure
SOURCE: US Department of Transportation, Federal Aviation Administration, *Final Environmental Assessment for the South-Central Florida Metroplex Project*, October 2020.

2.4 METEOROLOGICAL CONDITIONS

Weather has a direct effect on aircraft performance, and it plays an important role in the operation of airports. Wind and weather conditions impact runway use, runway length requirements, and runway capacity. In addition, the evaluation of meteorological conditions affecting an airport's operations generally dictates the type of airfield instrumentation required during poor weather for aircraft to safely land and takeoff. Observations of weather conditions at BCT, including wind direction and speed, visibility, and cloud ceiling, were used to evaluate general weather conditions and runway wind coverage.

2.4.1 GENERAL WEATHER CONDITIONS

Weather conditions related to aviation fall under two categories: visual meteorological conditions (VMC) and instrument meteorological conditions (IMC).

- **VMC** occur when the prevailing visibility is greater than or equal to 3 statute miles and the cloud ceiling is 1,000 feet AGL or higher. During VMC, pilots operate under VFR, essentially using visual means to see and maintain separation from other aircraft, objects, and terrain.

- **IMC** occur when the prevailing visibility is less than 3 statute miles, or the cloud ceiling is lower than 1,000 feet AGL. During IMC, pilots operate under IFR, relying on ATC to provide separation guidance from other aircraft and terrain. Operating under IFR requires additional pilot training and aircraft certifications beyond those required for operating under VFR. Pilots can operate under IFR in VMC.

The levels of rainfall, the prevailing winds, and the average amount of inclement weather help to determine runway orientation and the types of instrument approaches required to achieve the safest and most efficient operations possible. The National Oceanic and Atmospheric Administration (NOAA) compiles data related to precipitation and temperature. Although the Airport has an AWOS III located on the airfield, the data collected are not available on the NOAA website. The weather data for the Fort Lauderdale Executive Airport (FXE) weather station, located approximately 11.4 NM south of BCT (station identifier USW00012885), is used to assess the weather conditions the Airport.

The annual median temperature is 78.2 degrees Fahrenheit, with an average maximum temperature in the low 90s in August and lows in the high 50s in January. The NOAA precipitation data show the annual average rainfall over the data collection period was 58 inches, with much of the rainfall occurring from May through October. **Table 2-13** lists the average annual temperature and precipitation from January 2009 through October 2020.

TABLE 2-13 WEATHER CONDITIONS (11-YEAR NORMALS)

	ANNUAL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Average Max Temperature (°F)	85.4	76.4	78.5	80.5	84.7	86.9	90.0	91.1	91.5	89.6	86.5	81.4	78.8
Average Min Temperature (°F)	71.1	59.3	62.4	64.0	70.1	73.0	76.3	77.3	77.7	76.5	73.6	67.1	63.9
Average Temperature (°F)	78.2	67.8	70.5	72.3	77.4	80.0	83.1	84.2	84.6	83.1	80.1	74.3	71.3
Precipitation (inches)	58.2	2.3	1.6	3.0	3.8	6.5	5.9	6.4	7.5	8.0	5.8	3.6	3.9

SOURCE: US Department of Commerce, National Oceanic and Atmospheric Administration, *Fort Lauderdale Executive Airport Station (USW00012885)*, November 2020.

2.4.2 RUNWAY WIND COVERAGE

Local prevailing meteorological conditions at an airport, such as wind direction, cloud ceiling heights, and visibility, all directly influence the runway system functionality. As part of the MPU, a wind analysis was conducted to evaluate the local origin and velocity of prevailing winds.

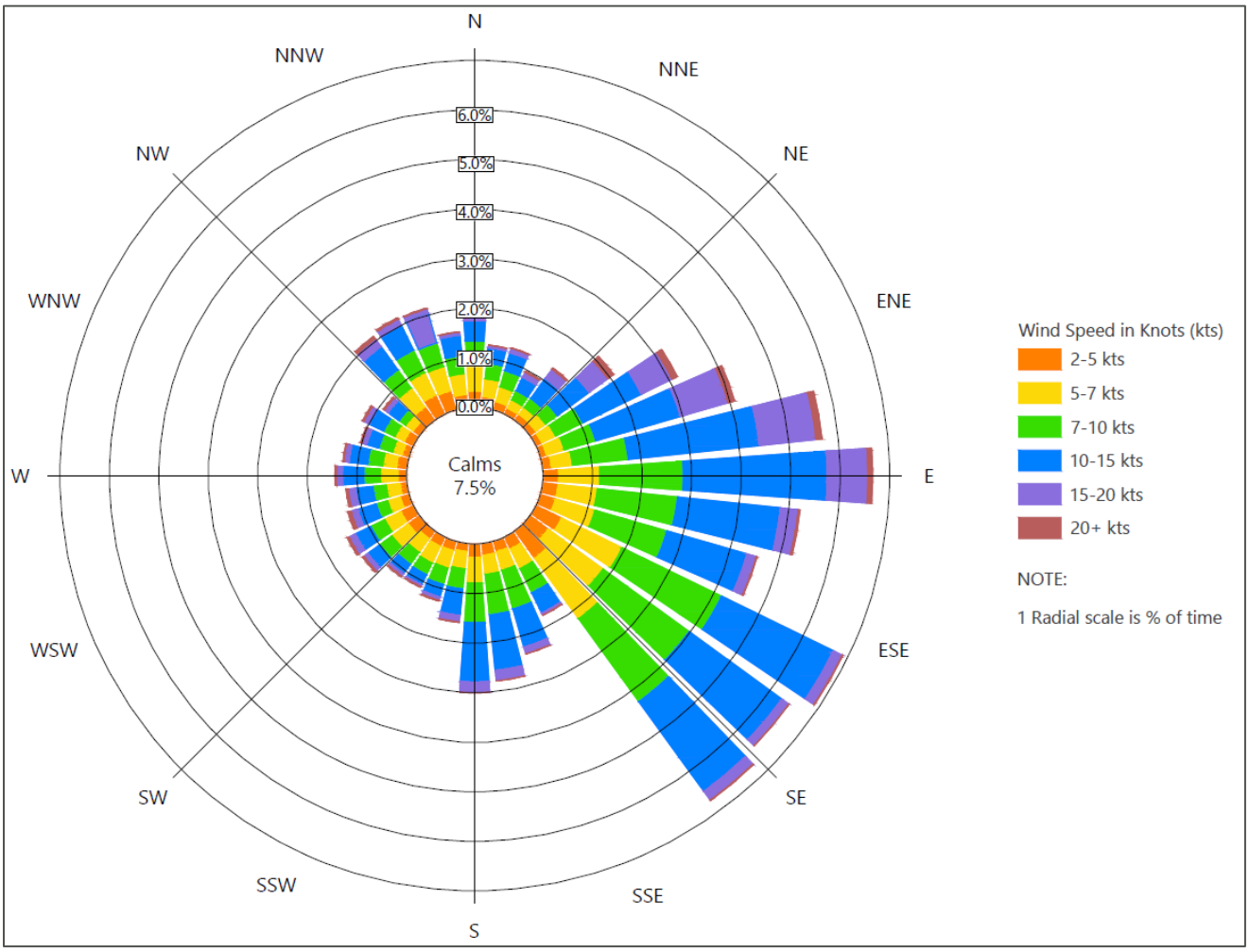
Wind patterns play an important role in determining runway orientation because aircraft typically take off and land into the wind. When the prevailing wind is not directly aligned with the runway orientation, pilots calculate the crosswind component. The crosswind component is the resultant vector of the runway direction and existing wind that acts at a right angle to the runway. Under certain conditions, surface winds that cross the runway at an angle during landing and takeoff can exert both headwind and crosswind components upon an aircraft. For operational safety considerations, the FAA AC 150/5300-13A, Change 1, *Airport Design*, Appendix 2, recommends that at least 95 percent crosswind coverage be provided by the runway system (one or more runways) at any airport for aircraft that are expected to conduct at least 500 operations per year.

Crosswind components of 10.5 knots, 13.0 knots, 16.0 knots, and 20.0 knots were evaluated to determine the runway wind coverage percentages for all Runway Design Codes (RDCs). According to an all-weather wind analysis for the

BCT AWOS weather station (based upon observations from 2010 through 2019), Runway 5-23 had a 99.2 percent wind coverage for the 16.5 knot crosswind component, which is required of the C-II RDC.

The BCT AWOS data observations were converted into a wind rose graphical representation using the Iowa State University's Iowa Environmental Mesonet.[3] The Iowa Environmental Mesonet integrates wind data information directly from AWOS station number 72202212803 located on the airfield at BCT. The data consisted of 51,787 hourly observations recorded from January 1, 2009, through January 1, 2019. The majority of the prevailing wind observations are from the east and southeast. **Exhibit 2-13** illustrates the all-weather wind rose representation.

EXHIBIT 2-13 ALL-WEATHER WIND ROSE



SOURCE: Iowa State University, Iowa Environmental Mesonet, Boca Raton Airport Station 72202212803, Wind Rose Plot, September 2020.

[3] Iowa State University, Iowa Environmental Mesonet, Boca Raton Airport Station 72202212803, https://mesonet.agron.iastate.edu/sites/locate.php (accessed September 2020).

2.5 ENVIRONMENTAL CONDITIONS

The environmental conditions inventory was prepared to evaluate the existing environmental conditions of the Airport property and surrounding community with the purpose of determining what, if any, environmental factors should be considered during the planning process.

The environmental conditions inventory focused on the specific environmental resource categories reviewed under NEPA and outlined under FAA Order 1050.1F.[4] Due to the location of the Airport and the surrounding environment, not all resources that are required to be reviewed under NEPA have the potential to be affected by proposed Airport development. The environmental resource categories relevant to future development at BCT are:

- Biological Resources
- Coastal Resources
- Department of Transportation, Section 4(f) Resources
- Hazardous Materials
- Historical, Archaeological, Architectural, and Cultural Resources
- Natural Resources and Energy Supply
- Noise and Noise-Compatible Land Use
- Water Resources

The existing conditions of these environmental resource categories are summarized in the following subsections.

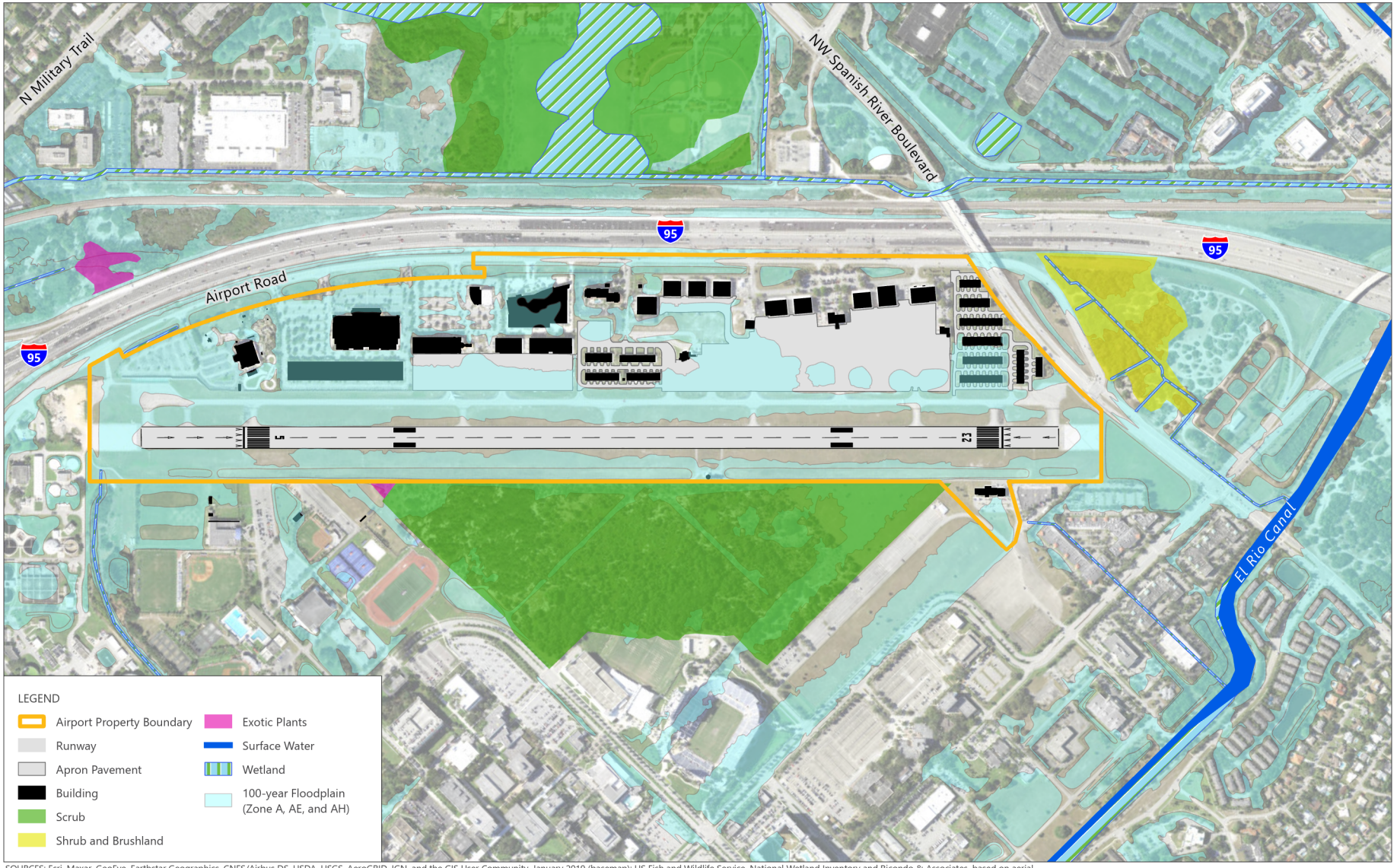
2.5.1 BIOLOGICAL RESOURCES

Exhibit 2-14 shows the vegetation on-Airport and in the vicinity of the Airport. Scrub, shrub and brushland, and a minor amount of exotic plants are present near the Airport property boundary.

The Florida Fish and Wildlife Conservation Commission (FFWCC) and the US Fish and Wildlife Service (USFWS) have authority over state and federally listed endangered and threatened species, respectively. A review of the USFWS Information for Planning and Consultation and the Florida Natural Areas Inventory databases identified threatened and endangered species that have the potential to have a presence on and around the Airport (see **Table 2-14**). The potential for habitat on-Airport to support these species has not been confirmed.

In 2018, a Wildlife Hazard Management Plan was completed for BCT to define measures to maintain safe operations by deterring wildlife from Airport property. Per the Wildlife Hazard Management Plan, any tortoise found on the Airport must be returned outside the perimeter fence as soon as possible (preferably in the wooded FAU property if authorized by the landowner). If a burrowing owl is found nesting in a safety area (including the RSA and taxiway safety area), then BRAA staff has the right to collapse its burrow once the owl is retrieved, under Florida Administrative Code (FAC) Rule 68A-9.012.

[4] US Department of Transportation, Federal Aviation Administration, Order 1050.1F, *Environmental Impacts: Policies and Procedures*, July 16, 2015.



SOURCES: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, January 2019 (basemap); US Fish and Wildlife Service, National Wetland Inventory and Ricondo & Associates, based on aerial imagery, October 2020 (wetlands); Federal Emergency Management Agency, FIRM Panels 12011C, 12099C, 2019 (floodplains); US Census, TIGER/Line Shapefile, 2019 (water); Ricondo & Associates, Inc., *Airport Layout Plan*, 2012 (Airport property and airfield).

EXHIBIT 2-14

NORTH 0 1,000 ft

ON AND OFF-AIRPORT ENVIRONMENTAL RESOURCES

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TABLE 2-14 FEDERALLY LISTED SPECIES POTENTIALLY OCCURRING NEAR THE AIRPORT

COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS
Florida Panther	*Puma concolor coryi*	Endangered
Southeastern Beach Mouse	*Peromyscus polionotus niveiventris*	Threatened
Florida Scrub-Jay	*Aphelocoma coerulescens*	Threatened
Ivory-Billed Woodpecker	*Campephilus principalis*	Endangered
Wood Stork	*Campephilus principalis*	Threatened
Eastern Indigo Snake	*Drymarchon corais couperi*	Threatened
Hawksbill Sea Turtle	*Eretmochelys imbricata*	Endangered
Leatherback Sea Turtle	*Dermochelys coriacea*	Endangered
Loggerhead Sea Turtle	*Caretta caretta*	Threatened
Bartram's Hairstreak Butterfly	*Strymon acis bartrami*	Endangered
Florida Leafwing Butterfly	*Anaea troglodyte*	Endangered
Miami Blue Butterfly	*Cyclargus thomasi bethunebakeri*	Endangered
Beach Jacquemontia	*Jacquemontia reclinate*	Endangered
Florida Prairie-Clover	*Dalea carthagenensis*	Endangered
Four-Petal Pawpaw	*Asimina tetramera*	Endangered
Tiny Polygala	*Polygala smallii*	Endangered
Florida Perforate Cladonia	*Cladonia perforate*	Endangered

SOURCE: US Fish and Wildlife Service, Information for Planning and Consultation, https://ecos.fws.gov/ipac/ (accessed October 1, 2020).

The USFWS has designated critical habitat for some federally endangered and threatened species in Palm Beach County; however, no designated critical areas are located within 1 mile of the Airport. State conservation land is located adjacent to the east side of the Airport on property owned and managed by FAU.

2.5.2 COASTAL RESOURCES

The Coastal Zone Management Act of 1972 ensures effective management, beneficial use, protection, and development of the coastal zone. The entire state of Florida is included within a coastal zone, and Palm Beach County is designated as a Florida Coastal County. Accordingly, any federal activity affecting the coastal zone must be consistent with the Florida Coastal Management Program. The Coastal Management Element of the County of Palm Beach's Comprehensive Plan defines proper use and management of the county's coastal resources, such as beaches and lagoons. Given BCT's location approximately 2 miles west of the Atlantic Ocean, most of the enforceable policies in the Coastal Management Element, which relate to protection of waterfront resources, are not directly applicable to development and operation of BCT, with the exception of policies related to stormwater runoff and water quality, with which BRAA complies.[5] These policies include meeting water quality regulations and compliance with National Pollutant Discharge Elimination System (NPDES) regulations.

2.5.3 DEPARTMENT OF TRANSPORTATION, SECTION 4(F) RESOURCES

Section 4(f) of the US Department of Transportation Act of 1966 (DOT Act of 1966) protects certain significant resources, such as publicly owned parks, recreational areas, wildlife, and waterfowl refuges of national, state, or local significance, and public and private historic sites of national, state, or local significance. Paragraph B-2 of FAA Order 1050.1F states:

[5] Palm Beach County, *Comprehensive Plan*, Coastal Management Element, December 10, 2018.

> Section 4(f) [of the DOT Act of 1966] provides that the Secretary of Transportation may approve a transportation program or project that requires the use of any publicly owned land from a public park, recreation area, or wildlife or waterfowl refuge of national, state, or local significance, or land from any publicly or privately owned historic site of national, state, or local significance, only if there is no feasible and prudent alternative to the use of such land and the program or project includes all possible planning to minimize harm resulting from the use.

There are no wildlife or waterfowl refuges or known historic sites located on Airport property or surrounding the Airport property boundary. Countess de Hoernle Park, also known as the Spanish River Athletic Facility, is located approximately 600 feet northwest of BCT, on the west side Interstate 95 (see **Exhibit 2-15**). Countess de Hoernle Park is an approximately 85-acre park with baseball, football, and soccer fields; a playground; and picnic areas.[6] Mizner Bark Dog Park is located approximately 1,400 feet west of BCT and is also separated from the Airport by Interstate 95. Yale Newman Park, a small park with a playground, is located approximately 0.5 miles east of BCT. A small open space area is located 0.4 miles east of the Airport; however, it was not identified as being managed as a park property, though it is owned by the City of Boca Raton.

2.5.4 HAZARDOUS MATERIALS

FAA Order 1050.1F identifies the Resource Conservation and Recovery Act (RCRA; 40 CFR 239–282) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; 42 United States Code [U.S.C.] 103) as key statutes to consider when reviewing actions to construct and operate facilities at Airports.

CERCLA provides for consultation with natural resource trustees and cleanup of any release of a hazardous substance (excluding petroleum) into the environment. The act enabled the creation of the National Priority List (NPL), a list of sites with known releases or threatened releases of hazardous substances used to guide the US Environmental Protection Agency (USEPA) in determining which sites warrant further investigation.

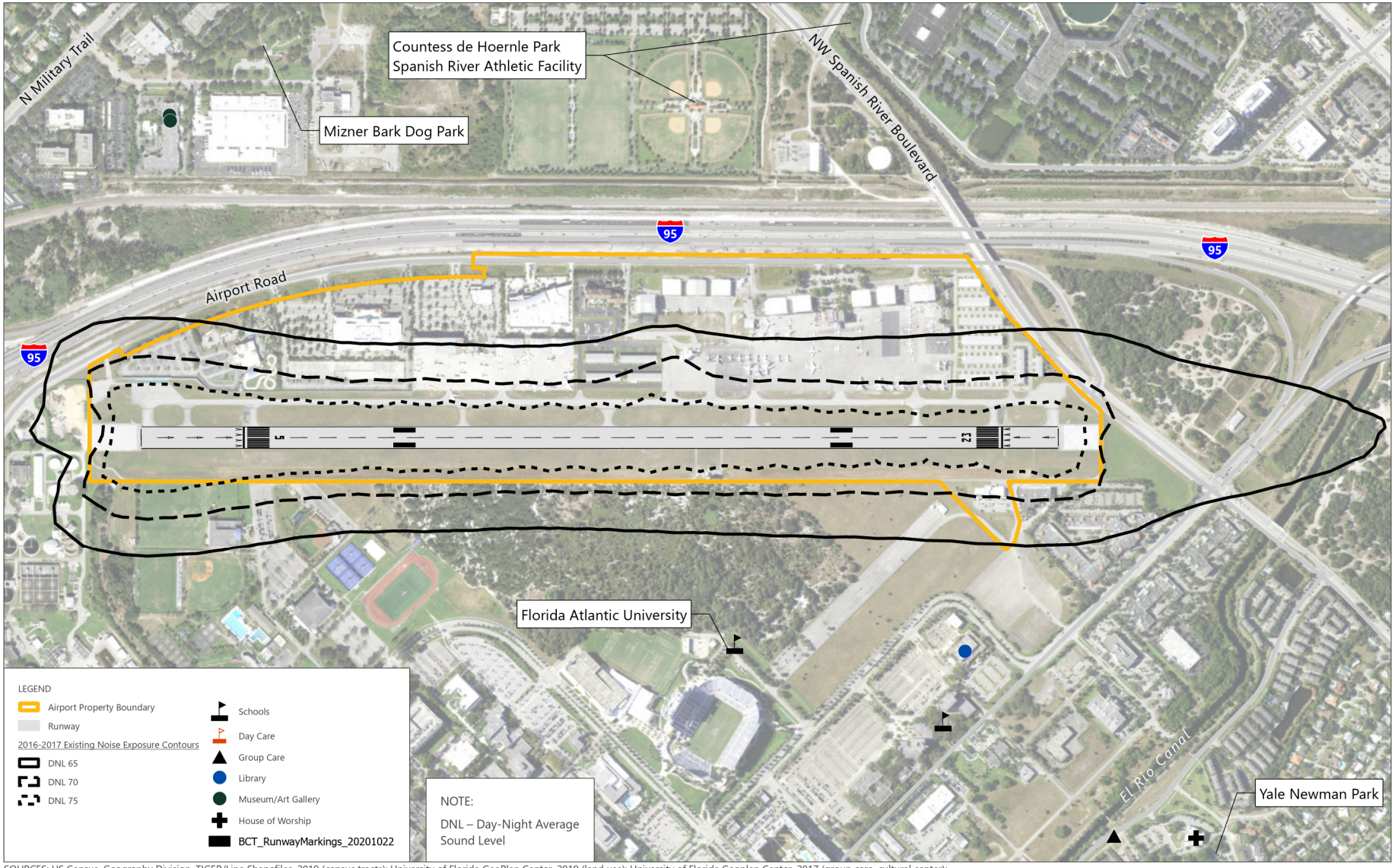
The RCRA governs the generation, treatment, storage, and disposal of hazardous wastes and establishes guidelines for hazardous waste and nonhazardous solid waste management activities.

Hazardous materials are commonly stored and used by a variety of businesses and are commonly encountered during construction activities. Hazardous materials typically require special handling, reuse, and disposal because of their potential to harm human health and the environment. A variety of regulatory agency sources are available to identify sites that may have been subject to a release of hazardous substances or that may have supported a use that could have resulted in hazardous conditions on-site.

FAA Order 1050.1F defines the significance threshold for hazardous materials as a proposed action that involves property on or eligible for the NPL. A review of the NPL[7] indicated that there are no current sites or proposed NPL sites at BCT or within the city of Boca Raton.

[6] City of Boca Raton, Facilities, https://www.myboca.us/facilities/facility/details/Countess-de-Hoernle-Park-Spanish-River-A-29 (accessed October 6, 2020).

[7] US Environmental Protection Agency, Superfund: National Priorities List (NPL), https://www.epa.gov/superfund/superfund-national-priorities-list-npl (accessed October 1, 2020).



SOURCES: US Census, Geography Division, TIGER/Line Shapefiles, 2019 (census tracts); University of Florida GeoPlan Center, 2019 (land use); University of Florida Geoplan Center, 2017 (group care, cultural center); University of Florida Geoplan Center, 2020 (schools); Ricondo & Associates, Inc., *Airport Layout Plan*, 2012 (Airport boundary); Ricondo & Associates, Inc., 2018 (noise contours).

NORTH 0 1,000 ft

EXHIBIT 2-15

EXISTING AIRCRAFT NOISE EXPOSURE AREA

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Hazardous materials can differ from site to site and are most likely to be encountered during ground-disturbing activities. The most fundamental management for hazardous materials is to avoid contaminated sites. A hazardous materials assessment, such as a Phase 1 Environmental Site Assessment, typically would be needed as part of future project development if identified within proximity to known hazardous sites. Where the potential for encountering contamination is suspected, avoidance or identification of mitigation measures can be implemented.

2.5.5 HISTORICAL, ARCHAEOLOGICAL, ARCHITECTURAL, AND CULTURAL RESOURCES

The National Historic Preservation Act (NHPA) established the National Register of Historic Places (NRHP). Section 106 of the NHPA requires federal agencies to consider whether proposed activities have the potential to have an adverse effect on historic properties that are already listed, determined eligible, or not yet evaluated under the NRHP criteria. Properties that are either listed in or eligible for listing in the NRHP are provided the same measure of protection under Section 106.

The NEPAssist tool,[8] which contains data from the NRHP, was used to search for historic properties. No known historic properties are located in or surrounding the Airport property boundary.

2.5.6 NATURAL RESOURCES AND ENERGY SUPPLY

Several federal laws require that federal facilities improve energy independence and that federal agencies take actions to improve energy reliability. As part of the environmental review of projects under NEPA, changes in energy use and use of consumable natural resources are considered to understand the effects of future demand associated with a federal action on available supplies. At BCT, electricity is supplied by Florida Power & Light. Electricity is primarily used at BCT for lighting, cooling, and equipment operation in buildings and airfield lighting and operations. The City of Boca Raton provides water service to city residents, as well as the Airport.

2.5.7 NOISE AND NOISE-COMPATIBLE LAND USE

Several federal laws pertain to aircraft noise and noise-compatible land use impacts, including the Noise Control Act of 1972, Aviation Safety and Noise Abatement Act of 1979, Airport and Airway Improvement Act of 1982, and Airport Noise and Capacity Act of 1990. These laws and regulations provide a basis for the local development of airports, an analysis of potential impacts from airport development, and land use compatibility policies.

The FAA defines day-night average sound level (DNL) 65 decibels (dB) as the threshold of noise compatibility for residential and other noise-sensitive land uses, such as schools, libraries, and religious facilities. As part of its environmental review of development actions, the FAA requires an analysis of noise exposure when development actions may change the cumulative noise exposure of individuals to aircraft noise in areas surrounding an airport. Common development actions that may change the cumulative noise environment include the following: runway reconfiguration, changes in aircraft operations and/or movements, changes in aircraft types using the airport, or changes in aircraft tracks and profiles.

Noise contours developed in 2017 using operations data between July 2016 and June 2017 are presented on Exhibit 2-15. The area within the DNL 65 dB noise contour is primarily contained on Airport property. Most of the remaining 65 dB noise contour area that extends beyond Airport property on adjacent public lands to the northeast and southwest of the runway ends as well as on adjacent FAU property to the southeast of the runway; however, no university-related noise-sensitive land uses or other noise-sensitive land uses such as residential areas or parks are located within the DNL 65 dB noise contour. Future improvements to the existing runway or a significant increase

[8] US Environmental Protection Agency, NEPAssist, https://www.epa.gov/nepa/nepassist (accessed October 1, 2020).

in aircraft operations would require new noise contour modeling and analysis.

2.5.8 WATER RESOURCES

2.5.8.1 WETLANDS

Executive Order 11990 requires consideration of indirect effects on wetlands and provides a long-term goal of no net loss of wetlands. Chapter 373 of the Florida Statutes and FAC 62-330 regulate activities in waters of the state, including wetlands. To obtain an Environmental Resource Permit (ERP) for regulated activities, criteria are established to ensure the project will meet state water quality standards and ensure the project is not contrary to the public interest.

A review of mapped wetlands in the USFWS National Wetlands Inventory (NWI) and known conditions identified that approximately 0.02 acres of wetlands are present in the southeast corner of Airport property (see Exhibit 2-14). Although NWI wetland mapping indicated the presence of two linear wetlands on Airport property, a review of aerial photography indicates that only a portion of one of the wetland areas is present. Site visits may be needed to delineate wetland resources on Airport property if future development is proposed for undeveloped areas of Airport property.

2.5.8.2 FLOODPLAINS

Executive Order 11988 was enacted to require avoidance, to the extent possible, of the long- and short-term adverse impacts associated with the occupancy and modification of floodplains, as well as to avoid direct and indirect support of floodplain development wherever there is a practical alternative. The order was issued to expand upon the NEPA, the National Flood Insurance Act of 1968, and the Flood Disaster Act of 1973.

Floodplains are defined as lowland and flat areas adjoining waters that are subject to a 1 percent or greater chance of flooding in any given year (i.e., a 100-year flood event). The Federal Emergency Management Agency designates approximately 115 acres of Airport property as being located in Zones A, AE, and AH, which are areas designated as being within the 100-year floodplain.[9] The designated floodplain areas on Airport are shown on Exhibit 2-14. A significant portion of the floodplain on-Airport has already been paved and developed with structures. The Runway 5-23 pavement is not designated as within the 100-year floodplain, although adjacent areas of the airfield are within the 100-year floodplains, including portions of the taxiway system.

2.5.8.3 SURFACE WATERS

The Clean Water Act (CWA) is the primary law that seeks to safeguard water quality in the United States. Under Section 402 of the CWA, the NPDES was established to regulate point source discharges, such as releases from wastewater treatment plants and industrial facilities (including airports), and other discharges, such as mobilized sediments and erosion from construction sites. Section 402 also resulted in the establishment of the requirement that facilities that store oil and oil-based products have Spill Prevention Control and Countermeasures (SPCC) Plans to minimize the likelihood or severity of water quality impacts in the event of a spill. Direct physical impacts to Waters of the United States, including surface waters, are also subject to permitting by the US Army Corps of Engineers (ACE) under Section 404 of the CWA, as well as Florida's ERP requirements.

Surface waters on-Airport include 0.22 acres of wetlands, as discussed in Section 2.5.9.1. No navigable Waters of the United States or natural stream channels are located on-Airport. The El Rio Canal is located approximately 1,600

[9] Zone A refers to areas with a 1 percent annual chance of flooding, for which no base flood elevations have been determined; Zone AE refers to areas with a 1 percent annual chance of flooding, for which the base flood elevations have been determined; and Zone AH refers to areas with a 1 percent annual chance of shallow flooding, for which base flood elevations have been determined.

feet east of the Airport property boundary.

2.5.8.4 GROUNDWATER

The Safe Drinking Water Act (SDWA) authorizes the USEPA to set standards for drinking water quality. The USEPA can delegate authority to states to implement the SDWA within their jurisdictions if they meet or exceed USEPA standards. In 40 CFR Parts 141 through 149, federal agencies are prohibited from funding actions that would contaminate USEPA-designated sole-source aquifers or recharge zones.

The City of Boca Raton's water supply is from the Biscayne Aquifer. There are no groundwater monitoring wells located on-Airport.

2.6 EXISTING SUSTAINABILITY POLICIES AND OPPORTUNITIES

The BRAA has implemented projects and programs to reduce the Airport's environmental footprint while enhancing the Airport's sustainability. Projects and programs implemented to date include two facilities that achieved sustainable design certifications, several projects to reduce aircraft and vehicle fuel use, projects to reduce energy use associated with lighting, and the provision of a recycling program. **Table 2-15** presents a summary of sustainability projects and programs implemented at BCT.

TABLE 2-15 SUSTAINABILITY PROJECTS AND PROGRAMS IMPLEMENTED AT THE AIRPORT

SUSTAINABILITY TOPIC	IMPLEMENTED PROJECTS AND PROGRAMS
Sustainable Design/Green Building	LEED Silver certified Airport Authority Administration Building[1]
	LEED certification of the US CBP Facility, with focuses on reducing building energy consumption, reducing building water use, and recycling the majority of construction waste[1]
	Applied pavement rejuvenator to runway and taxiway pavement in 2018 as part of the pavement management program to extend the useful life of airfield pavement[1]
Energy Efficiency	Construction of the US CBP Facility onsite to support international arrivals, which eliminated an extra stop at another airport to clear customs, thereby reducing fuel use[1]
	Taxiway lights converted to LED, with an estimated reduction of 270 metric tons of carbon dioxide over 15 years[1]
	Atlantic Aviation converted to use of LED lighting[2]
	Runway 5-23 Hangar Condominium Association converted to use of LED lighting[2]
	Cinemark Theatres provides dedicated parking spots for low-emission and electric vehicles to promote energy-efficiency vehicle use[3]
	Signature provides dedicated parking spots for low-emission and electric vehicles to promote energy-efficiency vehicle use and provides an electric vehicle charging station adjacent to Hangar V1[3]
Waste Reduction	Single stream recycling is provided at the Airport Authority Administration Building and the US CBP Facility[4, 5]
	Signature Flight Support transitioned from bottled water usage to a water filtration system to reduce plastic waste and is using compostable utensils and plates to reduce waste[6]

NOTES:
LED – Light-Emitting Diode
LEED – Leadership in Energy and Environmental Design (certification through the US Green Building Council)
1 Boca Raton Airport Authority, Boca Raton Airport, Earth Day Series 2019: Introduction, https://bocaairport.com/earth-day-series-2019-introduction/ (accessed October 5, 2020).
2 Boca Raton Airport Authority, Tenant Survey, March 2020.
3 Boca Raton Airport Authority, Master Plan Update Kick-off Meeting, September 17, 2020.
4 Waste Management Inc. of Florida, Service Agreement, Non-Hazardous Waste Service Summary, March 16, 2016.
5 Tenants are responsible for the collection of waste and recyclables collection from their facilities.
6 Boca Raton Airport Authority, Tenant Survey, November 2020.
SOURCES: As identified in table notes 1–4.

2.7 REGIONAL SETTING AND LAND USE

2.7.1 REGIONAL SETTING

The Airport is centrally located in the city of Boca Raton, in southeastern Palm Beach County, approximately 2.5 miles east of the Atlantic Ocean. The Airport is bordered by Interstate 95 to the west; Spanish River Boulevard to the north; a water treatment plant to the south; and office buildings, vacant lots, and the FAU campus to the east.

According to the 2012 update of the Palm Beach County Comprehensive Plan, portions of BCT are included in the county inventory of airport clear zones. The Comprehensive Plan defines an airport clear zone as a designated area of land that is subject to peak aircraft noise and on which there is the highest potential of danger from airport operations.

2.7.2 ZONING

The City of Boca Raton's Zoning District Map includes the Airport property, along with the FAU campus, within the Public Lands District zoning classification. Also noted on the zoning map is a planned mobility mixed use district north of the Airport, adjacent to the Spanish River Boulevard Interchange of Interstate 95. Planned mobility is characterized by having both a business district, for industry and retail, and a residential district. The proposed mixed use development north of the Airport is included in the University Village Master Plan, which includes 145,000 square feet of retail/restaurant space, 135,000 square feet of hotel space, and 350,000 square feet of commercial space[10]. **Exhibit 2-16** illustrates the City of Boca Raton's zoning districts around BCT.

Florida Statute Chapter 333, amended in 2016, provides state level regulations for airport zoning and requires that airport zoning regulations be adopted by every political subdivision having an airport hazard area within its territorial limits[11]. Chapter 333 addresses specific zoning components including, but not limited to: incompatible land uses, permit process for obstructions, handling overlap of zoning between jurisdictions, landfill proximity restrictions and mitigation practices, noise studies, and obstructions to navigable airspace[12]. The City of Boca Raton airport zoning ordinance is contained in *the Code of Ordinances of Boca Raton, Florida, Chapter 28 Zoning, Article VII, Airport Zoning*[13].

2.7.3 OFF-AIRPORT LAND USE

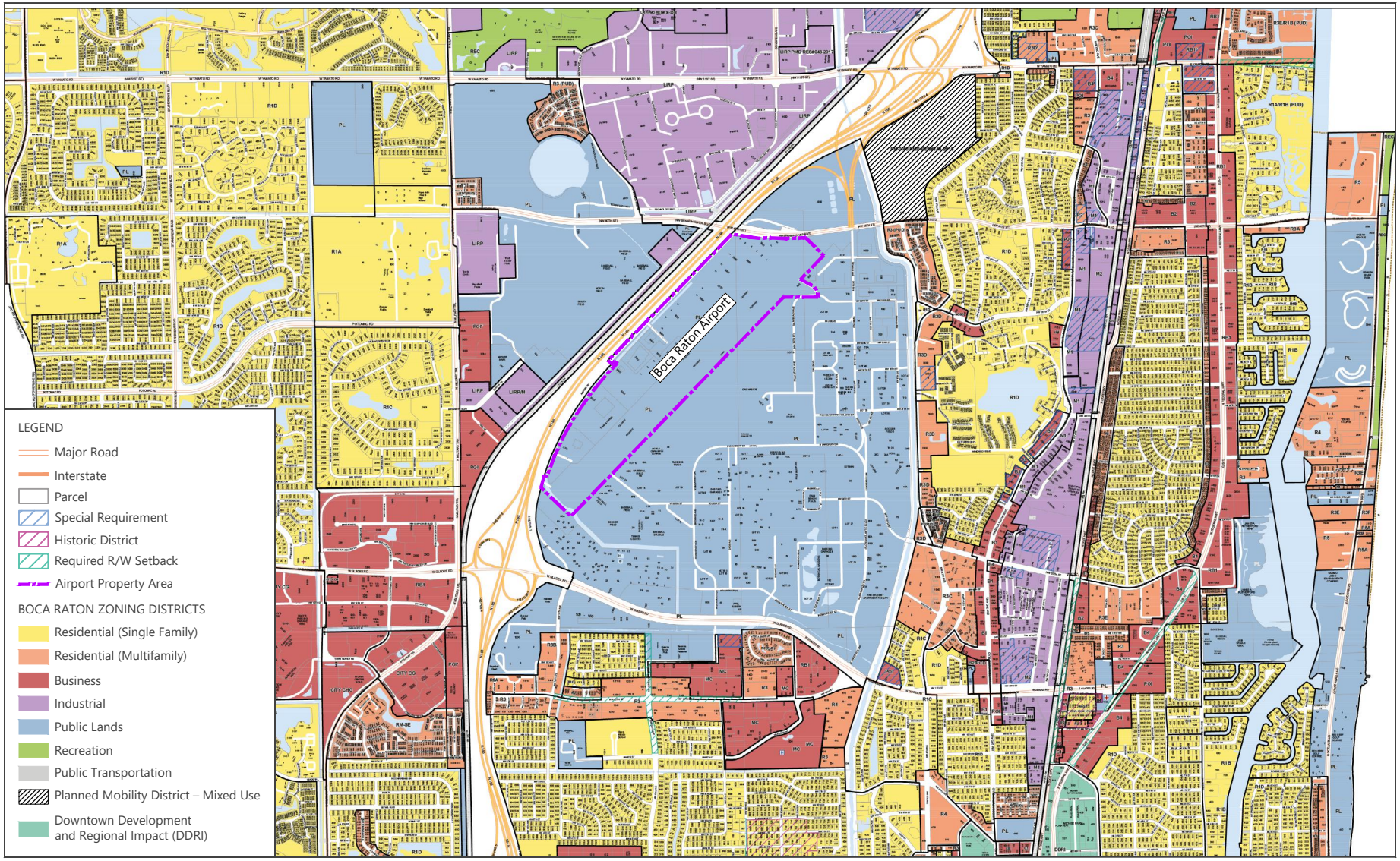
According to the City of Boca Raton's future land use map developed as part of the 2010 Comprehensive Plan, the Airport is included in the Institutional land use category. Land uses adjacent to the Institutional category include planned mobility, residential medium, residential low, residential high, commercial, conservation, and light industrial. **Exhibit 2-17** illustrates the future land uses around the Airport.

[10] City of Boca Raton Development Projects, http://bocagis.ci.boca-raton.fl.us/boca/development/ (accessed October 02, 2020).

[11] Florida Statute, Title XXV, Chapter 333.03, Airport Zoning, https://www.flsenate.gov/Laws/Statutes/2018/Chapter333/All (accessed December 17, 2020).

[12] Florida Department of Transportation, *2020 Airport Airspace and Land Use Guidebook*, https://www.fdot.gov/aviation/compland.shtm (accessed December 11, 2020).

[13] Code of Ordinances of Boca Raton, Florida, Chapter 28 – Zoning, Article VII. – Airport Zoning, Section 28-272., Authority. https://library.municode.com/fl/boca_raton/codes/code_of_ordinances?nodeId=VOII_CH28ZO_ARTVIIAIZO (accessed December 11, 2020).



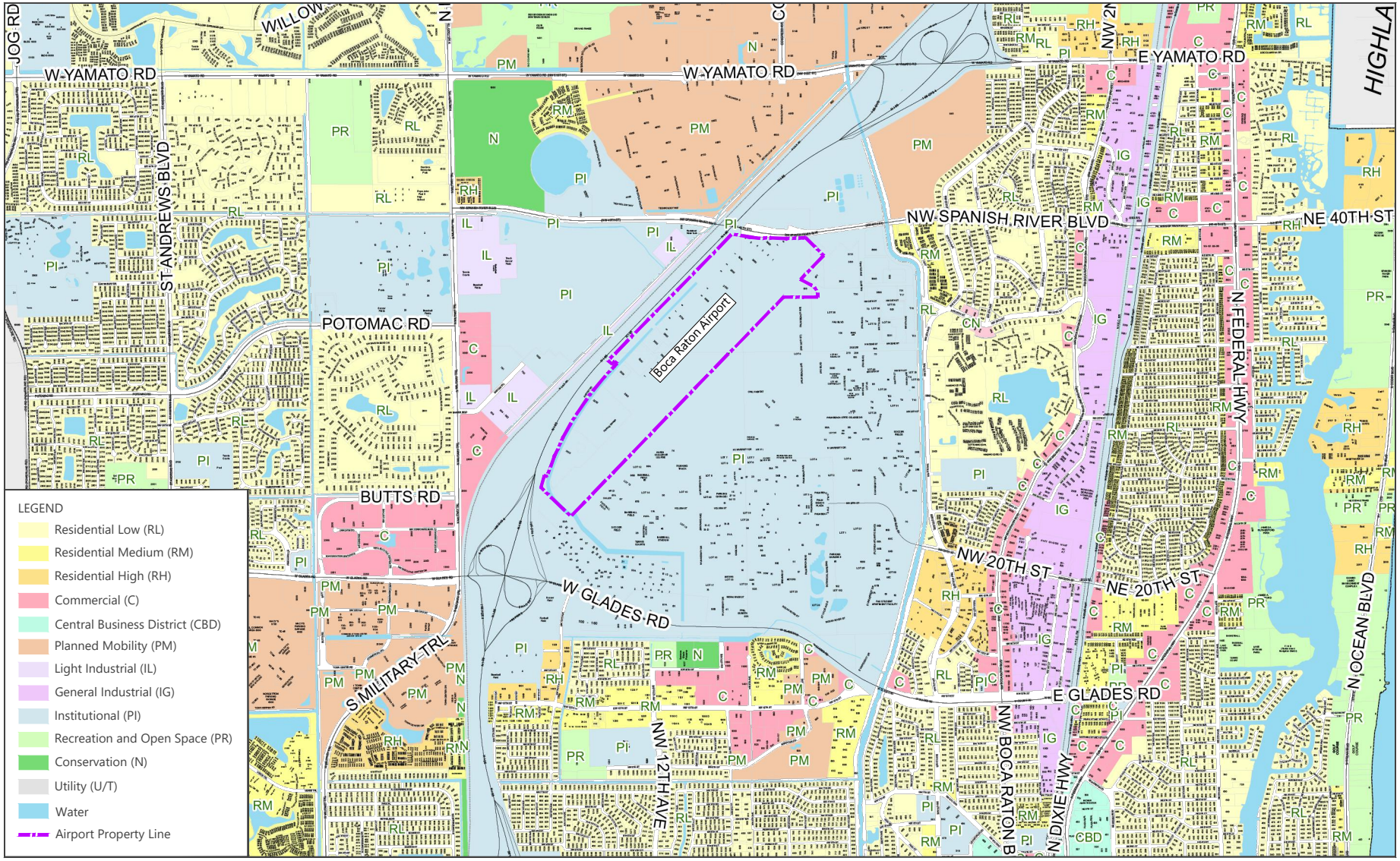
SOURCE: City of Boca Raton, *Zoning Map*, October 2018.

NORTH 0 Not To Scale

EXHIBIT 2-16

CITY OF BOCA RATON ZONING MAP

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\3. Inventory of Existing Conditions\AutoCAD\Exhibit 2-16_BCT_City of Boca Raton Zoning Map.dwgLayout: 8.5x11L Plotted: Nov 1, 2023, 08:53AM



SOURCE: City of Boca Raton, *Future Land Use Map*, June 2017.

NORTH 0 Not To Scale

EXHIBIT 2-17

CITY OF BOCA RATON FUTURE LAND USE MAP

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\3. Inventory of Existing Conditions\AutoCAD\Exhibit 2-17_BCT_Future Land Use Map.dwgLayout: 8.5x11L Plotted: Oct 31, 2023, 09:44AM

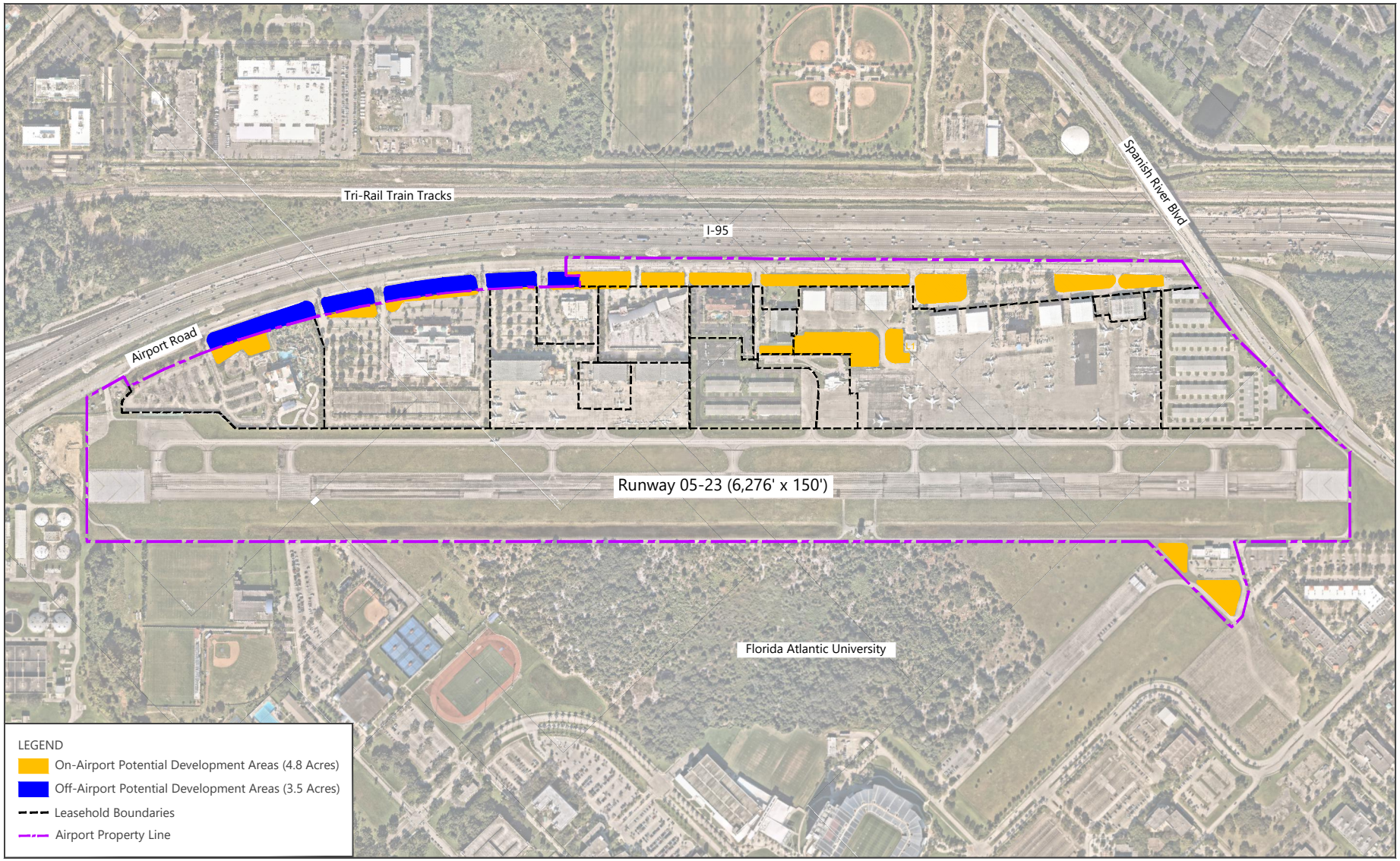
FAU, located east of BCT, updated its Campus Master Plan in 2019. The university manages state conservation land that abuts the Airport, which is part of the campus. The Campus Master Plan Update outlines objectives and policies to preserve and enhance the conservation land. One policy states that the university will not permit new development, expansion, or replacement in existing areas designated as conservation land unless development is undertaken by federal or state government in the public interest and the impacts are mitigated.

2.7.4 ON-AIRPORT LAND USE

On-Airport land uses include areas reserved for the airfield and associated safety surfaces, aeronautical development and supporting infrastructure, and nonaeronautical development. The Airport is approximately 215 acres; 98 acres are reserved for the airfield and associated safety surfaces, 73 acres are utilized for aeronautical development, and 44 acres are utilized for nonaeronautical development.

There are limited development opportunities on the Airport property for new development due to lack of developable space. The majority of the Airport property is already developed, is reserved for the airfield and associated safety surfaces, or is not easily developable due to stormwater management considerations or roadway right of ways. Of the 215 acres mentioned above, there are approximately 8.9 acres of property available for potential development; 3.2 acres of which are leased to existing tenants. Areas identified as potential developable space are illustrated on **Exhibit 2-18**.

The areas identified as potential developable space located adjacent to Airport Road are currently being used for stormwater management purposes. In August 2020, the BRAA completed an assessment, *Underground Containment Feasibility Study*, to determine the potential for development in these areas and concluded that limited development opportunities may be possible by utilizing underground containment systems. The use of underground containment systems is costly, and implementation would be subject to further analysis and consideration of each site's specific revenue generating potential. Exhibit 2-18 also depicts 3.5 acres of off-Airport potential developable space included in the study that is part of the stormwater system adjacent to Airport Road. Development of these parcels would require land acquisition by the BRAA.



SOURCE: Boca Raton Airport Authority, *Airport Layout Plan*, March 2012.

EXHIBIT 2-18

POTENTIAL DEVELOPABLE AREAS

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\3. Inventory of Existing Conditions\AutoCAD\Exhibit 2-4_BCT_Airfield Pavement Conditions.dwgLayout: 8.5x11L Plotted: Nov 1, 2023, 09:42AM

3. AVIATION ACTIVITY FORECASTS

This chapter of the MPU describes historical aviation activity at BCT and presents the forecasts of aviation demand through fiscal year (FY) 2040. The forecasts were developed for aircraft operations, aircraft fleet mix, and based aircraft by engine type. The aircraft operations forecast includes local and itinerant operations. The operations are further classified as air taxi, GA, and military. These forecasts will provide a foundation for evaluating the current facility capacity and determining future facility requirements for the MPU's 5-, 10-, and 20-year planning horizons.

The Airport FY was used for all forecast years. The FY begins on October 1 and ends on September 30 of the following year. Historical data are presented from FY 2010 through FY 2020, and the forecast period represents FY 2021 through FY 2040.

The future activity level at the Airport may differ from this forecast as a result of unexpected events, such as a prolonged pandemic and President of the United States (POTUS) flight restrictions to/from South Florida airports, economic changes, regulatory changes, political changes, technological changes, and environmental changes. The forecasts were developed during the COVID-19 pandemic, and they rely on publications and forecasts of aviation activity by the FAA, FDOT, and other agencies that were published before the pandemic. Given the state of the economy and the dynamics inherent to the aviation industry, the aviation activity demand remains volatile and subject to fluctuations. For the purpose of this MPU, the forecast focuses on long-term trends, but short-term fluctuations should be expected around the underlying trend. The forecasts are intended to represent the approximate future activity levels.

As recommended in FAA AC 150/5070-6B, *Airport Master Plans*, and the FDOT's *Guidebook for Airport Master Planning*, this chapter describes the following components:

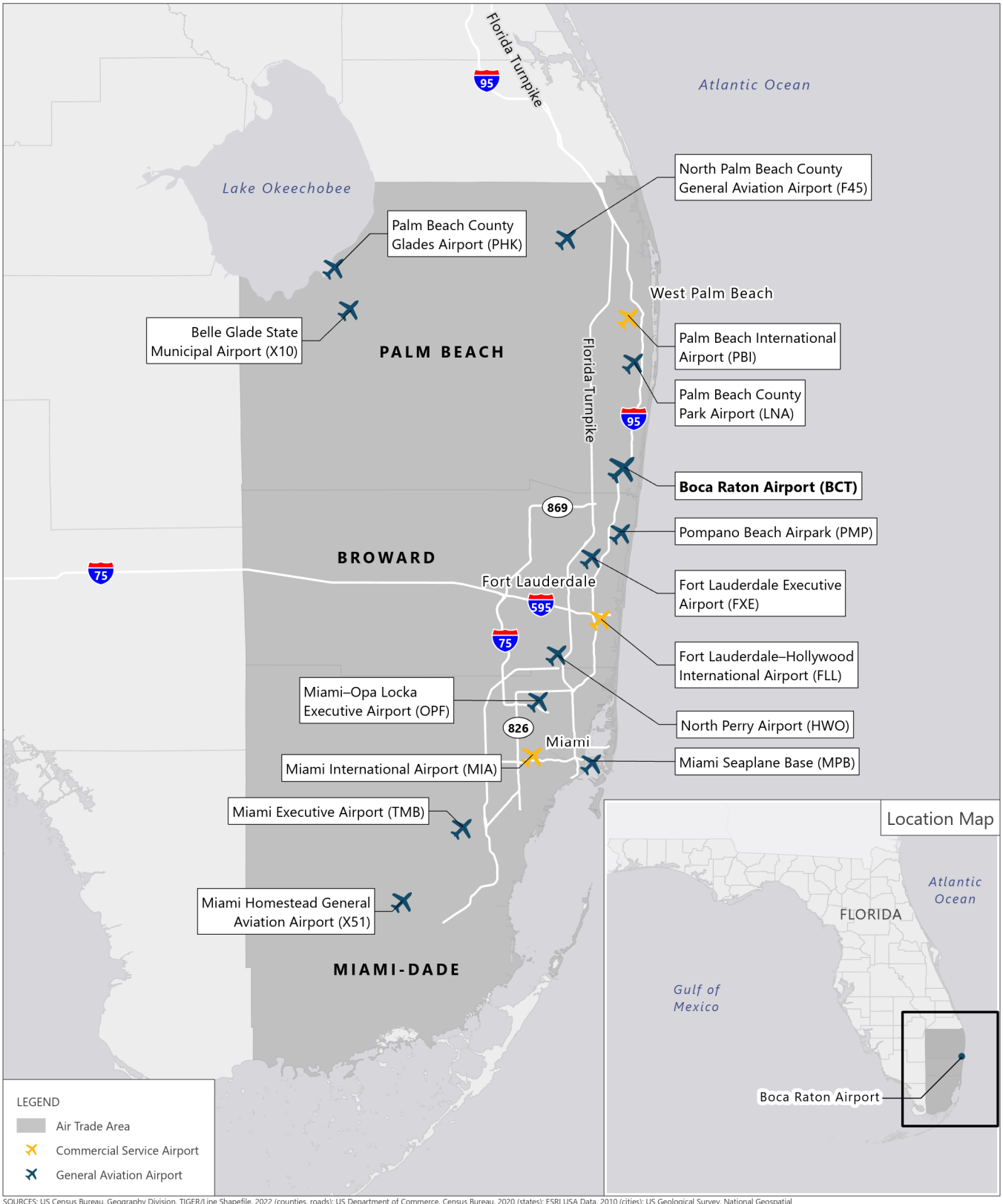
- historical activity levels
- factors affecting aviation activity
- forecast methodology and results

3.1 HISTORICAL AVIATION ACTIVITY

The Airport is located in Boca Raton, Florida, between Fort Lauderdale and West Palm Beach, in southern Palm Beach County. The overall South Florida region has a high concentration of both commercial service and GA airports; therefore, BCT competes with many other airfields for aviation activity. **Exhibit 3-1** shows the Airport's Air Trade Area and surrounding airports in the South Florida region that includes Palm Beach, Broward, and Miami-Dade Counties.

3.1.1 TOTAL AIRPORT OPERATIONS

Between FY 2010 and FY 2020, annual aircraft operations ranged from a low of 48,023 in 2013 to a high of 79,412 in FY 2019. Operations at BCT have increased at a compound annual growth rate (CAGR) of 3.3 percent over the past 10 years. In FY 2020, total Airport operations decreased 9.6 percent primarily due to the impact of the COIVD-19 pandemic, which is further discussed in Section 3.2.2. From the low of 48,023 operations in FY 2013, Airport operations have increased at a CAGR of 5.9 percent to FY 2020. **Table 3-1** presents the historical aircraft operations.



SOURCES: US Census Bureau, Geography Division, TIGER/Line Shapefile, 2022 (counties, roads); US Department of Commerce, Census Bureau, 2020 (states); ESRI USA Data, 2010 (cities); US Geological Survey, National Geospatial Program, June 2020 (Lake Okeechobee); US Department of Transportation, Federal Aviation Administration, Aeronautical Information Services Open Data, May 2020 (airports); Ricondo & Associates, Inc., September 2020 (airport).

EXHIBIT 3-1

NORTH 0 20 mi

AIR TRADE AREA

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TABLE 3-1 HISTORICAL AIRPORT OPERATIONS – TOTAL

FISCAL YEAR	TOTAL AIRPORT OPERATIONS	ANNUAL PERCENTAGE CHANGE
2010	51,999	
2011	56,859	9.3%
2012	52,962	-6.9%
2013	48,023	-9.3%
2014	56,581	17.8%
2015	63,257	11.8%
2016	63,182	-0.1%
2017	66,209	4.8%
2018	73,334	10.8%
2019	79,412	8.3%
2020	71,756	-9.6%
Compound Annual Growth Rate		
2010 – 2015	4.0%	
2015 – 2020	2.6%	(5.9% excluding FY20)
2010 – 2020	3.3%	(4.8% excluding FY20)

NOTE:
The fiscal year is October 1 through September 30.
SOURCES: Boca Raton Airport Authority, October 2020; US Department of Transportation, Federal Aviation Administration, Operations Network (OPSNET), November 2020.

3.1.2 ITINERANT AND LOCAL OPERATIONS

Aircraft operations at the Airport are further categorized by itinerant and local operations. Itinerant operations are operations performed by aircraft, either IFR or VFR, that land at an airport and arrive from outside the airport area or depart from the airport and leave the airport area. Local operations are airport operations that are performed by an aircraft that remains in the local traffic pattern, executes instrument approaches or low passes at the airport, and conducts operations to or from the same airport within a designated practice area within a 20-mile radius of the airport. Generally, local operations mostly comprise training activity.

As shown in **Table 3-2**, both itinerant and local operations have increased over the past 10 years, with itinerant operations increasing from 38,629 (FY 2010) to 45,683 (FY 2020) and local operations increasing from 13,370 (FY 2010) to 26,073 (FY 2020). From FY 2010 to FY 2020, itinerant operations increased at a CAGR of 1.7 percent, while local operations increased at a CAGR of 6.9 percent, compared to 3.3 percent for total Airport operations over the same period.

Local operations increased from a low of 8,853 operations in FY 2013 to 26,073 operations in FY 2020, a CAGR of 16.7 percent. According to BCT staff, a second flight school operated at the Airport from 2014 to 2017 and Lynn University's flight school doubled their aircraft training fleet from four to nine aircraft (since 2014). The increase in local operations could be attributed to the additional flight training activities.

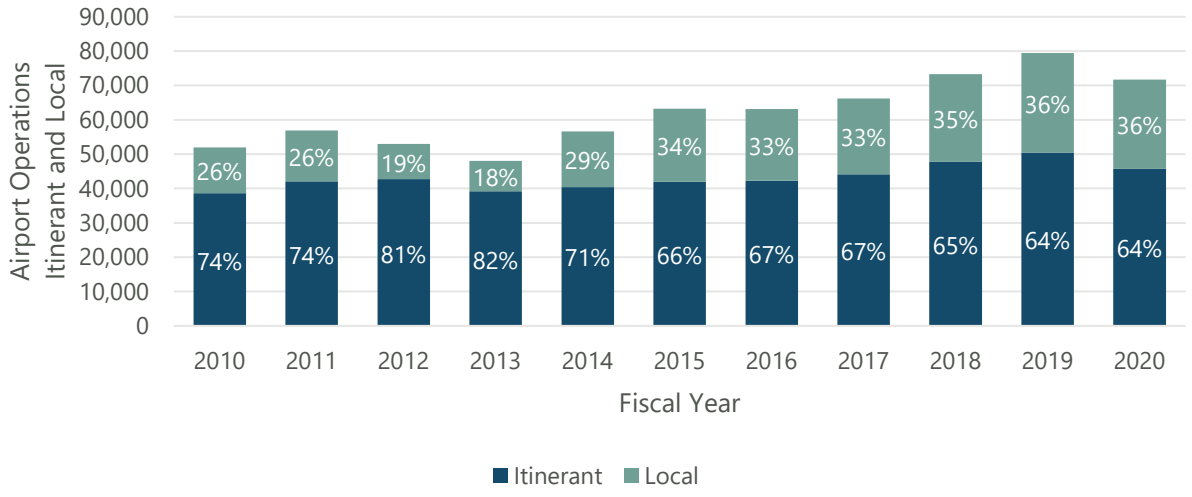
TABLE 3-2 HISTORICAL AIRPORT OPERATIONS – ITINERANT AND LOCAL

	AIRPORT OPERATIONS			SHARE OF OPERATIONS	
FISCAL YEAR	ITINERANT	LOCAL	TOTAL	ITINERANT	LOCAL
2010	38,629	13,370	51,999	74%	26%
2011	42,072	14,787	56,859	74%	26%
2012	42,688	10,274	52,962	81%	19%
2013	39,170	8,853	48,023	82%	18%
2014	40,404	16,177	56,581	71%	29%
2015	42,017	21,240	63,257	66%	34%
2016	42,285	20,897	63,182	67%	33%
2017	44,173	22,036	66,209	67%	33%
2018	47,742	25,592	73,334	65%	35%
2019	50,466	28,946	79,412	64%	36%
2020	45,683	26,073	71,756	64%	36%
Compound Annual Growth Rate					
2010 – 2015	1.7%	9.7%	4.0%		
2015 – 2020	1.7% (4.7% excluding FY20)	4.2% (8.0% excluding FY20)	2.6% (5.9% excluding FY20)		
2010 – 2020	1.7% (3.0% excluding FY20)	6.9% (9.0% excluding FY20)	3.3% (4.8% excluding FY20)		

NOTE:
The fiscal year is October 1 through September 30.
SOURCES: Boca Raton Airport Authority, October 2020; US Department of Transportation, Federal Aviation Administration, Operations Network (OPSNET), November 2020.

As shown in Table 3-2 and illustrated on **Exhibit 3-2**, the share of itinerant operations decreased from 74 percent in FY 2010 to 64 percent in FY 2019 and FY 2020, resulting in an increased share of local operations from 26 percent to 36 percent over the comparable period.

EXHIBIT 3-2 HISTORICAL AIRPORT OPERATIONS – ITINERANT AND LOCAL



NOTE:
The fiscal year is October 1 through September 30.
SOURCES: Boca Raton Airport Authority, October 2020; US Department of Transportation, Federal Aviation Administration, Operations Network (OPSNET), November 2020.

3.1.3 AIR TAXI OPERATIONS

Air taxi operators conduct operations in aircraft with 60 or fewer passenger seats and a maximum payload capacity of 18,000 pounds or less; they do not engage in scheduled passenger operations; and they do not otherwise seek economic authority as a certificated or commuter air carrier.[1] As shown in **Table 3-3**, air taxi operations increased from 5,553 operations in FY 2010 to 10,560 operations in FY 2020, a CAGR of 6.6 percent.

TABLE 3-3 HISTORICAL AIRPORT OPERATIONS – AIR TAXI

FISCAL YEAR	AIR TAXI OPERATIONS	ANNUAL PERCENTAGE CHANGE	TOTAL AIRPORT OPERATIONS	AIR TAXI SHARE OF TOTAL
2010	5,553		51,999	10.7%
2011	6,519	17.4%	56,859	11.5%
2012	6,705	2.9%	52,962	12.7%
2013	6,903	3.0%	48,023	14.4%
2014	7,504	8.7%	56,581	13.3%
2015	8,537	13.8%	63,257	13.5%
2016	9,279	8.7%	63,182	14.7%
2017	10,181	9.7%	66,209	15.4%
2018	10,392	2.1%	73,334	14.2%
2019	11,196	7.7%	79,412	14.1%
2020	10,560	-5.7%	71,756	14.7%
Compound Annual Growth Rate				
2010 – 2015	9.0%		4.0%	
2015 – 2020	4.3%	(7.0% excluding FY20)	2.6%	(5.9% excluding FY20)
2010 – 2020	6.6%	(8.1% excluding FY20)	3.3%	(11.2% excluding FY20)

NOTE:
The fiscal year is October 1 through September 30.
SOURCES: Boca Raton Airport Authority, October 2020; US Department of Transportation, Federal Aviation Administration, Operations Network (OPSNET), November 2020.

From FY 2010 to FY 2020, air taxi operations increased at a greater rate than total Airport operations, resulting in an air taxi share increase from 10.7 percent (FY 2010) to 14.7 percent (FY 2020) of total Airport operations. Air taxi operations increased year over year; however, air taxi operations decreased 5.7 percent in FY 2020 primarily due to the COVID-19 pandemic.

3.1.4 GENERAL AVIATION OPERATIONS

As shown in **Table 3-4**, GA operations increased from 46,365 in FY 2010 to 61,038 in FY 2020, a CAGR of 2.8 percent. GA operations peaked in FY 2019 with 68,042 operations, or 85.7 percent of total Airport operations. The GA operations share of total Airport operations decreased from 89.2 percent in FY 2010 to 85.1 percent in FY 2020. The share decrease is not the result of a decrease in operations; rather, it is the result of air taxi operations increasing at a greater rate than GA operations from FY 2010 to FY 2020.

[1] US Department of Transportation, Federal Aviation Administration, Flight Standards Information Management System, Volume 2, Chapter 2, Section 2-130F, https://fsims.faa.gov/PICResults.aspx?mode=EBookContents&restricttocategory=all~menu (accessed November 2020).

TABLE 3-4 HISTORICAL AIRPORT OPERATIONS – GENERAL AVIATION

FISCAL YEAR	GENERAL AVIATION OPERATIONS	ANNUAL PERCENTAGE CHANGE	TOTAL AIRPORT OPERATIONS	GENERAL AVIATION SHARE OF TOTAL
2010	46,365		51,999	89.2%
2011	50,209	8.3%	56,859	88.3%
2012	46,082	-8.2%	52,962	87.0%
2013	40,882	-11.3%	48,023	85.1%
2014	48,807	19.4%	56,581	86.3%
2015	54,297	11.2%	63,257	85.8%
2016	53,747	-1.0%	63,182	85.1%
2017	55,856	3.9%	66,209	84.4%
2018	62,751	12.3%	73,334	85.6%
2019	68,042	8.4%	79,412	85.7%
2020	61,038	-10.3%	71,756	85.1%
Compound Annual Growth Rate				
2010 – 2015	3.2%		4.0%	
2015 – 2020	2.4%	(5.8% excluding FY20)	2.6%	(5.9% excluding FY20)
2010 – 2020	2.8%	(4.4% excluding FY20)	3.3%	(4.8% excluding FY20)

NOTE:
The fiscal year is October 1 through September 30.
SOURCES: Boca Raton Airport Authority, October 2020; US Department of Transportation, Federal Aviation Administration, Operations Network (OPSNET), November 2020.

3.1.5 MILITARY OPERATIONS

Military operations have historically accounted for a small percentage of total operations at the Airport, fluctuating between 0.2 percent and 0.7 percent from FY 2010 to FY 2020, as shown in **Table 3-5**. From FY 2010 to FY 2020, military operations increased from 81 operations to 158 operations, a CAGR of 6.9 percent. During this period, military activity reached a high of 423 operations in FY 2015. According to historical data from the FAA's Traffic Flow Management System Counts (TFMSC) database, the most prominent aircraft conducting military operations is the Beech King Air 90, representing approximately 37.6 percent of military operations. The second most prominent aircraft, representing approximately 12.4 percent of military operations, is the Cessna Skyhawk 172. These two aircraft accounted for 50 percent of total military operations at the Airport.

3.1.6 AIRCRAFT FLEET MIX

Aircraft operating at BCT represent a wide range of aircraft types. Based on Airport Noise and Operations Monitoring System (ANOMS) data provided by the BRAA and the FAA's TFMSC data, the aircraft fleet mix was segmented by piston, turboprop, jet, and helicopter. In reconciling the data, not all Airport operations were captured by the ANOMS and/or TFMSC, requiring the assumption that the percentage of known operations (by segment) would be applied to itinerant operations, and local Airport operations represent piston aircraft.

As shown in **Table 3-6**, from FY 2010 to FY 2020, piston aircraft represented the majority aircraft type operating at the Airport. Estimated piston aircraft operations increased from 35,483 in FY 2010 to 46,979 in FY 2020, a CAGR of 2.8 percent. The share of piston aircraft operations decreased from 68.2 percent to 65.5 percent over the same period.

TABLE 3-5 HISTORICAL AIRPORT OPERATIONS – MILITARY OPERATIONS

FISCAL YEAR	MILITARY OPERATIONS	ANNUAL PERCENTAGE CHANGE	TOTAL AIRPORT OPERATIONS	MILITARY SHARE OF TOTAL
2010	81		51,999	0.2%
2011	131	61.7%	56,859	0.2%
2012	175	33.6%	52,962	0.3%
2013	238	36.0%	48,023	0.5%
2014	270	13.4%	56,581	0.5%
2015	423	56.7%	63,257	0.7%
2016	156	-63.1%	63,182	0.2%
2017	172	10.3%	66,209	0.3%
2018	191	11.0%	73,334	0.3%
2019	174	-8.9%	79,412	0.2%
2020	158	-9.2%	71,756	0.2%
Compound Annual Growth Rate				
2010 – 2015	39.2%		4.0%	
2015 – 2020	-17.9%	(-19.9% excluding FY 20)	2.6%	(5.9% excluding FY20)
2010 – 2020	6.9%	(8.9% excluding FY 20)	3.3%	(4.8% excluding FY20)

NOTE:
The fiscal year is October 1 through September 30.
SOURCES: Boca Raton Airport Authority, October 2020; US Department of Transportation, Federal Aviation Administration, Operations Network (OPSNET), November 2020.

TABLE 3-6 HISTORICAL AIRPORT OPERATIONS – ESTIMATED FLEET MIX OPERATIONS AND SHARE

FISCAL YEAR	PISTON	TURBOPROP	JET	HELICOPTER	TOTAL
2010	35,483	2,248	14,168	100	51,999
2011	39,554	2,330	14,833	142	56,859
2012	36,053	2,309	14,437	163	52,962
2013	31,028	2,189	14,660	146	48,023
2014	38,420	1,941	16,047	173	56,581
2015	43,866	2,248	16,943	200	63,257
2016	43,989	2,018	17,025	150	63,182
2017	43,822	2,047	20,269	71	66,209
2018	48,909	2,181	22,169	75	73,334
2019	53,921	2,560	22,866	65	79,412
2020	46,979	2,330	22,381	66	71,756
Compound Annual Growth Rate					
2010 – 2015	4.3%	0.0%	3.6%	14.9%	4.0%
2015 – 2020	1.4%	0.7%	5.7%	-19.9%	2.6%
2010 – 2020	2.8%	0.4%	4.7%	-4.1%	3.3%
Share of Operations					
2010	68.2%	4.3%	27.2%	0.2%	100.0%
2011	69.6%	4.1%	26.1%	0.2%	100.0%
2012	68.1%	4.4%	27.3%	0.3%	100.0%
2013	64.6%	4.6%	30.5%	0.3%	100.0%
2014	67.9%	3.4%	28.4%	0.3%	100.0%
2015	69.3%	3.6%	26.8%	0.3%	100.0%
2016	69.6%	3.2%	26.9%	0.2%	100.0%
2017	66.2%	3.1%	30.6%	0.1%	100.0%
2018	66.7%	3.0%	30.2%	0.1%	100.0%
2019	67.9%	3.2%	28.8%	0.1%	100.0%
2020	65.5%	3.2%	31.2%	0.1%	100.0%

NOTES:
The fiscal year is October 1 through September 30.
The totals may not match due to rounding.
The results are estimates and may not match actuals.
SOURCES: Boca Raton Airport Authority, Airport Noise and Operations Monitoring System (ANOMS), October 2020; US Department of Transportation, Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), November 2020.

Turboprop aircraft operations have fluctuated from year to year and increased from 2,248 in FY 2010 to 2,330 in FY 2020, a CAGR of 0.4 percent. Similar to piston aircraft operations, the share of turboprop aircraft operations decreased from 4.3 percent in FY 2010 to 3.2 percent in FY 2020.

Estimated jet aircraft operations increased the most among the segments shown in Table 3-6. Jet aircraft operations increased from 14,168 in FY 2010 to 22,381 in FY 2020, a CAGR of 4.7 percent, compared to 3.3 percent for total Airport operations over the comparable period. As a result, the share of jet aircraft operations increased from 27.2 percent in FY 2010 to 31.2 percent in FY 2020. Estimated helicopter operations decreased from 100 in FY 2010 to 66 in FY 2020, an annual average decline of 4.1 percent (although operations did increase to 200 in 2015).

3.1.7 BASED AIRCRAFT

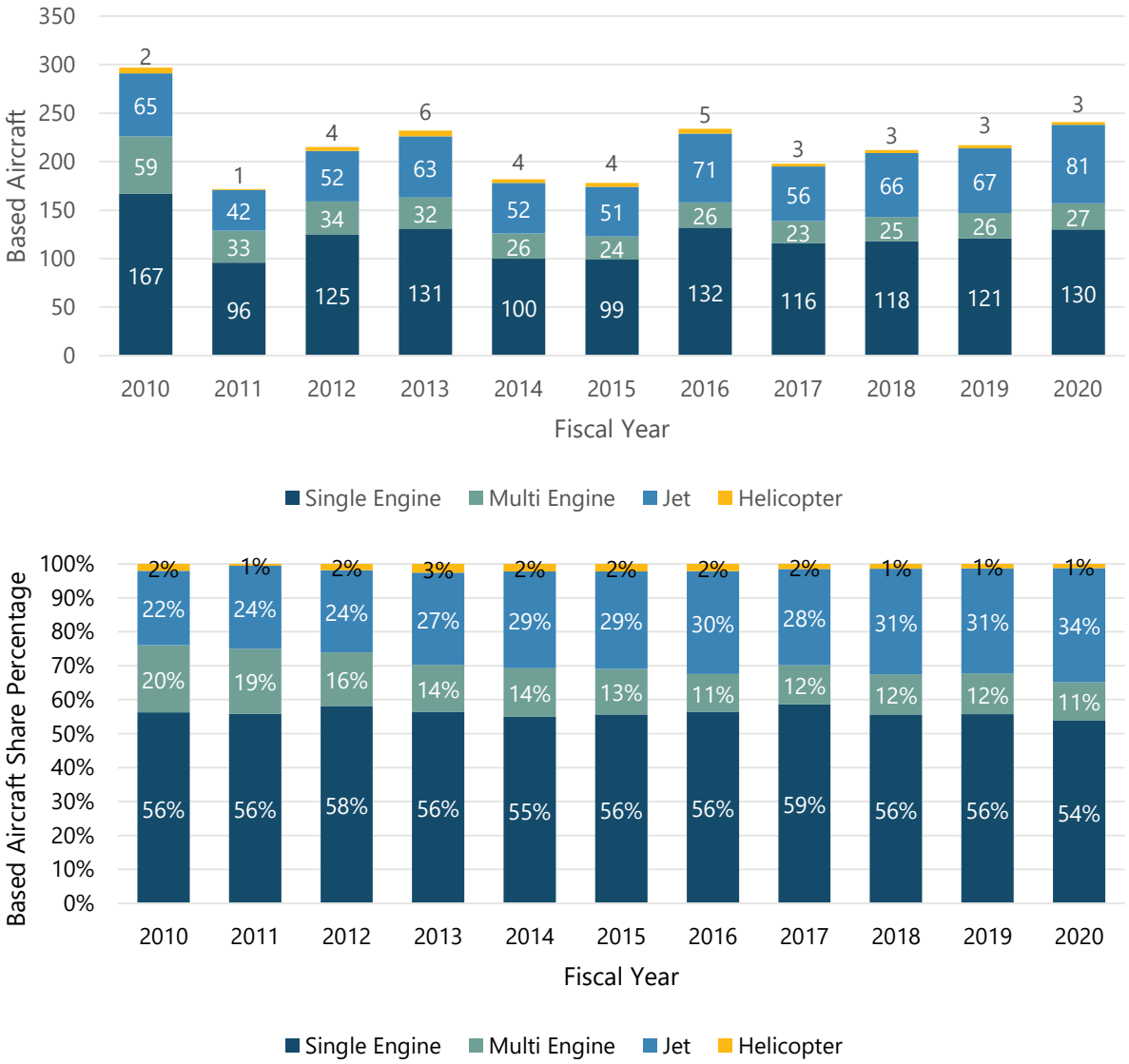
As listed in **Table 3-7** and shown on **Exhibit 3-3**, based aircraft at BCT decreased from 297 aircraft in FY 2010 to 241 aircraft in FY 2020. FY 2011 represents the lowest smallest number of based aircraft (172 based aircraft), and FY 2010 represents the largest number (297 based aircraft). Single-engine aircraft have consistently represented the highest share of based aircraft. The share of jet-engine aircraft increased from 22 percent in FY 2010 to 34 percent in FY 2020. The multi-engine share of based aircraft decreased from 20 percent to 11 percent over the comparable period.

TABLE 3-7 HISTORICAL BASED AIRCRAFT

FISCAL YEAR	SINGLE ENGINE	MULTI ENGINE	JET	HELICOPTER	TOTAL
2010	167	59	65	6	297
2011	96	33	42	1	172
2012	125	34	52	4	215
2013	131	32	63	6	232
2014	100	26	52	4	182
2015	99	24	51	4	178
2016	132	26	71	5	234
2017	116	23	56	3	198
2018	118	25	66	3	212
2019	121	26	67	3	217
2020	130	27	81	3	241
Compound Annual Growth Rate					
2010 – 2015	-9.9%	-16.5%	-4.7%	-7.8%	-9.7%
2015 – 2020	5.6%	2.4%	9.7%	-5.6%	6.2%
2010 – 2020	-2.5%	-7.5%	2.2%	-6.7%	-2.1%

NOTE:
The fiscal year is October 1 through September 30.
SOURCES: National Based Aircraft Inventory Program, September 2020 (2020 based aircraft); Boca Raton Airport Authority, October 2020; US Department of Transportation, Federal Aviation Administration, *2019 Terminal Area Forecast*, February 2020.

EXHIBIT 3-3 HISTORICAL BASED AIRCRAFT – NUMBER OF AIRCRAFT AND SHARE



NOTE:
The fiscal year is October 1 through September 30.
SOURCES: Boca Raton Airport Authority, October 2020; US Department of Transportation, Federal Aviation Administration, *2019 Terminal Area Forecast*, February 2020.

3.2 FACTORS AFFECTING AVIATION ACTIVITY

Aviation activity is influenced by numerous factors, including national, regional, and local socioeconomic conditions and trends. However, the extent of influence varies from airport to airport. Global events, such as pandemics, terrorism, natural disasters, fluctuations in fuel prices, severe weather events, and political changes, can also influence aviation activity at an airport.

In addition to global events, localized factors such as nearby airport competition also impact a GA airport's aviation activity. In southeast Florida (specifically Palm Beach, Broward, and Miami-Dade Counties), there are 12 reliever or GA airports and 3 commercial-service airports with GA operations. The number of airports in the region affects competition for GA activity, which could lead to shifting market shares of operations among the airports. For example, airports that open certain facilities, such as a US CBP facility, may attract international activity that would have previously flown to other airports in the region. In May 2018, a CBP facility opened at BCT.

Palm Beach and Broward counties include 10 airports (8 reliever/GA airports and 2 commercial service airports) that handle GA aircraft operations. While BCT's historical share of area GA operations has fluctuated from year to year, in FY 2019 BCT's share of area GA operations represented 6.7 percent, their highest share percentage since FY 2011. **Table 3-8** presents BCT's historical share of area GA operations for airports located in Palm Beach and Broward counties.

TABLE 3-8 AIRPORT'S SHARE OF GENERAL AVIATION OPERATION – PALM BEACH AND BROWARD COUNTY AIRPORTS

FISCAL YEAR	BCT	TOTAL	BCT'S SHARE
2010	46,137	722,352	6.4%
2011	50,209	747,597	6.7%
2012	46,082	741,155	6.2%
2013	40,882	804,935	5.1%
2014	48,807	835,684	5.8%
2015	54,297	858,109	6.3%
2016	53,747	867,406	6.2%
2017	55,856	900,429	6.2%
2018	62,751	982,312	6.4%
2019	68,042	1,020,799	6.7%

NOTES:
FY – Fiscal Year
CAGR – Compound Annual Growth Rate
N/A – Not Applicable
Palm Beach and Broward County airports include Boca Raton Airport (BCT), Belle Glade State Municipal Airport (X10), Fort Lauderdale Executive Airport (FXE), Fort Lauderdale–Hollywood International Airport (FLL), North Palm Beach County General Aviation Airport (F45), North Perry Airport (HWO), Palm Beach County Glades Airport (PHK), Palm Beach County Park/Lantana Airport (LNA), Palm Beach International Airport (PBI), and Pompano Beach Airpark (PMP).
SOURCES: Boca Raton Airport Authority, October 2020 (BCT 2020 data); US Department of Transportation, Federal Aviation Administration, *2019 Terminal Area Forecast*, November 2020.

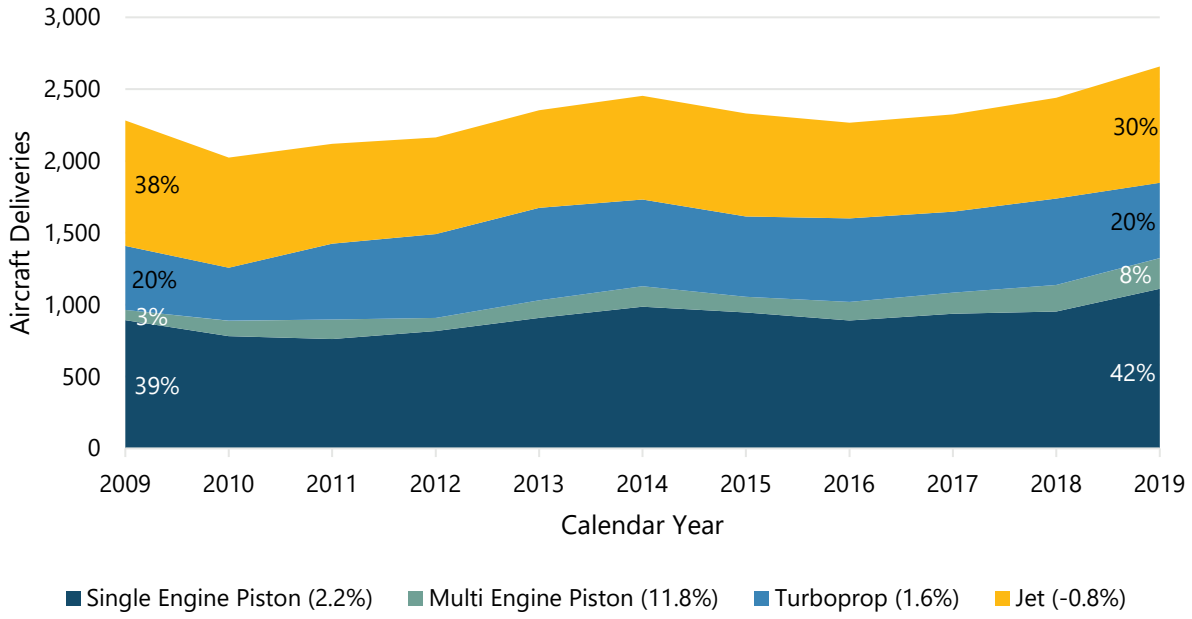
3.2.1 INDUSTRY AIRCRAFT MARKET TRENDS

As presented in the General Aviation Manufacturers Association's (GAMA's) *GAMA Annual Report 2019 and 50th Anniversary Edition*,[2] deliveries of GA aircraft manufactured worldwide grew at a CAGR of 1.5 percent from CY 2001 to CY 2019. Single-engine piston aircraft comprised the highest share of GA aircraft deliveries in CY 2019. The single-engine piston share of total worldwide deliveries increased from 39 percent in CY 2009 to 42 percent in CY 2019.

[2] General Aviation Manufacturers Association, *GAMA Annual Report 2019 and 50th Anniversary Edition*, March 2020.

During the same period, the multi-engine piston aircraft share of total worldwide deliveries increased 5 percentage points, as the turboprop's share remained unchanged at 20 percent and the jet aircraft share decreased by 8 percentage points. **Exhibit 3-4** presents the historical share of aircraft deliveries and each segment's CAGR from CY 2009 to CY 2019.

EXHIBIT 3-4 HISTORICAL GENERAL AVIATION AIRCRAFT DELIVERIES



NOTE:
The percentages represent the compound annual growth rate between calendar year 2009 and calendar year 2019.
SOURCE: General Aviation Manufacturers Association, *GAMA Annual Report 2019 and 50th Anniversary Edition*, March 2020.

According to the 2020 *FAA Aerospace Forecast*, single-engine piston activity comprises hobby and personal operators, whereas jet activity is more widely used for business purposes. As flying becomes more expensive due to increased training and maintenance costs, the FAA expects single-engine piston activity to decline. However, the FAA forecasts an increase in jet activity due to favorable socioeconomic and business trends.

Nationally, single- and multi- engine piston aircraft declined from FY 2010 to FY 2019 at an average annual decrease of 0.7 percent and 2.4 percent, respectively, as shown in **Table 3-9**. According to the 2020 *FAA Aerospace Forecast*,[3] the number of active single- and multi-engine piston aircraft nationwide is forecast to decline at an average annual rate of 0.5 percent from FY 2020 to FY 2040. In contrast, jet aircraft increased nationwide at a CAGR of 3.0 percent from FY 2009 to FY 2019 and are forecast to increase at a CAGR of 2.2 percent between FY 2020 and FY 2040, as shown in Table 3-9.

[3] US Department of Transportation, Federal Aviation Administration, *FAA Aerospace Forecast*, July 2020.

TABLE 3-9 US ACTIVE GENERAL AVIATION AND AIR TAXI AIRCRAFT

COMPOUND ANNUAL GROWTH RATE	SINGLE ENGINE PISTON[1]	MULTI ENGINE PISTON	TURBOPROP	JET	HELICOPTER
CY 2010 – 2019	-0.7%	-2.4%	0.7%	3.0%	0.1%
CY 2020 – 2040	-0.5%	-0.5%	1.2%	2.2%	1.6%

NOTES:
CY – Calendar Year
1 Single engine includes experimental and light sport aircraft.
SOURCE: US Department of Transportation, Federal Aviation Administration, *FAA Aerospace Forecast*, July 2020.

At the regional level, based aircraft trends are similar to those experienced nationally. As shown in **Table 3-10**, single-engine (piston and turboprop) based aircraft at select Southeast Florida airports have fluctuated from year to year; however, they remained nearly unchanged between FY 2010 and FY 2020, while multi-engine (piston and turboprop) based aircraft at the select airports increased from 307 in FY 2010 to 541 in FY 2020, representing a CAGR of 5.8 percent. Jet based aircraft at the select airports increased from 399 in FY 2010 to 504 in FY 2020, representing a CAGR of 2.4 percent, and the total based aircraft at the select airports increased from 2,000 to 2,400, a CAGR of 1.8 percent over the comparable period.

TABLE 3-10 BASED AIRCRAFT AT SELECT SOUTHEAST FLORIDA AIRPORTS

FY	SINGLE ENGINE[1]	MULTI ENGINE[1]	JET	HELICOPTER	OTHER	TOTAL	BCT	BCT SHARE
2010	1,175	307	399	119	0	2,000	297	14.9%
2011	941	351	348	106	0	1,746	172	9.9%
2012	1,029	378	377	134	55	1,973	215	10.9%
2013	1,107	416	381	133	67	2,104	232	11.0%
2014	1,120	489	430	139	67	2,245	182	8.1%
2015	1,185	534	469	138	0	2,326	178	7.7%
2016	1,214	565	482	153	67	2,481	234	9.4%
2017	1,177	571	458	141	67	2,414	198	8.2%
2018	1,140	571	439	112	67	2,329	212	9.1%
2019	1,154	576	444	113	67	2,354	217	9.2%
2020	1,174	541	504	114	67	2,400	241	10.0%
CAGR								
2010 – 2020	0.0%	5.8%	2.4%	-0.4%	N/A	1.8%	-2.1%	

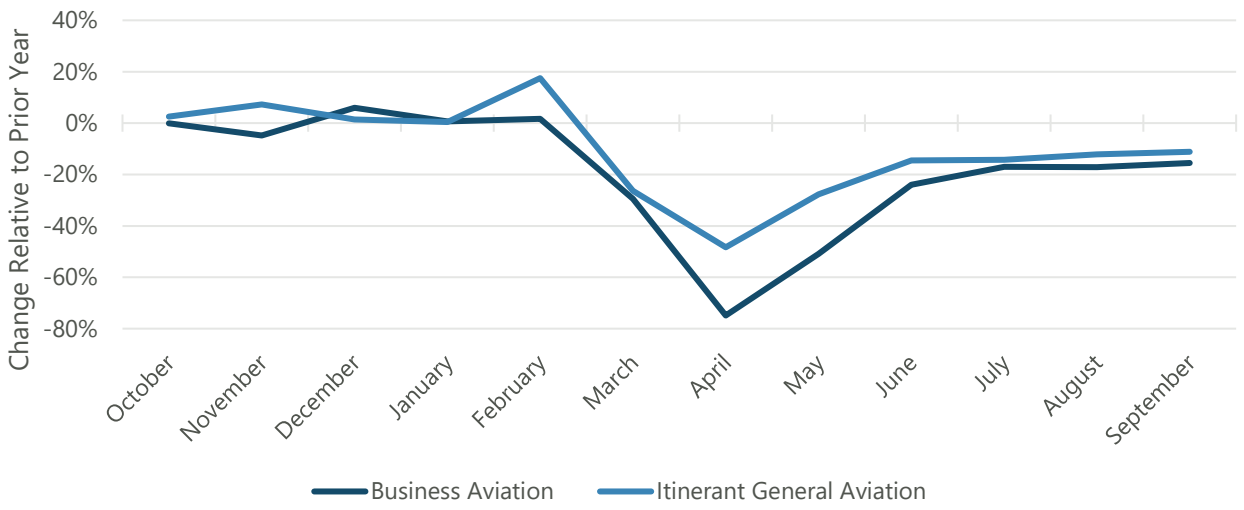
NOTES:
FY – Fiscal Year
CAGR – Compound Annual Growth Rate
N/A – Not Applicable
Southeast Florida airports include Boca Raton Airport (BCT) (shown in separate column), Belle Glade State Municipal Airport (X10), Fort Lauderdale Executive Airport (FXE), Fort Lauderdale–Hollywood International Airport (FLL), North Palm Beach County General Aviation Airport (F45), North Perry Airport (HWO), Palm Beach County Glades Airport (PHK), Palm Beach County Park/Lantana Airport (LNA), Palm Beach International Airport (PBI), and Pompano Beach Airpark (PMP).
1 Includes piston and turboprop-based aircraft.
SOURCES: Boca Raton Airport Authority, October 2020 (BCT 2020 data); US Department of Transportation, Federal Aviation Administration, *2019 Terminal Area Forecast*, November 2020.

The global and national trends in the GA fleet suggest that jet aircraft operations are likely to increase at the Airport throughout the forecast period. However, in contrast to global and national trends, single-engine piston aircraft are likely to continue to account for a significant share of activity at the Airport, as seen by the high share of single-engine based aircraft at the Airport and within the Southeast Florida region.

3.2.2 IMPACT OF COVID-19

Nationally, because of the COVID-19 pandemic, itinerant GA and business aviation volumes began to decrease in March 2020 as a ban on flights from other countries was instituted, and most domestic business travel ceased. However, since April, business aviation and itinerant GA operations have recovered more quickly than scheduled commercial (airline) aviation in the United States, as shown on **Exhibit 3-5**, as lockdown restrictions were lifted. Across the United States, business aviation operations in September 2020 were down 16 percent year over year, compared to a monthly low of -75 percent in April. Itinerant GA operations in September 2020 were down 11 percent year over year, compared to a monthly low of -48 percent in April.

EXHIBIT 3-5 CHANGE IN US AIRPORT OPERATIONS – BUSINESS AVIATION AND ITINERANT GENERAL AVIATION



SOURCES: US Department of Transportation, Federal Aviation Administration, *Business Jet Report*, November 2020; US Department of Transportation, Federal Aviation Administration, Operations Network (OPSNET), November 2020.

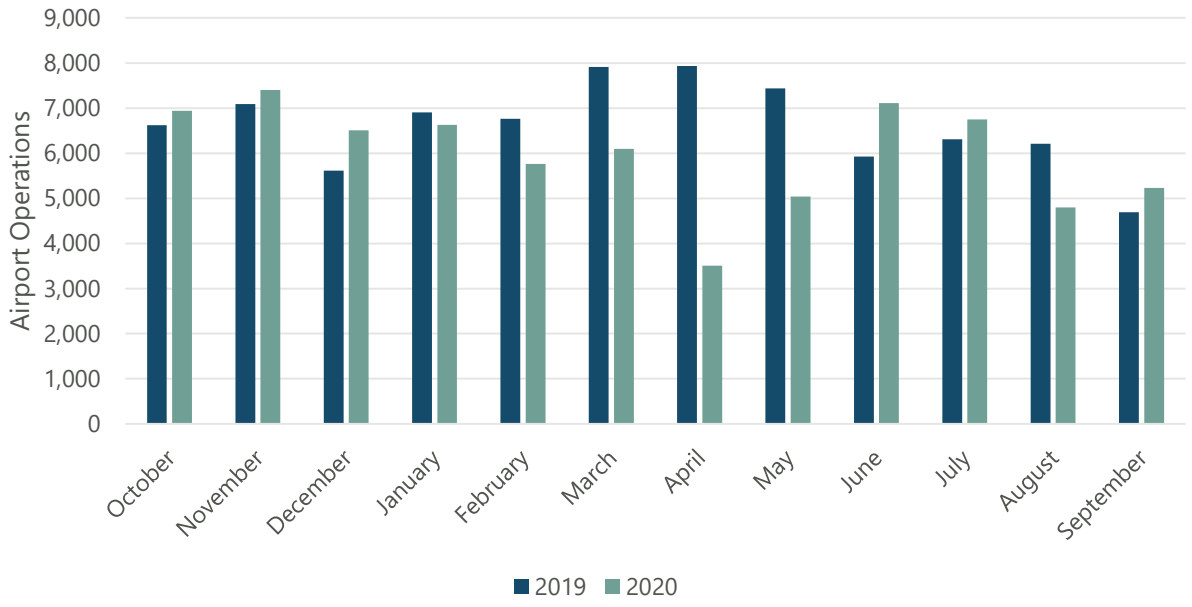
At BCT, total Airport operations in the first half of FY 2020 (October through March) decreased by 3.9 percent compared to the same period in FY 2019. In the second half of FY 2020 (April through September), total Airport operations decreased significantly in April (-55.8 percent) and May (-32.2 percent), before returning to monthly year-over-year increases in June (20.0 percent) and July (6.9 percent). After a decrease of 22.8 percent in August 2020, total Airport operations increased 11.6 percent in September 2020 over the comparable month in 2019. **Table 3-11** and **Exhibit 3-6** provide monthly comparisons for FY 2019 and FY 2020.

TABLE 3-11 MONTHLY AIRPORT OPERATIONS COMPARISON – 2019 AND 2020

MONTH	FY 2019	FY 2020	PERCENT CHANGE
October	6,622	6,941	4.8%
November	7,088	7,399	4.4%
December	5,617	6,505	15.8%
January	6,903	6,630	-4.0%
February	6,766	5,760	-14.9%
March	7,914	6,093	-23.0%
April	7,932	3,505	-55.8%
May	7,437	5,041	-32.2%
June	5,924	7,107	20.0%
July	6,310	6,745	6.9%
August	6,210	4,797	-22.8%
September	4,689	5,233	11.6%
FY Total	**79,412**	**71,756**	**-9.6%**

NOTE:
FY – Fiscal Year
SOURCES: Boca Raton Airport Authority, October 2020; US Department of Transportation, Federal Aviation Administration, Operations Network (OPSNET), November 2020.

EXHIBIT 3-6 MONTHLY AIRPORT OPERATIONS COMPARISON – 2019 AND 2020



SOURCES: Boca Raton Airport Authority October 2020; US Department of Transportation, Federal Aviation Administration, Operations Network (OPSNET), November 2020.

3.2.3 SOCIOECONOMICS

An airport's activity levels are often correlated with national and local socioeconomic conditions. Section 3.3 includes analyses of the historical relationships between local, state, and national socioeconomic variables and activity at BCT. As shown in **Appendix C** (Table C-1 to Table C-4), all socioeconomic variables evaluated in this report for Palm Beach County, the Miami–Fort Lauderdale–West Palm Beach Metropolitan Statistical Area (MSA), the state of Florida, and the United States have increased since 2010. From CY 2009 to CY 2019, the Palm Beach County Gross Regional Product (GRP) increased at rates greater than the MSA, state, and nation.

Over the forecast period (CY 2020 to CY 2040), the Palm Beach County GRP is projected to increase at rates above those projected for the MSA, state, and nation. When comparing the four geographic areas, Palm Beach County's per capita personal income (PCPI) remains above the MSA, state, and national levels and is projected to increase at rates greater than that of the state and nation. Based on the socioeconomic projections, Palm Beach County is projected to outperform the MSA, state, and nation across all variables (population, employment, total and net earnings, income, PCPI, and GRP/Gross Domestic Product [GDP]), with the exception of PCPI that is projected to increase at rates similar to those of the MSA (2.0 percent CAGR). Based on these data, Palm Beach County and the region are projected to experience positive population and economic growth, providing support for an increase in business and GA activity.

3.2.4 TECHNOLOGICAL SHIFTS

3.2.4.1 DRONES

According to the FAA drone registration database,[4] the number of registered drones in the United States is approximately 1.7 million (as of November 2020), with 1.2 million registered as recreational and approximately 500,000 registered as commercial use. In Florida, drones are also referred to as unmanned aircraft systems (UAS) and are used for commercial and recreational purposes, such as for real estate listings and water sport activities.

To help address the increased use of drones, the FAA has developed tools such as B4UFLY, a free application that drone operators can download for guidance on operating drones safely around airport areas. Drones may positively or negatively impact activity at GA airports such as BCT. Increased use of drones could spur additional interest in aviation and lead to more people flying. Conversely, drones may provide a substitute for flying aircraft (news and traffic reporting, for example), leading to a decrease in GA activity.

3.2.4.2 VERTICAL TAKEOFF AND LANDING AIRCRAFT

Vertical takeoff and landing (VTOL) aircraft can land and takeoff vertically and hover similar to helicopters; however, VTOL aircraft can also be fixed-winged aircraft. The ability for aircraft to land and takeoff vertically may positively impact activity at airports by allowing additional operations without the need for additional runway use or capacity; however, VTOL operations may negatively impact activity at airports due to increased airspace congestion and the possibility of specific takeoff/landing procedures for designated areas at the airport away from runway safety areas, approach areas, and other safety zones that require non-VTOL aircraft movements.

[4] US Department of Transportation, Federal Aviation Administration, https://www.faa.gov/uas/resources/by_the_numbers/ (accessed November 2020).

3.2.4.3 ELECTRIC AIRCRAFT

Electric aircraft offer a feasible alternative for the light aircraft sector. Electric aircraft are designed to produce less noise and provide a cleaner alternative to fuel-based aircraft. An influx of electric aircraft into the fleet could necessitate improvements to an airport's and tenant's existing electrical infrastructure to provide the required charging capacity. Increased activity by electric aircraft could reduce the fuel storage capacity requirements of fuel farms. Disadvantages for electric aircraft revolve around the batteries, with limitations on power and length of battery life, battery weight, and the ability to charge batteries at airports.

3.2.5 TEMPORARY FLIGHT RESTRICTIONS

TFRs were issued when the POTUS (President Trump) was in residence at Mar-A-Lago. Although BCT is located within the outer ring of the TFR, PBI is located within the inner core of the TFR and is subject to restrictions and prohibitions that do not apply at BCT. Dates of TFRs provided by the BRAA for FY 2017 through FY 2019 (totaling 102 days) were reviewed to provide input on the impact on daily and yearly operations. The analysis shows that the impact on annual Airport operations represented an annual increase of 0.8 percent additional annual operations. While TFR restrictions have impacted operations at the Airport, the increased activity levels remain minimal and does not justify adjusting the base year or operations forecast to reflect these special conditions.

3.3 FORECAST OF AVIATION ACTIVITY

Various FAA-approved forecasting techniques were explored to determine the preferred methodology for developing the Airport operations, based aircraft, and fleet mix forecasts. The forecast methodologies explored included socioeconomic regression analysis and market share analysis. Each methodology is described in further detail in this section.

3.3.1 SOCIOECONOMIC REGRESSION ANALYSIS

Socioeconomic regression analysis is used to identify relationships between aviation demand (dependent variable) and one or more socioeconomic variables (independent variables). The relationships identified by the regression analyses (in the form of a mathematical equation) can then be applied to independent projections of socioeconomic variables to forecast the total Airport demand.

The outputs of the socioeconomic regression analyses were evaluated based on certain criteria. The first criterion for evaluation is the regression model's coefficient of determination, or the R-squared value. An R-squared value is between 0 percent and 100 percent, with 0 percent representing no statistical relationship between the independent variable(s) and the dependent variable, and 100 percent indicating perfect correlation between the variables analyzed, such that a given change in the independent variable(s) always results in an equal change (in magnitude and direction) in the dependent variable. For these analyses, the independent variables were considered strongly correlated with the dependent variable when the R-squared value was more than 70.0 percent. However, the R-squared value is not the only output used to determine the appropriateness of a regression model. The direction of the coefficient also plays an important role in determining if the relationship makes sense in each context. For example, in aviation activity forecasts, it is expected that there would be a positive relationship between socioeconomic growth and aviation activity, such that an increase in GDP correlates with an increase in aviation activity. If a regression model were to indicate a negative relationship between a socioeconomic variable(s) and aviation activity, then the result would be a forecast decline in aviation activity as socioeconomic activity increases, ultimately resulting in declining activity.

For BCT, socioeconomic regression analyses incorporated local (county and MSA), state, and national socioeconomic data from Woods & Poole Economics, Inc. The socioeconomic variables considered in the analyses were population, employment, total and net earnings, total personal income, PCPI, and GRP/GDP; all economic data were in real terms, equivalent to 2012 US dollars. The local socioeconomic variables were data for Palm Beach County. In addition, the Miami–Fort Lauderdale–West Palm Beach MSA socioeconomic variables were included in the analyses, along with state and national variables.[5] Socioeconomic regression analyses were conducted using one independent socioeconomic variable (univariate regression) and multiple independent socioeconomic variables (multivariate regression).

An average percentage of the regression analysis results based on local, state, and national socioeconomic variables was subsequently used to forecast itinerant operations for the Airport. The single-variable analysis concluded that growth in local (Palm Beach County and MSA), state, and national socioeconomic variables, such as population, personal income, total GDP, and employment, coincides with an increase in itinerant aircraft operations at BCT and vice versa. The multivariable analysis concluded that growth in local (Palm Beach County) socioeconomic variables, such as population, personal income, total GRP, and employment, coincides with an increase in local aircraft operations at BCT and vice versa.

Table 3-12 depicts the relationship between historical aircraft operations at the Airport and the range of acceptable long-term growth rates. As a result, itinerant operations are forecast to increase at a CAGR of 1.9 percent based on an average of numerous single-variable regression analyses of local, state, and national predictive relationships. Local operations are forecast to increase at a CAGR of 2.7 percent based on the multivariable regression analysis of local variables. In addition to the socioeconomic regression analysis, a linear trend analysis was conducted to project long-term growth rates for itinerant operations (1.8 percent CAGR) and local operations (3.6 percent CAGR).

TABLE 3-12 REGRESSION AND LINEAR TREND ANALYSIS SUMMARY

GEOGRAPHIC AREA AND TREND ANALYSIS	R-SQUARE RANGE	LONG-TERM GROWTH RATES (2020 – 2040)	
		ITINERANT OPERATIONS	LOCAL OPERATIONS
Local (Palm Beach County)	82% – 89%	1.4% – 2.4%	2.7% [1]
Miami–Fort Lauderdale–West Palm Beach MSA	81% – 89%	1.6% – 2.3%	3.6% – 4.5%
State of Florida	82% – 90%	1.4% – 2.4%	3.6% – 4.9%
Nation	78% – 84%	1.5% – 2.0%	3.4% – 4.5%
Trend	78%	1.8%	3.6%

NOTES:
MSA – Metropolitan Statistical Area
1 Local operations are based on multi-variable regression, including the following Palm Beach County variables: population, employment, earnings, income, per capita personal income, and gross regional product.
SOURCES: Woods & Poole Economics, Inc., May 2020; Ricondo & Associates, Inc., November 2020.

[5] An MSA is a metropolitan statistical area consisting of urban cores and surrounding counties with a high degree of social and economic integration with the metropolitan area core, based on commuting patterns.

3.3.2 MARKET SHARE ANALYSIS

The market share analysis compares local aviation activity to state and national aviation activity. This technique is used to identify the historical market shares of an airport relative to a larger area containing the airport (e.g., a state and/or nation). The historical relationships are then used in conjunction with an independent forecast of the larger area to forecast activity at the airport. Market share analyses were conducted to explore the historical relationship trends between total operations at BCT and total GA operations at the statewide and national levels, as reported in the FAA's 2019 Terminal Area Forecast (TAF).

Table 3-13 shows the Airport's market share of total GA activity for the state and nation. The analysis shows an increasing long-term trend in share of operations at the Airport relative to the state and nation.

TABLE 3-13 MARKET SHARE ANALYSIS SUMMARY

		STATE OF FLORIDA MARKET SHARE			NATION MARKET SHARE		
FISCAL YEAR	BCT TAF OPS	FAA TAF FOR STATE OF FLORIDA	BCT SHARE OF STATE OPS	ESTIMATED BCT TOTAL OPS	FAA TAF FOR THE NATION	BCT SHARE OF NATION OPS	ESTIMATED BCT TOTAL OPS
2001	71,195	7,468,949	0.95%		85,579,408	0.08%	
2010	51,999	5,799,356	0.90%		71,028,355	0.07%	
2019	79,412	6,632,710	1.20%		68,854,373	0.12%	
Forecast							
2040	86,654	7,709,363	1.32%	101,900	75,074,721	0.14%	101,400
CAGR							
2019 – 2040	0.4%	0.8%		1.8%	0.4%		1.7%

NOTES:
The fiscal year is October through September.
FAA – Federal Aviation Administration
TAF – Terminal Area Forecast
CAGR – Compound Annual Growth Rate
OPS – Operations
SOURCES: US Department of Transportation, Federal Aviation Administration, *2019 Terminal Area Forecast*, February 2020; Ricondo & Associates, Inc., November 2020.

Assuming the Airport's market share of total GA operations in Florida and the United States continues the long-term historical trend (FY 2001 through FY 2019) through the forecast period, the total annual forecast operations at the Airport would be between approximately 101,400 operations (nation market share trend) and 101,900 operations (state market share trend) in FY 2040, as presented in Table 3-16. The CAGR from FY 2019 to FY 2040 for total operations at the Airport would be 1.7 percent (nation market share trend) and 1.8 percent (state market share trend) based on the Airport's historical long-term trend share of total state and nation GA operations. According to the 2019 TAF, from FY 2019 to FY 2040, BCT's operations are forecast to increase at a CAGR of 0.4 percent compared to a CAGR of 0.8 percent and 0.4 percent for the state and nation, respectively, over the comparable period. The long-term trend growth rates are near the average growth rates forecast in the socioeconomic regression analysis for itinerant operations at the Airport.

3.3.3 FORECAST RESULTS

Based on a review of the results of the forecast methodologies, the preferred baseline operations forecast was selected based on the socioeconomic regression analysis. The regression analysis was selected due to strong correlations between the variables analyzed. A comparison of the projected range of long-term growth rates for itinerant operations are within the historical 5- and 10-year growth rates experienced at BCT. The preferred baseline forecast of local operations were based on the local socioeconomic results. National, state, and MSA socioeconomics produce higher long-term growth rates which resulted in a more aggressive share increase of local operations when compared to historical trends. As a result, itinerant operations are forecast to increase at a CAGR of 1.9 percent which represents the average long-term growth rate from the socioeconomic regression analysis, and local operations are forecast to increase at a CAGR of 2.7 percent over the forecast period (FY 2020 to FY 2040). Forecast results for total, air taxi, GA, and military operations, including fleet mix and based aircraft, are discussed further in the following subsections.

3.3.3.1 TOTAL AIRPORT OPERATIONS

Total Airport operations at BCT, as presented in **Table 3-14**, are forecast to increase from 71,756 in FY 2020 to approximately 111,200 in FY 2040, a CAGR of 2.2 percent. The long-term growth rate (2.2 percent) is lower than the 3.3 percent recorded between FY 2010 and FY 2020. Total operations are forecast to return to the historical 10-year peak (79,412 operations in FY 2019) in FY 2025.

3.3.3.2 ITINERANT AND LOCAL AIRPORT OPERATIONS

As shown in **Table 3-15**, itinerant operations are forecast to increase from 45,683 in FY 2020 to approximately 67,200 in FY 2040, a CAGR of 1.9 percent. Local operations are forecast to increase from 26,073 in FY 2020 to approximately 44,000 in FY 2040, a CAGR of 2.7 percent. Itinerant operations are forecast to return to the historical 10-year peak (50,466 operations in FY 2019) in FY 2025. The share of itinerant operations is forecast to decrease from 64 percent (FY 2020) to 60 percent (FY 2040) of total Airport operations. Local operations are forecast to return to the historical 10-year peak (28,946 operations in FY 2019) in FY 2024. The share of local operations increased from 26 percent (FY 2010) to 36 percent (FY 2020) of total Airport operations. The share of local operations is forecast to increase throughout the forecast period and represent 40 percent of total Airport operations in FY 2040, as shown on **Exhibit 3-7**.

3.3.3.3 AIR TAXI OPERATIONS

As shown in **Table 3-16**, air taxi aircraft operations at BCT are forecast to increase from 10,560 in FY 2020 to approximately 19,080 in FY 2040, a CAGR of 3.0 percent. Air taxi operations (all itinerant operations) are forecast to return to the historical 10-year peak (11,196 operations in FY 2019) in FY 2022. The share of air taxi operations increased from 10.7 percent (FY 2010) to 14.7 percent (FY 2020) when compared to total Airport operations. The increasing trend is forecast to continue over the forecast period with air taxi operations representing 17.2 percent of total Airport operations in FY 2040.

3.3.3.4 GENERAL AVIATION (GA) OPERATIONS

As shown in Table 3-16, total GA operations (comprising both itinerant and local operations) are forecast to increase from 61,038 in FY 2020 to approximately 91,960 in FY 2040, a CAGR of 2.1 percent. GA operations are forecast to return to the historical 10-year peak (68,042 operations in FY 2019) in FY 2025. The share of GA operations decreased from 89.2 percent (FY 2010) to 85.1 percent (FY 2020) when compared to total Airport operations. The decreasing trend is forecast over the period with GA operations representing 82.7 percent of total Airport operations in FY 2040.

TABLE 3-14 HISTORICAL AND FORECAST AIRPORT OPERATIONS – TOTAL

FISCAL YEAR	TOTAL AIRPORT OPERATIONS	ANNUAL PERCENTAGE CHANGE
2010	51,999	
2011	56,859	9.3%
2012	52,962	-6.9%
2013	48,023	-9.3%
2014	56,581	17.8%
2015	63,257	11.8%
2016	63,182	-0.1%
2017	66,209	4.8%
2018	73,334	10.8%
2019	79,412	8.3%
2020	71,756	-9.6%
Forecast		
2021	73,400	2.3%
2022	75,300	2.6%
2023	77,200	2.5%
2024	79,100	2.5%
2025	80,800	2.1%
2026	82,700	2.4%
2027	84,500	2.2%
2028	86,300	2.1%
2029	88,200	2.2%
2030	90,000	2.0%
2031	91,900	2.1%
2032	93,900	2.2%
2033	95,900	2.1%
2034	97,900	2.1%
2035	100,100	2.2%
2036	102,100	2.0%
2037	104,400	2.3%
2038	106,500	2.0%
2039	108,900	2.3%
2040	111,200	2.1%
Compound Annual Growth Rate		
2010 – 2020	3.3%	
2020 – 2030	2.3%	
2020 – 2040	2.2%	

NOTE:
The fiscal year is October 1 through September 30.

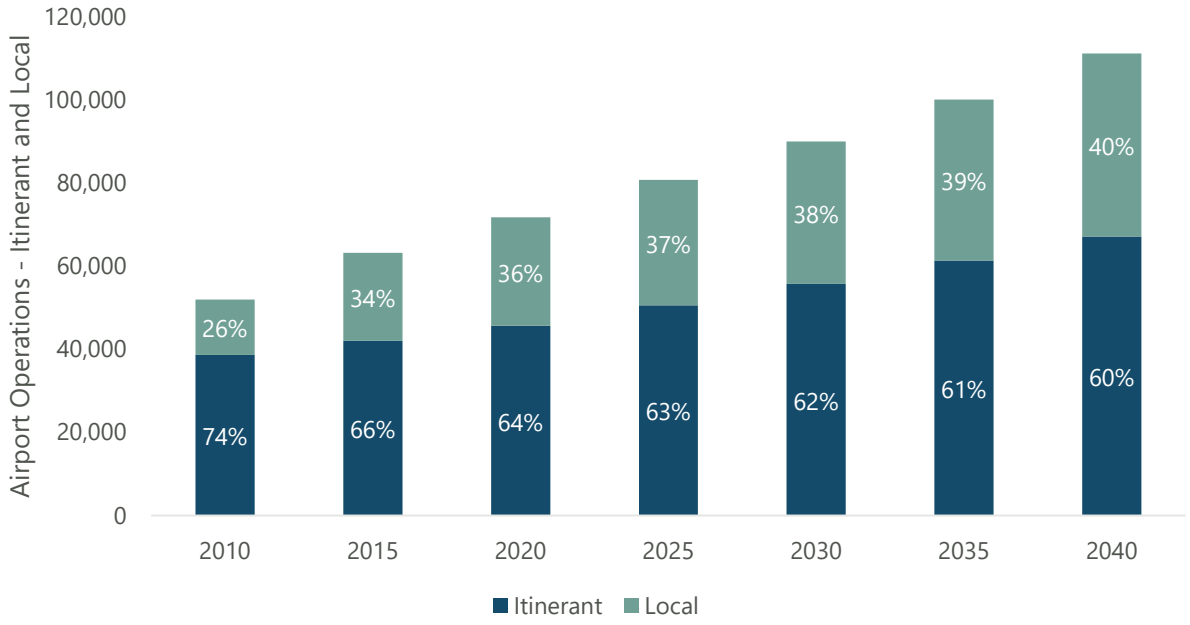
SOURCES: Boca Raton Airport Authority, October 2020; US Department of Transportation, Federal Aviation Administration, Operations Network (OPSNET), October 2020; Ricondo & Associates, Inc., November 2020.

TABLE 3-15 HISTORICAL AND FORECAST AIRPORT OPERATIONS – ITINERANT AND LOCAL

	AIRPORT OPERATIONS			SHARE OF OPERATIONS	
FISCAL YEAR	ITINERANT	LOCAL	TOTAL	ITINERANT	LOCAL
2010	38,629	13,370	51,999	74%	26%
2011	42,072	14,787	56,859	74%	26%
2012	42,688	10,274	52,962	81%	19%
2013	39,170	8,853	48,023	82%	18%
2014	40,404	16,177	56,581	71%	29%
2015	42,017	21,240	63,257	66%	34%
2016	42,285	20,897	63,182	67%	33%
2017	44,173	22,036	66,209	67%	33%
2018	47,742	25,592	73,334	65%	35%
2019	50,466	28,946	79,412	64%	36%
2020	45,683	26,073	71,756	64%	36%
Forecast					
2021	46,700	26,700	73,400	64%	36%
2022	47,700	27,600	75,300	63%	37%
2023	48,600	28,600	77,200	63%	37%
2024	49,600	29,500	79,100	63%	37%
2025	50,600	30,200	80,800	63%	37%
2026	51,700	31,000	82,700	63%	37%
2027	52,700	31,800	84,500	62%	38%
2028	53,700	32,600	86,300	62%	38%
2029	54,800	33,400	88,200	62%	38%
2030	55,800	34,200	90,000	62%	38%
2031	56,900	35,000	91,900	62%	38%
2032	58,000	35,900	93,900	62%	38%
2033	59,100	36,800	95,900	62%	38%
2034	60,200	37,700	97,900	61%	39%
2035	61,400	38,700	100,100	61%	39%
2036	62,500	39,600	102,100	61%	39%
2037	63,700	40,700	104,400	61%	39%
2038	64,800	41,700	106,500	61%	39%
2039	66,000	42,900	108,900	61%	39%
2040	67,200	44,000	111,200	60%	40%
Compound Annual Growth Rate					
2010 – 2020	1.7%	6.9%	3.3%		
2020 – 2030	2.0%	2.8%	2.3%		
2020 – 2040	1.9%	2.7%	2.2%		

NOTES:
The fiscal year is October 1 through September 30.
The totals may not match due to rounding.
SOURCES: Boca Raton Airport Authority, October 2020; US Department of Transportation, Federal Aviation Administration, Operations Network (OPSNET), October 2020; Ricondo & Associates, Inc., November 2020.

EXHIBIT 3-7 HISTORICAL AND FORECAST AIRPORT OPERATIONS – ITINERANT AND LOCAL



NOTE:
The fiscal year is October 1 through September 30.

SOURCES: Boca Raton Airport Authority, October 2020; US Department of Transportation, Federal Aviation Administration, Operations Network (OPSNET), October 2020; Ricondo & Associates, Inc., November 2020.

TABLE 3-16 HISTORICAL AND FORECAST AIRPORT OPERATIONS – AIR TAXI, GENERAL AVIATION, AND MILITARY

FISCAL YEAR	AIR TAXI	GENERAL AVIATION	MILITARY	TOTAL AIRPORT OPERATIONS	AIR TAXI SHARE	GENERAL AVIATION SHARE	MILITARY SHARE
2010	5,553	46,365	81	51,999	10.7%	89.2%	0.2%
2011	6,519	50,209	131	56,859	11.5%	88.3%	0.2%
2012	6,705	46,082	175	52,962	12.7%	87.0%	0.3%
2013	6,903	40,882	238	48,023	14.4%	85.1%	0.5%
2014	7,504	48,807	270	56,581	13.3%	86.3%	0.5%
2015	8,537	54,297	423	63,257	13.5%	85.8%	0.7%
2016	9,279	53,747	156	63,182	14.7%	85.1%	0.2%
2017	10,181	55,856	172	66,209	15.4%	84.4%	0.3%
2018	10,392	62,751	191	73,334	14.2%	85.6%	0.3%
2019	11,196	68,042	174	79,412	14.1%	85.7%	0.2%
2020	10,560	61,038	158	71,756	14.7%	85.1%	0.2%
Forecast							
2021	10,890	62,350	160	73,400	14.8%	84.9%	0.2%
2022	11,270	63,870	160	75,300	15.0%	84.8%	0.2%
2023	11,640	65,400	160	77,200	15.1%	84.7%	0.2%
2024	12,030	66,910	160	79,100	15.2%	84.6%	0.2%
2025	12,380	68,260	160	80,800	15.3%	84.5%	0.2%
2026	12,780	69,760	160	82,700	15.4%	84.4%	0.2%
2027	13,160	71,180	160	84,500	15.6%	84.2%	0.2%
2028	13,540	72,600	160	86,300	15.7%	84.1%	0.2%
2029	13,950	74,090	160	88,200	15.8%	84.0%	0.2%
2030	14,340	75,500	160	90,000	15.9%	83.9%	0.2%
2031	14,760	76,980	160	91,900	16.1%	83.8%	0.2%
2032	15,190	78,550	160	93,900	16.2%	83.7%	0.2%
2033	15,640	80,100	160	95,900	16.3%	83.5%	0.2%
2034	16,080	81,660	160	97,900	16.4%	83.4%	0.2%
2035	16,560	83,380	160	100,100	16.5%	83.3%	0.2%
2036	17,020	84,920	160	102,100	16.7%	83.2%	0.2%
2037	17,530	86,710	160	104,400	16.8%	83.1%	0.2%
2038	18,010	88,330	160	106,500	16.9%	82.9%	0.2%
2039	18,550	90,190	160	108,900	17.0%	82.8%	0.1%
2040	19,080	91,960	160	111,200	17.2%	82.7%	0.1%
Compound Annual Growth Rate							
2010 – 2020	6.6%	2.8%	6.9%	3.3%			
2020 – 2030	3.1%	2.1%	0.1%	2.3%			
2020 – 2040	3.0%	2.1%	0.1%	2.2%			

NOTE:
The fiscal year is October 1 through September 30.
SOURCES: Boca Raton Airport Authority, October 2020; US Department of Transportation, Federal Aviation Administration, Operations Network (OPSNET), October 2020; Ricondo & Associates, Inc., November 2020.

3.3.3.5 MILITARY OPERATIONS

As standard practice in master plan forecasts, military operations are held constant over the forecast period. As shown in Table 3-16, the share of military operations has fluctuated from year to year; however, they remain under 1.0 percent of total operations. In FY 2020, the Airport recorded 158 military operations, or 0.2 percent of total Airport operations. Military operations are held constant (160 operations) over the forecast period and are forecast to represent 0.1 percent of total Airport operations in FY 2040.

3.3.3.6 FLEET MIX

As previously noted, the historical operational fleet mix was estimated through an analysis of ANOMS and TFMSC[6] data. In addition, the correlation between based aircraft at the Airport and national active GA aircraft was examined, as based aircraft are likely to be representative of the types of aircraft that operate at the Airport.

Estimated piston and jet aircraft operations at BCT have increased at rates greater than those of national active piston and jet aircraft over the historical period from FY 2010 to FY 2019. Piston and jet aircraft operations represent nearly 90 percent of based aircraft at the Airport. Over the same period, estimated turboprop and helicopter aircraft operations have underperformed when compared to national active turboprop and helicopter aircraft in part due to a decrease in turboprop and helicopter based aircraft at the Airport. Therefore, it was assumed that piston and jet activity at the Airport would continue to outperform national trends of active aircraft, while turboprop and helicopter operations were assumed to align with the growth rates of corresponding active aircraft from the 2020 *FAA Aerospace Forecast*.

Piston and jet aircraft Airport operations were assumed to follow historical trends in share of Airport operations. As a result, piston aircraft operations are forecast to increase from 46,979 in FY 2020 to 64,880 in FY 2040, a CAGR of 1.6 percent. Jet aircraft operations are forecast to increase from 22,381 in FY 2020 to 43,500 in FY 2040, a CAGR of 3.4 percent compared to 2.2 percent in the 2020 *FAA Aerospace Forecast*. From FY 2010 to FY 2020, turboprop and helicopter based aircraft and estimated helicopter operations decreased, and turboprop operations increased slightly. Turboprop and helicopter operations are forecast to increase at rates comparable to the corresponding active aircraft long-term growth rates in the 2020 *FAA Aerospace Forecast*.

Fleet mix operations across all categories are forecast to increase from FY 2020 to FY 2040. Among the categories of aircraft, piston, turboprop aircraft, and helicopters are forecast to decrease in market share of total operations over the forecast period, while the share of jet aircraft are forecast to increase from approximately 31 percent in FY 2020 to approximately 39 percent in FY 2040. The most prevalent jet aircraft operating at the Airport are the Cessna Citation X, V, and XLS series; Hawker 800; Learjet 45 and 60; and Gulfstream IV. **Table 3-17** and **Exhibit 3-8** summarizes the aircraft operations at BCT by aircraft type.

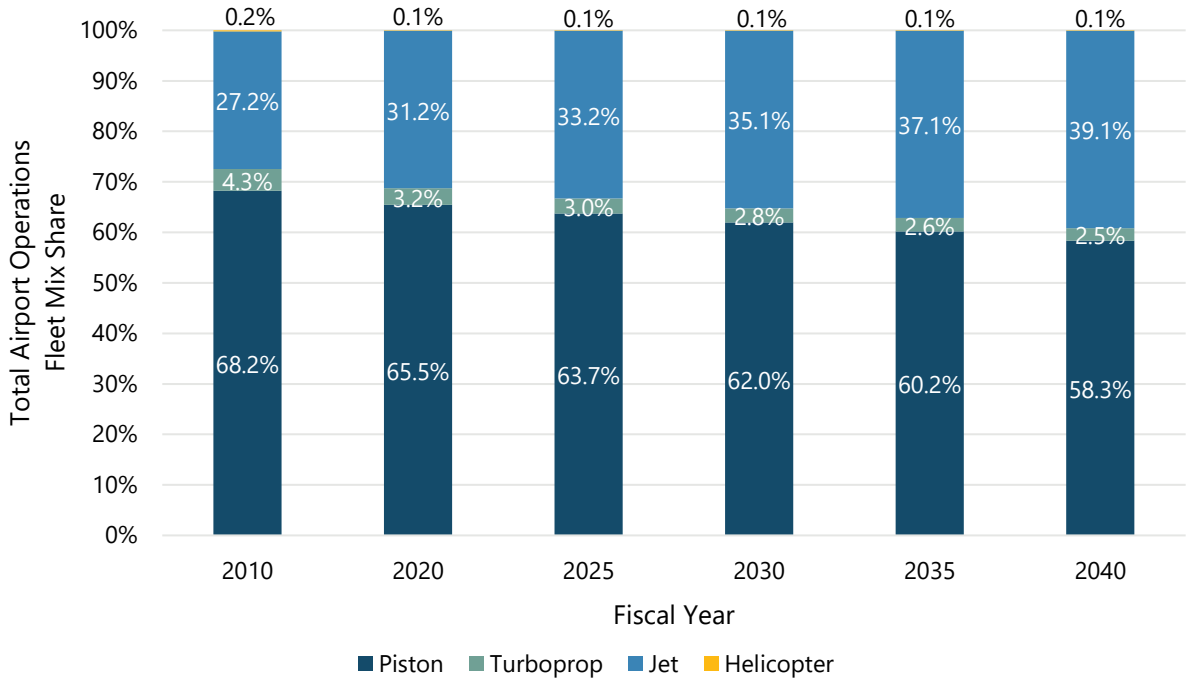
[6] Traffic Flow Management System Counts

TABLE 3-17 HISTORICAL AND FORECAST AIRPORT OPERATIONS – FLEET MIX OPERATIONS

FISCAL YEAR	PISTON	TURBOPROP	JET	HELICOPTER	TOTAL
2010	35,483	2,248	14,168	100	51,999
2011	39,554	2,330	14,833	142	56,859
2012	36,053	2,309	14,437	163	52,962
2013	31,028	2,189	14,660	146	48,023
2014	38,420	1,941	16,047	173	56,581
2015	43,866	2,248	16,943	200	63,257
2016	43,989	2,018	17,025	150	63,182
2017	43,822	2,047	20,269	71	66,209
2018	48,909	2,181	22,169	75	73,334
2019	53,921	2,560	22,866	65	79,412
2020	46,979	2,330	22,381	66	71,756
Forecast					
2021	47,780	2,350	23,200	70	73,400
2022	48,760	2,370	24,100	70	75,300
2023	49,740	2,390	25,000	70	77,200
2024	50,720	2,410	25,900	70	79,100
2025	51,500	2,430	26,800	70	80,800
2026	52,380	2,450	27,800	70	82,700
2027	53,260	2,470	28,700	70	84,500
2028	54,140	2,490	29,600	70	86,300
2029	55,010	2,510	30,600	80	88,200
2030	55,790	2,530	31,600	80	90,000
2031	56,573	2,550	32,700	77	91,900
2032	57,552	2,570	33,700	78	93,900
2033	58,431	2,590	34,800	79	95,900
2034	59,310	2,610	35,900	80	97,900
2035	60,290	2,630	37,100	80	100,100
2036	61,068	2,650	38,300	82	102,100
2037	62,047	2,670	39,600	83	104,400
2038	62,926	2,690	40,800	84	106,500
2039	64,005	2,710	42,100	85	108,900
2040	64,880	2,730	43,500	90	111,200
Compound Annual Growth Rate					
2010 – 2020	2.8%	0.4%	4.7%	-4.1%	3.3%
2020 – 2030	1.7%	0.8%	3.5%	1.9%	2.3%
2020 – 2040	1.6%	0.8%	3.4%	1.6%	2.2%

NOTES:
The fiscal year is October 1 through September 30.
The totals may not match due to rounding.
The results are estimates and may not match actuals.
SOURCES: Boca Raton Airport Authority, Airport Noise and Operations Monitoring System (ANOMS), October 2020; US Department of Transportation, Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), November 2020.

EXHIBIT 3-8 HISTORICAL AND FORECAST AIRPORT OPERATIONS – FLEET MIX OPERATIONS



NOTES:
The fiscal year is October 1 through September 30.
The totals may not match due to rounding.
The results are estimates and may not match actuals.
SOURCES: Boca Raton Airport Authority, Airport Noise and Operations Monitoring System (ANOMS), October 2020; US Department of Transportation, Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), November 2020.

3.3.3.7 BASED AIRCRAFT

The based aircraft at the Airport were forecast using a similar methodology to the operational fleet mix forecast. Using total based aircraft at local Palm Beach County and Broward County airports for FY 2019 as a baseline number of based aircraft, based aircraft by engine type were grown proportionally to the national active GA aircraft of the respective engine type, as listed in the *FAA Aerospace Forecast*, leading to differentiated growth rates by engine type.[7] In addition, the BCT share of local based aircraft was assumed to increase nominally based on the historical trend from FY 2011 through FY 2020 (actuals reported by the BRAA). As a result, BCT's share of local based aircraft is forecast to reach 10.3 percent or 298 based aircraft in FY 2040.

Table 3-18 presents the historical and forecast based aircraft results for the local airports. Throughout the forecast period, total based aircraft at BCT are forecast to increase from 241 aircraft in FY 2020 to 298 aircraft in FY 2040, a CAGR of 1.1 percent, compared to 321 based aircraft forecast for FY 2040 in the 2019 FAA TAF. For comparison, total based aircraft at the local airports (including BCT) are forecast to increase from 2,400 in FY 2020 to 2,909 in FY 2040, a CAGR of 1.0 percent.

[7] FAA Aerospace Forecast (2020 – 2040) active general aviation and air taxi aircraft growth rates: single engine piston (-1.0 percent), single engine experimental/light sport (1.2 percent), multi engine (-0.5 percent), jet (2.2 percent), and rotorcraft/helicopter (1.7 percent).

TABLE 3-18 HISTORICAL AND FORECAST BASED AIRCRAFT – PALM BEACH COUNTY AND BROWARD COUNTY AIRPORTS

FY	BCT	F45	FLL	FXE	HWO	LNA	PBI	PHK	PMP	X10	TOTAL	BCT SHARE
2010	297	219	57	708	247	258	127	7	68	12	2,000	14.9%
2011	172	228	49	554	247	255	149	7	74	11	1,746	9.9%
2012	215	321	76	554	252	295	149	24	76	11	1,973	10.9%
2013	232	341	71	644	253	307	136	31	78	11	2,104	11.0%
2014	182	336	94	817	258	294	148	31	74	11	2,245	8.1%
2015	178	273	88	933	245	273	165	15	145	11	2,326	7.7%
2016	234	313	85	990	244	269	171	30	134	11	2,481	9.4%
2017	198	293	102	959	276	243	171	30	131	11	2,414	8.2%
2018	212	275	88	913	271	193	167	26	173	11	2,329	9.1%
2019	217	275	88	926	273	197	168	26	173	11	2,354	9.2%
2020	241	275	88	940	275	202	169	26	173	11	2,400	10.0%
Forecast												
2040	298	276	88	1,220	313	308	190	26	179	11	2,909	10.3%
CAGR												
2010 – 2020	-2.1%	2.3%	4.4%	2.9%	1.1%	-2.4%	2.9%	14.0%	9.8%	-0.9%	1.8%	
2020 – 2040	1.1%	0.0%	0.0%	1.3%	0.6%	2.1%	0.6%	0.0%	0.2%	0.0%	1.0%	

NOTES:
The fiscal year is October 1 through September 30.
FY – Fiscal Year
CAGR – Compound Annual Growth Rate
Palm Beach and Broward County airports include: Boca Raton Airport (BCT), Belle Glade State Municipal Airport (X10), Fort Lauderdale Executive Airport (FXE), Fort Lauderdale–Hollywood International Airport (FLL), North Palm Beach County General Aviation Airport (F45), North Perry Airport (HWO), Palm Beach County Glades Airport (PHK), Palm Beach County Park/Lantana Airport (LNA), Palm Beach International Airport (PBI), and Pompano Beach Airpark (PMP).
SOURCES: Boca Raton Airport Authority, October 2020; US Department of Transportation, Federal Aviation Administration, *2019 Terminal Area Forecast*, February 2020; Ricondo & Associates, Inc., November 2020.

Table 3-19 and **Exhibit 3-9** present the historical and forecast based aircraft for BCT. Throughout the forecast period, jet based aircraft are forecast to increase at a rate comparable to the rates in the 2020 *FAA Aerospace Forecast*. As a result, jet based aircraft are forecast to increase from 81 aircraft in FY 2020 to 125 aircraft in FY 2040, a CAGR of 2.2 percent. Similar to jet based aircraft, helicopter based aircraft are forecast to increase at a rate comparable to the rates in the 2020 *FAA Aerospace Forecast* and increase from 3 aircraft in FY 2020 to 5 aircraft in FY 2040. Single engine based aircraft are forecast to follow the slight decrease in the historical share trend over the forecast period. Single engine based aircraft are forecast to increase from 130 aircraft in FY 2020 to 137 aircraft in FY 2040, a CAGR of 0.3 percent; however, the share of single engine based aircraft is forecast to decrease from 54 percent to 46 percent over the comparable period. Total based aircraft are forecast to reach 298 aircraft with the remaining based aircraft allocated to multi engine aircraft. As a result, multi engine based aircraft are forecast to increase from 27 aircraft in FY 2020 to 31 aircraft in FY 2020, a CAGR of 0.7 percent.

TABLE 3-19 (1 OF 2) HISTORICAL AND FORECAST BASED AIRCRAFT

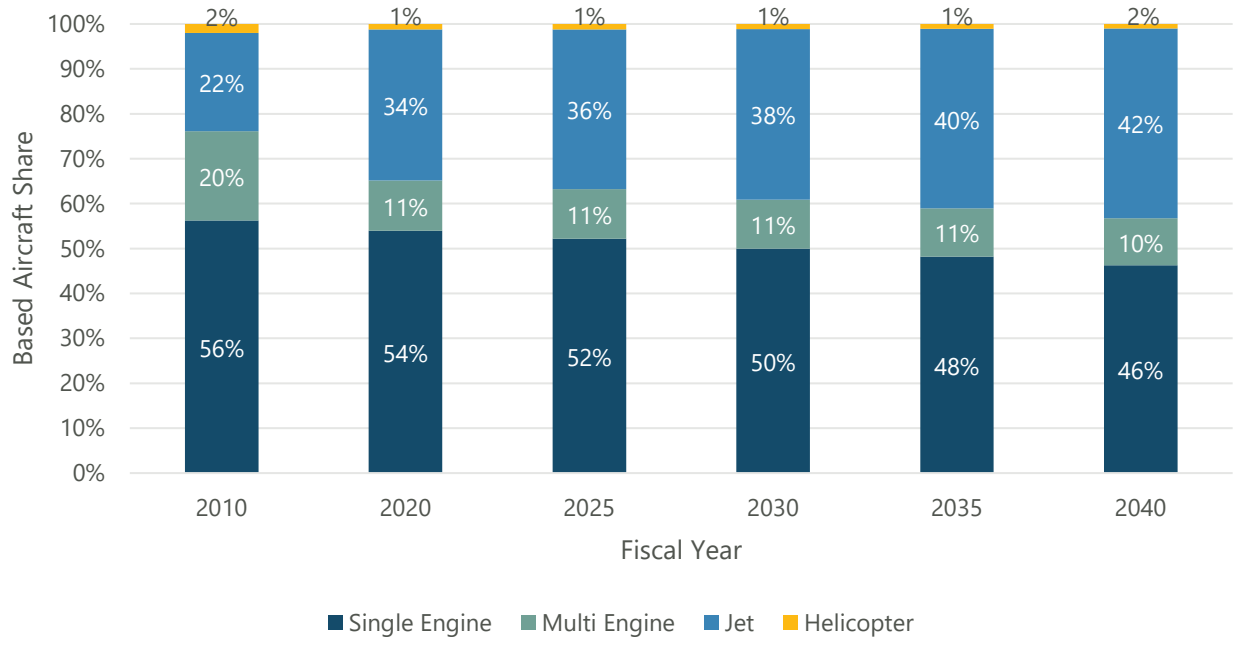
FISCAL YEAR	SINGLE ENGINE	MULTI ENGINE	JET	HELICOPTER	TOTAL	SINGLE ENGINE	MULTI ENGINE	JET	HELICOPTER
2010	167	59	65	6	297	56%	20%	22%	2%
2011	96	33	42	1	172	56%	19%	24%	1%
2012	125	34	52	4	215	58%	16%	24%	2%
2013	131	32	63	6	232	56%	14%	27%	3%
2014	100	26	52	4	182	55%	14%	29%	2%
2015	99	24	51	4	178	56%	13%	29%	2%
2016	132	26	71	5	234	56%	11%	30%	2%
2017	116	23	56	3	198	59%	12%	28%	2%
2018	118	25	66	3	212	56%	12%	31%	1%
2019	121	26	67	3	217	56%	12%	31%	1%
2020	130	27	81	3	241	54%	11%	34%	1%
Forecast									
2021	130	27	83	3	243	53%	11%	34%	1%
2022	131	27	85	3	246	53%	11%	35%	1%
2023	131	28	86	3	248	53%	11%	35%	1%
2024	131	28	88	3	250	52%	11%	35%	1%
2025	132	28	90	3	253	52%	11%	36%	1%
2026	132	28	92	3	255	52%	11%	36%	1%
2027	132	28	94	4	258	51%	11%	36%	2%
2028	133	29	96	4	262	51%	11%	37%	2%
2029	133	29	98	4	264	50%	11%	37%	2%
2030	133	29	101	4	267	50%	11%	38%	1%
2031	134	29	103	4	270	50%	11%	38%	1%
2032	134	29	105	4	272	49%	11%	39%	1%
2033	135	30	107	4	276	49%	11%	39%	1%
2034	135	30	110	4	279	48%	11%	39%	1%
2035	135	30	112	4	281	48%	11%	40%	1%

TABLE 3-19 (2 OF 2) HISTORICAL AND FORECAST BASED AIRCRAFT

FISCAL YEAR	SINGLE ENGINE	MULTI ENGINE	JET	HELICOPTER	TOTAL	SINGLE ENGINE	MULTI ENGINE	JET	HELICOPTER
2036	136	30	115	5	286	48%	10%	40%	2%
2037	136	30	117	5	288	47%	10%	41%	2%
2038	136	31	120	5	292	47%	11%	41%	2%
2039	137	31	122	5	295	46%	11%	41%	2%
2040	137	31	125	5	298	46%	10%	42%	2%
CAGR									
2010 – 2020	-2.5%	-7.5%	2.2%	-6.7%	-2.1%				
2020 – 2030	0.2%	0.7%	2.2%	2.9%	1.0%				
2020 – 2040	0.3%	0.7%	2.2%	2.6%	1.1%				

NOTES:
The fiscal year is October 1 through September 30.
CAGR – Compound Annual Growth Rate
SOURCES: Boca Raton Airport Authority, October 2020; US Department of Transportation, Federal Aviation Administration, *2019 Terminal Area Forecast*, February 2020; Ricondo & Associates, Inc., November 2020.

EXHIBIT 3-9 HISTORICAL AND FORECAST BASED AIRCRAFT SHARE



NOTES:
The fiscal year is October 1 through September 30.
SOURCES: Boca Raton Airport Authority, October 2020; US Department of Transportation, Federal Aviation Administration, *2019 Terminal Area Forecast*, February 2020; Ricondo & Associates, Inc., November 2020.

3.3.3.8 FORECASTS OF PEAK ACTIVITY

FY 2020 FAA Air Traffic Activity Systems (ATADS) and ANOMS data were used to identify the peak month at BCT, which was determined to be November. On a rolling-hour basis, the relationship between peak hour and total daily operations was analyzed to determine the percentage of daily operations that occur during the peak hour. This approach was employed to avoid the inherent time-of-day variations that occur at a GA airport, due to the lack of scheduled activity. The ratio of peak-hour operations to daily operations was then applied to the peak month average day (PMAD) in November. The results are depicted in **Table 3-20**. PMAD itinerant and local operations are forecast to increase at annual growth rates from FY 2020 through FY 2040. PMAD operations are forecast to increase from 247 operations in FY 2020 to 382 operations in FY 2040, while peak-hour operations are forecast to grow from 38 operations to 59 operations over the same period.

3.3.4 FORECAST COMPARISON

Table 3-21 compares the MPU operations forecast with the 2019 FAA TAF for BCT. The Preliminary 2020 FAA TAF model forecasts an average annual growth rate of 1.1 percent from FY 2020 to FY 2040. For the period from FY 2020 to FY 2040, total operations in the BCT MPU are forecast to increase at an average annual rate of 2.2 percent. The MPU forecast remains within the variance tolerance levels specified by the FAA (within 10.0 percent over 5 years and within 15.0 percent over 10 years,[8] as presented in Table 3-26). **Exhibit 3-10** illustrates the forecast comparisons.

[8] Forecast tolerances are defined in FAA AC 150/5070-6B, *Airport Master Plans*.

TABLE 3-20 PEAK OPERATIONS METRICS

	FISCAL YEAR			
	2020	2025	2030	2040
Annual Operations	71,756	80,800	90,000	111,200
Peak Month Operations Ratio [1]	10.3%	10.3%	10.3%	10.3%
Peak Month Operations	7,399	8,332	9,280	11,466
Peak Month Average Day (Peak Month / 30) [2]	247	278	309	382
PMAD to Annual Ratio	0.34%	0.34%	0.34%	0.34%
Peak Hour Operations	38	43	47	59
PMAD Peak Hour to PMAD Ratio	15.3%	15.3%	15.3%	15.3%
PMAD By Operations Type				
IFR Itinerant	94	104	115	138
VFR Itinerant	67	74	81	98
Local	86	100	113	146
PMAD Operations by Aircraft Type				
Helicopters	1	1	1	1
Jet	122	137	153	189
Piston	109	123	136	169
Turboprop	15	17	19	23

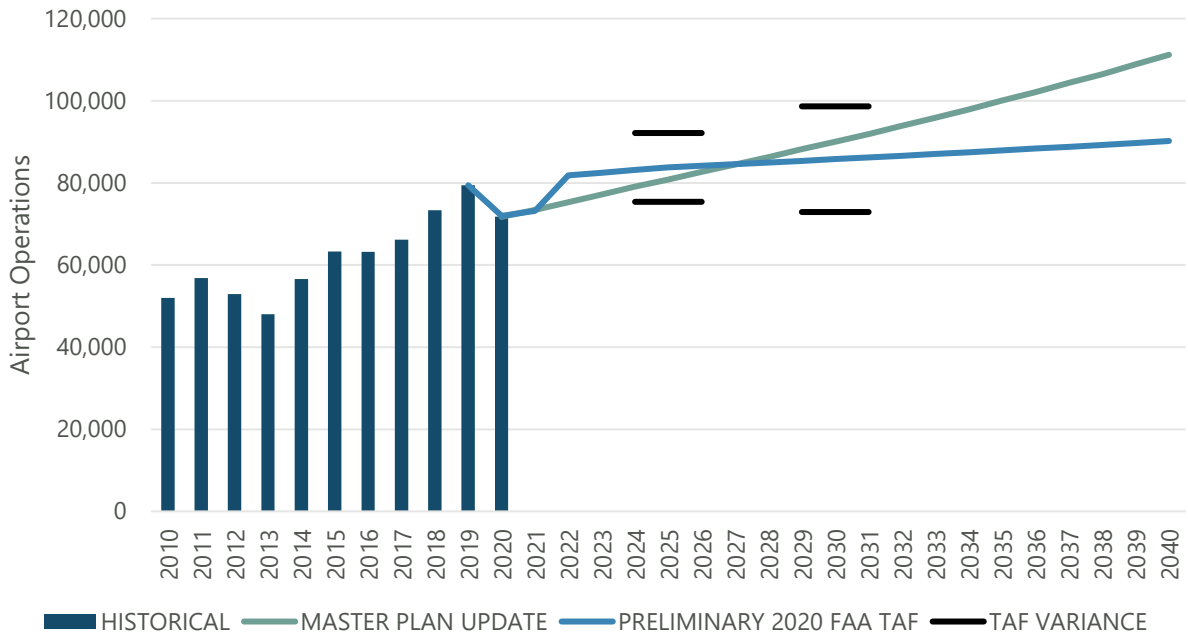
NOTES:
PMAD – Peak Month Average Day
IFR – Instrument Flight Rules
VFR – Visual Flight Rules
1 Ratios are not forecast to change over forecast period.
2 PMAD operations by type are based on FY 2020 peak month of November 2019, which had 247 operations on an average day.
SOURCES: Boca Raton Airport Authority, October 2020; Ricondo & Associates, Inc., November 2020.

TABLE 3-21 HISTORICAL AND FORECAST AIRPORT OPERATIONS COMPARISON – MASTER PLAN UPDATE BASELINE FORECAST AND FEDERAL AVIATION ADMINISTRATION PRELIMINARY 2020 TERMINAL AREA FORECAST

FISCAL YEAR	MASTER PLAN UPDATE BASELINE FORECAST	PRELIMINARY 2020 FAA TAF	VARIANCE
2010	51,999	51,999	
2011	56,859	56,859	
2012	52,962	52,962	
2013	48,023	48,023	
2014	56,581	56,581	
2015	63,257	63,257	
2016	63,182	63,182	
2017	66,209	66,209	
2018	73,334	73,334	
2019	79,412	79,412	
2020	71,756	71,964	
Forecast			
2021	73,400	73,174	
2022	75,300	81,840	
2023	77,200	82,483	
2024	79,100	83,126	
2025	80,800	83,771	-3.5%
2026	82,700	84,163	
2027	84,500	84,557	
2028	86,300	84,957	
2029	88,200	85,363	
2030	90,000	85,775	4.9%
2031	91,900	86,190	
2032	93,900	86,613	
2033	95,900	87,040	
2034	97,900	87,472	
2035	100,100	87,913	
2036	102,100	88,359	
2037	104,400	88,811	
2038	106,500	89,268	
2039	108,900	89,736	
2040	111,200	90,209	
Compound Annual Growth Rate			
2010 – 2020	3.3%	3.3%	
2020 – 2030	2.3%	1.8%	
2020 – 2040	2.2%	1.1%	

NOTES: The fiscal year is October 1 through September 30.
FAA – Federal Aviation Administration
TAF – Terminal Area Forecast
SOURCES: Boca Raton Airport Authority, October 2020; US Department of Transportation, Federal Aviation Administration, *Preliminary 2020 Terminal Area Forecast*, November 2020; Ricondo & Associates, Inc., November 2020.

EXHIBIT 3-10 HISTORICAL AND FORECAST AIRPORT OPERATIONS COMPARISON – MASTER PLAN UPDATE BASELINE FORECAST AND FEDERAL AVIATION ADMINISTRATION PRELIMINARY 2020 TERMINAL AREA FORECAST



NOTES:
The fiscal year is October 1 through September 30.
The variance equals +-10 percent in five years and +-15 percent in ten years.
FAA – Federal Aviation Administration
TAF – Terminal Area Forecast
SOURCES: Boca Raton Airport Authority, October 2020; US Department of Transportation, Federal Aviation Administration, *Preliminary 2020 Terminal Area Forecast*, November 2020; Ricondo & Associates, Inc., November 2020.

4. DEMAND/CAPACITY ANALYSIS AND AIRPORT REQUIREMENTS

The demand/capacity analysis addresses the Airport's ability to accommodate airside and landside facility needs based on the aviation activity forecasts discussed in Section 3 of the MPU, approved by the FAA on May 25, 2021 (reference **Appendix D**). Existing airfield/airside, GA/ FBO, support, and landside access are analyzed to determine the type and magnitude of aviation improvements required to meet future demand levels for the 20-year planning period (FY 2021 to FY 2040). This section also identifies the critical aircraft for the Airport for use in determining existing and future airfield requirements.

The current activity levels (the base or baseline) reflect a typical busy day in the Airport's peak month of November 2020 to establish the peak month average day PMAD. Three future planning horizon years were analyzed, which correspond to traffic activity levels 5, 10, and 20 years from the base year (FY 2025, FY 2030, and FY 2040) based on the approved airport activity forecast.

Subsequent sections discuss the assessments of demand/capacity and associated facility requirements that were performed for each of the following functional areas of the Airport:

- Airfield facilities
- GA and FBO facilities
- Support facilities
- Landside access

Each section describes the key findings from the analyses, any potential limitations based on existing facilities, and areas that may require improvements/expansion to accommodate anticipated Airport traffic levels throughout the forecast horizon. This information will be used in the next step in the planning process: the definition and evaluation of development alternatives.

4.1 AIRFIELD FACILITIES

4.1.1 DEMAND/CAPACITY ASSESSMENT

An analysis of airfield capacity is used to determine levels of aircraft operations (i.e., takeoffs and landings) that an airfield can safely accommodate within given timeframes. Airfield capacity, also referred to as throughput, is defined as the maximum number of aircraft operations that can be accommodated on an airfield during a specific period without incurring an unacceptable level of delay. Airfield capacity varies according to weather conditions, types of aircraft operating on the airfield, airfield configuration, and ATC procedures. The number and location of runway exits and the share of touch-and-go operations also influence airfield capacity. Aircraft delays increase exponentially as the number of aircraft operations (i.e., demand) nears or exceeds the airfield capacity under a specific operating condition.

The methodology for assessing airfield capacity and delay, as described in FAA AC 150/5060-5, Change 2, *Airport Capacity and Delay*, was used to assess the capacity of the BCT airfield. The results of this analysis are expressed in terms of the hourly capacity and annual service volume (ASV) of the airfield. As defined in the AC, ASV "is a reasonable estimate of an airport's annual capacity." In estimating ASV, the hourly, daily, and seasonal variations in

aircraft demand associated with the airfield are considered, as well as the occurrence of low visibility and/or cloud ceiling heights in which ATC procedures are modified to maintain aircraft operational safety.

4.1.1.1 ANALYSIS ASSUMPTIONS

Consistent with the methodologies noted in FAA AC 150/5060-5, Change 2, *Airport Capacity and Delay*, several key factors were analyzed to determine the airfield capacity:

- runway configuration
- meteorological conditions including the percentage of time the Airport experiences poor weather conditions
- aircraft fleet mix (types of aircraft operating at the Airport)
- the share of aircraft arrivals
- frequency of aircraft touch-and-go operations
- taxiway configuration

Each factor impacts the airfield capacity by setting certain limits on how aircraft can operate on the airfield system. The following subsections evaluate each of these factors with respect to the airfield at BCT.

Runway Configuration

The number of runways and how they are positioned in relation to one another impacts the number of arrivals and departures that can occur within an hour. As noted in Section 2, BCT has one runway, Runway 5-23, with a northeast–southwest orientation.

Meteorological Conditions

Meteorological conditions affecting airfield capacity include wind direction and speed, cloud ceiling height, and visibility. Fog, intense storms, and strong crosswinds have a major impact on runway capacity and may even result in temporary closures of the airfield. Low cloud ceilings and low visibility conditions result in greater airspace separations between aircraft and longer runway occupancy times. These conditions may also restrict which runways can be used, because arrivals in these conditions require the use of a published instrument approach procedure. VFR govern the procedures used to conduct flight operations under VMC. Similarly, IFR govern the procedures used to conduct flight operations under IMC. **Table 4-1** lists the criteria for determining the two operating conditions and their occurrences at BCT, as well when the Airport is closed.

Runway capacity is highest during VMC conditions when visibility is at its best and VFR are in effect. Based on 2019 data from the BCT AWOS, it is estimated that VMC occurs 96.2 percent of the time, while IMC occurs 3.5 percent of the time. The Airport currently has RNAV GPS localizer performance with vertical guidance (LPV) approaches to both Runways 5 and 23, allowing operations at the Airport when horizontal visibility is as low as 0.88 statute miles. However, when visibility minimums fall under 0.88 statute miles, aircraft may not operate at the Airport. Weather conditions below the Runway 5-23 published approach minimums occur 0.3 percent of the time. When these weather conditions occur, it is assumed the Airport is closed.

TABLE 4-1 METEOROLOGICAL CONDITIONS AT BOCA RATON AIRPORT

CLASSIFICATION	VISIBILITY		CLOUD CEILING	OCCURRENCE AT BCT (2019)
Visual Meteorological Conditions (VMC)	Greater than or equal to 3.0 statute miles	*and*	Greater than or equal to 1,000 feet above ground level	96.2%
Instrument Meteorological Conditions (IMC)	Less than 3.0 statute miles but greater than 0.88 statute mile	*and/or*	Less than 1,000 feet above ground level but greater than 200 feet above ground level	3.5%
Airport Closed (weather below minimums)	Less than 0.88 statute miles	*and/or*	Less than 200 feet above ground level	0.3%
Total				**100.0%**

SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5060-5, *Airport Capacity and Delay*, December 1995; Ricondo & Associates, Inc., March 2021; Boca Raton Airport, Automated Weather Observing Station, December 2020 (Calendar Year 2019 Weather Data).

Using the CY 2019 ANOMS data provided by the BRAA, runway end utilization percentages were established. **Table 4-2** lists the individual runway end utilizations that were used for estimating airfield capacity. North flow is the predominant flow of operations, with Runway 5 being used 77.6 percent of the time for departure or arrival.

TABLE 4-2 RUNWAY END UTILIZATION

RUNWAY END	CONFIGURATION	UTILIZATION[1]
5	North Flow - VFR	74.9%
	North Flow - IFR	2.7%
23	South Flow - VFR	21.3%
	South Flow - IFR	0.8%
Airport Closed		0.3%
Total		**100.0%**

NOTE:
1 Runway end utilization based upon an analysis of the airport noise and operations monitoring system counts for calendar year 2019.
SOURCE: Boca Raton Airport Authority, Airport Noise and Operations Monitoring System Data, September 2020.

Aircraft Fleet Mix Index

According to AC 150/5060-5, the FAA classifies aircraft based on their maximum certified operational weight. This weight classification system, which is presented in **Table 4-3**, is used to establish the Airport's mix index. The mix index is defined as the percent of large aircraft plus three times the percent of heavy aircraft (C+3D). The percent of small aircraft is not considered because the wake turbulence generated by these aircraft dissipates rapidly. Small aircraft can also be spaced closer than large or heavy class aircraft. As the number of heavier aircraft increases, so does the mix index. The hourly runway capacity decreases as the mix index increases because heavier aircraft must be spaced farther apart in the air from other aircraft for safety reasons. Helicopter operations are not included in the fleet mix and mix index calculations, as they typically fly a separate traffic pattern from fixed-wing aircraft.

TABLE 4-3 AIRCRAFT CLASSIFICATIONS BY WEIGHT

AIRCRAFT CLASSIFICATION	CLASS	MAXIMUM CERTIFICATED TAKEOFF WEIGHT (POUNDS)	REPRESENTATIVE AIRCRAFT TYPES
Small (single engine)	A	12,500 or less	Piper PA-23, Cessna C-180, Cessna C-182
Small (multi engine)	B		Lear 25, Cessna Citation, King Air 200
Large	C	12,501 to 300,000	Gulfstream 550/650, Bombardier Global Express
Heavy	D	300,001 or more	Airbus A300, Boeing 767 (*not applicable at BCT*)

SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5060-5, *Airport Capacity and Delay*, December 1995; Ricondo & Associates, Inc., March 2021.

For this analysis, the baseline (FY 2020) aircraft fleet mix index was determined using ANOMS data provided by the BRAA. Based on the data, it is estimated that Class A and Class B aircraft comprise 70.7 percent of aircraft operations, and Class C aircraft comprise 29.3 percent of aircraft operations. There are no Class D aircraft that operate at BCT. The aircraft operational fleet mix index for the future years (FY 2025, FY 2030, and FY 2040) was determined to be constant throughout the planning period.

The fleet mix index percentage is calculated by adding the percentage of Class C operations to three times the percentage of Class D operations (29.3% + 3(0) = 29.3%).

Percent of Aircraft Arrivals

An arriving aircraft occupies a runway longer than a departing aircraft. Therefore, the hourly runway capacity decreases as the percentage of aircraft arrivals increases. For this analysis, the percentage of aircraft arrivals is expected to remain at 50 percent throughout the planning period.

Percent of Aircraft Touch-and-Go Operations

A touch-and-go operation is defined as an operation by an aircraft that lands and departs without stopping or exiting the runway. Pilots conducting touch-and-go operations are usually conducting training exercises and, thus, stay in the airport traffic pattern. Airfield capacity tends to increase as the proportion of touch-and-go operations increases, which can be attributed to aircraft continually making approaches and departures without requiring significant runway occupancy time. However, continuous touch-and-go operations will reduce the availability of the runway for other non-training operations.

Based upon a review of ANOMS data and conversations with Airport and ATCT personnel, touch-and-go operations at BCT occur approximately 30-35 percent of the time. The number of touch-and-go operations has been generally consistent in the past five years.

Taxiway Configuration

The number of exit taxiways along a runway influences the hourly runway capacity by impacting when a landing aircraft can exit the runway after slowing to a safe taxiing speed. The number of exit taxiways and their placement, based on the Airport's fleet mix (index), can reduce runway occupancy times and preserve optimum capacity. The longer an aircraft remains on a runway, the less time the runway is available for other operations; therefore, the runway has a lower hourly capacity. The FAA has determined optimal distances to exit taxiways based upon the mix index, as listed in **Table 4-4**.

TABLE 4-4 OPTIMUM TAXIWAY EXIT DISTANCE

MIX INDEX (%)	MINIMUM DISTANCE FROM THRESHOLD (FEET)	MAXIMUM DISTANCE FROM THRESHOLD (FEET)
0 to 20	2,000	4,000
21 to 50[1]	**3,000**	**5,500**
51 to 80	3,500	6,500
81 to 120	5,000	7,000
121 to 180	5,500	7,500

NOTE:
1 The calculated mix index for BCT is 29.3 percent.
SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5060-5, *Airport Capacity and Delay*, December 1995; Ricondo & Associates, Inc., March 2021.

Based on the FAA's criteria, the exit factor at BCT is maximized when the runways have exit taxiways between 3,000 and 5,500 feet from the runway ends separated by at least 750 feet (the mix index at BCT is 29.3 percent). Using this criterion, Runway 5-23 has two exits (Taxiways C and A) within the optimum range in north flow and two exits (Taxiways F and G) in south flow.

4.1.1.2 AIRFIELD CAPACITY ANALYSIS

The FAA methodology for capacity analysis involves a step-by-step process that incorporates the factors previously discussed as they pertain specifically to BCT. Two components of the airfield's capacity can be determined using the method in AC 150/5060-5, Change 2, *Airport Capacity and Delay*, these include the hourly capacity of the runway and the ASV. Each component is discussed in the following subsections.

Hourly Capacity of the Runway

The first step in assessing airfield capacity involves determining the hourly capacity (i.e., the number of aircraft operations that can be accommodated at the Airport in one hour) of each runway-use configuration, which is dependent on the previously described factors. Hourly capacity is calculated for operations in both VMC and IMC. The FAA's capacity calculations include several assumptions:

- The number of arrivals is equal to the number of departures.
- The percent of touch-and-go operations is within the ranges shown in AC 150/5060-5. The range of touch and go operations for a mix index of 29.3 percent is 0 – 40 percent. As noted previously, the estimated touch and go percentage at BCT is 30 -35 percent.
- There is a full-length parallel taxiway with ample runway entrance/exit taxiways and no taxiway-crossing problems.
- There are no airspace limitations that would adversely impact flight operations, or otherwise restrict aircraft that could operate at the Airport. Missed approach protection is assured for all operations in IFR weather conditions.

Table 4-5 presents the calculated hourly capacities for the Airport's operational configurations.

TABLE 4-5 HOURLY AIRFIELD CAPACITY (AIRCRAFT PER HOUR)

FISCAL YEAR	VISUAL METEOROLOGICAL CONDITIONS		INSTRUMENT METEOROLOGICAL CONDITIONS	
	NORTH FLOW	SOUTH FLOW	NORTH FLOW	SOUTH FLOW
2020	84	84	54	54
2021–2040	84	84	54	54

SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5060-5, *Airport Capacity and Delay*, December 1995; Ricondo & Associates, Inc., March 2021.

The hourly airfield capacities in Table 4-5 are combined to represent an annualized weighted hourly capacity to account for the amount of time the Airport operates in various flows and weather conditions throughout the year. The weighted hourly capacity for this analysis is 72 operations per hour.

Annual Service Volume

ASV accounts for the hourly, daily, and seasonal variations in aircraft demand associated with the airfield, as well as the occurrence of low visibility conditions during which ATC procedures for an airport are modified to maintain operational safety. ASV can be used as a reference point for the general planning of capacity-related improvements. As the annual number of aircraft operations at an airport approaches the ASV, aircraft delays increase rapidly with relatively small increases in the number of operations.

The ASV was calculated using the capacity and planning factor assumptions previously discussed. Based on the aviation activity forecast presented in Section 3, peak-month operations comprise 10.3 percent of total annual operations. **Table 4-6** summarizes the criteria used to calculate the ASV through the planning period.

TABLE 4-6 ANNUAL SERVICE VOLUME CALCULATION SUMMARY

	BASE FY 2020	FY 2025	FY 2030	FY 2040
Annual Operations	71,756	80,800	90,000	111,200
Peak Month = 10.3 Percent of Total Annual Operations				
Average Peak Month Daily Operations (Avg PMDO) [1]	247	278	309	382
Average Peak Month Peak Hour Operations (Avg PMPHO) [2]	38	43	47	59
D = Annual Ops / (Avg PMDO) [3]	291	291	291	291
H = (Avg PMDO) / (Avg PMPHO)	6.50	6.47	6.57	6.47
CW = Weighted Hourly Capacity	72	72	72	72
Annual Service Volume (ASV): [4]	**136,000**	**136,000**	**138,000**	**136,000**

NOTES:
FY – Fiscal Year
1 The peak month is assumed to represent 10.3 percent of the total annual aircraft operations.
2 The peak hour is assumed to represent 15.3 percent of the average daily operations of the peak month.
3 Calculations are rounded to the nearest whole integer.
4 ASV calculations are rounded to the nearest 1,000.
SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5060-5, *Airport Capacity and Delay*, December 1995; Ricondo & Associates, Inc., March 2021.

As shown in Table 4-6, the resulting ASV ranges between 136,000 annual operations and 138,000 annual operations, with the minor fluctuations stemming from small variations in the inputs to the calculations, such as increasing peak hour operations over time.

The ASV ratio, which is the ratio of future demand to the ASV for the Airport, can be used to evaluate if planning and construction of new or modified runways or taxiways would be required. The FAA, in the *NPIAS* Order 5090.5, recommends airport operators initiate planning for new runways when existing facilities reach 60 percent of their capacity, and additional taxiway exits when annual demand reaches 50 percent of the ASV.

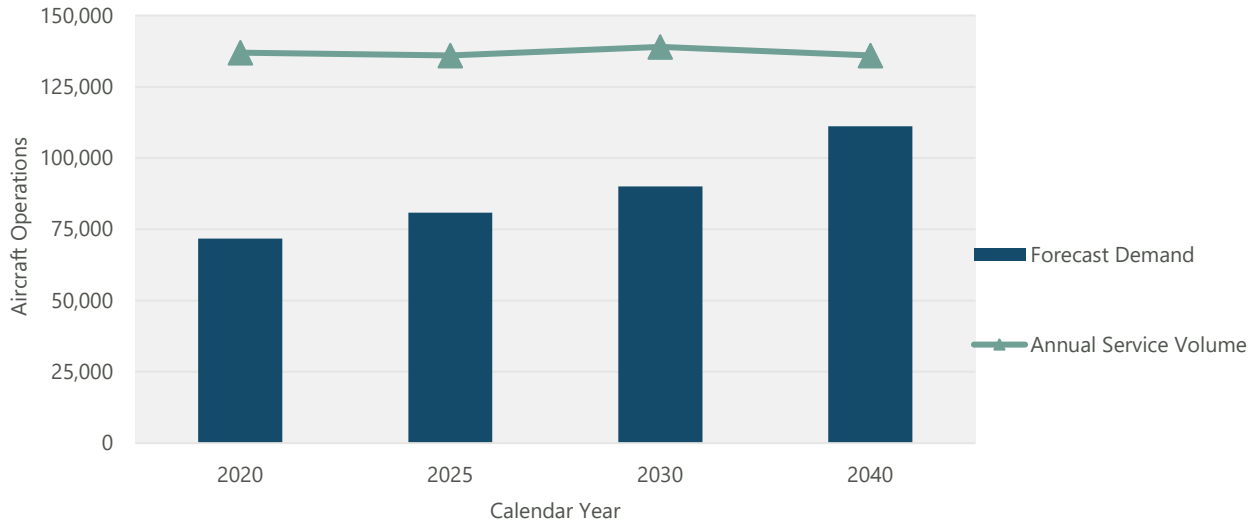
As indicated in **Table 4-7** and on **Exhibit 4-1**, the Airport's annual demand is forecast to increase from 71,756 operations (52 percent of the ASV) in 2020 to 111,200 operations (82 percent of the ASV) in 2040. Since the construction of an additional runway at BCT is not practicable given the existing property constraints, capacity enhancement alternatives could consist of taxiway improvements, demand management practices, or operational changes. **Exhibit 4-2** illustrates the weighted hourly airfield capacity in comparison to the forecast peak hour operations (reference Section 3.3.3.8) throughout the planning period.

TABLE 4-7 ANNUAL DEMAND VERSUS ANNUAL SERVICE VOLUME

	BASE (FY 2020)	FY 2025	FY 2030	FY 2040
Annual Operations	71,756	80,800	90,000	111,200
ASV	136,000	136,000	138,000	136,000
ASV Ratio	53%	59%	65%	82%

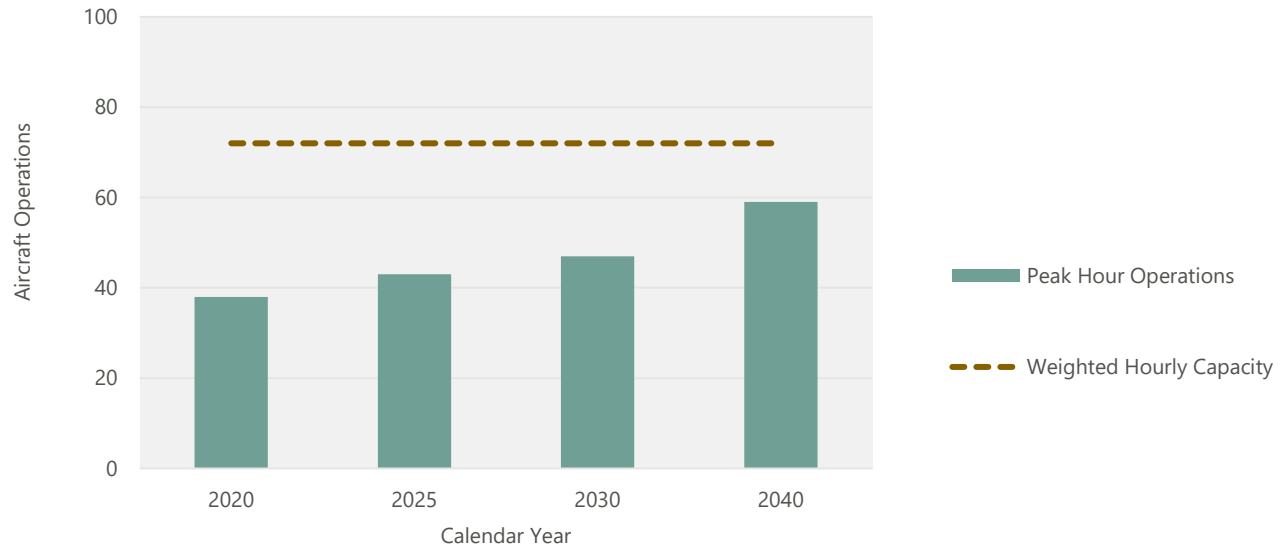
NOTES:
ASV – Annual Service Volume
FY – Fiscal Year
SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5060-5, *Airport Capacity and Delay*, December 1995; Ricondo & Associates, Inc., *Aviation Activity Forecasts*, January 2021.

EXHIBIT 4-1 ANNUAL SERVICE VOLUME VERSUS FORECAST DEMAND



SOURCES: Ricondo & Associates, Inc., March 2021; US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5060-5, Change 2, *Airport Capacity and Delay*, December 1995.

EXHIBIT 4-2 HOURLY CAPACITY VERSUS PEAK HOURLY OPERATIONS



SOURCES: Boca Raton Airport Authority, Air Traffic Control Tower Counts, November 2020; Ricondo & Associates, Inc., March 2021.

4.1.2 AIRFIELD REQUIREMENTS

The following subsections present an assessment of the airfield geometry, layout, and configuration, including evaluating and establishing the critical aircraft and applicable airfield design standards.

4.1.2.1 APPLICABLE DESIGN CRITERIA

Airport Reference Code

As discussed in Section 2, the ARC is a designation indicating the family or grouping of aircraft that regularly operate at an airport in terms of approach speed and physical aircraft design. The ARC is expressed as an alphanumeric identifier, comprising the AAC, representative of aircraft approach speeds, and ADG, representative of aircraft wingspan and tail height. The ARC impacts the applicable design standards.

Critical Aircraft

In addition to the ARC, a key component of the airport master planning process is the determination of the critical aircraft. FAA AC 150/5000-17, *Critical Aircraft and Regular Use Determination*, defines the critical aircraft as the most demanding aircraft type, or grouping of aircraft with similar characteristics, that make regular use of an airport. Regular use is defined as 500 annual operations (an operation is defined as one arrival or one departure), not including touch-and-go operations. Identification of the critical aircraft helps to establish airfield design standards that will be analyzed as part of this MPU.

Prior to the 2004 AEP (considered the previous master plan), the critical aircraft identified for planning purposes was classified as a B-II. As a part of the AEP, the ARC classification was increased to C-II, and the critical aircraft was identified as the Gulfstream III. This is consistent with the most recent ALP approved by the FAA in 2018.

As a part of this MPU, the historical aircraft operations documented in the Airport's ANOMS were reviewed to determine the critical aircraft. After reviewing the ANOMS data, it was determined that the critical aircraft and

associated ARC has increased from C-II to D-III, beginning in 2015. In 2019 and 2020, the critical aircraft was the Gulfstream G550 with 850 operations and 537 operations respectively. The ARC and critical aircraft are anticipated to remain constant throughout the planning period. Additional information regarding the critical aircraft and ARC is presented in **Appendix E**.

Runway Design Code

The RDC is defined in FAA AC 150/5300-13B, *Airport Design* as the basis for determining applicable runway design standards and associated dimensions. The RDC consists of three parameters: AAC, ADG, and planned approach visibility minimums. Based on the critical aircraft analysis and the current minimum visibility published in the instrument approach procedures, as noted in Section 2, the applicable RDC for BCT is D-III-4,000. **Table 4-8** lists the RDC components for Runway 5-23.

TABLE 4-8 RUNWAY DESIGN CODE

RUNWAY	AIRCRAFT APPROACH CATEGORY	AIRPLANE DESIGN GROUP	VISIBILITY MINIMUMS	RUNWAY DESIGN CODES
5	D	III	4,000 feet (0.88 miles)	D-III-4,000
23	D	III	4,000 feet (0.88 miles)	D-III-4,000

SOURCE: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 31, 2022.

Taxiway Design Group

In addition to aircraft approach speed and wingspan, aircraft are further categorized by TDG, which is a classification of airplanes based on the outer main gear width (MGW) and cockpit to main gear distance (CMG). Taxiway/taxilane width and fillet standards, and in some instances, runway to taxiway and taxiway/taxilane separation requirements, are determined by TDG.

It is appropriate for taxiways serving different locations on an airport to be built to different TDG standards based on the expected use. For example, taxiways providing access to T-hangars accommodating small, single engine aircraft will have different a TDG than those taxiways serving an airports primary runway, accommodating large corporate aircraft. The critical aircraft at BCT, the Gulfstream G550, has a TDG of 2B.

4.1.2.2 RUNWAY DIMENSIONAL STANDARDS

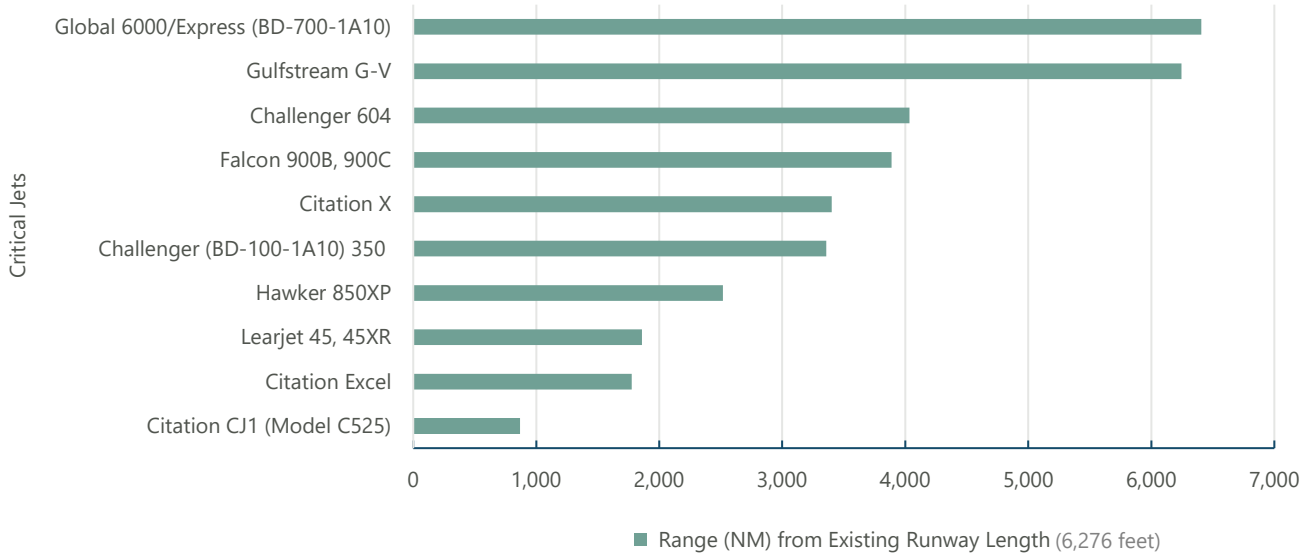
Runway Length

The length of the runway is one of the most important factors in the ability of an airport to accommodate traffic; the length should be suitable for the existing and future critical aircraft. Given the Airport's existing physical constraints and the significant impacts associated with any runway length extension, runway length requirements are discussed regarding the ability of the critical aircraft and similar types to operate from the existing runway length of 6,276 feet. For this analysis, the most common business jet aircraft using BCT were evaluated using the Aircraft Performance Comparator (APC) tool, developed by Conklin & de Decker.

Each aircraft was analyzed with the APC tool to determine the maximum range that could be flown by each aircraft given the available runway length at BCT. **Exhibit 4-3** depicts the maximum range the evaluated aircraft could travel from BCT, assuming a typical payload of four passengers and a temperature of 91-degrees Fahrenheit, which is representative of the mean maximum temperature of the hottest month at BCT. According to data collected from

the user surveys provided by the tenants and during discussions at the TAC meeting, the existing runway length is sufficient to accommodate the majority of the destinations served.

EXHIBIT 4-3 MAXIMUM AIRCRAFT RANGE FROM BOCA RATON AIRPORT FOR SELECTED JET AIRCRAFT



NOTE:
The maximum ranges presented above represent the range of each aircraft operating at BCT with four passengers on a 6,276-foot runway.
NM – Nautical Miles
SOURCES: Conklin & de Decker, Aircraft Performance Comparator, 2021; Ricondo & Associates, Inc., March 2021.

Runway Designation

The runway designation (5-23) and associated runway landing designator markings, which represent the runway magnetic headings (i.e., the takeoff direction the runway is pointing toward) must be evaluated periodically to adjust for magnetic declination. Because the magnetic poles slowly drift on the Earth's surface, but the runway remains fixed, the magnetic bearings change over time. At BCT, the magnetic heading of the Earth changes approximately 0.1 degree every year. This gradual change will not necessitate increasing or decreasing the runway designation throughout the planning period.

Declared Distances

Declared distances represent the maximum distances available and suitable for meeting takeoff, rejected takeoff, and landing distances for turbine powered aircraft. The four types of declared distances are:

- Takeoff Run Available (TORA) - the runway length declared available and suitable for the ground run of an aircraft taking off
- Takeoff Distance Available (TODA) - the TORA plus the length of any remaining runway or clearway beyond the end of the TORA
- Accelerate-Stop Distance Available (ASDA) - the runway plus stopway length declared available and suitable for the acceleration and deceleration of an aircraft aborting a takeoff

- Landing Distance Available (LDA) - the runway length declared available and suitable for landing an aircraft

Declared distances can be applied to mitigate obstructions, non-standard runway safety/object free areas, and incompatible land uses within the arrival or departure runway protection zones. In some instances, declared distances can be applied to increase the TODA or ASDA through the designation of clearways or stopways, respectively.

At BCT, Runway 5-23 has displaced thresholds on each runway end, which reduces the LDA. **Table 4-9** summarizes the declared distances associated with Runway 5-23.

TABLE 4-9 DECLARED DISTANCES

DECLARED DISTANCE	RUNWAY 5	RUNWAY 23
Takeoff Run Available (TORA)	6,276′	6,276′
Takeoff Distance Available (TODA)	6,276′	6,276′
Accelerate-Stop Distance Available (ASDA)	6,276′	6,276′
Landing Distance Available (LDA)	5,580′	5,898′

SOURCE: US Department of Transportation, Federal Aviation Administration, Chart Supplements BCT, April 2021.

Runway Orientation

Runway 5-23 is oriented in a northeast–southwest fashion. For operational safety considerations, the FAA recommends that at least 95 percent crosswind coverage be provided by the runway system (one or more runways) at any airport for aircraft that are expected to conduct at least 500 operations per year. The allowable crosswind per RDC is listed in **Table 4-10**.

TABLE 4-10 ALLOWABLE CROSSWIND COMPONENT PER RUNWAY DESIGN CODE

RUNWAY DESIGN CODE	ALLOWABLE CROSSWIND COMPONENT
A-I and B-I	10.5 knots
A-II and B-II	13.0 knots
C-I through C-III D-I through D-III	16.0 knots

SOURCE: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 31, 2022.

Table 4-11 lists the wind coverage crosswind components for BCT during all weather, IFR, and VFR conditions. The all-weather wind coverage of Runway 5-23 is 99.20 percent using a 16-knot crosswind component. This exceeds the FAA's recommended 95 percent wind coverage for the existing and future critical aircraft at BCT.

TABLE 4-11 WIND COVERAGE

WEATHER COVERAGE	CROSSWIND COMPONENT – RUNWAY 5-23			
	10.5 KTS	13.0 KTS	16.0 KTS	20.0 KTS
All Weather	89.42%	95.06%	99.20%	99.89%
IFR Weather	82.96%	90.33%	99.20%	99.89%
VFR Weather	89.56%	95.17%	99.27%	99.91%

NOTES:
KTS – knots
IFR – Instrument Flight Rules
VFR – Visual Flight Rules
Green shading indicates conditions where FAA's recommended wind coverage is exceeded.
SOURCE: US Department of Transportation, Federal Aviation Administration, Airport Data and Information Portal, Weather Observations for Boca Raton Airport (722022), 2011 – 2020 (54,843 Observations), April 15, 2022.

The 95 percent coverage threshold is also achieved for the 13.0 knot crosswind component under all weather conditions; however, it is not met for the 10.5 knot crosswind component. According to FAA AC 150/5300-13B, operational tolerance for crosswinds can be provided in situations where there are limitations to the provision of a crosswind runway by upgrading the runway to a higher RDC. Therefore, in the case of BCT, where a crosswind runway or runway relocation with prevailing winds is not feasible, an increase in RDC may need to be considered. Given the existing runway width of 150 feet exceeds the FAA standard runway width of 100 feet, further analysis of an increase in RDC to achieve a suitable crosswind component is not necessary.

Runway Width

The FAA has determined runway width requirements based upon the critical aircraft's approach speed and wingspan. The various widths provide a certain margin of error to account for wind effects on aircraft landing and taking off. The standard runway width for an ARC of D-III and a critical aircraft with a maximum take-off weight of less than 150,000 pounds is 100 feet. The current runway width of 150 feet exceeds the standards; however, the additional runway width provides operational tolerance for crosswinds as discussed above.

Runway Shoulders

According to the 2004 AEP, Runway 5-23 does not have shoulders. According to FAA AC 150/5300-13B, runways with an ARC of D-III are required to have 20-foot shoulders. Shoulders can be paved or a stabilized surface, such as turf. The AC further states that paved shoulders are recommended for runways accommodating ADG-III aircraft. The construction of shoulders (paved or turf) will be required to meet this standard and should be analyzed during future runway improvements. Given the runway width of 150 feet, which is 50 feet wider than the FAA standard of 100 feet, it is recommended that future shoulder improvements be discussed with the FAA prior to the next runway rehabilitation to determine if shoulders are necessary.

Runway Blast Pads

Paved runway blast pads provide blast erosion protection beyond runway ends during jet aircraft operations. The standard blast pad dimensions contained in FAA AC 150/5300-13B for a D-III runway are 140 feet wide by 200 feet long. Both runway ends have EMAS beds that serve the purpose of a blast pad.

4.1.2.3 RUNWAY DESIGN STANDARDS

Runway Safety Areas

The RSA is a rectangular area centered on the runway centerline. Under normal (dry) conditions, these areas can support aircraft without causing structural damage to the aircraft or injury to its occupants, should an aircraft inadvertently veer off the paved runway surface. The FAA requires the RSA to be cleared and graded, drained by grading or storm sewers to prevent water accumulation, and free of objects, except those that must be in the RSA because of their function (e.g., approach lighting, navigational aids [NAVAIDS]).

The standard RSA width for ARC D-III is 500 feet, the standard length beyond the departure end is 1,000 feet, and the standard length prior to the threshold is 600 feet. The existing RSA width at BCT is 400 feet, which corresponds to an ARC of C/D-II. At BCT, the RSA length beyond the ends of the runway are reduced due to the proximity of Airport Road and the water treatment plant on the Runway 5 end, as well as Spanish River Boulevard on the Runway 23 end. However, the reduced RSA lengths are mitigated using EMAS. The existing and ARC D-III RSA dimensions are listed in **Table 4-12**. The runway design standards, including the existing RSA, are illustrated on **Exhibit 4-4.**

TABLE 4-12 RUNWAY SAFETY AREA DESIGN STANDARDS

	EXISTING		D-III STANDARDS			
			RUNWAY 5		RUNWAY 23	
CHARACTERISTICS	RUNWAY 5	RUNWAY 23	STANDARD	GAP	STANDARD	GAP
Length Beyond Departure End (feet)[1]	300	350	1,000	700	1,000	650
Length Prior to Threshold (feet)	1,046	678	600	0	600	0
Width (feet)	400		500	100	500	100

NOTES:

EMAS – Engineered Materials Arresting System

1 The EMASs at BCT mitigate the reduced runway safety area length beyond the departure end of the runways.

SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 31, 2022; Ricondo & Associates, Inc., *Airport Layout Plan*, June 2018.

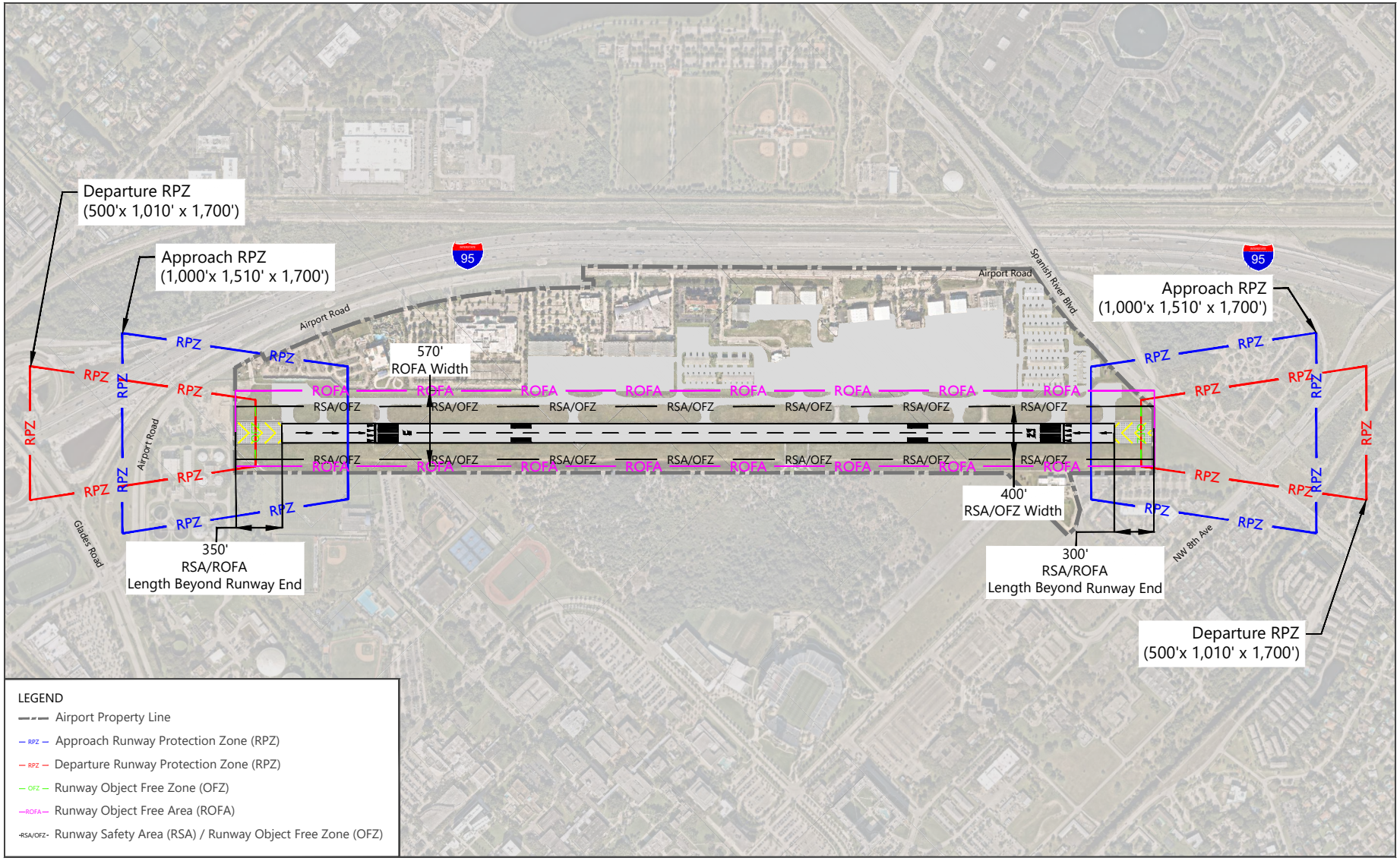
The Runway 23 end (Runway 5 departure) nonstandard EMAS is 278 feet long by 162 feet wide, with a setback of 35 feet. This EMAS provides a minimum predicted performance of 60 knots or greater for a mix of aircraft, including the Challenger 300, Challenger 600, Gulfstream IV, Hawker 800, and Learjet 60, at maximum takeoff weight (MTOW), 49 knots or greater at 80 percent maximum landing weight (MLW).

The Runway 5 end (Runway 23 departure) EMAS is 340 feet long by 190 feet wide, with a setback of 36 feet. This EMAS would provide a minimum predicted performance of 70 knots or greater for a mix of aircraft, including the Hawker 400, Challenger 300, Challenger 600, Citation Excel, Citation X, Falcon 2000, Falcon 900, Gulfstream IV, Hawker 800, and Learjet 60, at MTOW, 56 knots or greater at 80 percent MLW.

It is recommended that the EMAS manufacturer be contacted to analyze the performance of the EMAS beds for the accommodation of aircraft with an ARC of D-III. Additional RSA improvements, specifically opportunities to widen the existing RSA to east of Runway 5-23, will be discussed in the Alternatives Analysis section of the MPU.

Runway Object Free Areas

The ROFA is a rectangular area centered on the runway centerline that is required to be clear of objects protruding above the RSA edge elevation, except for those objects that are essential to air navigation or aircraft ground maneuvering. Objects that are nonessential for either air navigation or aircraft ground maneuvering are not permitted within the ROFA.



SOURCES: Boca Raton Airport Authority, *Airport Layout Plan*, June 2018; US Department of Transporation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 2022; Nearmap, Florida, November 23, 2021 (aerial image for Visual Reference only - may not be to scale).

NORTH 0 1,100 ft

EXHIBIT 4-4

RUNWAY DESIGN STANDARDS

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\5. DCA and Airport Requirements\AutoCAD\Exhibit 4-4_BCT_Runway Design Standards.dwgLayout: 8.5x11L Plotted: Oct 31, 2023, 10:34AM

The existing ROFA at BCT is 570 feet wide (250 feet east of the runway centerline and 320 feet west of the runway centerline). As noted in **Table 4-13**, the standard ROFA width is 800 feet. The Runway 5 ROFA length beyond the departure end of the runway is 300 feet, 700 feet less than the D-III standard. The Runway 23 ROFA length beyond the departure end of the runway is 350 feet, 650 feet less than the 1,000-foot D-III standard. The length of the ROFA is mitigated by the EMAS.

TABLE 4-13 RUNWAY OBJECT FREE AREA DESIGN STANDARDS

	EXISTING		D-III			
			RUNWAY 5		RUNWAY 23	
CHARACTERISTICS	RUNWAY 5	RUNWAY 23	STANDARD	GAP	STANDARD	GAP
Length Beyond Departure End (feet)[1]	300	350	1,000	700	1,000	650
Length Prior to Threshold (feet)	1,046	678	600	0	600	0
Width (feet)	570		800	230	800	230

NOTES:
EMAS – Engineered Materials Arresting System
1 A Modification of Standards exists for the reduced length of the runway object-free area beyond the departure end.
SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 31, 2022; Ricondo & Associates, Inc., *Airport Layout Plan*, June 2018.

A MOS was approved May 5, 2004, for the existing nonstandard Runway 5-23 ROFA width and length. The currently approved ROFA is illustrated on Exhibit 4-4. At the request of the FAA, a new MOS form to maintain this condition was created as part of this MPU and submitted to the FAA July 15, 2021. On January 19, 2022, the FAA indicated that MOS forms are no longer required for existing conditions; however, an MOS form will be required when the runway is rehabilitated or reconstructed. A copy of the MOS form submitted to the FAA on July 15, 2021, is included in **Appendix F**.

Runway Obstacle Free Zone

The obstacle free zone (OFZ) is a three-dimensional volume of airspace that supports the transition of ground-to-airborne aircraft (and vice-versa). The OFZ clearance standards prohibit taxiing and parking aircraft, or locating other objects, where they would penetrate this airspace, except frangible NAVAIDS or fixed-function objects. The OFZ consists of the airspace up to 150 feet above the established Airport elevation and along the runway and extended runway centerline.

The required runway OFZ for runways serving aircraft weighing more than 12,500 pounds is 400 feet wide and extends 200 feet beyond each end of the runway. The OFZ is illustrated on Exhibit 4-4. The OFZ for Runway 5-23 meets current FAA standards. The only objects within the runway OFZ are NAVAIDS that are required to be located there because of their function.

Runway Protection Zones

The runway protection zone (RPZ) is a trapezoidal area centered on the extended runway centerline; its purpose is to enhance the protection of people and property on the ground. The FAA recommends that the airport operator own the property inside the RPZ. The RPZ should be free of land uses that create glare and smoke, and the FAA recommends that airport operators keep the RPZs clear of incompatible land uses, specifically residences, fuel storage facilities, and places of public assembly (e.g., churches, schools, office buildings, and shopping centers).

The length and width of the RPZ are contingent on the size of the aircraft operating on the runway, as well as the type of approach (e.g., visual, instrument) and the visibility minimums available. As a result, the criteria for the RPZ may vary for each runway end. Since the completion of the 2018 ALP update, the FAA has lowered the approach visibility minimums associated with the LPV approaches to Runways 5 and 23 from not lower than 1 mile visibility to not lower than ¾ mile visibility. This reduction in visibility minimums has increased the size of the RPZs from 29.47 acres to 48.98 acres.

Located within the Runway 5 RPZ is a portion of the Boomers Boca Raton surface parking lot (approximately 34,000 square feet), Interstate-95, Airport Road, Glades Road, and the Boca Raton Utility Services administration building and its various service facilities. Located within the Runway 23 RPZ are the FAU Tech Runway Building, two office buildings in FAU's Research Park, a T-hangar, NW 8th Ave, and Spanish River Boulevard. **Table 4-14** lists the RPZ dimensions for Runways 5 and 23 for not lower than ¾ mile. The RPZs are illustrated on Exhibit 4-4.

TABLE 4-14 RUNWAY PROTECTION ZONE DIMENSIONS

DESCRIPTION	RUNWAY 5	RUNWAY 23
Approach RPZ		
Length (feet)	1,700	1,700
Inner Width (feet)	1,000	1,000
Outer Width (feet)	1,510	1,510
Acres	48.98	48.98
Departure RPZ		
Length (feet)	1,700	1,700
Inner Width (feet)	500	500
Outer Width (feet)	1,010	1,010
Acres	29.47	29.47

SOURCE: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 2022.

Runway Line of Sight

Since BCT has one runway with a full parallel taxiway, any point 5 feet above the runway centerline must be mutually visible with any other point 5 feet above the runway centerline that is located at a distance that is less than one-half the length of the runway. Based on the ground surveys that were completed in winter 2020, the runway meets the FAA line-of-sight requirements.

Runway–Taxiway Separation

The FAA's design standards for runway-taxiway separation distances ensure aircraft can safely operate on parallel taxiways without encroaching the RSA, OFZ, or NAVAID critical areas. The existing Runway 5-23 centerline separation to Taxiway P is 240 feet. As noted in Section 2, an MOS exists for this condition. As indicated in **Table 4-15**, for D-III runways, the FAA requires a 400-foot separation between the runway centerline and the parallel taxiway centerline.

As a part of this MPU, a new MOS form (to maintain this condition) was created and submitted to the FAA at their request on July 15, 2021. A copy of the MOS is included in Appendix F. As mentioned previously, the FAA indicated on January 19, 2022 that MOS forms are no longer required for existing conditions; however, an MOS form will be required when the runway or taxiway is rehabilitated or reconstructed.

TABLE 4-15 RUNWAY–TAXIWAY SEPARATION DESIGN STANDARDS

DESIGN STANDARD	EXISTING	D-III	
		STANDARD	GAP
Holding Position (feet)	200	250	50
Parallel Taxiway/Taxilane Centerline Separation (feet)	240	400	160
Aircraft Parking Area (feet)	320	500	180

SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 31, 2022.

4.1.2.4 RUNWAY PAVEMENT STRENGTH AND CONDITION

According to FAA Form 5010, *Airport Master Record*, the published pavement strength for Runway 5-23 is rated for 95,000 pounds for dual-wheel tandem landing gears. The critical aircraft, noted previously in this section is the Gulfstream G550 and has maximum takeoff and landing weights of 91,000 pounds and 75,300 pounds, respectively. The Gulfstream G550's operating weight limitations are under the published pavement strength ratings for Runway 5-23. As a result, the existing runway pavement strength is adequate.

As mentioned in Section 2.2.1, according to the *2019 Statewide Airfield Pavement Management Program*, published by the FDOT Aviation and Spaceports Office, Runway 5-23 is classified as being in "good" condition with a weighted PCI value of 90.

4.1.2.5 TAXIWAY REQUIREMENTS

Taxiway requirements are established by the FAA based upon the ADG and TDG of an airport's critical aircraft. The Airport's existing and future critical aircraft, the Gulfstream G550, is classified as an ADG III and TDG 2B aircraft. The critical aircraft's ADG classification sets the dimensional standards for the taxiway safety area and the taxiway object free area (TOFA). The TDG classification establishes the dimensional standards for the taxiway width, taxiway shoulder, and taxiway edge safety margin (TESM).

In many cases, the taxiway system at an airport will not have a uniform application of design standards, as different facilities and portions of the airport will have a different critical aircraft. For example, taxiways designed to serve a bank of T-hangars, housing only single-engine aircraft, should be planned and designed to a lower TDG/ADG combination than a primary parallel taxiway, which would accommodate the airport's overall critical aircraft. **Table 4-16** lists the taxiways, their ADG and TDG, and associated design standards. The taxiways are illustrated on **Exhibit 4-5**.

Since 2018, the BRAA has been improving nonstandard taxiway connectors and their associated fillets to meet FAA design standards and to eliminate taxiway excursions. These taxiway excursion events were generally associated with the movement of large business jet aircraft (Gulfstream G550 and equivalent) traveling between parallel Taxiway P and the existing FBO ramps, and they resulted in the main gear of the aircraft veering off the pavement edge, resulting in the immobilization of the aircraft and the partial shutdown of Taxiway P. Taxiways P4, B, P5, P6, P7, P8, P10, F, and P11 have been widened to accommodate a 15-foot TESM for most demanding aircraft operating at the Airport.

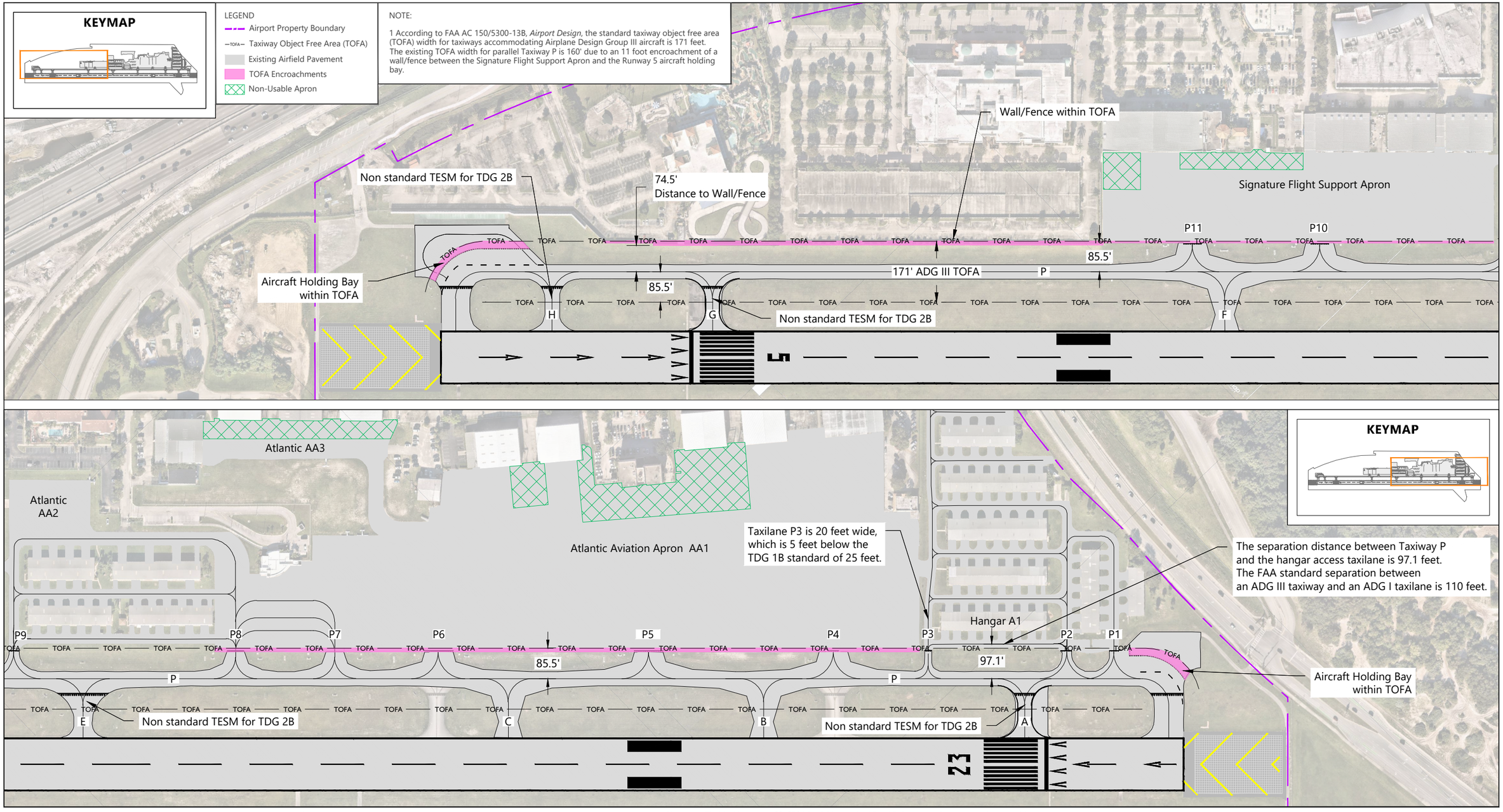
There are several non-standard taxiway conditions at BCT. These are briefly described below and illustrated on Exhibit 4-5. Taxiway improvements will be discussed further in the Alternatives Analysis section of the MPU.

- The existing fillets and geometry of Taxiways H, G, E, and A do not provide standard TESM in accordance with FAA design standards for TDG 2B.
- Taxiway P3 is 20 feet wide, which is 5 feet below the TDG 1B 25-foot width standard.
- The FAA standard TOFA width for an ADG III taxiway is 171 feet. The Taxiway P TOFA width is currently 160 feet due to encroachment on the west side of the taxiway by a wall/fence and portions of aircraft parking aprons.
- The separation distance between Taxiway P and the hangar access taxilane supporting Hangar A1 within the Boca Aircraft Owners leasehold is 97 feet. FAA standard separation between an ADG III taxiway (Taxiway P) and an ADG I taxilane is 110 feet.

TABLE 4-16 BCT'S TAXIWAY DESIGN STANDARDS AND GEOMETRIC CHARACTERISTICS

				STANDARD BASED ON TDG			STANDARD BASED ON ADG	
TAXIWAY	ADG	TDG	EXISTING TAXIWAY WIDTH	TAXIWAY WIDTH	SHOULDER WIDTH[1]	TESM	TAXIWAY SAFETY AREA WIDTH	TOFA WIDTH
A	III	2B	40'	35′	15′	7.5'	118'	171'
B	III	2B	60′	35′	15′	7.5'	118'	171'
C	III	2B	60′	35′	15′	7.5'	118'	171′
E	III	2B	50'	35′	15′	7.5'	118'	171′
F	III	2B	40'	35′	15′	7.5'	118'	171′
G	III	2B	40'	35′	15′	7.5'	118'	171′
H	III	2B	40'	35′	15′	7.5'	118'	171′
P	III	2B	40' – 85'	35′	15′	7.5'	118'	171′
P1	I	1B	25'	25′	10′	5.0'	49'	89'
P2	I	1B	25'	25′	10′	5.0'	49'	89'
P3	I	1B	20'	25′	10′	5.0'	49'	89'
P4	III	2B	60′	35′	15′	7.5'	118'	171′
P5	III	2B	60'	35′	15′	7.5'	118'	171′
P6	III	2B	50'	35′	15′	7.5'	118'	171′
P7	III	2B	50'	35′	15′	7.5'	118'	171′
P8	III	2B	50'	35′	15′	7.5'	118'	171′
P9	I	1B	25'	25′	10′	5.0'	49'	89'
P10	III	2B	50'	35′	15′	7.5'	118'	171'
P11	III	2B	50'	35′	15′	7.5'	118'	171′

NOTES:
ADG – Airplane Design Group
TDG – Taxiway Design Group
TOFA – Taxiway Object Free Area
TESM – Taxiway Edge Safety Margin
1 Paved shoulders are recommended for taxiways serving ADG III aircraft but are not required.
SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 31, 2022; Ricondo & Associates, May 2021.



SOURCES: Boca Raton Airport Authority, *Airport Layout Plan*, June 2018; US Department of Transporation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 2022; Nearmap, Florida, November 23, 2021 (aerial image for Visual Reference only - may not be to scale); Ricondo & Associates, Inc. May 2021.

NORTH 0 270 ft

EXHIBIT 4-5

EXISTING TAXIWAY SYSTEM

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\5. DCA and Airport Requirements\AutoCAD\Exhibit 4-5_BCT_Taxiway.dwgLayout: 11x17L (2) Plotted: Oct 31, 2023, 10:36AM

Taxiway Nomenclature

The FAA has published guidance on taxiway nomenclature in FAA AC 150/5340-18G, *Standards for Airport Sign Systems*. The FAA recommends using this guidance when revising an airport signage plan, an airport layout plan, and for all new development projects. After reviewing the FAA's guidance, the following taxiway nomenclature does not align with the FAA guidelines:

- The start and end taxiway connectors use the same name as the parallel taxiway (Taxiway P).
- The taxiway stubs connecting the current parallel Taxiway P to Runway 5-23 are not alphanumeric, but rather each has a separate letter assigned to it (Taxiways H, G, F, E, C, B, and A).

The proposed taxiway nomenclature will be further discussed in the Alternatives Analysis section of the MPU.

4.1.2.6 AIRFIELD SERVICE ROAD

Service roads allow the circulation of vehicles around the airfield for maintenance and security purposes, while minimizing impacts to aircraft flows. For crossfield movement of vehicles, the Airport currently has a paved service road that is located east Runway 5-23, beginning at each runway end and connecting the ATCT. The existing airfield service road is in poor condition and not wide enough to accommodate emergency vehicles. The service road is scheduled for rehabilitation in FY 2024. A portion of the airfield service road enters the movement area in the hold bay at the Runway 23 end. A relocated service road option will be presented in the Alternatives Analysis.

4.1.2.7 AIRFIELD SIGNAGE

As noted in Section 2, the existing airfield signage system was installed in 2008 and is generally in poor condition, requiring ongoing maintenance to replace sign bases, panels, and electrical components. A project is planned to install new LED based signage in accordance with current FAA standards in FY 2024.

4.1.2.8 AIRFIELD LIGHTING

In March 2022, an *Airfield Lighting and Signage Project Definition and Preliminary Design* study was completed to assess the conditions of the existing airfield lighting at BCT, as well as recommend/define project parameters to replace the systems as part of a future project. The project is planned for construction in FY 2024 and being designed as of July 2022. The airfield lighting improvements recommended as part of the study are summarized below.

- The medium intensity runway edge lights (MIRLs) are considered in need of immediate replacement due their poor condition. It is recommended to update the lighting to LED fixtures as the quartz lighting fixtures are being discontinued/phased out by airfield lighting manufacturers.
- The displaced threshold lighting should be relocated to comply with the current edition of AC 150/5340-30, *Design and Installation Details for Airport Visual Aids.* Although the runway end and displaced threshold lights are in good condition, the lights will need to be upgraded to LED fixtures in conjunction with the replacement of the runway edge lights, as the intermixing of LED and quartz technology is not allowed for runways.
- New runway circuit conductors are recommended.
- Portions of the taxiway lighting system are recommended for immediate replacement due to a poor condition rating.
- The obstruction lighting system at BCT is considered in need of immediate replacement due to its poor condition rating.

- The REIL power pedestals and conductor systems are recommended for immediate replacement because they are in poor condition. Further, the relocation of the displaced threshold lights will also require the replacement of the four REIL units.

4.1.2.9 AIRFIELD MARKINGS

Runway 5-23 currently has nonprecision instrument markings installed, which are in fair to poor condition. The planned runway visibility minimums will remain as nonprecision; therefore, no changes to the runway markings are necessary, other than planned restriping for maintenance purposes. Taxiways have existing yellow centerline markings and Pattern A holding markings prior to runway entrances, meeting the requirements of FAA AC 150/5340-1M, *Standards for Airport Markings*.

4.1.2.10 NAVIGATIONAL AIDS

NAVAIDS are visual or electronic devices that provide aircraft operators with approach information, weather data, traffic pattern advisories, and airport and facility location information. NAVAIDS can include lighting, aviation weather equipment, and electronic equipment for aircraft guidance.

Rotating Beacon

In March 2021, the BRAA replaced the rotating beacon with a new LED rotating beacon. No additional improvements to the rotating beacon are anticipated through the planning period, except for periodic and regular maintenance. Airport staff has indicated the desire to relocate the rotating beacon atop the ATCT and convert the existing site to developable space. According to FAA AC 150/5340-30J, *Design and Installation Details for Airport Visual Aids*, the installation of a rotating beacon atop of an ATCT requires authorization from the FAA. This will be discussed further in the Alternatives Analysis section of the MPU.

Precision Approach Path Indicators

The existing PAPIs on both runway ends were replaced with LED PAPIs in 2020. According to FAA Order 5100.38D, *Airport Improvement Program Handbook*, the minimum useful life for NAVAIDS is 15 years. Therefore, replacement of the PAPIs may be needed after 2035, depending upon the condition and functionality of the PAPIs.

Runway End Identifier Lights

As discussed previously, the REIL power pedestals and conductor systems are in poor condition. Further, the relocation of the displaced threshold lights will also require the replacement of the four REIL units. The REILs will be replaced as part of the previously mentioned signage and lighting improvements, in FY 2024.

Wind Cones / Traffic Indicators

The Airport does not have a primary wind cone; however, there are two supplemental wind cones on the airfield. One is located immediately north of the Runway 5 PAPI, and the other is located immediately south of the Runway 23 PAPI. The wind cones are in poor condition and are recommended to be replaced. The location of the supplemental wind cones does not meet current FAA standards regarding distance to the runway centerline and distance from the runway ends. The wind cones will be replaced, along with the previously mentioned signage and lighting improvements, in FY 2024. The relocated wind cone sites will be discussed in the Alternatives Analysis.

Automated Weather Observing System

Weather data are currently recorded and reported by an AWOS III located on top of and northeast of the ATCT. The AWOS III at BCT was installed in 2013 and does not function properly and requires ongoing maintenance. AWOS units are operated and controlled by the FAA and predate the Automated Surface Observing Systems (ASOS)

program which is a joint effort a joint effort of the National Weather Service (NWS), the FAA, and the Department of Defense (DOD). The Airport is considering replacement of the AWOS III with an ASOS if funding can be secured.

4.2 GENERAL AVIATION AND FIXED BASE OPERATOR FACILITIES

GA facilities at BCT include aircraft hangars, aircraft parking aprons, FBO terminal facilities, automobile parking, fuel storage facilities, and aircraft maintenance hangars. This section describes the GA/FBO facilities at BCT and assesses their abilities to accommodate the demand levels forecast through 2040. This information will contribute to the definition and evaluation of development alternatives discussed in the next section of the MPU.

4.2.1 AIRCRAFT PARKING APRONS

The functions of aircraft parking aprons are to accommodate aircraft during loading and unloading of people and fuel, as well as to provide tiedown storage capability. The configuration and sizes of aircraft parking aprons are dependent on the aircraft that frequent the airport, aircraft circulation needs, and FAA design standards. Typically, parking aprons are classified into their primary use by either based aircraft or itinerant aircraft. Apron space planning for itinerant aprons considers the operational needs of aircraft taxiing and maneuvering, while based aircraft apron space typically assumes the aircraft will be parked closer together and will not be taxiing as much as the itinerant aircraft.

4.2.1.1 ASSUMPTIONS AND METHODOLOGY

The following subsections present the assumptions and methodologies that were used in the development of aircraft parking apron requirements.

Existing Apron Storage

The existing gross area of the aprons used by Signature Flight Support and Atlantic Aviation was segmented into usable and non-usable apron areas and then divided into based and itinerant apron areas. These assumptions are based upon observations obtained during site visits and a review of existing and historic aerial imagery of the apron areas. The total usable apron areas for both based and itinerant aircraft at BCT are 1,002,000 square feet. **Table 4-17** lists the existing based and itinerant aprons and their estimated sizes.

TABLE 4-17 EXISTING APRON STORAGE

APRON[1]	GROSS AREA (SQ FT)	NON-USEABLE (HANGAR INGRESS/EGRESS, FUEL TRUCKS) SHARE %	USEABLE APRON (INCLUDING CIRCULATION AREA) (SQ FT)	BASED SHARE %	ITINERANT SHARE %	EXISTING BASED APRON (SQ FT)	EXISTING ITINERANT APRON (SQ FT)
Signature Flight Support	272,000	10	244,800	25	75	61,200	183,600
Atlantic AA1	775,000	10	697,500	25	75	174,375	523,125
Atlantic AA2	32,000	N/A		100	0	32,000	0
Atlantic AA3	55,500	50	27,750	100	0	27,750	0
Subtotal[2]	1,134,500	-	-	-	-	295,000	707,000
Grand Total Usable Apron						**1,002,000**	

NOTES:
N/A – Not applicable
1 Reference Exhibit 4-5 for the location of the aprons and non-usable apron areas listed in Table 4-17.
2 The subtotals have been rounded to the nearest 1,000.
SOURCE: Ricondo & Associates, Inc., March 2021.

Aircraft Storage Location

Aircraft at BCT are assumed to be stored either in a hangar (T-hangar or conventional hangar), the apron in a tiedown location, or general apron parking. Storage location assumptions were developed by specific aircraft type for based aircraft and by ADG (or families of aircraft) for itinerant aircraft. **Table 4-18** and **Table 4-19** present the aircraft storage assumptions and parking location share percentages. These storage assumptions have been developed through observations conducted during site visits, a tenant survey, and conversations with BCT staff.

TABLE 4-18 BASED AIRCRAFT STORAGE LOCATION ASSUMPTIONS BY TYPE

	SINGLE ENGINE	MULTI ENGINE	JET	HELICOPTER
Apron Storage	20%		30%	50%
Hangar Storage (conventional or T-hangar)	80%		70%	50%

SOURCE: Ricondo & Associates, Inc., March 2021.

TABLE 4-19 ITINERANT AIRCRAFT STORAGE LOCATION BY AIRPLANE DESIGN GROUP

	ADG I	ADG II	ADG III	HELICOPTER
Apron Storage	100%		90%	50%
Hangar Storage (conventional or T-hangar)	0%		10%	50%

NOTE:
ADG – Airplane Design Group
SOURCE: Ricondo & Associates, Inc., March 2021.

Itinerant Aircraft Storage

Itinerant aircraft storage requirements were identified by determining the PMAD itinerant aircraft (operations divided by 2) that would operate at BCT through the planning horizon and applying an additional factor of 10 percent to represent a busy day in the peak month. Further, for space planning purposes, it was assumed that 65 percent of these aircraft would be parked on the apron at any given point. **Table 4-20** shows the itinerant aircraft storage requirements based on PMAD calculations.

TABLE 4-20 ITINERANT AIRCRAFT TOTALS

FISCAL YEAR	ANNUAL ITINERANT OPERATIONS	PMAD ITINERANT OPERATIONS	PMAD ITINERANT AIRCRAFT PLUS 10% FOR BUSY DAY	ITINERANT AIRCRAFT ON GROUND AT ANY POINT IN TIME (65% PMAD)
2025	50,600	178	98	64
2030	55,800	196	108	70
2040	67,200	236	130	85

NOTES:
The results are estimates and may not match actuals.
PMAD – Peak Month Average Day
SOURCE: Ricondo & Associates, Inc., March 2021.

The ANOMS data were reviewed for CY 2015 to CY 2019 to obtain an annual average percentage of the aircraft fleet mix by ADG. The percentages were then applied to the 'itinerant aircraft on ground at any point in time (65 percent PMAD)' values presented in Table 4-20. **Table 4-21** lists the itinerant aircraft demand by ADG.

TABLE 4-21 ITINERANT AIRCRAFT DEMAND BY AIRPLANE DESIGN GROUP

FISCAL YEAR	ADG I (36%)	ADG II (59%)[1]	ADG III (5%)	HELICOPTER (<1%)	ITINERANT AIRCRAFT ON GROUND AT ANY POINT IN TIME
2025	23	37	3	1	64
2030	25	40	4	1	70
2040	31	49	4	1	85

NOTES:
ADG – Airplane Design Group
1 ADG II demand figures rounded down to account for less than 1 percent historical helicopter demand while maintaining itinerant aircraft on ground at any point in time values presented in Table 4-20.
SOURCES: Ricondo & Associates, Inc., March 2021; Boca Raton Airport Authority, Airport Noise and Operations Monitoring System, October 2020.

Itinerant and based aircraft space requirements were calculated based upon the wingspan/tail rotor arc dimensions, aircraft length, and a 10-foot to 20-foot buffer to provide separation between aircraft. The itinerant aircraft space requirements also include circulation space derived from their representative ADG taxilane object free area. **Table 4-22** presents the itinerant and based aircraft apron space requirements.

TABLE 4-22 ITINERANT AND BASED AIRCRAFT APRON SPACE REQUIREMENTS

ADG / TYPE	WINGSPAN / TAIL ROTOR ARC (FEET)	AIRCRAFT LENGTH (FEET)	BUFFER (FEET)	PER AIRCRAFT SPACE REQUIREMENT (SQUARE FEET)
Itinerant Aircraft (Based on ADG)[1]				
ADG I	49	30	15	5,400
ADG II	79	59	20	13,300
ADG III	118	107	20	28,400
Helicopter	22	39	10	3,200
Based Aircraft (Based on Type)[2]				
Single Engine[3]	36	27	10	1,700
Multi Engine[4]	41	36	15	2,900
Jet[5]	64	67	20	7,300
Helicopter[6]	22	39	10	1,600

NOTES:
ADG – Airplane Design Group
1 Itinerant aircraft space requirements calculated as follows – (Aircraft Length + Buffer) x (Wingspan + Buffer) + (Respective Taxilane OFA / 2) x (Aircraft Wingspan +Buffer).
2 Based aircraft space requirements calculated as follows - (Aircraft Length + Buffer) x (Wingspan + Buffer).
3 Single engine aircraft dimensions based upon a Cessna 172.
4 Multi engine aircraft dimensions based upon a Cessna 421.
5 Jet aircraft dimensions based upon a Falcon 2000, a representative mid-size business jet. Use of the critical aircraft (Gulfstream G550) would unrealistically assume that all based jet aircraft would require a parking footprint of 13,300 square feet.
6 Helicopter dimensions based upon a Bell 206/407.
SOURCES: Boca Raton Airport Authority, Airport Noise and Operations Monitoring System, October 2020; US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, *Airport Design*, February 26, 2014; Ricondo & Associates, Inc., March 2021.

4.2.1.2 AIRCRAFT APRON PARKING REQUIREMENTS

As discussed previously, the existing usable based and itinerant aircraft parking aprons are approximately 295,000 and 707,000 square feet respectively, totaling 1,002,000 square feet. Demand for itinerant apron parking will exceed

existing capacity by 2025, reaching a demand of 718,000 square feet, 11,000 square feet over capacity and the existing based apron area demand has an excess of 34,000 square feet below capacity in 2025. **Table 4-23** presents the apron parking requirements for the planning horizon. By 2040, the total aircraft parking apron will have a deficit of approximately 294,000 square feet.

TABLE 4-23 BASED AND ITINERANT AIRCRAFT APRON PARKING REQUIREMENTS

		FY 2025[1]		FY 2030[2]		FY 2040[3]	
	EXISTING	REQUIREMENTS	SURPLUS (DEFICIENCY)	REQUIREMENTS	SURPLUS (DEFICIENCY)	REQUIREMENTS	SURPLUS (DEFICIENCY)
Based Aircraft Apron (square feet)	295,000	261,000	34,000	286,000	9,000	342,000	(47,000)
Itinerant Aircraft Apron (square feet)	707,000	718,000	(11,000)	786,000	(79,000)	954,000	(247,000)
Total Apron (square feet)	**1,002,000**	**979,000**	**23,000**	**1,072,000**	**(70,000)**	**1,296,000**	**(294,000)**
Total Apron (acres)	**23.0**	**22.5**	**0.5**	**24.6**	**(1.6)**	**29.8**	**(6.7)**

NOTES:
FY – Fiscal Year
1. FY 2025 demand levels are 80,800 aircraft operations and 253 based aircraft.
2. FY 2030 demand levels are 90,000 aircraft operations and 267 based aircraft.
3. FY 2040 demand levels are 111,200 aircraft operations and 298 based aircraft.
4. The totals may not match due to rounding.

SOURCES: Boca Raton Airport Authority, Airport Noise and Operations Monitoring System, October 2020; Ricondo & Associates, Inc., March 2021; US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, *Airport Design*, February 26, 2014.

4.2.2 AIRCRAFT HANGAR STORAGE

The quantity and types of hangars at an airport are influenced by factors such as aircraft fleet mix, local climate conditions, security, and aircraft owner preferences. In general, smaller single-engine aircraft and multi-engine aircraft are stored in T-hangar units. Helicopters, larger multi-engine aircraft, and jet aircraft are typically stored in conventional hangars. For the purposes of this MPU, the term conventional hangar includes all hangars not considered T-hangars or maintenance hangars, and is synonymous with corporate hangars, box hangars, and business hangars.

4.2.2.1 ASSUMPTIONS AND METHODOLOGY

Individual aircraft hangar space requirements were calculated for both based and itinerant aircraft using a similar methodology to the apron space requirements. The space requirements were developed based upon the ADG dimensions for itinerant aircraft and for specific aircraft dimensions for based aircraft. **Table 4-24** presents the itinerant and based aircraft hangar space requirements. For single-engine and multi-engine aircraft, hangar storage was assumed to be T-hangar storage, or small box hangers, whereas jet aircraft are assumed to be stored in a conventional hangar.

TABLE 4-24 ITINERANT AND BASED AIRCRAFT HANGAR SPACE REQUIREMENTS

ADG / TYPE	WINGSPAN / TAIL ROTOR ARC (FEET)	AIRCRAFT LENGTH (FEET)	PER AIRCRAFT HANGAR SPACE REQUIREMENT (SQUARE FEET)[1]
Itinerant Aircraft (Based on ADG)[2]			
ADG I	49	30	1,500
ADG II	79	59	4,700
ADG III	118	107	12,600
Helicopter	22	39	1,500
Based Aircraft (Based on Type)[3]			
Single Engine[4]	36	27	1,300
Multi Engine[5]	41	36	1,900
Jet[6]	65	75	4,900
Helicopter[7]	22	39	1,500

NOTES:
ADG – Airplane Design Group
1 Totals rounded to the nearest hundred.
2 Itinerant aircraft hangar space requirements calculated as follows – Aircraft Length x Aircraft Wingspan.
3 Based aircraft hangar space requirements calculated as follows - (Aircraft Length + Buffer) x (Wingspan + Buffer). A 5-foot buffer applies only to single and multi-engine aircraft.
4 Single engine aircraft dimensions based upon a Cessna 172.
5 Multi engine aircraft dimensions based upon a Cessna 421.
6 Jet aircraft dimensions based upon an average length and width of ADG II jets.
7 Helicopter dimensions based upon Bell a 206/407.
SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, *Airport Design*, February 26, 2014; Ricondo & Associates, Inc., March 2021.

Table 4-25 presents the hangar requirements for BCT for the projected number of based and itinerant aircraft through the planning horizon. Demand for T-hangars, conventional hangars, and maintenance hangars is projected to exceed capacity in the near term (by FY 2025). By FY 2040, T-hangars will be deficient by 40,000 square feet (approximately 31 units [approximately 1,300 square foot hangar]), conventional hangar space will be deficient by approximately 163,000 square feet, and maintenance hangars will be deficient by approximately 28,000 square feet. It is recommended that areas be reserved for the development of additional hangars. The construction of new hangars, however, will be driven by tenant demand and needs. The Alternatives Analysis will focus on the identification of available areas for hangar development and will identify conceptually where facilities may be located at the Airport.

TABLE 4-25 HANGAR STORAGE REQUIREMENTS

HANGAR TYPE	EXISTING	FY 2025[1]		FY 2030[2]		FY 2040[3]	
		REQUIREMENTS	SURPLUS / (DEFICIENCY)	REQUIREMENTS	SURPLUS / (DEFICIENCY)	REQUIREMENTS	SURPLUS / (DEFICIENCY)
T-Hangars (square feet)[4]	150,000	180,000	(30,000)	182,000	(32,000)	190,000	(40,000)
Conventional Hangars (square feet)[5]	217,000	276,000	(59,000)	309,000	(92,000)	380,000	(163,000)
Maintenance Hangars (square feet)	39,000	49,000	(10,000)	55,000	(16,000)	67,000	(28,000)
Total Hangars (square feet)	**406,000**	**505,000**	**(99,000)**	**546,000**	**(140,000)**	**637,000**	**(231,000)**

NOTES:
The totals may not match due to rounding.
FY – Fiscal Years
1 FY 2025 demand levels are 80,800 aircraft operations and 253 based aircraft.
2 FY 2030 demand levels are 90,000 aircraft operations and 267 based aircraft.
3 FY 2040 demand levels are 111,200 aircraft operations and 298 based aircraft.
4 There are currently 177 T-hangars at BCT. The estimated square foot deficiencies equate to the need for 23 additional T-hangars by FY 2025, 25 additional T-hangars by FY 2030, and 31 additional T-hangars by FY 2040. The approximate T-hangar size is 1,300 square feet.
5 The term conventional hangar includes corporate hangars, box hangars, and business hangars.
SOURCE: Ricondo & Associates, Inc., March 2021.

4.2.2.2 AIRCRAFT MAINTENANCE

Reliable Jet Maintenance subleases 17,000 square feet of conventional hangar space from Atlantic Aviation. As a part of Signature Flight Support's FBO operation, Boca Aircraft Maintenance subleases 22,000 square feet of conventional hangar space from Premier Aviation, resulting in approximately 15 percent of the total conventional hangar space at BCT being utilized for aircraft maintenance. This factor was held constant through the end of the planning period. As a result, it was estimated that 28,000 square feet of additional hangar space by 2040 would need to be preserved for aircraft maintenance purposes.

4.2.3 FIXED BASE OPERATOR / GENERAL AVIATION TERMINAL

Traditional GA terminal functions at BCT are currently provided by the two FBOs, Atlantic Aviation and Signature Flight Support and include waiting areas, pilot lounges, passenger amenities, and restrooms. As of June 2022, there is currently a total of 31,000 square feet GA terminal space between the two FBOs. Currently, Atlantic Aviation utilizes approximately 14,000 square feet of their 28,000 square foot facility for terminal functions, such as waiting areas and pilot amenities. Signature Flight Support has 17,000 square feet of space used for terminal functions.

Facility requirements for FBO/GA terminals were determined by applying planning factors contained in the Transportation Research Board's (TRB's) Airport Cooperative Research Program (ACRP) Report 113, *Guidebook on General Aviation Facility Planning*. ACRP Report 113 specifies that an allocation of 100 to 150 square feet per peak-hour passenger can be used to estimate an appropriate FBO/GA terminal area. For this analysis, an average of 125 square feet was used to estimate FBO/GA terminal requirements. It is assumed that an average of 5 passengers per peak-hour operation will utilize FBO/GA terminal spaces, inclusive of crew. **Table 4-26** presents the resulting space estimates based on this methodology. It is anticipated that by the end of the planning horizon, there will be a deficit of 6,000 square feet of terminal space.

TABLE 4-26 GENERAL AVIATION TERMINAL AREA REQUIREMENTS

FISCAL YEAR	PMAD OPERATIONS	PEAK HOUR OPERATIONS (15.3% OF PEAK DAY)	TOTAL PASSENGERS IN PEAK HOUR	TOTAL REQUIREMENT (SQUARE FEET)	EXISTING (SQUARE FEET)[1]	SURPLUS / (DEFICIT) (SQUARE FEET)
2025[2]	278	43	213	27,000	31,000	4,000
2030[3]	309	47	237	30,000	31,000	1,000
2040[4]	382	59	293	37,000	31,000	(6,000)

NOTES:
Totals may not match due to rounding.
PMAD – Peak Month Average Day
1. Existing general aviation terminal space includes 14,000 square feet (1/2 of total building or two of four floors) operated by Atlantic Aviation and 17,000 square feet of space operated by Signature Flight Support.
2. FY 2025 demand levels are 80,800 aircraft operations and 253 based aircraft.
3. FY 2030 demand levels are 90,000 aircraft operations and 267 based aircraft.
4. FY 2040 demand levels are 111,200 aircraft operations and 298 based aircraft.

SOURCES: Boca Raton Airport Authority, September 2020, Transportation Research Board, Airport Cooperative Research Program, Report 113, *Guidebook on General Aviation Facility Planning*, September 11, 2014; Ricondo & Associates, Inc., March 2021.

4.2.4 VEHICULAR PARKING

Adequate automobile parking is required to provide convenient and efficient access to GA facilities, such as hangars and FBOs. The required number of parking stalls was estimated using requirements from the *City of Boca Raton Code of Ordinances, Chapter 28 – Zoning, Article XVI. Off-Street Parking* and the methodology contained within ACRP Report 113, *Guidebook on General Aviation Facility Planning*. Parking requirements were divided into requirements for aircraft operators and to support administrative space. The methodology is further described below.

- **Aircraft Operators** – 3.5 parking stalls per peak hour operation. This metric was adapted from guidance contained in ACRP 113, which recommends 2.5 parking stalls per peak hour operation. For BCT, this metric was increased nominally to 3.5 to reflect the larger aircraft fleet operating at BCT. As specific hangars are designed and construction plans are submitted to the City of Boca Raton for review and approval, each facilities parking requirements will be refined. The City's parking requirements for public transportation facilities requires 1 parking stall for each employee, plus adequate parking for visitors and patrons.
- **Administrative Space Users** – 1 parking stall for every 200 square feet of administrative space included in conventional and maintenance hangars. This metric was derived from the City of Boca Raton's requirements for business, professional, governmental, and research development offices. Administrative space was estimated to account for 10 percent of the total conventional and maintenance hangar space requirements. This metric aligns with administrative space requirements from ACRP 113.
- **GA Terminal Users** – 1 parking stall for every 175 square feet. This metric was derived from the City of Boca Raton's requirement for retail stores, service agencies, and brokerage firms.

According to the City of Boca Raton Code of Ordinances for vehicular parking design, the minimum single parking stall area requirement, including two-way traffic access, is 320 square feet.

Table 4-27 presents the automobile parking requirements. Approximately 526 parking stalls are currently reserved for GA and FBO facility operations. The automobile parking requirements are estimated to be 641 parking stalls by FY 2040, or approximately 36,900 square feet of additional parking space. As noted previously, future parking requirements will be refined and tailored based on individual tenant needs when new development projects are proposed, and plans are prepared for the Airport and City to review. Parking expansion should occur in areas most convenient and accessible to GA and FBO facilities, such as T-hangars, conventional hangars, and apron areas.

TABLE 4-27 AUTOMOBILE PARKING AREA REQUIREMENTS

	AIRCRAFT OPERATORS		ADMINISTRATIVE SPACE USERS		GA TERMINAL USERS					
FISCAL YEAR	PEAK HOUR OPERATIONS	AUTOMOBILE PARKING STALLS	ADMINISTRATIVE SPACE (SF)[1]	AUTOMOBILE PARKING STALLS	TERMINAL BUILDING (SF)	AUTOMOBILE PARKING STALLS	TOTAL AUTOMOBILE PARKING STALLS REQUIRED	EXISTING PARKING STALLS	SURPLUS / (DEFICIT) [# OF STALLS]	ADDITIONAL PARKING SURPLUS / (DEFICIT) (SF)
2025[2]	43	151	32,500	163	27,000	154	467	526	59	18,800
2030[3]	47	165	36,400	182	30,000	171	518	526	8	2,600
2040[4]	59	207	44,700	224	37,000	211	641	526	(115)	(36,900)

NOTES:
SF - square feet
1 Administrative space includes ten percent of the future requirements for conventional and maintenance hangars.
2 FY 2025 demand levels are 80,800 aircraft operations and 253 based aircraft.
3 FY 2030 demand levels are 90,000 aircraft operations and 267 based aircraft.
4 FY 2040 demand levels are 111,200 aircraft operations and 298 based aircraft.
The totals may not match due to rounding.
SOURCES: Ricondo & Associates, Inc., March 2021; Transportation Research Board, Airport Cooperative Research Program, Report 113, *Guidebook on General Aviation Facility Planning*, September 11, 2014, City of Boca Raton, *Code of* Ordinances*, Chapter 28 – Zoning, Article XVI. Off-Street Parking*, February 1, 2022.

4.2.5 GENERAL AVIATION AND FIXED BASE OPERATOR FACILITY REQUIREMENTS SUMMARY

The GA and FBO facility requirements discussed in Section 4.2 are summarized in **Table 4-28**. This will be further discussed in the Alternatives Analysis section of the MPU.

TABLE 4-28 SUMMARY OF GENERAL AVIATION AND FIXED BASE OPERATOR FACILITY REQUIREMENTS

AIRPORT ATTRIBUTE	EXISTING	FY 2025[1]	FY 2030[2]	FY 2040[3]
Hangars				
T-Hangars	150,000	180,000	182,000	190,000
Conventional Hangars	217,000	276,000	309,000	380,000
Maintenance Hangars	39,000	49,000	55,000	67,000
Subtotal Hangars	**406,000**	**505,000**	**546,000**	**637,000**
Apron				
Hangar Access[4]	406,000	505,000	546,000	637,000
Based Aircraft	295,000	261,000	286,000	342,000
Itinerant Aircraft	707,000	718,000	786,000	954,000
Subtotal Apron	**1,408,000**	**1,484,000**	**1,618,000**	**1,933,000**
Other				
General Aviation / FBO Terminal	31,000	27,000	30,000	37,000
Vehicular Parking	168,000	150,000	166,000	205,000
Landscaping/Drainage[5]	503,000	542,000	590,000	703,000
Totals				
Grand Total (square feet)	**2,516,000**	**2,708,000**	**2,950,000**	**3,515,000**
Grand Total (Acres)	**57.8**	**62.2**	**67.7**	**80.7**

NOTES:
FBO – Fixed Base Operator
FY – Fiscal Year
The totals may not match due to rounding.
1 FY 2025 demand levels are 80,800 aircraft operations and 253 based aircraft.
2 FY 2030 demand levels are 90,000 aircraft operations and 267 based aircraft.
3 FY 2040 demand levels are 111,200 aircraft operations and 298 based aircraft.
4 An allowance for hangar access, and parking outside of a hangar while remaining clear of the taxilane object free area, has been added to the apron subheading. The estimated hangar access equals the amount of total hangar space.
5 A landscaping and drainage allowance of 25 percent of the total amount of hangar, apron, GA terminal, and vehicular parking subtotals has been included.
SOURCES: Ricondo & Associates, Inc., April 2021; Transportation Research Board, Airport Cooperative Research Program, Report 113, *Guidebook on General Aviation Facility Planning*, September 11, 2014; US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, *Airport Design*, February 26, 2014; Boca Raton Airport Authority, Airport Noise and Operations Monitoring System, October 2020.

4.3 SUPPORT FACILITIES

As described in Section 2, support facilities provide essential, core services needed for the safe and efficient operation of airports. Support services vary based on the type of airport and the amount of passenger and aircraft activity. An assessment of these services has been conducted to determine if they are adequately meeting the current needs of BCT, or if improvements are needed to meet current and/or future needs. These have also been evaluated to determine if the services currently provided will be compatible with forecast growth and recommended development. This section describes the facility requirements for primary support facilities at BCT, including fuel

storage, CBP, ATCT, airport administration, airport maintenance, airport security, and aircraft rescue and firefighting (ARFF).

4.3.1 FUEL STORAGE

There are two fuel farm facilities at BCT operated by the FBOs. BRAA constructed the fuel farm operated by Atlantic Aviation and Premier Aviation constructed and owns the fuel farm operated by Signature Flight Support. Combined, the existing fuel facilities have a capacity of 96,000 gallons of Jet A and 27,000 gallons of aviation gasoline (Avgas).

Fuel facility storage requirements were developed to provide a 5-day fuel supply. Analysis of the peak month fuel delivery data for CY 2015 to CY 2020 identified an average of 12 gallons of Avgas delivered per helicopter/piston aircraft departure and 398 gallons delivered per jet/turboprop departure. By applying these ratios to the future fleet mix developed as part of the forecasts, the future fuel requirements are determined.

It is estimated that Avgas will maintain a steady surplus of approximately 22,000 - 23,000 gallons throughout the planning horizon and Jet A will reach a deficit of 115,000 gallons of fuel (5-day supply) by FY 2040. **Table 4-29** and **Table 4-30** present the fuel storage requirements for the planning horizon years. Based upon the assumed delivery rate of Avgas and Jet A fuel and if the BRAA desires to maintain 5 days of fuel reserves, the 2040 projected demand will require a minimum of four (30,000 gallon) Jet A fuel storage tanks and no additional Avgas fuel storage tanks.

TABLE 4-29 AVIATION GASOLINE FUEL STORAGE REQUIREMENTS

FISCAL YEAR	DAILY HELO/PISTON AIRCRAFT DEPARTURES	AVERAGE FLOW / DEPARTURE (GAL)	AVERAGE DAILY FLOW (GAL)	STORAGE REQUIREMENT FOR 5-DAY SUPPLY (GAL)	EXISTING CAPACITY (GAL)	SURPLUS / (DEFICIT) (GAL)
2025	62	12	720	3,600	27,000	23,400
2030	68	12	796	4,000	27,000	23,000
2040	85	12	989	4,900	27,000	22,100

NOTES:
GAL -Gallon
The totals may not match due to rounding.
SOURCE: Boca Raton Airport Authority, September 2020; Ricondo & Associates, Inc., April 2021.

TABLE 4-30 JET A FUEL STORAGE REQUIREMENTS

FISCAL YEAR	DAILY JET/TURBOPROP AIRCRAFT DEPARTURES	AVERAGE FLOW / DEPARTURE (GAL)	AVERAGE DAILY FLOW (GAL)	STORAGE REQUIREMENT FOR 5-DAY SUPPLY (GAL)	EXISTING CAPACITY (GAL)	SURPLUS / (DEFICIT) (GAL)
2025	77	398	30,600	153,000	96,000	(57,000)
2030	86	398	34,200	171,000	96,000	(75,000)
2040	106	398	42,200	211,000	96,000	(115,000)

NOTES:
GAL - Gallon
The totals may not match due to rounding.
SOURCE: Boca Raton Airport Authority, September 2020; Ricondo & Associates, Inc., April 2021.

4.3.2 US CUSTOMS AND BORDER PROTECTION FACILITY

As noted in Section 2, a new US CBP facility opened at BCT in May 2018. The facility was designed using the requirements contained in the US CBP *Airport Technical Design Standard* document, dated June 2012. The facility provides the ability to process up to 20 international passengers and their baggage at one time.

Between FY 2019 and 2021, the CBP facility cleared an average of approximately 6,500 aircraft arriving at BCT per year with each flight averaging 4.5 passengers per aircraft arrival. During the peak month, January 2020, aircraft clearings totaled 249 flights and 1,269 passengers. These numbers equate to an average of 8 aircraft and 42 passengers being processed by the US CBP facility each day. Over an eight-hour period, the average number of passenger clearings is 5 passengers per hour. Utilizing a ratio between itinerant operations and historical aircraft and passenger clearings, projections of future activity levels can be estimated. By 2040, an average of 13 aircraft and 61 passengers are projected to be processed by the US CBP during the peak month. The passenger processing projections are listed in **Table 4-31**.

TABLE 4-31 US CUSTOMS AND BORDER PROTECTION FACILITY AIRCRAFT AND PASSENGER PROCESSING

FISCAL YEAR	ITINERANT OPERATIONS	AIRCRAFT CLEARINGS PEAK MONTH[1]	PEAK MONTH AVERAGE DAY AIRCRAFT CLEARINGS[2]	PEAK MONTH PASSENGERS[3]	PEAK MONTH PASSENGERS PER DAY[4]	PEAK MONTH PASSENGERS PER HOURS[5]
2019	50,466	269	9	1,269	42	5
2020	45,683	249	8	1,269	42	5
2021	52,537	177	6	830	28	3
2022 (Partial)	39,314	225	8	1,074	36	4
2025	50,600	290	10	1,382	46	6
2030	55,800	319	11	1,524	51	6
2040	67,200	385	13	1,836	61	8

NOTES:
1 Projected aircraft clearings during the peak month estimated using the FY 2022 ratio of itinerant operations to peak month clearings (0.57%) times the forecast itinerant operations.
2 Peak month average day aircraft clearings are calculated by dividing aircraft clearings peak month by 30.
3 Projected peak month passengers calculated by multiplying the ratio of peak month passengers to aircraft clearings (5) times the projected aircraft clearings during the peak month.
4 Peak month passengers per day calculated by dividing the peak month passengers by 30.
5 Peak month passengers per hour calculated by dividing peak month passengers per day by 8.
SOURCE: Boca Raton Airport Authority, June 2022; Ricondo & Associates, Inc., July 2022.

According to Airport staff, the ability to process international passengers is limited by staffing and hours of operations, particularly during peak periods, rather than the size of the CBP facility. It is recommended that the BRAA continue to monitor daily and hourly activity at the facility and work with CBP staff to adjust accordingly. The Airport is planning a project in FY 2028 to replace carpet, paint, and other aesthetic improvements that are common in a 10-year-old facility.

4.3.3 AIR TRAFFIC CONTROL TOWER

The BCT ATCT, which is part of the FAA Contract Tower (FCT) Program, opened in 2000 and is owned and maintained by the BRAA. The ATCT is operated under a contract with Robinson Aviation, Inc. Several interior and mechanical

improvements were completed in 2015 and 2016. Additional improvements to the electronics, communications, and radio systems are planned for FY 2023.

By the end of the planning horizon, the ATCT will be approximately 40 years old and will likely be approaching the end of its useful life. As a substitute for the construction of a new ATCT, it is recommended that the possibility of a remote or virtual tower be explored. This system would allow for the continuation of air traffic services currently provided at the Airport today using cameras delivering live views, surface surveillance feeds, radio communication, and information technology from a remote location (on-Airport or off-Airport). These systems rely on the use of video camera technology to provide live feeds and an "out-the-window" view for air traffic controllers to use to enable the safe movement of aircraft. The cameras are capable of display in all-weather conditions on a 24-hours-per-day, 7-days-per-week basis. Fixed-view cameras would be mounted at various points around the Airport to provide panoramic or stitched views that would be displayed on the wall of a ramp control room located at the Airport or off-site. These systems are currently undergoing testing at several airports in the United States, including at Leesburg Executive Airport, a GA reliever airport located in Virginia, and Northern Colorado Regional Airport, a commercial service airport that is used primarily for GA aircraft operations.

4.3.4 AIRPORT ADMINISTRATION BUILDING

The BRAA Administration Building, located northeast of the ATCT, is a one story 9,200 square foot facility that opened in 2015. According to the 2019 Facilities Management Plan (FMP), the facility is in excellent condition with no immediate major maintenance recommendations or requirements. The BRAA is initiating a project to expand the main conference room, reconfigure several spaces, and continues to perform routine maintenance of the facility.

4.3.5 AIRPORT MAINTENANCE

Airport maintenance and equipment storage facilities are collocated with the existing Administration Building, which was constructed in 2015. Airport staff have indicated that this facility's storage capacity and maintenance capabilities are adequate. No additional Airport maintenance and/or storage space is recommended at this time.

4.3.6 AIRPORT SECURITY

According to a security assessment completed in 2018 for BCT and prepared by the FDOT, no additional security improvements were recommended. While the Airport has no dedicated law enforcement, it relies primarily on staff and security contractor to provide daily 24-hour surveillance, and it relies on the Boca Raton Police Department for law enforcement response to immediate threats or disturbances. The CBP facility at the Airport maintains at least one security officer 5 days a week. The AOA is fully enclosed by an 8-foot security fence wrapped with barbed wire with 10 to 12 feet of clearance on each side. The Airport can be accessed at one of the existing 17 gates. Eight of the access gates can be opened with a proximity card, while the remaining nine gates are secured via manual lock.

The BRAA also coordinates with FAU police by auditing security protocols at various access points. The AOA, its access gates, fueling facilities, and aircraft parking areas are monitored through security cameras. Airport staff and tenants are encouraged to follow the BRAA's formal security/emergency plans for the Airport, as well as all established security protocols, including the Aircraft Owners and Pilots Association (AOPA) Airport Watch Program.

4.3.7 AIRCRAFT RESCUE AND FIREFIGHTING

As BCT is not a certificated facility under 14 Code of Federal Regulations Part 139, *Airport Certification*, on-site ARFF facilities and capabilities are not required. Boca Raton Fire Station 4 is located approximately 1.1 miles northeast of the Airport, and Boca Raton Fire Station 5 is located approximately 1.0 mile southwest of the Airport. The rescue

and firefighting vehicles at these stations are equipped with the appropriate quantities of fire safety chemicals to meet FAA Index C (including aircraft up to 159 feet in length).

4.4 LANDSIDE ACCESS

4.4.1 AIRPORT ROAD (WESTSIDE ACCESS)

The aeronautical and nonaeronautical facilities, located west of Runway 5-23 and adjacent to Interstate 95, are accessible via Airport Road. As a part of the MPU, bidirectional vehicular traffic counts to quantify traffic activity were obtained for Airport Road from automatic traffic recorders (ATRs) between February 12, 2021 and February 20, 2021. Additionally, turning movement counts (TMCs) were collected at the intersections of Glades Road and Airport Road and Spanish River Boulevard and Airport Road. TMCs were collected for 2-hour peak periods in the a.m. and 2-hour peak periods in the p.m., as well as the peak period on Saturday.

The study concluded that Airport Road, between Glades Road and Spanish River Boulevard, had a daily vehicular volume level of service (LOS) of C. The two-way peak hour vehicular volumes and peak hour/peak direction vehicular volumes for Airport Road equated to an LOS of D. LOS is defined by thresholds set forth in FDOT's *2020 Quality/Level of Service Handbook*[1], with LOS A representing the best traveler experience and perspective and LOS F representing a failing condition. According to the FDOT publication, "transportation professionals widely consider LOS D for the automobile mode an acceptable condition, and this threshold is often used as a design condition in urbanized areas." The vehicular traffic counts, detailed TMCs by direction, and other details are summarized in **Appendix G**.

Since the completion of the traffic counts, a project to widen, add turning lanes and sidewalks, and improve the aesthetics and lighting along Airport Road, was completed in 2022. As discussed in Section 2, the existing Airport property is constrained, with limited areas for new development. It is unlikely that new development or redevelopment on Airport property would cause future capacity issues on Airport Road. However, development adjacent to, and surrounding Airport property could impact driving patterns and traffic volumes as Airport Road is a throughway connecting Spanish River Blvd to Glades Road. BRAA should continue to monitor traffic along Airport Road to ensure that new or additional development north or south of the Airport and/or evolving travel patterns do not significantly add traffic, which in turn would decrease the LOS of Airport Road in the future.

4.4.2 BRAA ADMINISTRATION BUILDING (EASTSIDE ACCESS)

The BRAA Administration Building and ATCT, located on the eastern side of the airfield, are accessible via Northwest 8th Avenue. Access to the BRAA Administration Building is through a large parking lot which also provides access to the FAA Tech Runway facility and several other buildings and parking lots.

The BRAA does not own the access road, have a dedicated right of way, or an easement preserving access to the Administration Building. To ensure future ingress and egress from the Airport facilities to a public roadway, the Airport has expressed an interest in acquiring an easement or securing a dedicated right of way to access the BRAA Administration Facility. This will be discussed further in the Alternatives Analysis.

[1] Florida Department of Transportation, *2020 Quality/Level of Service Handbook*, https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/planning/systems/systems-management/document-repository/qlos/fdot_qlos_handbook_june-2020.pdf?sfvrsn=98f689a7_2 (accessed May 26, 2022).

4.5 SUMMARY OF DEMAND/CAPACITY ANALYSIS AND FACILITY REQUIREMENTS

The facility requirements discussed in Sections 4.1 through 4.4 highlight potential deficiencies in FAA design standards and areas that may require improvements/expansion to accommodate forecast demand throughout the planning horizon. A summary of the 20-year facility requirements is listed below.

- Airfield Facilities:
  - Improvements to the RSA width east of Runway 5-23
  - Coordination with EMAS manufacturer to study impacts of the evolving aircraft fleet
  - Widening of Taxiway P3 to 25 feet
  - Geometry enhancements at Taxiways H, G, E, and A to provide standard TESM in accordance with FAA design standards for TDG 2B aircraft.
  - Airfield service road widening and realignment near the Runway 23 aircraft holding bay
  - Replace airfield signage currently in poor condition (project currently in design)
  - Replace Runway 5-23 MIRLs and REILs, portions of the taxiway lighting system, and obstruction lights currently in poor condition (project currently in design)
  - Relocation of rotating beacon to provide additional developable space for aeronautical activities
  - Install new wind cones in accordance with current FAA guidance (project currently in design)
- FBO and GA Facilities:
  - Future Needs: approximately 47,000 square feet of future based aircraft apron space
  - Future Needs: approximately 247,000 square feet of future itinerant apron space
  - Future Needs: approximately 40,000 square feet of future T-hangars
  - Future Needs: approximately 163,000 square feet of future conventional hangar space
  - Future Needs: approximately 28,000 square feet of future maintenance hangar space
  - Increase FBO/GA terminal building space by approximately 6,000 square feet
  - Increase automobile parking spaces by approximately 115 spaces (36,900 square feet)
- Support Facilities:
  - Construct fuel tanks capable of storing approximately 115,000 gallons of Jet A fuel
  - Replace ATCT when it reaches the end of useful life with a new remote or virtual tower (pending approval of technology by the FAA)
- Landside Access:
  - Consider acquiring a dedicated right of way or easement to ensure future roadway access to the BRAA Administration Building and facilities.

5. ALTERNATIVES ANALYSIS AND RECOMMENDED AIRPORT IMPROVEMENT PLAN

A key objective of the master planning process is to identify projects (e.g., facilities and infrastructure) to accommodate forecast aviation activity and support the Authority's planning priorities for the Airport. The alternatives analysis identifies and evaluates various development scenarios that accommodate the increased demand for aeronautical services and aid in the long-term financial sustainability of the Airport. This analysis provides the framework for selecting a preferred development concept for each facility that best meets the future needs of the Airport.

The alternatives process for this MPU followed the guidance found in FAA AC 150/5070-6B, *Airport Master Plans*, and the FDOT *Guidebook for Airport Master Planning*. This process included the identification and screening of alternatives based on input from BRAA and the TAC. The TAC consisted of BRAA staff from various departments, representatives from local municipalities, FAA and FDOT representatives, ATCT staff, and Airport tenants. The TAC reviewed and provided input on the technical and operational analysis and recommendations for the MPU.

This chapter identifies and discusses the following alternatives:

- Airfield Alternatives and Enhancements
- GA / Aeronautical Use Alternatives
- Airport Support Facility Improvements
- Landside Alternatives

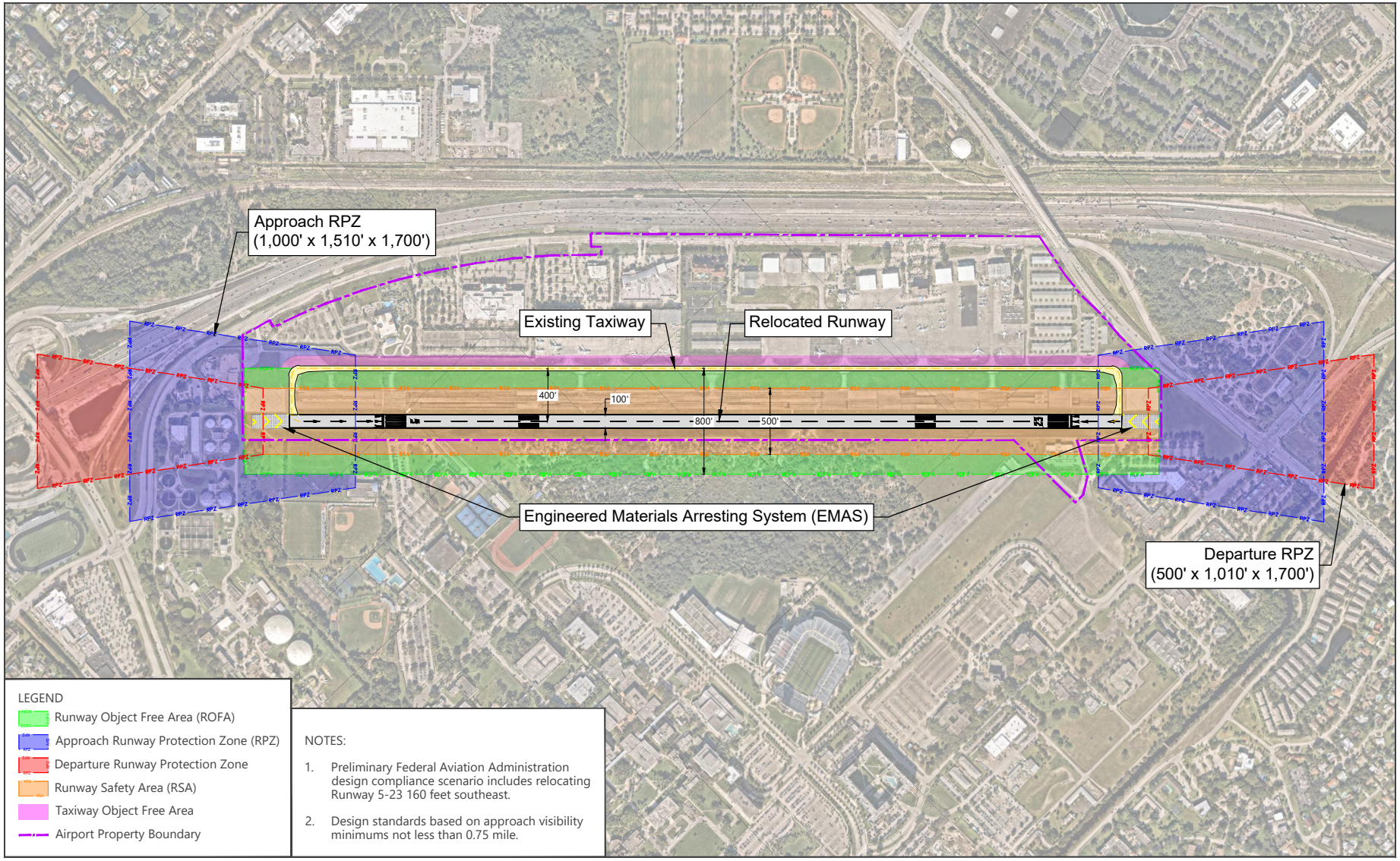
5.1 AIRFIELD ALTERNATIVES AND ENHANCEMENTS

5.1.1 RUNWAY-TO-TAXIWAY CENTERLINE SEPARATION

FAA AC 150/5300-13B, *Airport Design*, dated March 31, 2022, establishes runway design standards, including the separation distance between runways and parallel taxiways. The runway centerline to parallel taxiway centerline separation for a runway with RDC of D-III is 400 feet. The current separation for Runway 5-23 to parallel Taxiway P is 240 feet. The following subsections describe the four alternatives that were developed to address the runway-to-taxiway separation distance.

5.1.1.1 ALTERNATIVE 1 – RELOCATE RUNWAY 160 FEET SOUTHEAST

Alternative 1 relocates the runway 160 feet to the southeast and maintains the existing parallel taxiway centerline. The proposed runway would be 100 feet wide and would require the installation of EMAS to provide the necessary RSA. Stormwater and drainage systems would need to be modified or relocated, along with signage, markings, and lighting, etc. Land acquisition and grading would be required to meet the ROFA requirements. Replacement of navigational aids, including the PAPIs, REILS, and wind cones, would also be necessary. **Exhibit 5-1** illustrates the proposed improvements associated with Alternative 1.



SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 2022; Martinez Geospatial, *BCT Basemap*, April 2021; Nearmap, Florida, November 2021 (aerial imagery for visual reference only – may not be to scale); Nearmap, Florida, August 2022 (aerial image for visual reference only – may not be to scale); Ricondo & Associates, Inc, August 2022 (runway alternative).

NORTH 0 1,100 ft

EXHIBIT 5-1

ALTERNATIVE 1
RELOCATE RUNWAY 160 FEET SOUTHEAST

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\6. Alternatives Analysis\AutoCAD\MPU Alternatives Documentation Supporting Graphics.dwgLayout: 5-1 Plotted: Nov 3, 2023, 10:09AM

Alternative 1 enabling projects include replacement in-kind of the following (east of runway centerline):

- ATCT
- BRAA Administration Building (9,200 square feet)
- two FAU athletic fields/facilities (6.4 acres)
- three FAU vehicular parking lots (118,000 square feet)
- office building in the FAU Research Park (28,000 square feet)

The relocated runway would create incompatible land uses within the RPZ. The proposed improvements could also increase aircraft noise impacts due to shifting the runway centerline to areas not currently experiencing noise impacts. Alternative 1 may also result in environmental impacts within the Florida Atlantic University conservation area (716,000 square feet). The width of the relocated runway would be reduced from the existing 150 feet to 100 feet. Also, the proposed improvements would result in operational impacts during construction.

Additional details on Alternative 1, including a rough order of magnitude cost, can be found in the MOS form included in Appendix F. The rough order of magnitude cost includes airfield relocation work and does not include all enabling costs, land acquisition, environmental mitigation, and obstruction mitigation.

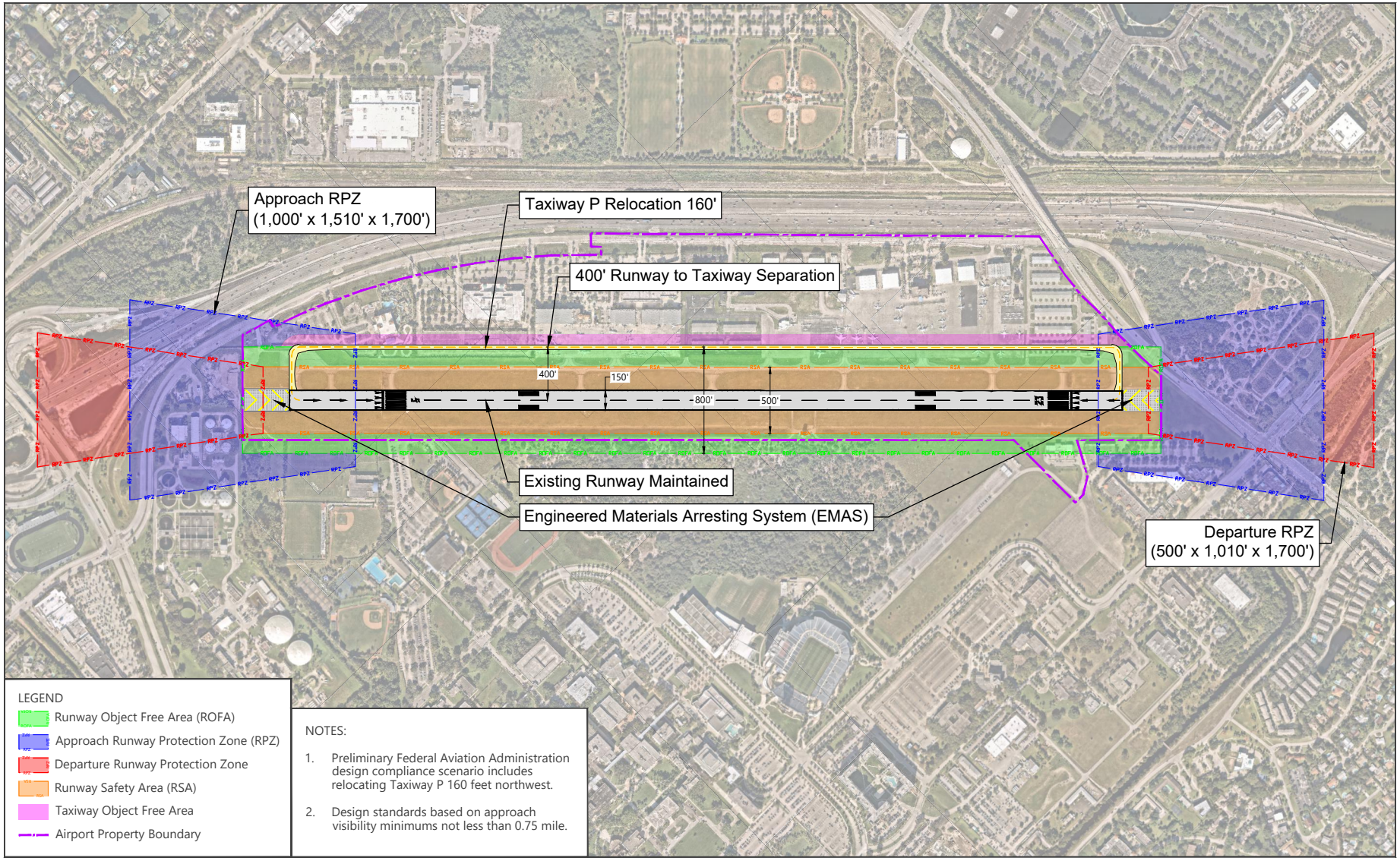
5.1.1.2 ALTERNATIVE 2 – RELOCATE TAXIWAY 160 FEET NORTHWEST

Alternative 2 maintains the existing runway and shifts the parallel taxiway 160 feet to the southwest. The taxiway centerline to runway centerline separation would be 400 feet, per AC 150/5300-13B, *Airport Design*. Stormwater and drainage systems would need to be modified or relocated, along with signage, markings, and lighting, etc. To comply with design standards, the proposed improvements will require taxiway safety area grading, TOFA clearing, RSA grading on each side of the runway to account for the standard RSA, and ROFA clearing east and west of the runway centerline. **Exhibit 5-2** illustrates the proposed improvements associated with Alternative 2.

Alternative 2 enabling projects include replacement in-kind of the following:

- two aircraft holding bays (59,000 square feet)
- two vehicular parking lots (on two different leaseholds; 147,000 square feet)
- two buildings supporting a nonaeronautical tenant and a go-kart track (51,000 square feet)
- two-level parking garage supporting a nonaeronautical tenant (88,000 square feet)
- 41 T-hangars
- 193,000 square feet of the Signature Flight Support apron
- 54,000 square feet of the US CBP apron
- 284,000 square feet of the Atlantic Aviation apron

Additional details on Alternative 2, including a rough order of magnitude cost, can be found in the MOS form included in Appendix F. The rough order of magnitude cost includes airfield relocation work and does not include all enabling costs, land acquisition, environmental mitigation, and obstruction mitigation.



SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 2022; Martinez Geospatial, *BCT Basemap*, April 2021; Nearmap, Florida, November 2021 (aerial imagery for visual reference only – may not be to scale); Nearmap, Florida, August 2022 (aerial image for visual reference only – may not be to scale); Ricondo & Associates, Inc, August 2022 (runway alternative).

NORTH 0 1,100 ft

EXHIBIT 5-2

ALTERNATIVE 2
RELOCATE TAXIWAY 160 FEET NORTHWEST

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\6. Alternatives Analysis\AutoCAD\MPU Alternatives Documentation Supporting Graphics.dwgLayout: 5-2 Plotted: Nov 3, 2023, 10:08AM

5.1.1.3 ALTERNATIVE 3 – RELOCATE TAXIWAY 70 FEET NORTHWEST

Alternative 3 maintains the existing runway and shifts the parallel taxiway 70 feet to the northwest for a 310-foot separation. This does not meet FAA design standards, and it would require further coordination with the FAA and modification of standards and additional operational restrictions. Stormwater and drainage systems would need to be modified or relocated, along with signage, markings, and lighting, etc. To comply with other FAA design standards, the proposed improvements would require taxiway safety area grading, TOFA clearing, RSA grading on each side of the runway to provide a standard RSA, and ROFA clearing east and west of the runway centerline. **Exhibit 5-3** illustrates Alternative 3.

Alternative 3 enabling projects include replacement in-kind of the following:

- two aircraft holding bays (59,000 square feet)
- two vehicular parking lots (on two different leaseholds; 147,000 square feet)
- two buildings supporting a nonaeronautical tenant and a go-kart track (51,000 square feet)
- two-level parking garage supporting a nonaeronautical tenant (88,000 square feet)
- 41 T-hangars
- 94,000 square feet of the Signature Flight Support apron
- 26,000 square feet of the US Customs and Border Protection apron
- 138,000 square feet of the Atlantic Aviation apron

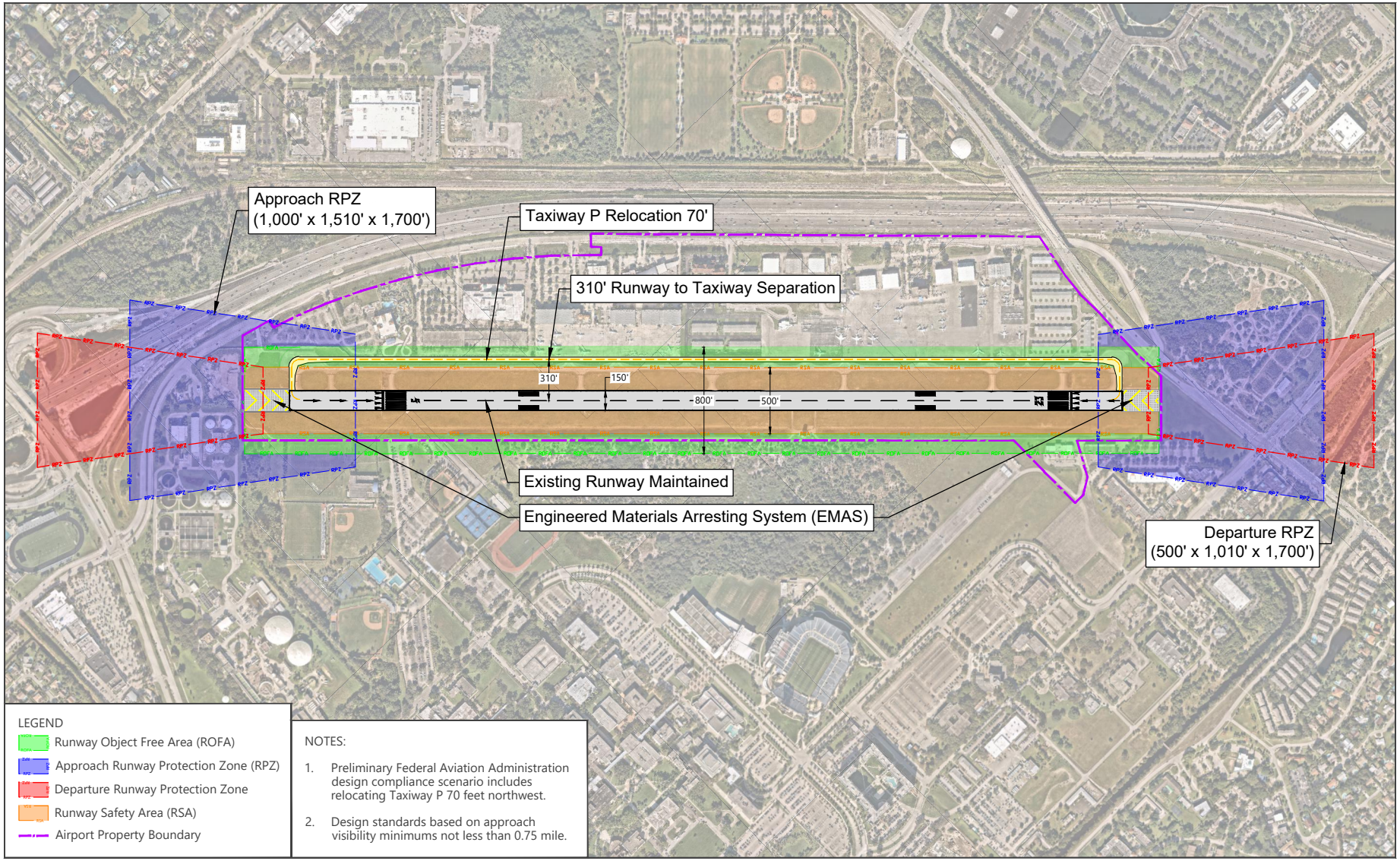
Additional details on Alternative 3, including a rough order of magnitude cost, can be found in the MOS form included in Appendix F. The rough order of magnitude cost includes airfield relocation work and does not include all enabling costs, land acquisition, environmental mitigation, and obstruction mitigation.

5.1.1.4 ALTERNATIVE 4 – REQUEST RENEWAL OF MODIFICATION OF STANDARD

Alternative 4 includes a request for the renewal of the existing MOS that was initially approved May 5, 2004, to maintain the existing Runway 5-23 runway centerline to taxiway centerline separation distance of 240 feet. A copy of this MOS is located in Appendix F.

This alternative also includes maintaining the existing operational restriction for ADG III aircraft. The restriction is formalized as a SOP used by air traffic control tower staff. A copy of the correspondence detailing the specifics of the SOP is included as Appendix B. The SOP states that two ADG III aircraft may not operate simultaneously on the runway and parallel taxiway.

Alternative 4 is the preferred alternative due to the unique local conditions of BCT that preclude the BRAA from cost effectively relocating the runway and/or taxiway to provide the standard D-III runway-to-taxiway centerline separation distance. In addition to being cost prohibitive, land acquisition, environmental factors, and operational considerations would preclude the Authority from implementing the other alternatives. An acceptable level of safety has been demonstrated over the past 17 years that the existing MOS has been in place.



SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 2022; Martinez Geospatial, *BCT Basemap*, April 2021; Nearmap, Florida, November 2021 (aerial imagery for visual reference only – may not be to scale); Nearmap, Florida, August 2022 (aerial image for visual reference only – may not be to scale); Ricondo & Associates, Inc, August 2022 (runway alternative).

NORTH 0 1,100 ft

EXHIBIT 5-3

ALTERNATIVE 3
RELOCATE TAXIWAY 70 FEET NORTHWEST

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\6. Alternatives Analysis\AutoCAD\MPU Alternatives Documentation Supporting Graphics.dwgLayout: 5-3 Plotted: Nov 3, 2023, 10:04AM

5.1.2 RUNWAY SAFETY AREA

5.1.2.1 RUNWAY SAFETY AREA WIDTH

According to FAA AC 150/5300-13B, *Airport Design*, the standard RSA width for runways with an RDC of D-III is 500 feet, 250 feet each side of the centerline. The existing RSA width at BCT is 400 feet.

The RSA cannot be widened west of the runway centerline due to proximity to Taxiway P (240 feet from the runway centerline). As indicated in Section 5.1.1.4, it is not financially or operationally feasible to relocate Taxiway P. The RSA east of the runway centerline could potentially be graded to achieve the standard RSA width (250 feet from the centerline). The project would entail relocating the existing stormwater ponds or managing stormwater in underground containment structures between the runway and vehicular service road. In addition to providing the standard RSA grading on the east side of the runway, the project would remove standing or ponding water that occasionally attracts wildlife. BRAA has included a project in its current capital improvement program to further study the implications of widening the RSA east of the runway in FY 2023.

Exhibit 5-4 illustrates the recommended RSA width improvements.

5.1.2.2 RUNWAY SAFETY AREA LENGTH BEYOND RUNWAY END

As discussed in Section 4, the length beyond the runway end (1,000 feet) design standard for both runways is mitigated using an EMAS. The EMAS beds were designed and installed beginning in 2015, prior to the D-III critical aircraft designation. Therefore, it is recommended that the EMAS manufacturer be contacted to analyze the performance of the EMAS beds for D-III aircraft.

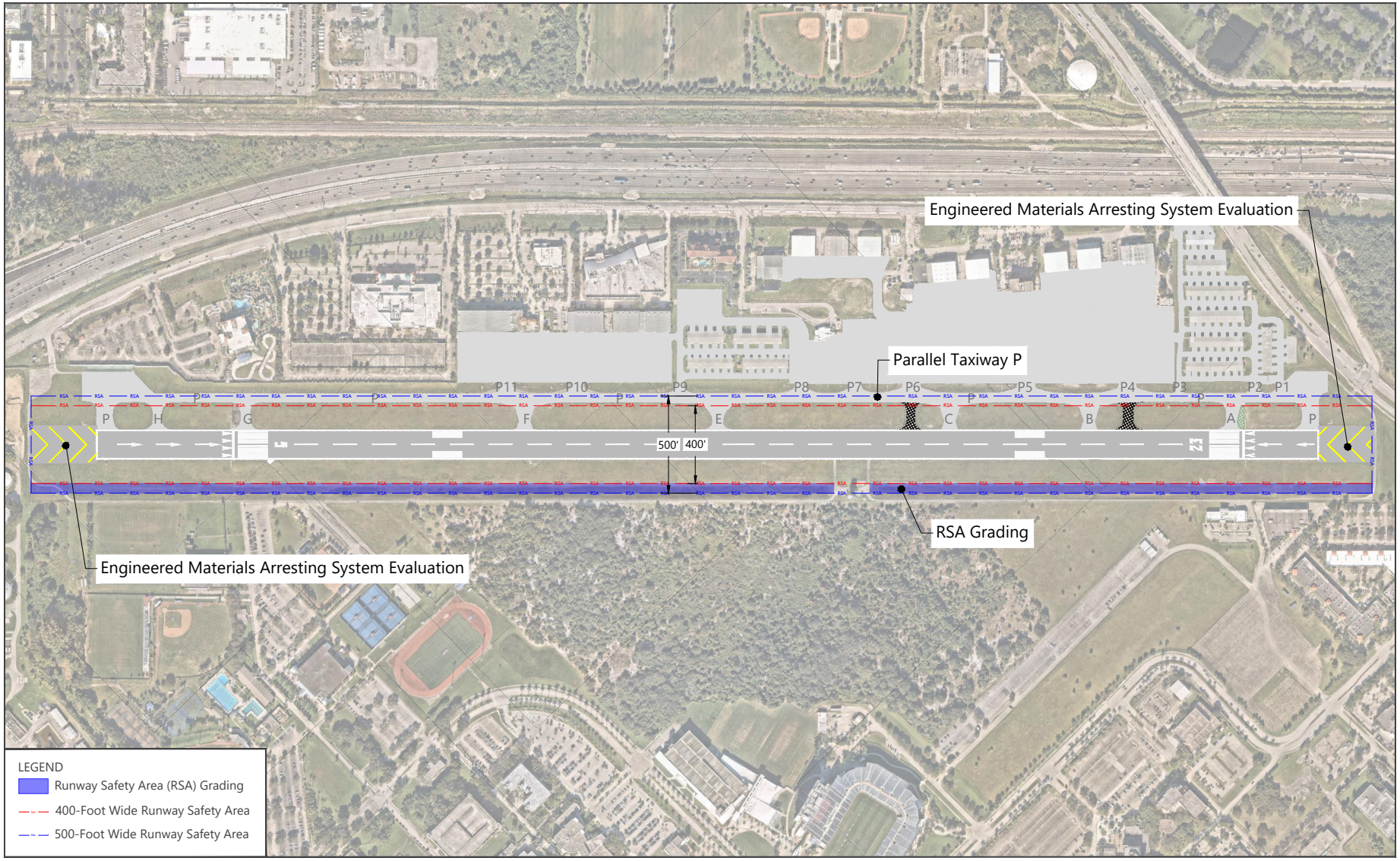
5.1.3 RUNWAY OBJECT FREE AREA

The FAA design standard width for the ROFA supporting a critical aircraft with a D-III designation is 800 feet. The existing ROFA width is 570 feet. The ROFA extends 320 feet from the centerline on the west side of Runway 5-23 and 250 feet from the centerline on the east side of Runway 5-23.

An MOS was approved by the FAA in May 2004 for the substandard ROFA. A new MOS was developed in July 2021 at the request of the FAA. Three alternatives were documented: runway length reduction, the use of declared distances, and full conformity through land acquisition.

It was determined that the standard ROFA requirements cannot be met for two primary reasons. First, the BRAA does not own all the property within the standard ROFA; approximately 40 acres of land would need to be acquired to own all land within the standard ROFA. Land acquisition is not considered feasible due to the presence of existing facilities and major roadways. The second reason is that the Authority has limited (less than 3 acres) developable space on Airport property to relocate buildings and facilities currently located within the standard ROFA. The FAA has indicated that the MOS for existing conditions will be evaluated as part of the airfield service road widening project in 2023.

A copy of the MOS can be found in Appendix F.



SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 2022; Ricondo & Associates, Inc. and Martinez, August 2022 (basemap); Nearmap, Florida, November 2021 (aerial imagery for visual reference only – may not be to scale); Nearmap, Florida, August 2022 (aerial image for visual reference only – may not be to scale).

NORTH 0 750 ft

EXHIBIT 5-4

RUNWAY SAFETY AREA IMPROVEMENTS

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\6. Alternatives Analysis\AutoCAD\MPU Alternatives Documentation RSA.dwgLayout: 5-4 Plotted: Nov 3, 2023, 10:21AM

5.1.4 RUNWAY PROTECTION ZONE

In 2015, the FAA lowered the approach visibility minimums for Runways 5 and 23 from 1.0 mile to 0.88 miles. The lower visibility minimums, which can allow certain aircraft to land during lower visibility, require a larger RPZ. **Exhibit 5-5** compares the approach RPZs for not lower than 1.0 mile and not lower than 0.75 miles (applicable to 0.88-miles visibility).

According to the BCT AWOS records, the visibility at BCT was over 1 mile for approximately 99 percent of the observations between CY 2019 and CY 2021. Therefore, it is recommended that the BRAA request the FAA increase visibility minimums back to 1 mile, which will allow for the application of the smaller RPZ. This smaller RPZ reduces the incompatible land uses, including four office buildings in the FAU Research Park and a T-hangar in the Runway 23 approach RPZ. Alternatively, the Airport could pursue acquistion of property interests (e.g., fee simple, avigation easement, etc.).

5.1.5 TAXIWAY ENHANCEMENTS

5.1.5.1 TAXIWAY GEOMETRY ENHANCEMENTS

As discussed in Section 4, Taxiways H, G, E, and A do not provide the standard TESM and centerline turning radius in accordance with FAA design standards for TDG 2B. It is recommended that a project be completed to add additional pavement to the edge of the existing taxiways and remark the centerlines to comply with FAA guidance.

It is also recommended that the width of Taxiways P1, P2, and P3 be increased from 20 feet to 25 feet to comply with the taxiway width requirement for TDG 1B. It should be noted that improvements to Taxiways P2 and P3 may not be necessary due to the need to expand the aircraft holding bay at the Runway 23 end. This will be further discussed in Section 5.1.6.

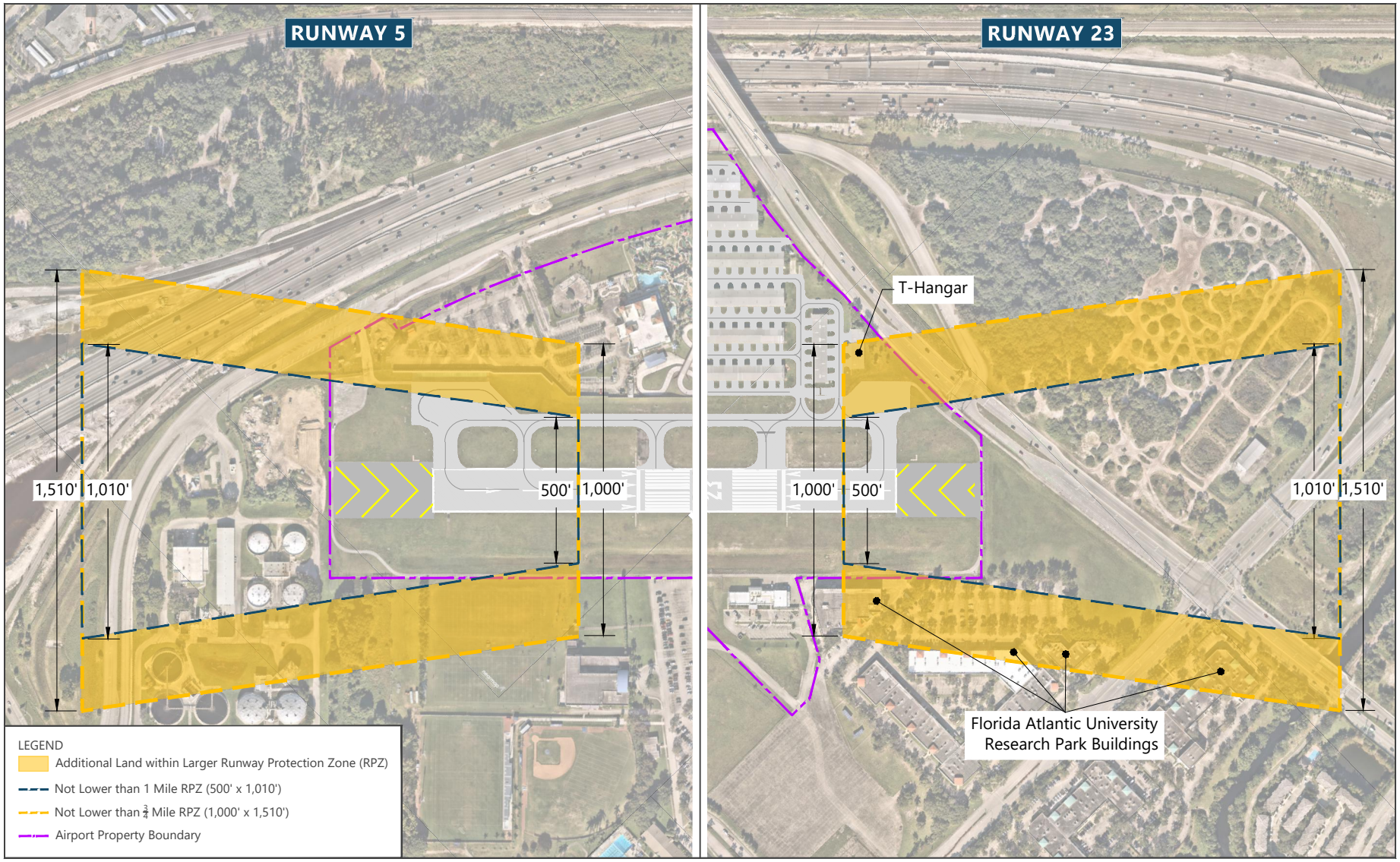
The FAA standard TOFA width for an ADG III taxiway is 171 feet. The Taxiway P TOFA width is currently 160 feet due to encroachment on the west side of the taxiway by a wall/fence and portions of aircraft parking aprons. It is recommended that an MOS be completed for FAA consideration during the next taxiway rehabilitation project.

The separation distance between Taxiway P and the hangar access taxilane supporting Hangar A1 within the Boca Aircraft Owners leasehold is 97 feet. The FAA standard separation between an ADG III taxiway (Taxiway P) and an ADG I taxilane is 110 feet. An MOS may be necessary during the next taxiway rehabilitation until the leasehold expires or the hangar reaches the end of its useful life and the building can be demolished.

Exhibit 5-6 illustrates the recommended taxiway enhancements.

5.1.5.2 TAXIWAY NOMENCLATURE CHANGES

The FAA guidance pertaining to taxiway nomenclature is found in FAA AC 150/5340-18G, *Standards for Airport Sign Systems*. The FAA recommends using this guidance when revising an airport signage plan and an airport layout plan, as well as for all new development projects. In March 2022, the *Airfield Lighting and Signage Upgrades Project Definition and Preliminary Design Document* was completed. To align with the FAA guidelines, taxiway nomenclature alternatives were developed and reviewed with BCT staff on November 3, 2021. The project is presently being designed and will be constructed in 2023.



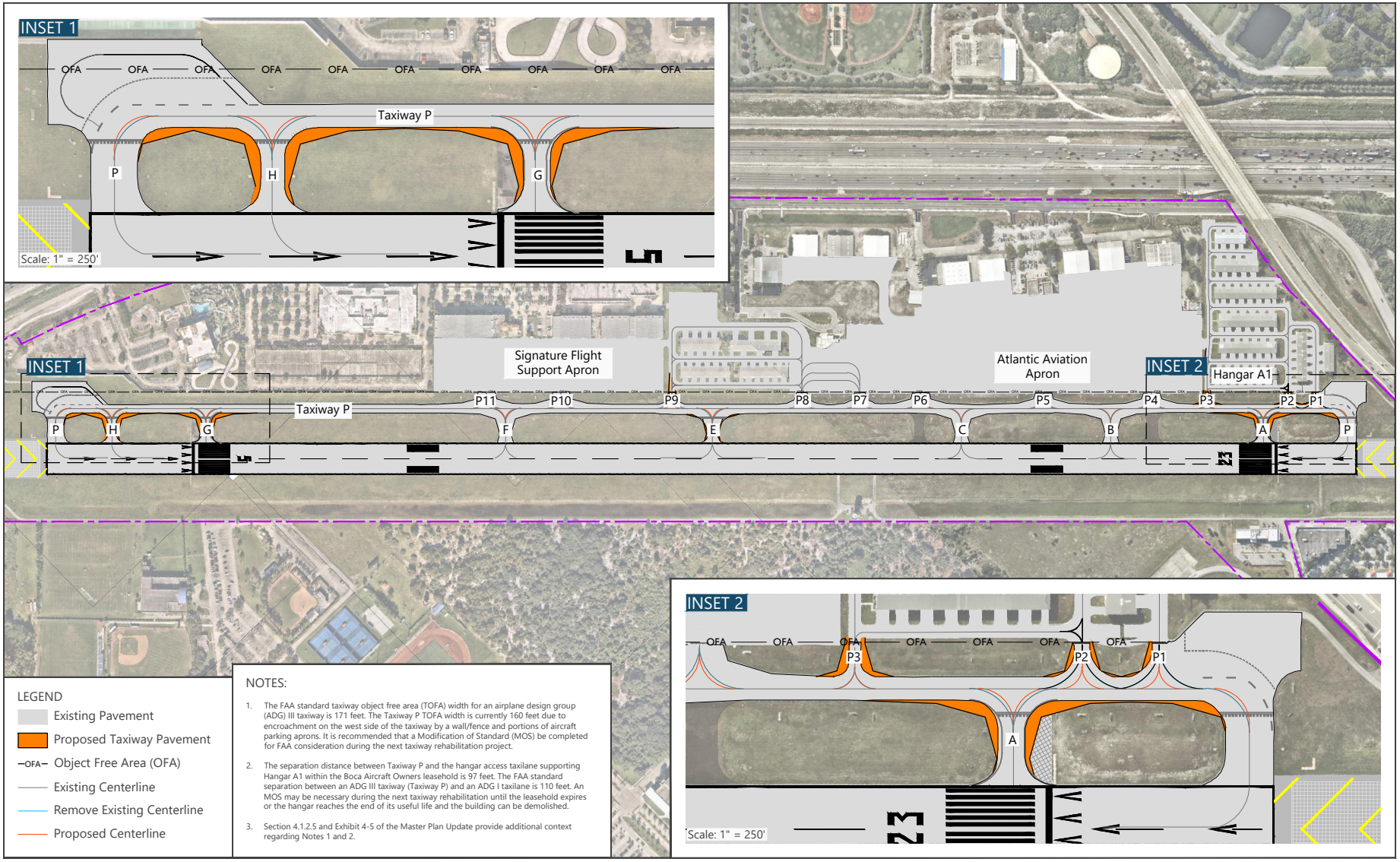
SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 2022; Martinez Geospatial, *BCT Basemap*, April 2021; Nearmap, Florida, November 2021 (aerial imagery for visual reference only – may not be to scale); Nearmap, Florida, August 2022 (aerial image for visual reference only – may not be to scale); Ricondo & Associates, Inc, August 2022 (RPZ comparison).

NORTH 0 500 ft

EXHIBIT 5-5

RUNWAY PROTECTION ZONE COMPARISON

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\6. Alternatives Analysis\AutoCAD\MPU Alternatives ppt Supporting Graphics_RPZ Comparison.dwgLayout: Exh 5-5 Plotted: Oct 31, 2023, 10:59AM



SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 2022; Martinez Geospatial, *BCT Basemap*, April 2021; Nearmap, Florida, November 2021 (aerial imagery for visual reference only – may not be to scale); Nearmap, Florida, August 2022 (aerial image for visual reference only – may not be to scale); Ricondo & Associates, Inc, August 2022 (taxiway fillet).

EXHIBIT 5-6

PROPOSED TAXIWAY GEOMETRY ENHANCEMENTS

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\6. Alternatives Analysis\AutoCAD\MPU Alternatives ppt Supporting Graphics Taxiway Fillet.dwgLayout: 5-6 Plotted: Nov 3, 2023, 12:14PM

The preferred taxiway nomenclature alternative was developed based on feedback received from BRAA staff. The alternative proposes the existing parallel taxiway be named Taxiway B. The use of Taxiway B will allow for the possibility of a future parallel taxiway east of Runway 5-23 to be designated as Taxiway A in the event development occurs east of the runway. The stub connectors between the runway and existing parallel taxiway will be sequentially designated B1 through B9, beginning at the Runway 23 approach end. To minimize pilot confusion, Taxiways P1 through P11 will remain unchanged. **Exhibit 5-7** illustrates the proposed taxiway nomenclature changes.

5.1.6 AIRCRAFT HOLDING BAYS

According to FAA Order 5090.5, *Formulation of the NPIAS and the Airports Capital Improvement Plan (ACIP)*, planning and development for holding bays may be triggered when airports reach 75,000 total operations, 20,000 itinerant operations, or 30 peak hour operations. The operations at BCT exceed these operational thresholds, and the Airport currently has aircraft holding bays adjacent to both runway ends.

The existing holding bay located near the Runway 5 end encroaches the ADG III TOFA by 20.5 feet (6,215 square feet of holding bay pavement), and the existing holding bay located near the Runway 23 end encroaches the ADG III TOFA by 25.0 feet (4,900 square feet of holding bay pavement). Both holding bays provide for non-channelized taxiing, a lack of independent taxiway routes allowing multiple aircraft to enter and exit the holding bay, which does not ensure standard wingtip clearance.

The following subsections describe the three holding bay alternatives that were developed for each runway end.

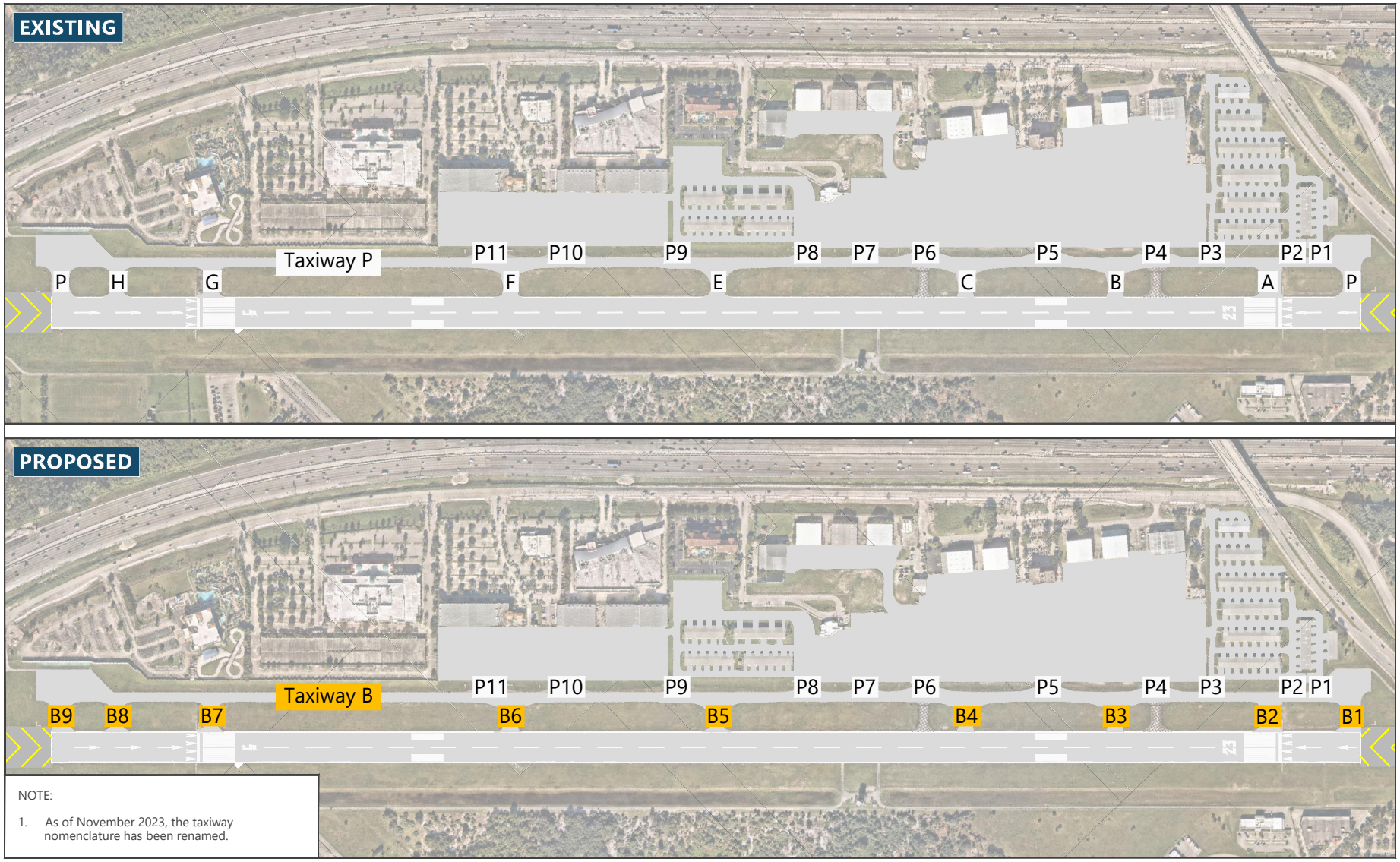
5.1.6.1 ALTERNATIVE 1 – AIRPLANE DESIGN GROUP III CONCEPT

Alternative 1 provides two independent ADG III aircraft holding positions on the Runway 5 and Runway 23 ends. The proposed improvements recommend adding 35,000 square feet of new pavement, 40,000 square feet of proposed grass island, a 430-linear-foot blast fence to the Runway 5 end, as well as 46,500 square feet of new pavement and 40,500 square feet of proposed grass island to the Runway 23 end. Enabling projects, such as pavement removal, airfield service road realignment, and hangar demolition, would be required at the Runway 23 end. Alternative 1 would allow all aircraft that currently operate at, or are forecast to operate at, BCT to independently use both aircraft holding positions. This alternative would provide ATC with flexibility to park ADG III aircraft outside the RSA and TOFA when the operational restriction is in place. **Exhibit 5-8** illustrates Alternative 1.

5.1.6.2 ALTERNATIVE 2 – AIRPLANE DESIGN GROUP III QUEUING CONCEPT

Alternative 2 proposes a queuing concept with one ADG III aircraft holding position and a bypass taxiway where an aircraft would hold at an intermediate holding position marking until cleared to use the bypass taxiway to access the runway end or to continue taxiing to the holding position. The proposed improvements include 32,000 square feet of new pavement and 19,500 square feet of grass island at the Runway 5 end, as well as 39,000 square feet of new pavement and 24,500 square feet of grass island to the Runway 23 end. Enabling projects, such as pavement removal, airfield service road realignment, and hangar demolition would be required at the Runway 23 end. Alternative 2 would also accommodate all aircraft that currently operate at, or are forecast to operate at, BCT. This alternative is slightly more complex for ATC to manage, and it would require surface painted markings to identify intermediate hold position designations. Alternative 2 minimizes the amount of space required for the development of aircraft holding bays; the remaining space could potentially be used for other revenue-generating purposes.

Alternative 2 is the preferred aircraft holding bay alternative. **Exhibit 5-9** illustrates this alternative.



NOTE:

1. As of November 2023, the taxiway nomenclature has been renamed.

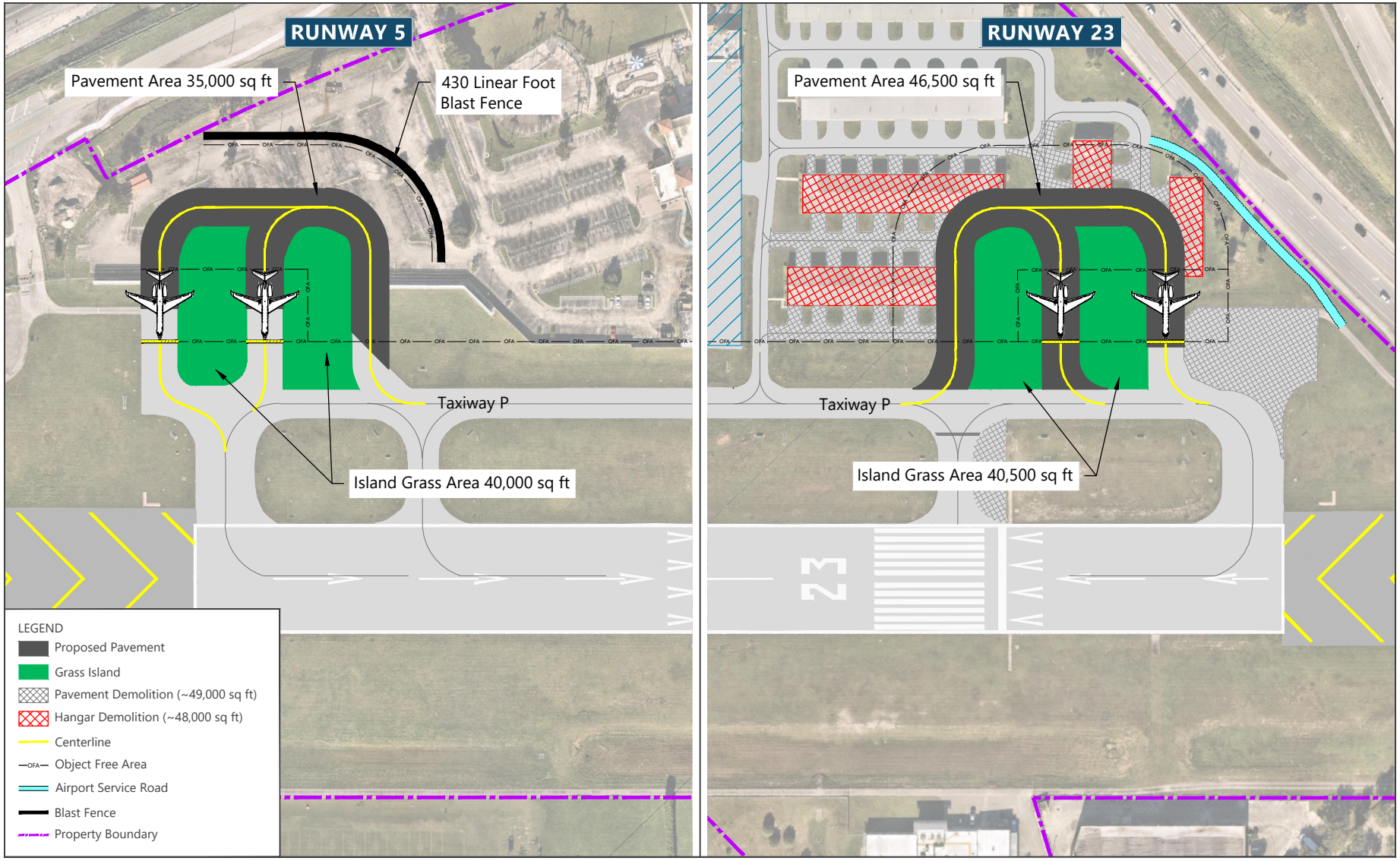
SOURCES: Martinez Geospatial, *BCT Basemap*, April 2021; Nearmap, Florida, August 2022 (aerial image for visual reference only – may not be to scale); Ricondo & Associates, Inc, August 2022 (Taxiway Naming Study).

EXHIBIT 5-7

NORTH 0 700 ft

TAXIWAY NOMENCLATURE CHANGES

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\6. Alternatives Analysis\AutoCAD\MPU Alternatives ppt Supporting Graphics.dwgLayout: 5-6 Exh Plotted: Nov 3, 2023, 10:13AM



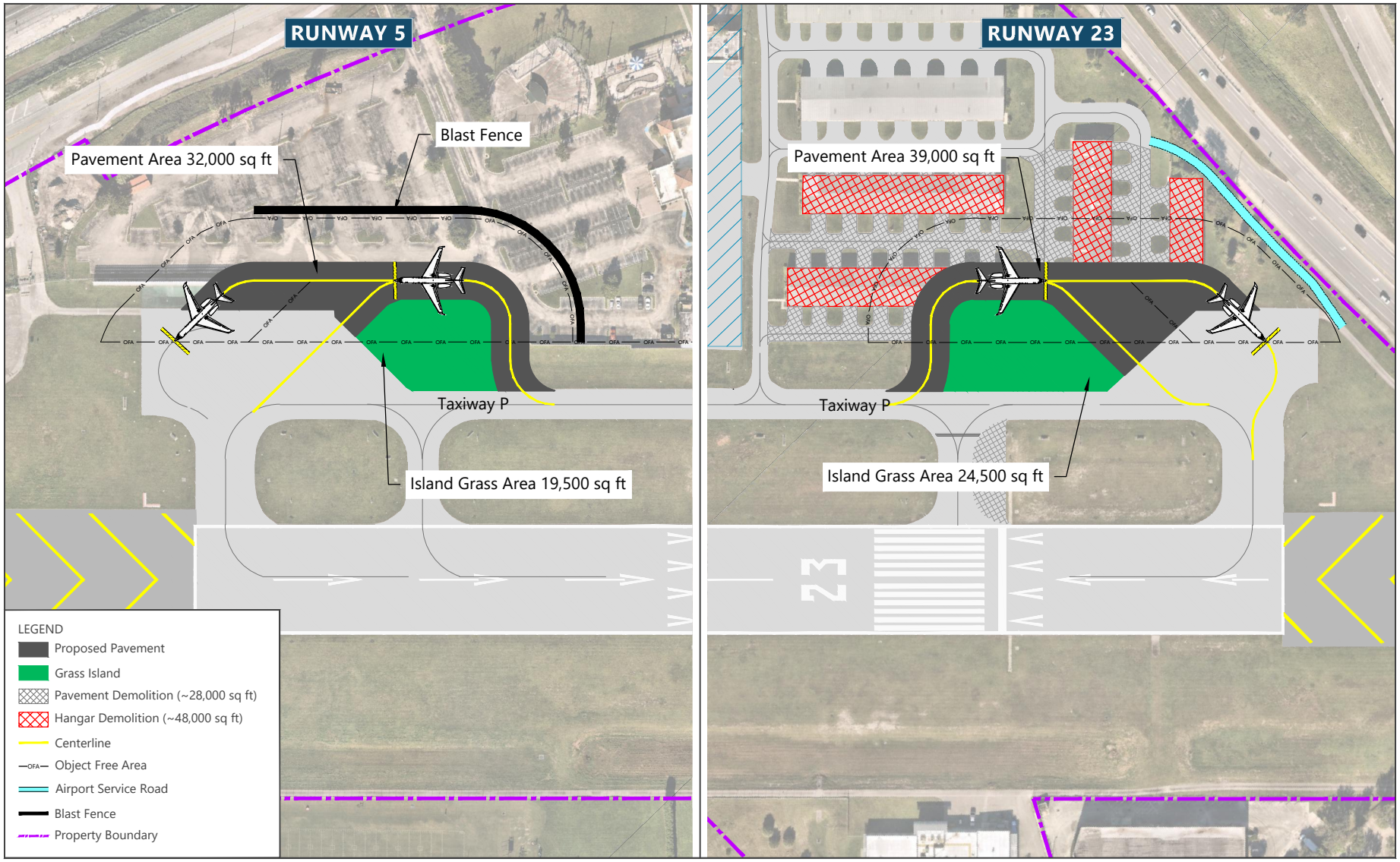
SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 2022; Martinez Geospatial, *BCT Basemap*, April 2021; Nearmap, Florida, August 2022 (aerial image for visual reference only – may not be to scale); Ricondo & Associates, Inc, August 2022 (hold bay alternative).

NORTH 0 100 ft

EXHIBIT 5-8

AIRCRAFT HOLDING BAY ALTERNATIVE 1
AIRPLANE DESIGN GROUP III CONCEPT

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\6. Alternatives Analysis\AutoCAD\MPU Alternatives ppt Supporting Graphics_Hold Bay Options.dwgLayout: Exh 5-8 Plotted: Nov 3, 2023, 10:25AM



SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 2022; Martinez Geospatial, *BCT Basemap*, April 2021; Nearmap, Florida, August 2022 (aerial image for visual reference only – may not be to scale); Ricondo & Associates, Inc, August 2022 (hold bay alternative).

EXHIBIT 5-9

AIRCRAFT HOLDING BAY ALTERNATIVE 2
AIRPLANE DESIGN GROUP III QUEUING CONCEPT

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\6. Alternatives Analysis\AutoCAD\MPU Alternatives ppt Supporting Graphics_Hold Bay Options.dwgLayout: Exh 5-9 Plotted: Nov 3, 2023, 10:26AM

5.1.6.3 ALTERNATIVE 3 – AIRPLANE DESIGN GROUP II CONCEPT

Alternative 3 provides three independent ADG II aircraft holding positions at the Runway 5 and Runway 23 ends. The proposed improvements include constructing 29,000 square feet of new pavement, 39,500 square feet of grass island, and a 400-linear-foot blast fence to the Runway 5 end. The proposed improvements at the Runway 23 end include constructing 42,000 square feet of new pavement and a 36,000-square-foot grass island. Enabling projects, such as pavement removal, airfield service road realignment, and hangar demolition would be required at the Runway 23 end. Alternative 3 provides the most capacity benefit for the majority of the fleet operating at BCT, but it does not accommodate the larger ADG III aircraft (critical aircraft). Alternative 3 would require ATC personnel to manage the size of aircraft using the holding bays. **Exhibit 5-10** illustrates this alternative.

5.1.7 PAVEMENT REHABILITATION

In 2019, the FDOT published the *SAPMP*, which inventoried airfield pavements at airports across Florida, and it quantified potential airfield rehabilitation needs through FY 2029. At BCT, Taxiway E was identified as needing rehabilitation in FY 2025, and the Runway 5 aircraft holding bay could require rehabilitation between FY 2027 and FY 2028.

Although Runway 5-23 and parallel Taxiway P were not identified as needing rehabilitation within the SAPMP study period, the MPU has utilized the existing PCI and forecast PCI to extrapolate the years that the pavement will need to be rehabilitated. It is estimated that Runway 5-23 and parallel Taxiway P could require rehabilitation between FY 2032 and FY 2033, depending on frequency of use, type of aircraft activity, and ongoing maintenance.

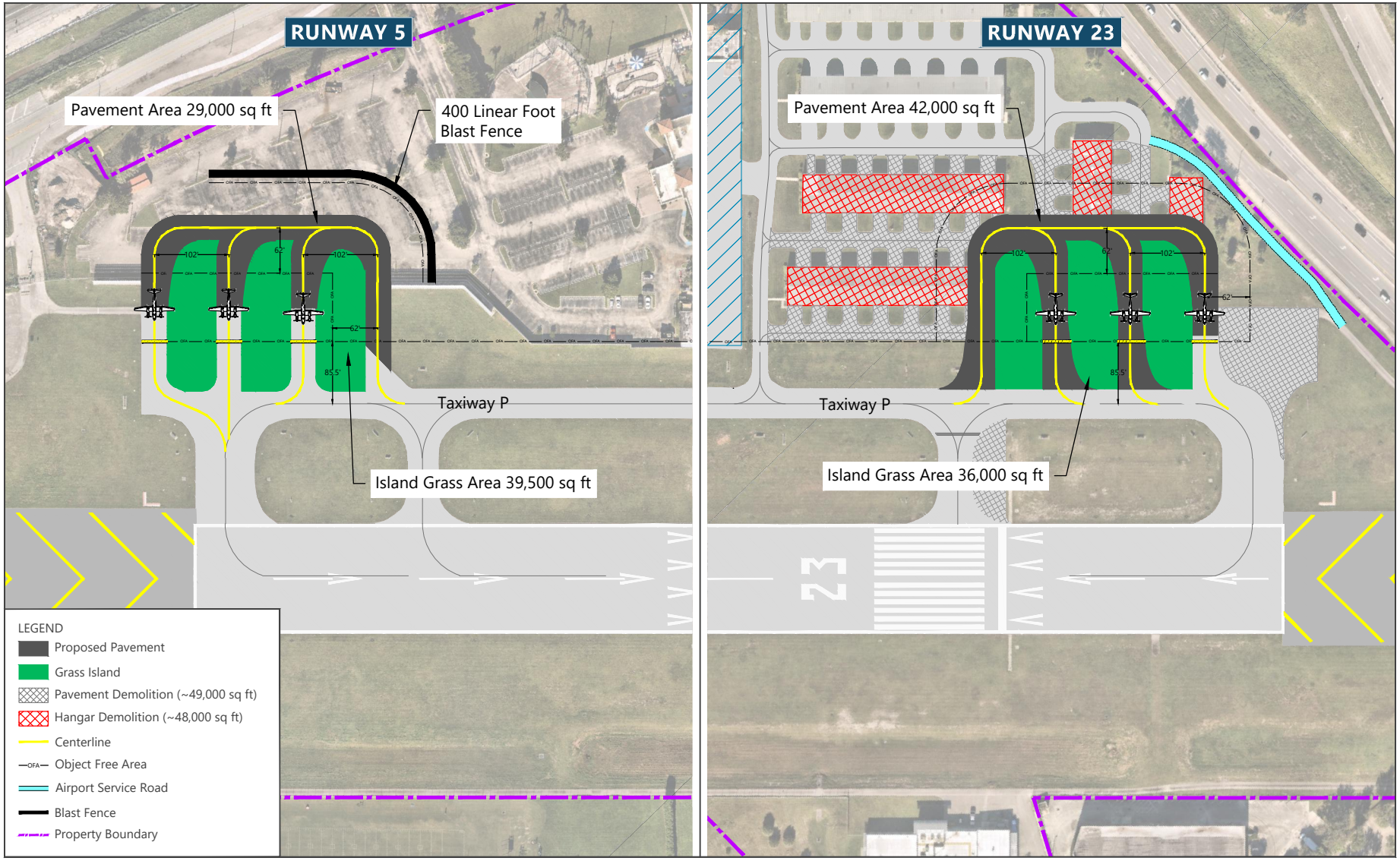
5.1.8 AIRFIELD LIGHTING, SIGNAGE, AND NAVIGATIONAL AIDS

The BRAA is completing the design of an airfield lighting, signage, and NAVAIDS improvement project in FY 2023. This project will include installation of new LED-based airfield signage, MIRLs, displaced threshold lights, portions of the taxiway edge lighting system, obstruction lights, REILs, new runway circuit conductors, and wind cones. This project will also include the renaming of the taxiways, as described in Section 5.1.5.2.

According to FAA AC 150/5340-30J, *Design and Installation Details for Airport Visual Aids*, a primary wind cone "is needed at any airport without a 24-hour ATCT." The ATCT at BCT is closed nightly from 11:00 p.m. to 7:00 a.m. The primary wind cone at BCT was removed and replaced with two supplemental wind cones in 2000 to accommodate the construction of the ATCT. One supplemental wind cone is located at each end of the runway (see **Exhibit 5-11**).

The location of the supplemental wind cones does not meet current FAA standards regarding distance to the runway centerline and distance from the runway ends. According to FAA AC 150/5340-30J, *Design and Installation Details for Airport Visual Aids*, supplemental wind cones should be cited as follows:

- outside the RSA and clear of the OFZ
- outside the ROFA, unless there is an operational need and a documented explanation of the reason for the location
- 1,000 feet from the runway end (500-foot plus or minus tolerance)

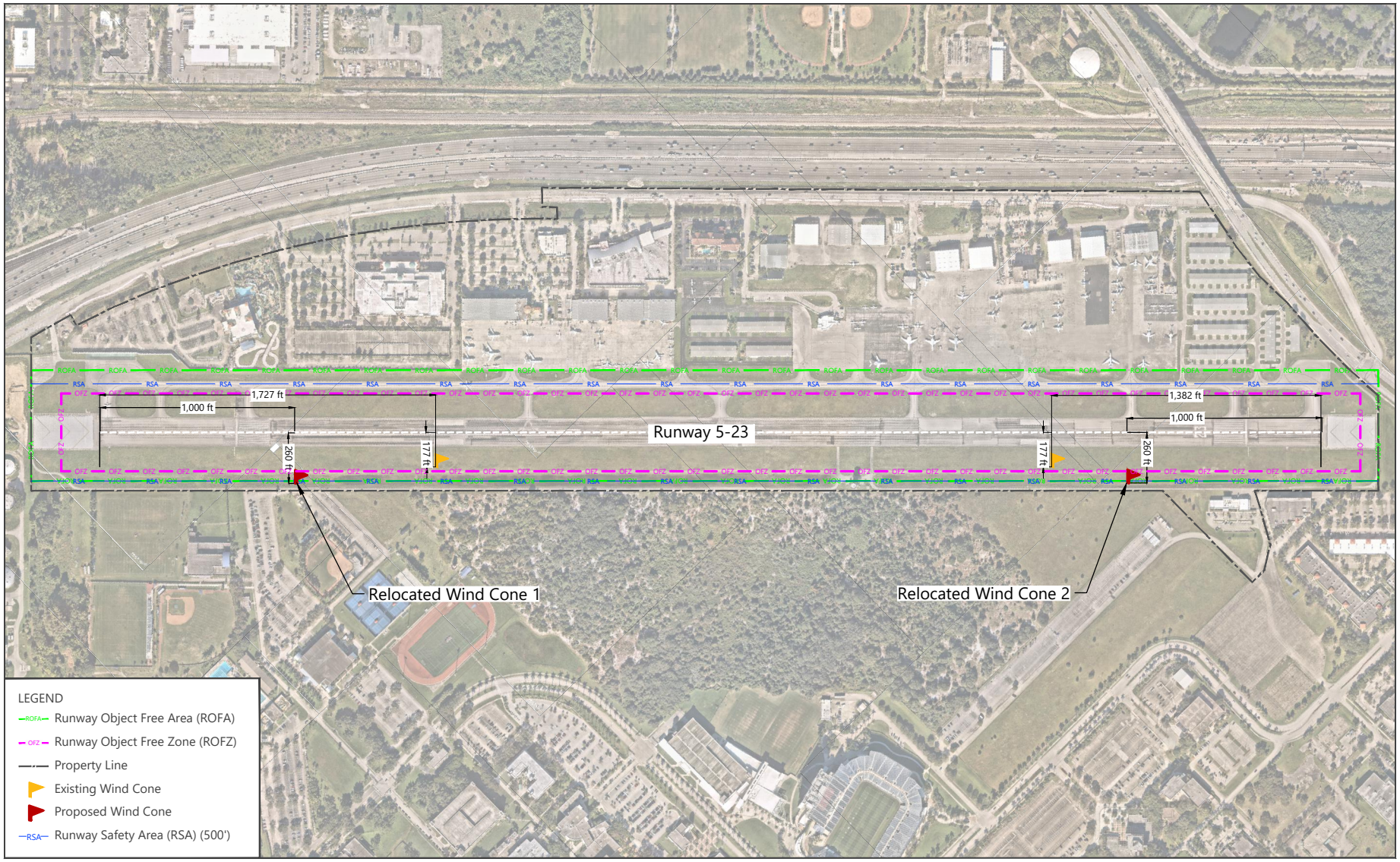


SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 2022; Martinez Geospatial, *BCT Basemap*, April 2021; Nearmap, Florida, August 2022 (aerial image for visual reference only – may not be to scale); Ricondo & Associates, Inc, August 2022 (hold bay alternative).

EXHIBIT 5-10

AIRCRAFT HOLDING BAY ALTERNATIVE 3
AIRPLANE DESIGN GROUP II CONCEPT

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\6. Alternatives Analysis\AutoCAD\MPU Alternatives ppt Supporting Graphics_Hold Bay Options.dwgLayout: Exh 5-10 Plotted: Nov 3, 2023, 10:44AM



SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 2022; Martinez Geospatial, *BCT Basemap*, April 2021; Boca Raton Airport Authority, Florida, September 2021 (aerial image for visual reference only – may not be to scale); Ricondo & Associates, Inc, August 2022 (wind cone location sketch).

EXHIBIT 5-11

EXISTING AND PROPOSED WIND CONE LOCATIONS

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 75A - Airfield Lighting and Signage Project Def and Prelim Design\02-Drawings\BCT Wind Cone Relocation and vault location.dwgLayout: 8.5x11L Plotted: Nov 3, 2023, 10:48AM

It is recommended that during the design of the airfield lighting, signage, and NAVAID project in FY 2023, the FAA be engaged to discuss the primary wind cone requirement and if two lighted supplemental wind cones will continue to be adequate to provide wind information to pilots. If a primary wind cone is required, then one of the supplemental cones could be constructed as a primary wind cone. A segmented circle and traffic pattern indicator will be required.

Should the FAA approve the continued use of two supplemental wind cones, it is recommended the wind cones be located in accordance with the criteria previously noted. The proposed recommended wind cone locations are illustrated on Exhibit 5-11.

5.1.9 AIRFIELD SERVICE ROAD

The Airport's existing airfield service road is approximately 9 feet wide and constrained by a fence line on the east side and a drainage basin on the west side. The width of the roadway and proximity of the fence and drainage swale are not conducive for safely accommodating emergency vehicles and construction equipment. It is recommended that the airfield service road be widened to accommodate emergency vehicles by 3 to 4 feet. The project is scheduled for design in FY 2023, and construction and rehabilitation are anticipated for FY 2024.

5.2 GENERAL AVIATION / AERONAUTICAL USE ALTERNATIVES

As previously noted, one of the objectives of this chapter is to identify areas that would be suitable to accommodate the Airport's future GA/aeronautical facility requirements. The following subsections summarize the future demand quantified in Section 4, identify existing tenant development currently in progress, and present alternative concepts or strategies for accommodating demand.

5.2.1 SUMMARY OF FUTURE DEMAND

As presented in Section 4, the additional GA facility requirements for BCT over the 20-year planning horizon are estimated to encompass approximately 23 acres. This estimate is in excess of the existing GA/aeronautical use development currently at BCT and excluded planned tenant development (to be discussed in the next subsection). **Table 5-1** lists the additional GA facility requirements.

TABLE 5-1 ADDITIONAL GENERAL AVIATION FACILITY REQUIREMENTS

GENERAL AVIATION FACILITY DESCRIPTION[1,2]	FY 2025	FY 2030	FY 2040
Hangars			
T-Hangars	30,000	32,000	40,000
Conventional Hangars	59,000	92,000	163,000
Maintenance Hangars	10,000	16,000	28,000
Subtotal Hangars	**99,000**	**140,000**	**231,000**
Apron			
Hangar Access	99,000	140,000	231,000
Based and Itinerant Apron	11,000	79,000	294,000
Subtotal Apron	**110,000**	**219,000**	**525,000**
Other Support Areas[3]	**39,000**	**87,000**	**243,000**
Grand Total	**248,000**	**446,000**	**999,000**
Grand Total in Acres	**5.69**	**10.24**	**22.93**

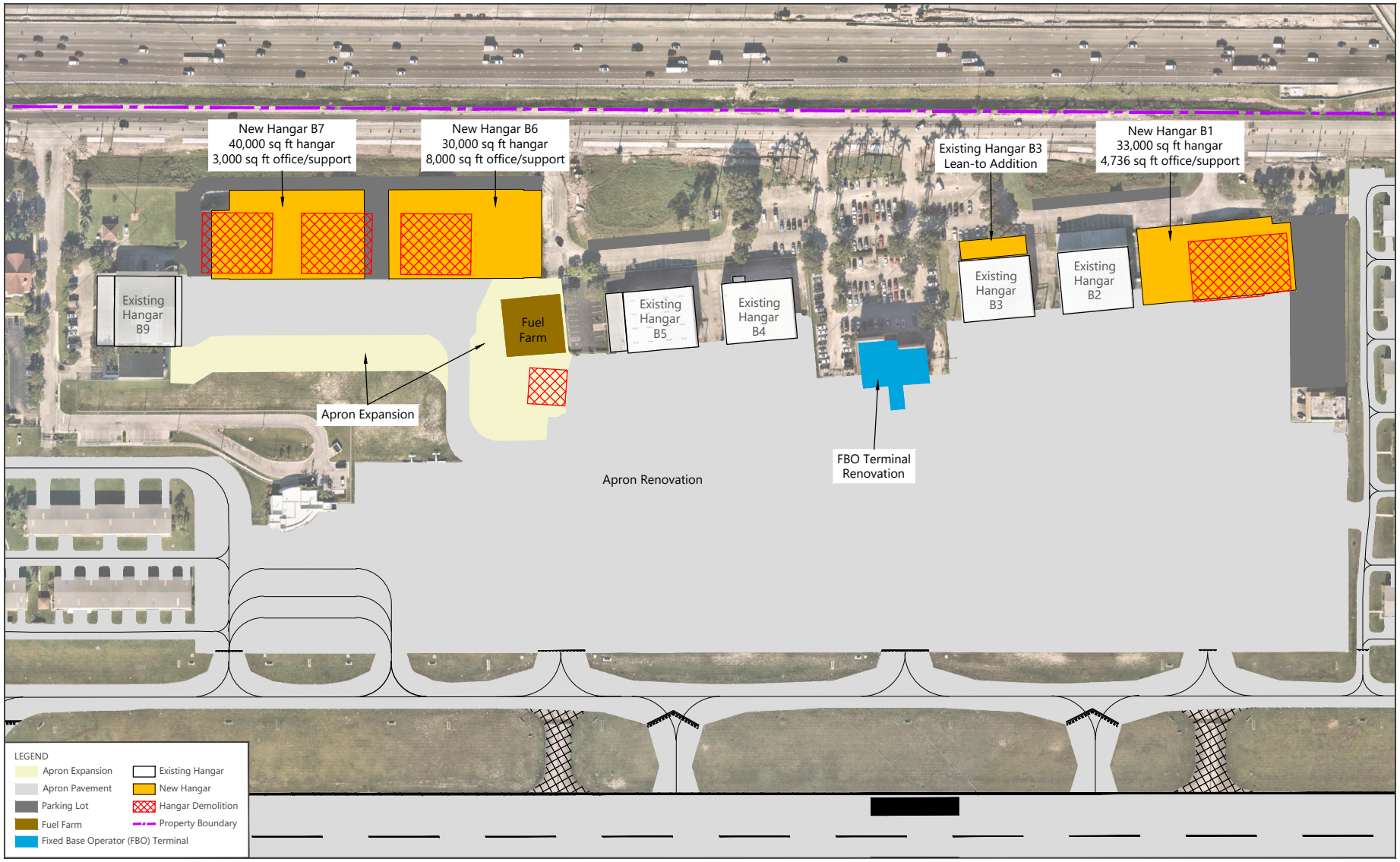
NOTES:
FY – Fiscal Year (October 1 through September 30)
1 Values are presented in square feet unless otherwise noted.
2 Additional general aviation facilities are needed to accommodate future demand identified in the preliminary aviation activity forecasts. These forecast values are in excess of the current general aviation facilities at BCT.
3 Other support areas include general aviation / fixed base operator terminal facilities, vehicular parking, and landscaping/drainage areas.
SOURCES: Ricondo & Associates, Inc., April 2021; Transportation Research Board, Airport Cooperative Research Program, Report 113, *Guidebook on General Aviation Facility Planning*, September 11, 2014; US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, *Airport Design*, February 26, 2014; Boca Raton Airport Authority, Airport Noise and Operations Monitoring System, October 2020.

5.2.2 EXISTING TENANT IMPROVEMENTS

In May 2022, Atlantic Aviation signed a new 40-year master lease agreement with the BRAA. The lease agreement included a commitment to upgrade, enhance, and expand existing Airport infrastructure over the next 7 years. Atlantic Aviation's planned infrastructure upgrades at the Airport include the following:

- addition of approximately 52,000 square feet of new hangar space and 12,000 square feet of new shop and/or office space
- milling and paving of approximately 710,000 square feet of existing ramp space
- addition of approximately 50,000 square feet of new ramp space
- renovation of the executive terminal office space
- rehabilitation of the vehicle parking areas
- construction of a new 90,000-gallon fuel farm

The additional apron and hangars will expand Atlantic Aviation's existing ramp and hangar capacity by 2.6 acres and expand its existing (approximately 41.0-acre) campus to accommodate Boca Raton's growing demand for private air travel. **Exhibit 5-12** depicts the conceptual Atlantic Aviation improvements.



SOURCES: Martinez Geospatial, *BCT Basemap*, April 2021; Nearmap, Florida, November 2021 (aerial image for visual reference only – may not be to scale); DYE-NBA Aviation, *Atlantic FBO Facilities Schematic Site Plan,* May 2022; Ricondo & Associates, Inc, August 2022.

NORTH 0 250 ft

EXHIBIT 5-12

ATLANTIC AVIATION IMPROVEMENTS

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\6. Alternatives Analysis\AutoCAD\MPU Alternatives ppt Supporting Graphics_Atlantic Aviation Layout.dwgLayout: 8.5x11L Plotted: Oct 31, 2023, 12:27PM

5.2.3 AREAS AVAILABLE FOR GENERAL AVIATION FACILITY DEVELOPMENT

As noted throughout the MPU, there is no readily available developable space at BCT; therefore, to develop conceptual alternatives to support aeronautical demand, redevelopment of sites currently used for aeronautical and nonaeronautical development was considered. These sites, referred to as North Aeronautical Area, Midfield Aeronautical Area, and South Aeronautical Area, are illustrated on **Exhibit 5-13**.

Preferred alternatives for the sites discussed in the following subsections have not been identified. Specific development would likely be determined by a third-party developer or tenant with specific design and development criteria. The sites discussed in the following subsections will be depicted on the Recommended Airport Improvement Plan and ALP as potential aeronautical development pending development opportunities and amendments to existing leaseholds.

5.2.3.1 NORTH AERONAUTICAL AREA

Two alternatives for the North Aeronautical Area (6.9 acres) were evaluated: one alternative proposes corporate hangars and the other proposes T-hangars. Both alternatives preserve space for future aircraft holding bay improvements on the Runway 23 end. The alternatives are further described as follows:

- Alternative 1 includes a 58,000-square-foot corporate hangar, capable of housing multiple large (G550 or Global Express) aircraft, and 10,300 square feet of office space and vehicular parking, as well as a 22,500-square-foot hangar and 67,000 square feet of new apron pavement.
- Alternative 2 includes six new T-hangars in the following sizes: 20,000 square feet, 22,000 square feet, 5,400 square feet, 7,500 square feet, 23,700 square feet, and 16,400 square feet. It also includes 61,400 square feet of proposed taxilane pavement.

Exhibit 5-14 illustrates the proposed North Aeronautical Area alternatives.

5.2.3.2 MIDFIELD AERONAUTICAL AREA

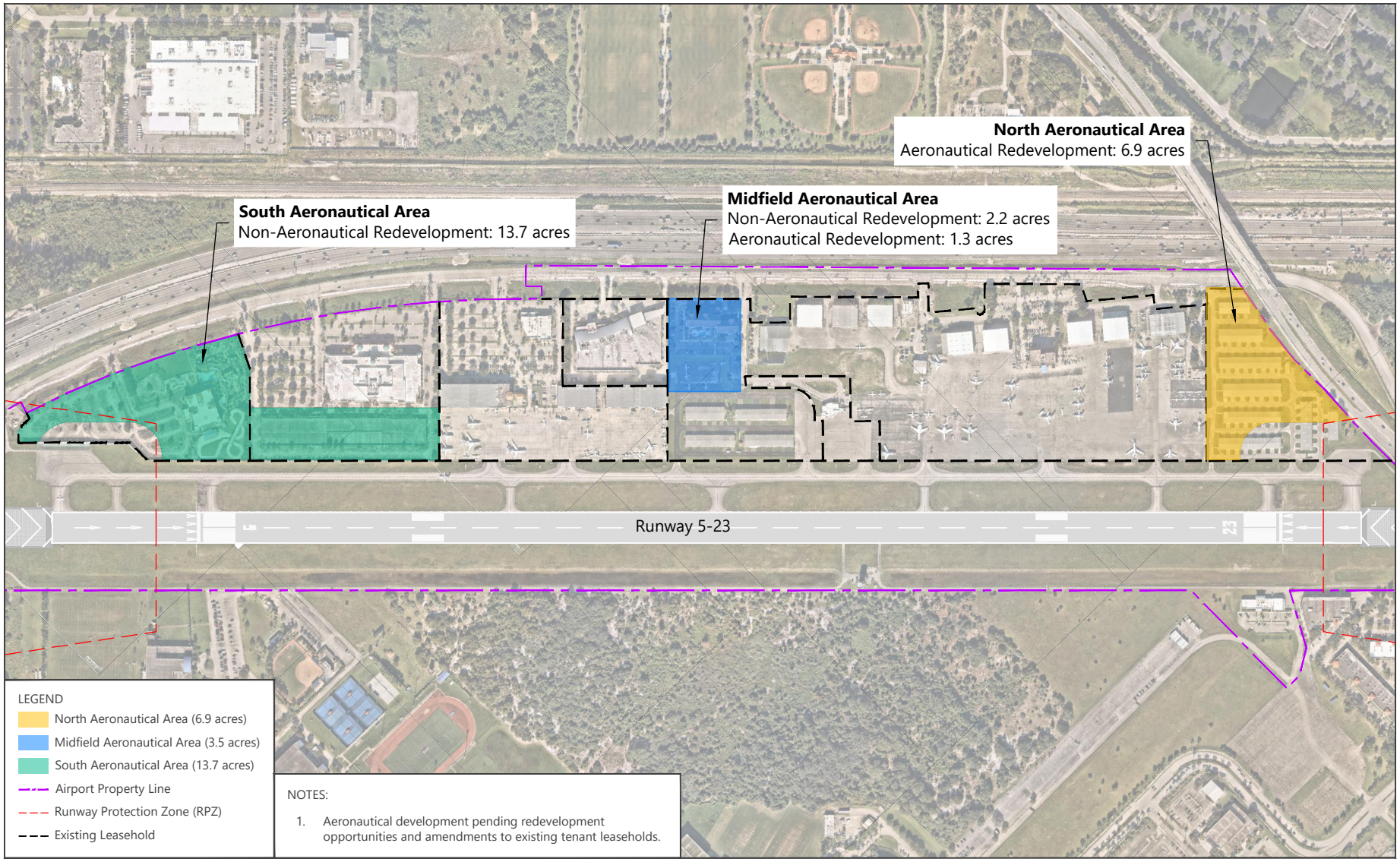
Two alternatives for the Midfield Aeronautical Area (3.5 acres) were evaluated. The alternatives will require the displacement and demolition of the Fairfield Inn & Suites and 33,000 square feet of existing based aircraft apron. The alternatives are further described as follows:

- Alternative 1 proposes two T-hangars totaling 47,300 square feet (approximately 34 units) and 42,200 square feet of proposed taxilane pavement.
- Alternative 2 proposes four T-hangars totaling 36,000 square feet (approximately 32 units) and 49,700 square feet of proposed taxilane pavement.

Exhibit 5-15 illustrates the proposed Midfield Aeronautical Area alternatives.

5.2.3.3 SOUTH AERONAUTICAL AREA

Two alternatives for the South Aeronautical Area (13.2 acres) were evaluated. The proposed redevelopment alternatives impact two nonaeronautical leaseholds: Apex Park Group, LLC (Boomers!) and iStar Florida 2015 Cinemas, LLC (Cinemark Theatres). The entire Boomers! leasehold would be repurposed for aeronautical development, while only the existing parking deck within the Cinemark Theatre leasehold would be impacted. The alternatives are further described as follows:



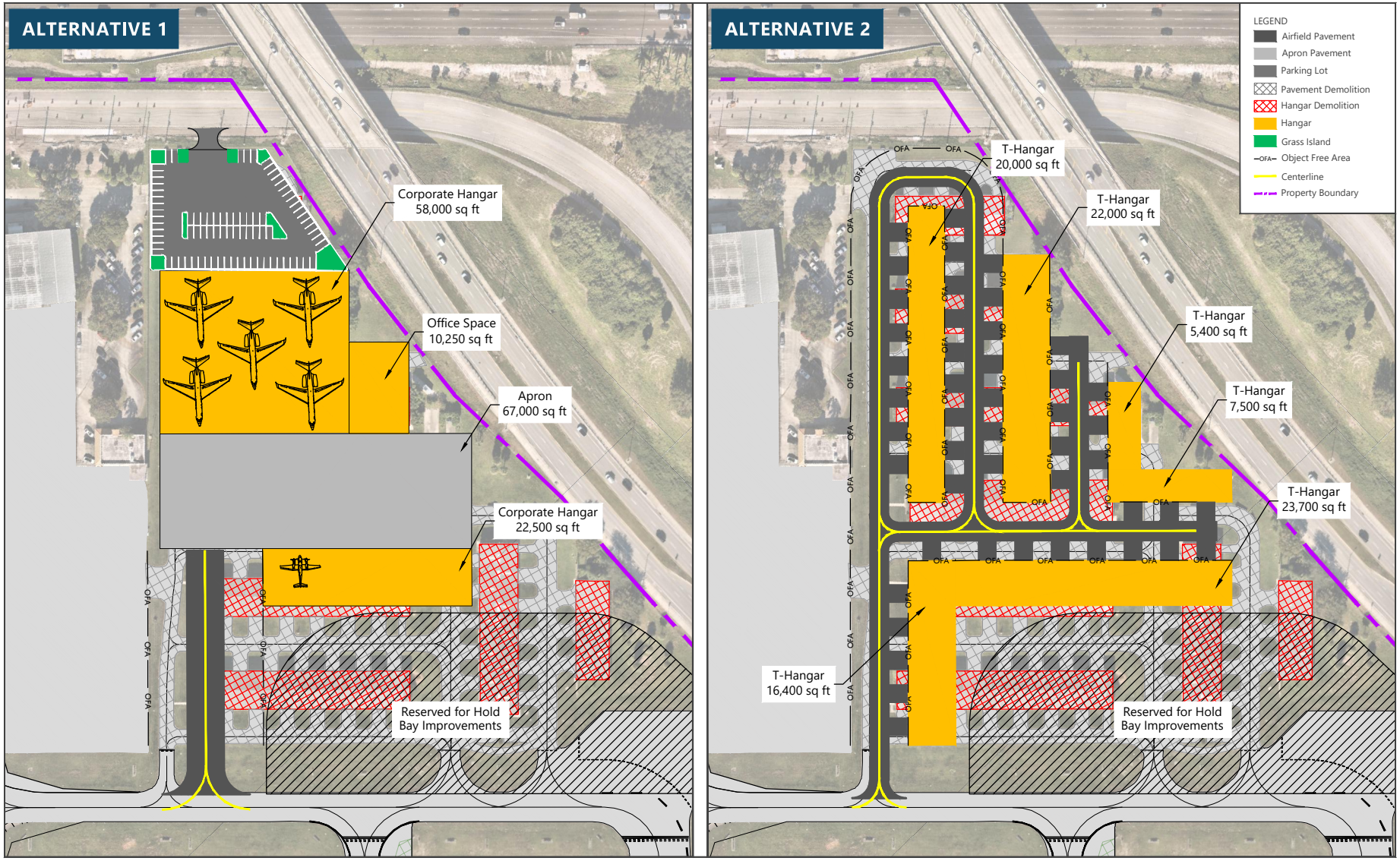
SOURCES: Martinez Geospatial, *BCT Basemap*, April 2021; Nearmap, Florida, November 2021 (aerial image for visual reference only – may not be to scale); Ricondo & Associates, Inc, August 2022.

NORTH 0 700 ft

EXHIBIT 5-13

AERONAUTICAL DEVELOPMENT / REDEVELOPMENT AREAS

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\6. Alternatives Analysis\AutoCAD\MPU Alternatives ppt Supporting Graphics_Aero Areas Site Locations.dwgLayout: 8.5x11L Plotted: Nov 3, 2023, 11:32AM

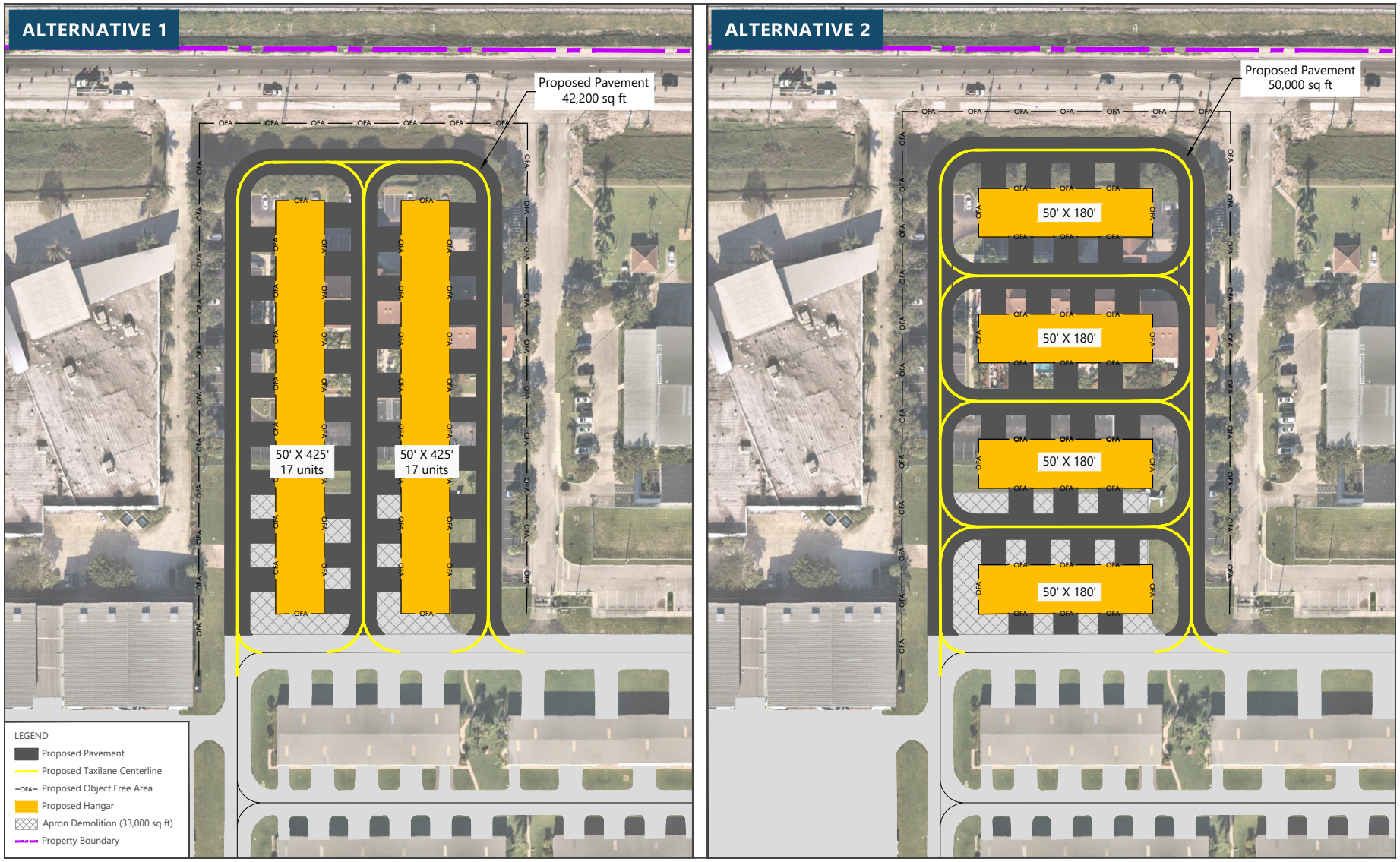


SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 2022; Martinez Geospatial, *BCT Basemap*, April 2021; Nearmap, Florida, November 2021 (aerial image for visual reference only – may not be to scale); Ricondo & Associates, Inc, August 2022.

EXHIBIT 5-14

NORTH AERONAUTICAL AREA
SITE ALTERNATIVES

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\6. Alternatives Analysis\AutoCAD\MPU Alternatives ppt Supporting Graphics_Aero Area North Alternatives.dwgLayout: 8.5x11L Plotted: Oct 31, 2023, 12:43PM



SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 2022; Martinez Geospatial, *BCT Basemap*, April 2021; Nearmap, Florida, November 2021 (aerial image for visual reference only – may not be to scale); Ricondo & Associates, Inc, August 2022.

NORTH 0 250 ft

EXHIBIT 5-15

MIDFIELD AERONAUTICAL AREA
SITE ALTERNATIVES

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\6. Alternatives Analysis\AutoCAD\MPU Alternatives ppt Supporting Graphics_Midfield Aeronautical Area.dwgLayout: 8.5x11L Plotted: Oct 31, 2023, 12:44PM

- Alternative 1 includes 320,000 square feet of apron pavement, one 34,500-square-foot corporate hangar, one 18,000-square-foot corporate hangar, two 13,600-square-foot GA hangars, three 6,800-square-foot GA hangars, and a 7,000-square-foot building that could be used for office space or support. This alternative includes a five-level entertainment complex that would be used for a restaurant, retail space, and parking. The proposed entertainment complex would replace the existing parking garage supporting the Cinemark Theatre and accommodate future retail development. **Exhibit 5-16** illustrates Alternative 1.
- Alternative 2 includes 273,000 square feet of apron pavement, one 41,000-square-foot corporate hangar, one 22,000-square-foot corporate hangar, one 15,000-square-foot GA hangar, one 11,000-square-foot GA hangar, three 3,600-square-foot GA hangars, and a 7,000-square-foot building that could be used for office space or support. Similar to Alternative 1, this concept includes a five-level entertainment complex that would be used for a restaurant, retail space, and parking. **Exhibit 5-17** illustrates Alternative 2.

5.3 AIRPORT SUPPORT FACILITY IMPROVEMENTS

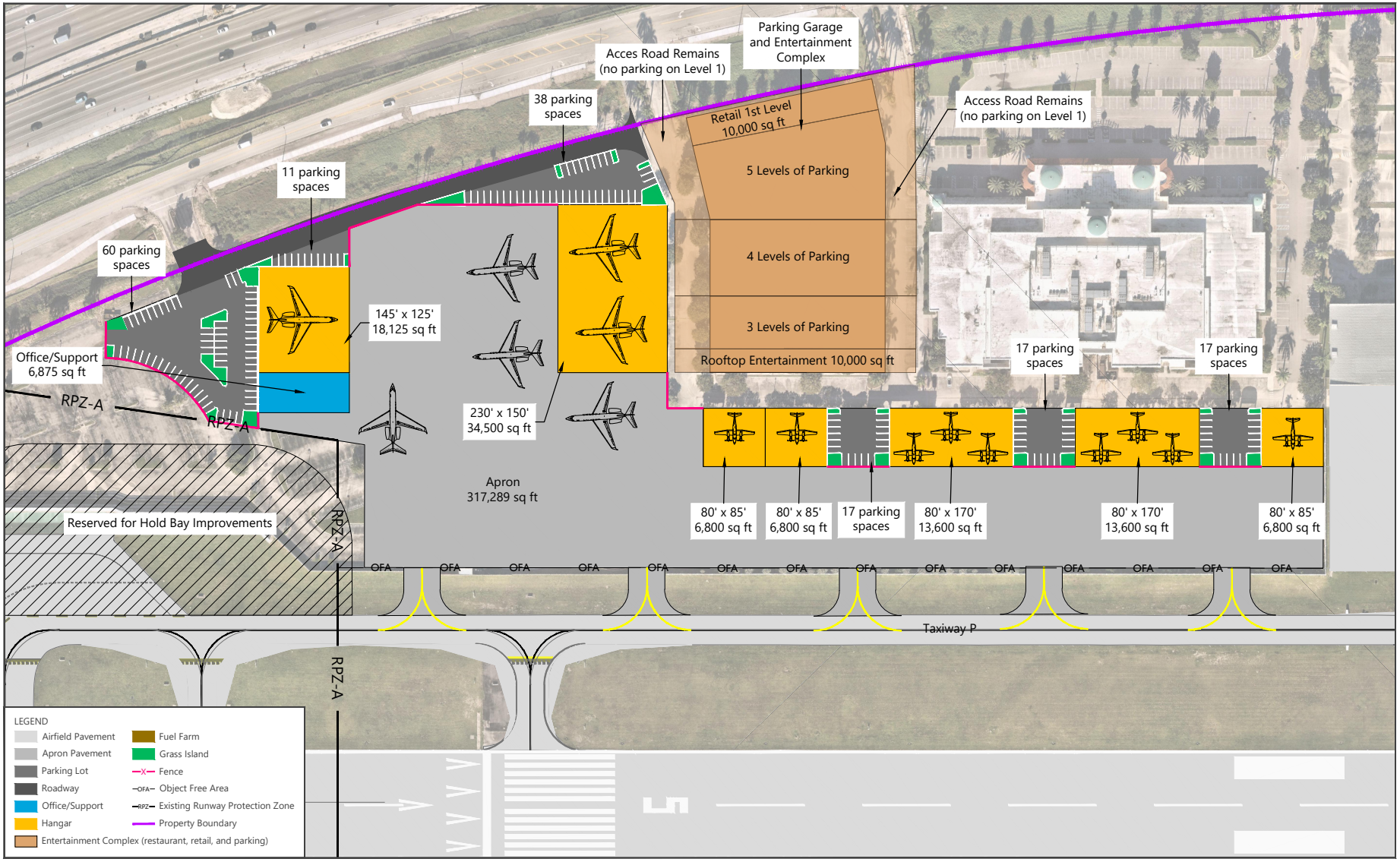
This section describes the recommended improvements for the Airport support facilitates. These include the AWOS, ATCT, airfield electrical vault and rotating beacon, US CBP facility, and BRAA Administration Building.

5.3.1 AUTOMATED WEATHER OBSERVING SYSTEM

As noted in Section 4, the existing AWOS III (installed in 2013) does not function properly and requires ongoing maintenance. The BRAA is considering the replacement of the AWOS with an ASOS.

Per the US Department of Commerce (DOC) / NOAA, Office of the Federal Coordinator for Meteorological Services and Supporting Research, *Federal Standard for Siting Meteorological Sensors at Airports*, dated July 2019, the preferred siting criteria for ASOS for sensor placement at airports with a non-precision runway are as follows:

- The preferred siting of the cloud height, visibility, and wind sensors and associated data collection platform (DCP) is adjacent to the primary runway 1,000 feet (300 meters) to 3,000 feet (900 meters) down the runway from the threshold.
- The minimum distance from the runway centerline shall be 500 feet (150 meters).
  - The maximum distance shall not exceed 1,000 feet (300 meters).
  - The minimum distance of 500 feet (150 meters) assumes flat terrain.
- If the elevation of the wind sensor site is above or below the runway elevation, then the minimum distance is adjusted by 7 feet (2.1 meters) for every foot (0.3 meters) of elevation difference.
- In no case shall the site selected result in a violation of a runway or taxiway object free area, runway or taxiway safety area, obstacle free zone or instrument flight procedures surfaces described in AC 150/5300-13B, *Airport Design*, or FAA Order 8260.3C, *United States Standard for Terminal Instrument Procedures (TERPS)*.
- The maximum height of vegetation within a 100 foot radius from the site is 10 inches.
- The maximum elevation of trees and buildings within the 500-foot radius should be 18 feet AGL. This is based upon a recommended sensor height of 33 feet AGL. It is recommended that the sensor should be 15 feet above the height of any obstruction (e.g., vegetation, buildings, etc.).



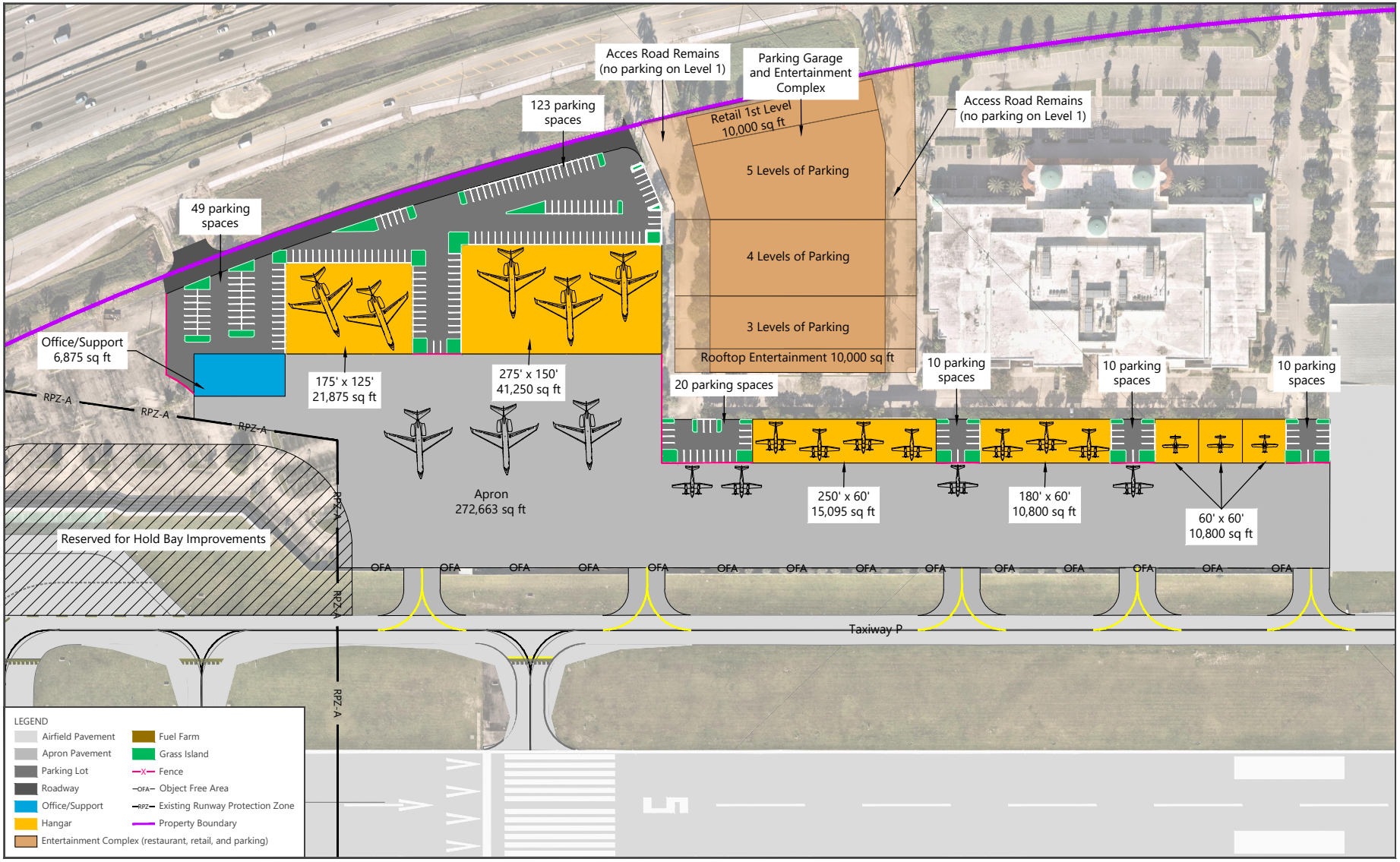
SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 2022; Martinez Geospatial, *BCT Basemap*, April 2021; Nearmap, Florida, November 2021 (aerial image for visual reference only – may not be to scale); Ricondo & Associates, Inc, August 2022.

NORTH 0 200 ft

EXHIBIT 5-16

SOUTH AERONAUTICAL AREA
ALTERNATIVE 1

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\6. Alternatives Analysis\AutoCAD\MPU Alternatives ppt Supporting Graphics_Aero Area South Alt 1_recover.dwgLayout: 8.5x11L Plotted: Nov 21, 2023, 08:50AM



SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 2022; Martinez Geospatial, *BCT Basemap*, April 2021; Nearmap, Florida, November 2021 (aerial image for visual reference only – may not be to scale); Ricondo & Associates, Inc, August 2022.

EXHIBIT 5-17

SOUTH AERONAUTICAL AREA
ALTERNATIVE 2

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\6. Alternatives Analysis\AutoCAD\MPU Alternatives ppt Supporting Graphics_Aero Area South Alt 2.dwgLayout: 8.5x11L Plotted: Nov 21, 2023, 09:01AM

- The maximum elevation of trees and buildings within the 1,000-foot radius is 23 feet AGL. The sensor height should be at least 10 feet higher than the height of any obstruction (e.g., vegetation, buildings, etc.).

Due to property constraints at BCT, there is no site on the existing property that would accommodate an ASOS according to the parameters above. A preliminary site, located off airport property, has been identified and is illustrated on **Exhibit 5-18**. The preferred ASOS site shown is the most suitable location based on the siting criteria and surrounding obstacles. The preferred site does not fully comply with the DOC / NOAA guidance contained in the *Federal Standard for Siting Meteorological Sensors at Airports*. Trees and vegetation will penetrate the 500-foot radius and two T-hangars, the ATCT, and a parking garage will encroach upon the 1,000-foot radius.

The siting, procurement, and installation of an ASOS is complicated and involves extensive coordination between the Airport, FAA, NWS, and Department of Defense (DOD). It is recommended that the Airport replace the existing AWOS equipment (currently in poor condition) while the installation of an ASOS is discussed with the FAA, NWS, and DOD.

5.3.2 AIR TRAFFIC CONTROL TOWER

As discussed in Section 4, by the end of the planning horizon, the ATCT will be approximately 40 years old and will likely be approaching the end of its useful life. As a substitute for the construction of a new ATCT, it is recommended that the possibility of a remote or virtual tower be explored. A remote or virtual tower could be located on or off Airport property. The MPU is recommending that a technology review of remote or virtual tower technology be conducted in FY 2033 or several FYs prior to planned implementation of the system.

5.3.3 ELECTRICAL VAULT AND ROTATING BEACON

To increase developable space at BCT, it is recommended that relocation of the electrical vault and rotating beacon be studied. The BRAA has programmed a project to study these relocations in FY 2026. Equipment from the electrical vault could be relocated to the first floor of the ATCT (or a small building to be constructed near the ATCT), and the beacon could be relocated to the top of the ATCT. It should be noted that installing a rotating beacon on top of an ATCT requires authorization from the FAA regional office, according to FAA AC 150/5340-30, *Design and Installation Details for Airport Visual Aids*.

5.3.4 US CUSTOMS AND BORDER PROTECTION

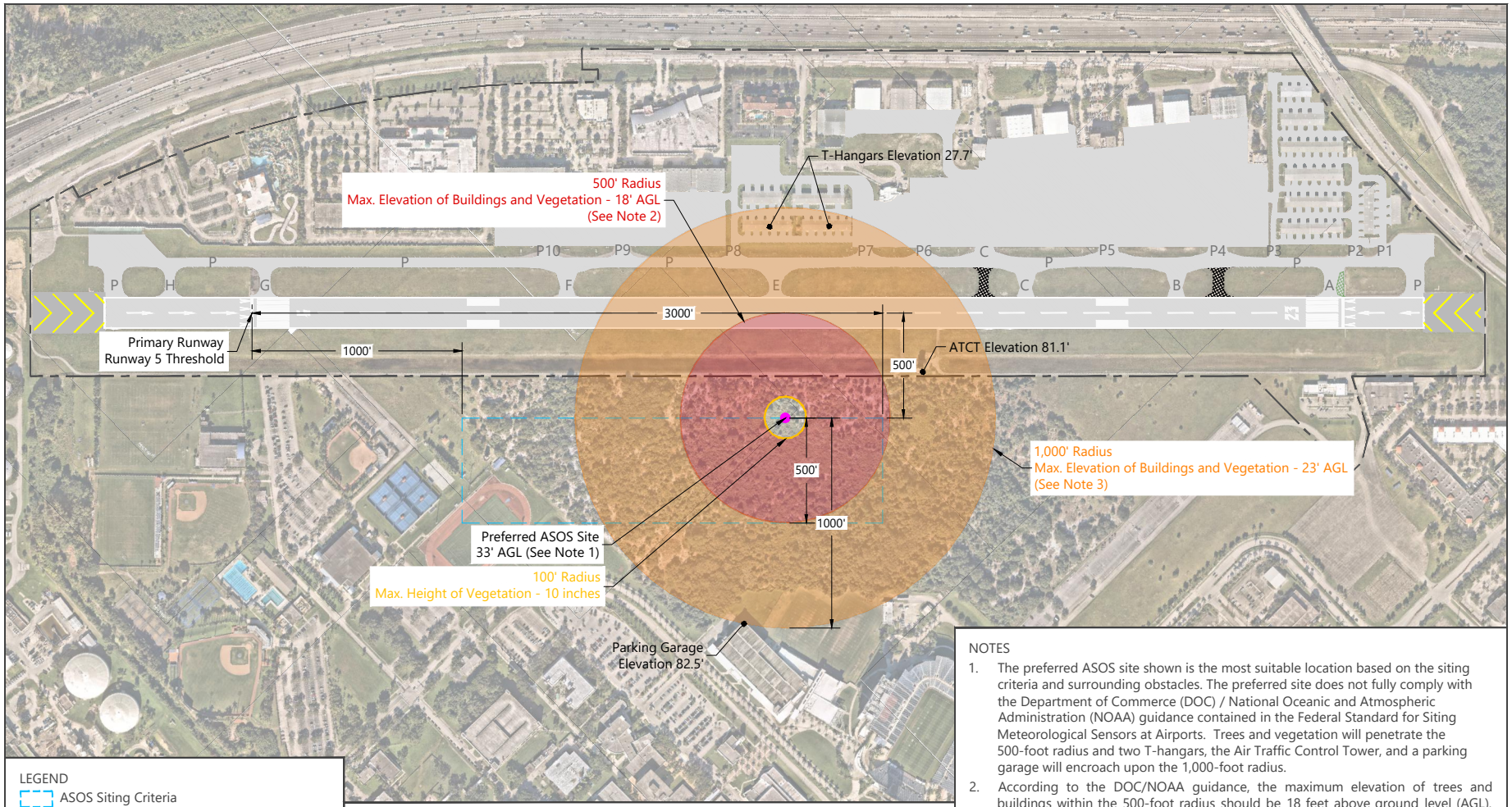
The US CBP facility was constructed in 2018. It is anticipated that by FY 2029 minor improvements, including air conditioner replacement, security system upgrades, appliance upgrades, a garbage room expansion, and generator upgrades, may be needed. The BRAA has also noted that extending a natural gas line and replacing the existing incinerator may be considered.

5.3.5 AIRPORT ADMINISTRATION BUILDING

As noted in Section 2, the BRAA Administration Building is 7 years old and is generally in excellent condition. The BRAA has requested funds from FDOT in FY 2023 for minor interior reconfigurations, including a conference room expansion and adjustment to several interior spaces.

5.4 LANDSIDE ALTERNATIVES

This section discusses potential landside alternatives, including adjacent land opportunities, underground stormwater containment, Administration Building access improvements, and advanced air mobility (AAM) alternatives.



SOURCE: Boca Raton Airport, *Airport Layout Plan* (ALP), June 2018 (basemap); US Department of Commerce (DOC) / National Oceanic and Atmospheric Administration (NOAA), Office of the Federal Coordinator for Meteorological Services and Supporting Research, *Federal Standard for Siting Meteorological Sensors at Airports*, July 2019; Nearmap, Florida, November, 2021 & August 2022 (aerial image for visual reference only - may not be to scale).

EXHIBIT 5-18

AUTOMATED SURFACE OBSERVING SYSTEM SITING CRITERIA

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\6. Alternatives Analysis\AutoCAD\MPU Alternatives Documentation ASOS Siting.dwgLayout: 1 Plotted: Oct 31, 2023, 01:22PM

5.4.1 ADJACENT LAND OPPORTUNITIES

Four parcels of land are adjacent to the Airport that are included in the MPU as potential land opportunities. These parcels could be used for future support facilities, such as a remote tower, drainage/stormwater, and demand-driven aeronautical and nonaeronautical development. **Exhibit 5-19** depicts the location of the parcels, which represent adjacent land opportunities. The parcels are owned by the same entity that owns the Airport, the Board of Trustees of the Internal Improvement Trust Fund (TIITF) of the State of Florida. Two of the parcels, east of the Airport, are included as part of the FAU campus. The property in the Runway 5 RPZ is used by the City of Boca Raton Utility Services Department. The property located adjacent to the Runway 23 extended runway centerline, east of Interstate 95, is undeveloped with vegetation.

5.4.2 UNDERGROUND STORMWATER CONTAINMENT

As part of the 2019 Strategic Business Plan, the feasibility of constructing underground stormwater containment was evaluated. The current permit requirements from the South Florida Water Management District (SFWMD) require that the attenuation and treatment volumes within the existing ponds are maintained. To maintain these volumes, but still expand developments, one potential solution is utilizing underground containment systems to store the volume under pavement. These systems typically require more space than the original pond area and costs can be high, but they can be located under revenue-producing facilities, such as parking lots or aircraft aprons. Underground stormwater containment should not be located under buildings or other vertical structures.

It is recommended that consideration for underground stormwater containment be evaluated for each site, including an assessment of the potential return on investment based upon project cost and potential revenues. Another candidate for underground stormwater containment is the RSA east of the runway centerline. A project to study the implications of this will begin in FY 2023.

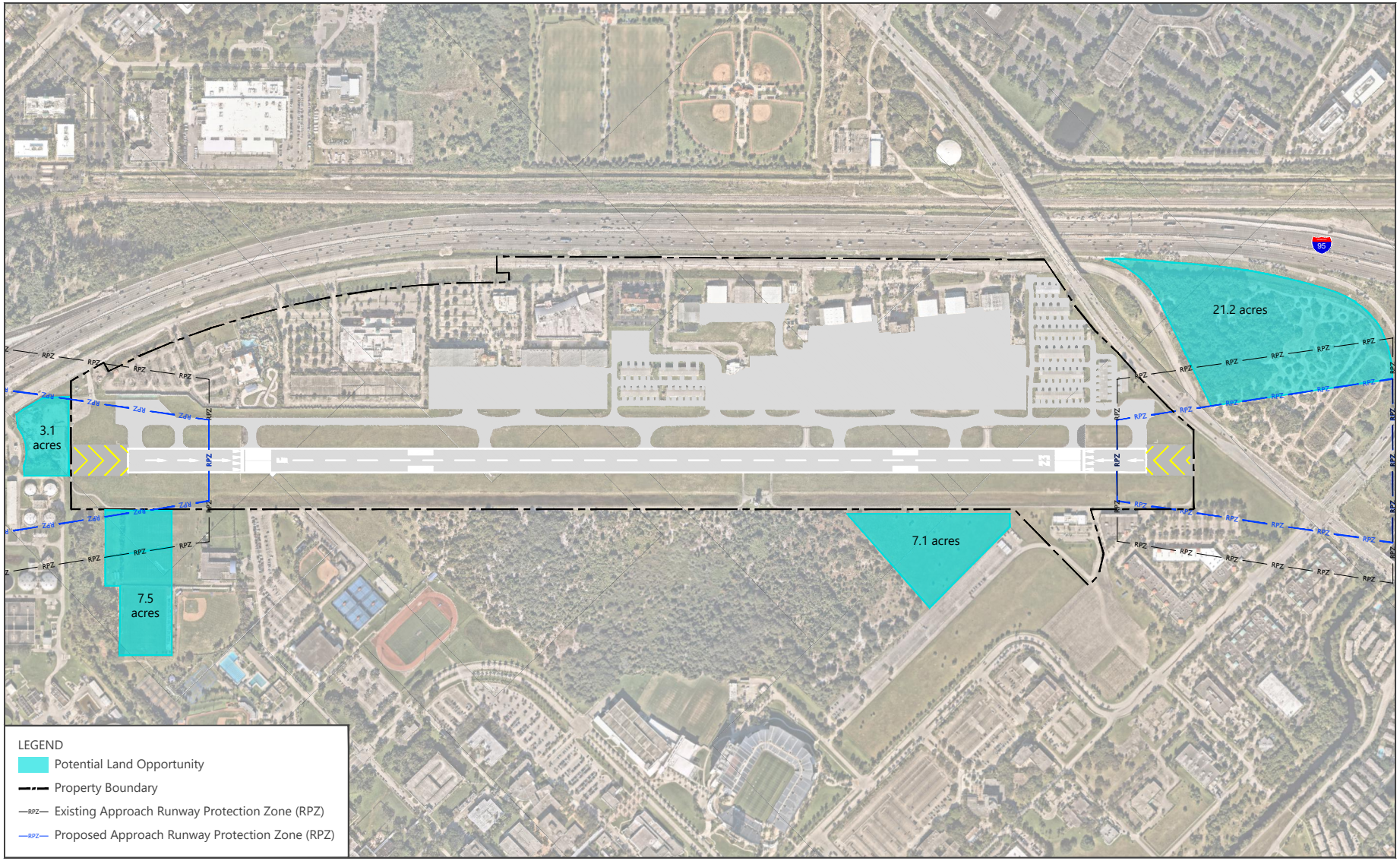
5.4.3 BRAA ADMINISTRATION BUILDING ACCESS ROAD IMPROVEMENTS

As noted in Section 4, access to the BRAA Administration Building and ATCT is provided via a parking lot within the leasehold of the FAU Research Park. It is recommended that the BRAA obtain a legal instrument, easement, right-of-way, or an expansion of its leasehold to preserve access to and from the Airport's facilities. A new dedicated access road, outside the FAU Research Park facility leasehold, could be constructed for Airport facilities and the FAU Tech Runway Building. **Exhibit 5-20** conceptualizes this area, which is approximately 1.6 acres.

5.4.4 ADVANCED AIR MOBILITY ALTERNATIVES

The FAA defines urban air mobility (UAM) as an aviation transportation system that will use highly automated aircraft that will operate and transport passengers or cargo at lower altitudes within urban and suburban areas. AAM is the overarching term that combines UAM with regional air mobility (RAM). The AAM concept has captured the aviation industry's attention as electric vertical takeoff and landing (eVTOL) aircraft have quickly advanced in the last 5 years and are expected to be certified as early as 2025. In the last 2 years, the number of eVTOL designs has more than doubled to reach approximately 600 designs in 2022. The AAM market is quickly expanding, but several challenging hurdles need to be addressed to reach a mature AAM market, including creating adequate regulatory guidelines, obtaining social acceptance, and integrating AAM with existing infrastructures.

Both the FAA and the National Aeronautics and Space Administration (NASA) developed a concept of operations and continue to refine it each year. In February 2022, the FAA published the draft Engineering Brief (EB) 105, which provides guidance on designing facilities called "vertiports" that are specifically constructed to serve eVTOL aircraft, assuming they are operating with a pilot under visual flight rules. In addition, the FAA is working on an Advisory Circular that provides detailed design guidelines for vertiports, with an anticipated publication date in 2024.



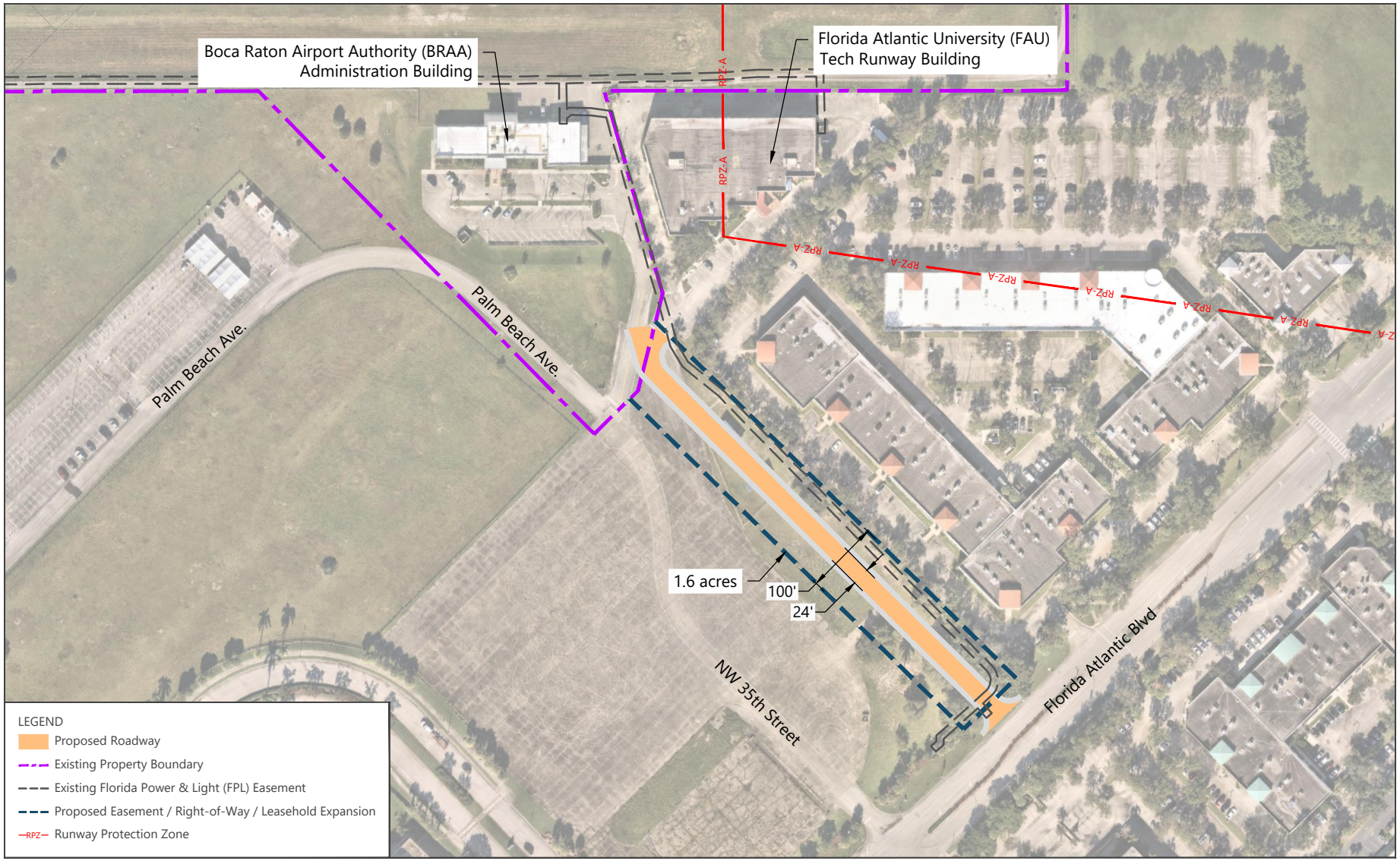
SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 2022; Martinez Geospatial, *BCT Basemap*, April 2021; Nearmap, Florida, November 2021 (aerial image for visual reference only – may not be to scale); Ricondo & Associates, Inc, August 2022.

NORTH 0 900 ft

EXHIBIT 5-19

ADJACENT LAND OPPORTUNITIES

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\6. Alternatives Analysis\AutoCAD\MPU Alternatives ppt Supporting Graphics_Potential Land.dwgLayout: Exh 5-18 Plotted: Oct 31, 2023, 01:15PM



SOURCES: Brown & Phillips, *Florida Power & Light (FPL) Easement*, August 2022; Martinez Geospatial, *BCT Basemap*, April 2021; Nearmap, Florida, November 2021 (aerial image for visual reference only – may not be to scale); Ricondo & Associates, Inc, August 2022.

NORTH 0 200 ft

EXHIBIT 5-20

BRAA ADMINISTRATION BUILDING ACCESS ROAD IMPROVEMENTS

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\6. Alternatives Analysis\AutoCAD\MPU Alternatives ppt Supporting Graphics_BRAA Admin Bldg Access Road Option 1.dwgLayout: 8.5x11L Plotted: Oct 31, 2023, 01:23PM

Four alternatives were developed for advanced air mobility concepts. Each concept offers a touchdown and liftoff area, final approach and takeoff area, safety area, and approach/departure corridors. The proposed advanced air mobility aircraft facilities and infrastructure are based upon general aviation heliport standards prescribed in EB 105 and FAA AC 150/5390-2C, *Heliport Design*.

The airfield design parameters and associated parking positions are based on a representative/composite advanced air mobility aircraft with a maximum dimension of 50 feet. The facilities were sited to remain clear of the runway design and airspace surfaces, which resulted in a 500-foot separation distance between the runway centerline and the center of the advanced air mobility takeoff and landing areas. The following subsections describe the four alternatives.

5.4.4.1 ALTERNATIVE 1 – EAST OF RUNWAY 5 APPROACH END

Alternative 1 is located east of the Runway 5 approach end. The proposed site is approximately 6.0 acres and includes parking for up to four advanced air mobility aircraft, a 5,000-square-foot passenger and technical operations facility, a 400-square-foot fire safety building, 50 vehicular parking spots, and an access road providing ingress/egress to the existing airfield. **Exhibit 5-21** illustrates Alternative 1.

5.4.4.2 ALTERNATIVE 2 – WEST OF RUNWAY 5 APPROACH END

Alternative 2 is located west of the Runway 5 approach end. The proposed site is approximately 3.5 acres and includes parking for up to three advanced air mobility aircraft, a 5,000-square-foot passenger and technical operations facility, a 400-square-foot fire safety building, 50 vehicular parking spots, and an access road providing ingress/egress to the existing airfield. **Exhibit 5-22** illustrates Alternative 2.

5.4.4.3 ALTERNATIVE 3 – EAST OF RUNWAY 23 APPROACH END

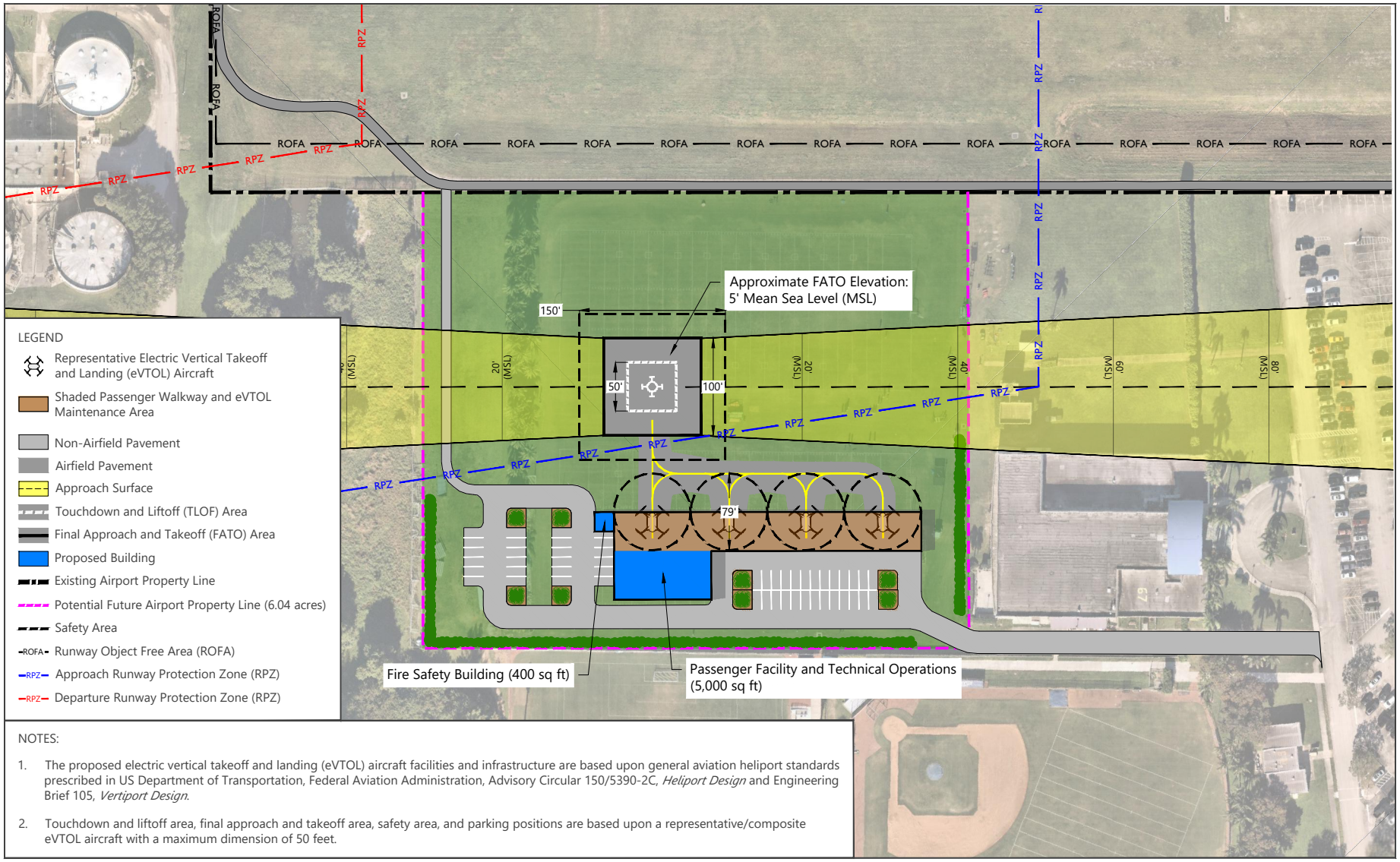
Alternative 3 is located east of the Runway 23 approach end. The proposed site is approximately 5.7 acres and includes parking for up to three advanced air mobility aircraft, a 5,000-square-foot passenger and technical operations facility, a 400-square-foot fire safety building, 22 vehicular parking spots, and an access road providing ingress/egress to the existing airfield. **Exhibit 5-23** illustrates Alternative 3.

5.4.4.4 ALTERNATIVE 4 – NORTH OF AIRPORT ROAD

Alternative 4 is located northeast of the Airport on the other side of Airport Road. The proposed site is approximately 3.2 acres and includes parking for up to three advanced air mobility aircraft, a 5,000-square-foot passenger and technical operations facility, a 400-square-foot fire safety building, 22 vehicular parking spots, and an access road providing ingress/egress to the existing airfield. **Exhibit 5-24** illustrates Alternative 4.

5.4.5 NONAERONAUTICAL FACILITIES

One of the strategic initiatives identified in the 2020 Strategic Business Plan is to plan for financial resiliency in a dynamic and uncertain future environment. The existing nonaeronautical development at BCT has assisted the BRAA in diversifying its revenue streams in pursuit of this initiative. As noted throughout this section and the broader MPU, the Airport's limited land assets and unique location require a thoughtful and strategic approach to the development of land use plans.



NOTES:

1. The proposed electric vertical takeoff and landing (eVTOL) aircraft facilities and infrastructure are based upon general aviation heliport standards prescribed in US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5390-2C, *Heliport Design* and Engineering Brief 105, *Vertiport Design*.
2. Touchdown and liftoff area, final approach and takeoff area, safety area, and parking positions are based upon a representative/composite eVTOL aircraft with a maximum dimension of 50 feet.

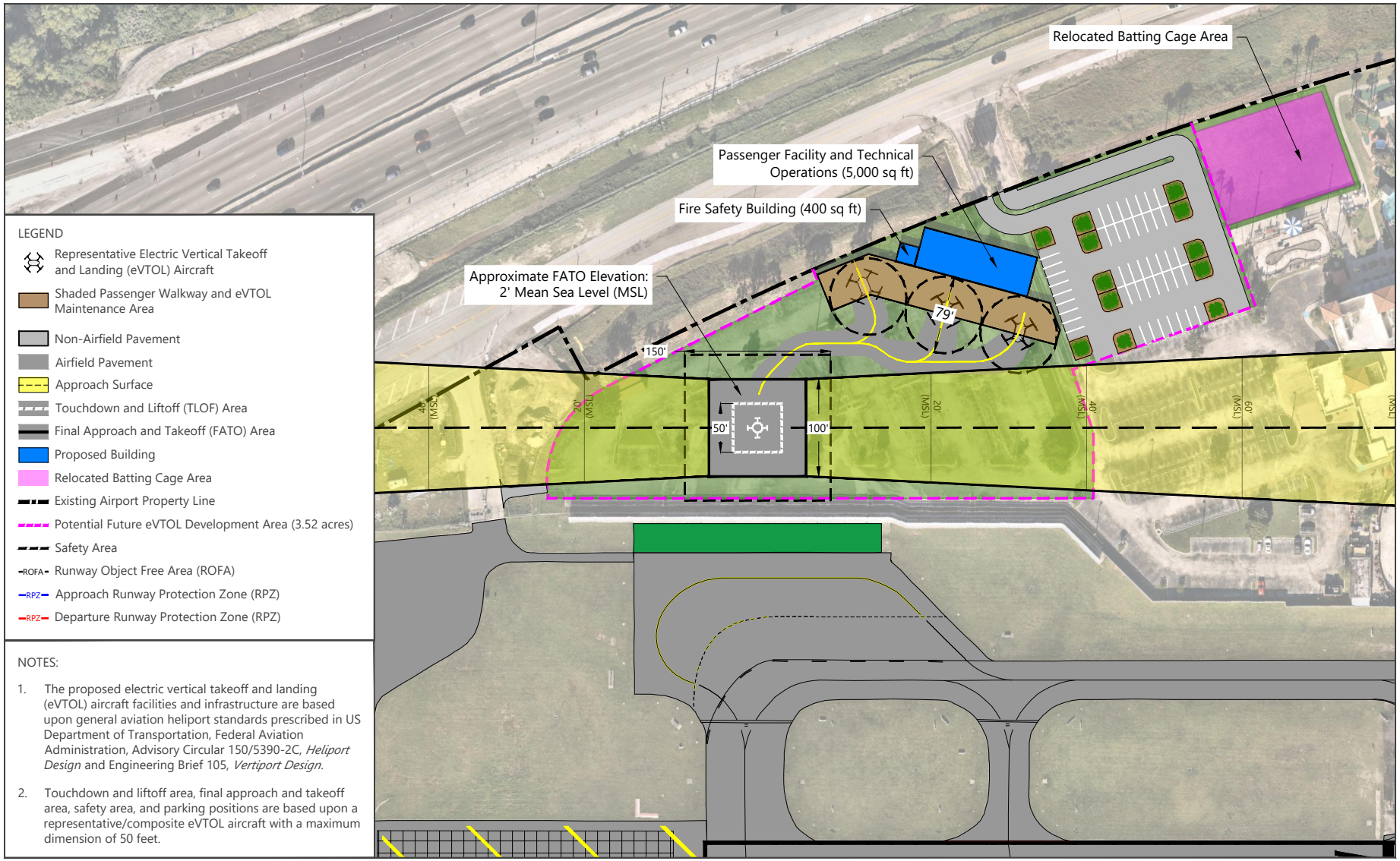
SOURCES: US Department of Transportation, Federal Aviation Administration, Engineering Brief 105, *Vertiport Design*, September 2022; US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5390-2C, *Heliport Design,* April 24, 2012; Ricondo & Associates, Inc., July 2021; Nearmap, Florida, November 2021 (aerial image for visual reference only – may not be to scale).

NORTH 0 150 ft

EXHIBIT 5-21

ADVANCED AIR MOBILITY ALTERNATIVE 1
EAST OF RUNWAY 5 APPROACH END

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\6. Alternatives Analysis\AutoCAD\EVTOL Alternatives\Alternative 1_BCT EVTOL Concepts_East of RWY 5 Approach.dwgLayout: 8.5x11 Plotted: Nov 3, 2023, 10:58AM



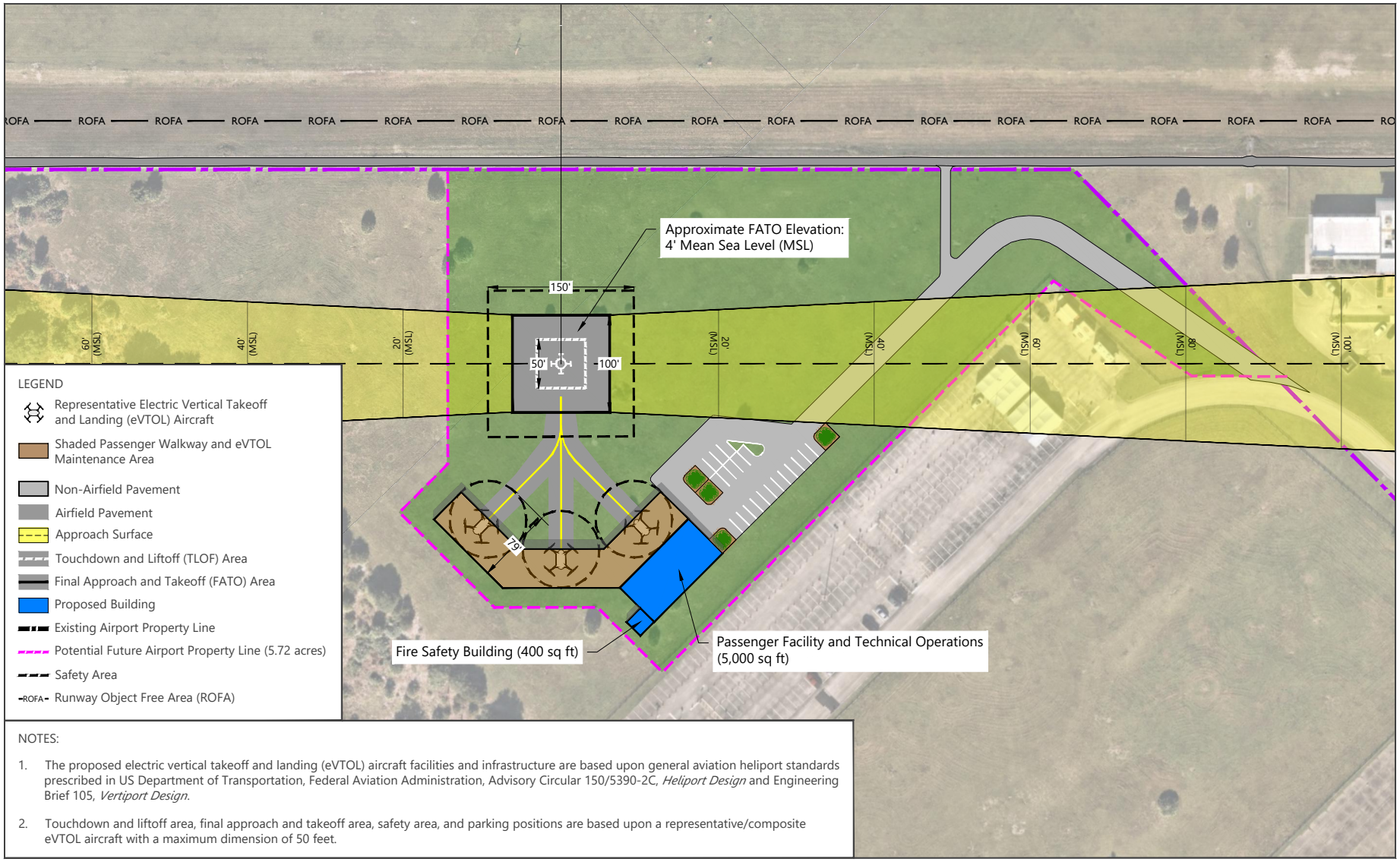
SOURCES: US Department of Transportation, Federal Aviation Administration, Engineering Brief 105, *Vertiport Design*, September 2022; US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5390-2C, *Heliport Design,* April 24, 2012; Ricondo & Associates, Inc., July 2021; Nearmap, Florida, November 2021 (aerial image for visual reference only – may not be to scale).

NORTH 0 150 ft

EXHIBIT 5-22

ADVANCED AIR MOBILITY ALTERNATIVE 2
WEST OF RUNWAY 5 APPROACH END

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\6. Alternatives Analysis\AutoCAD\EVTOL Alternatives\Alternative 2_BCT EVTOL Concepts_West of RWY 5 Approach.dwgLayout: 8.5x11L Plotted: Oct 31, 2023, 01:27PM



NOTES:

1. The proposed electric vertical takeoff and landing (eVTOL) aircraft facilities and infrastructure are based upon general aviation heliport standards prescribed in US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5390-2C, *Heliport Design* and Engineering Brief 105, *Vertiport Design*.
2. Touchdown and liftoff area, final approach and takeoff area, safety area, and parking positions are based upon a representative/composite eVTOL aircraft with a maximum dimension of 50 feet.

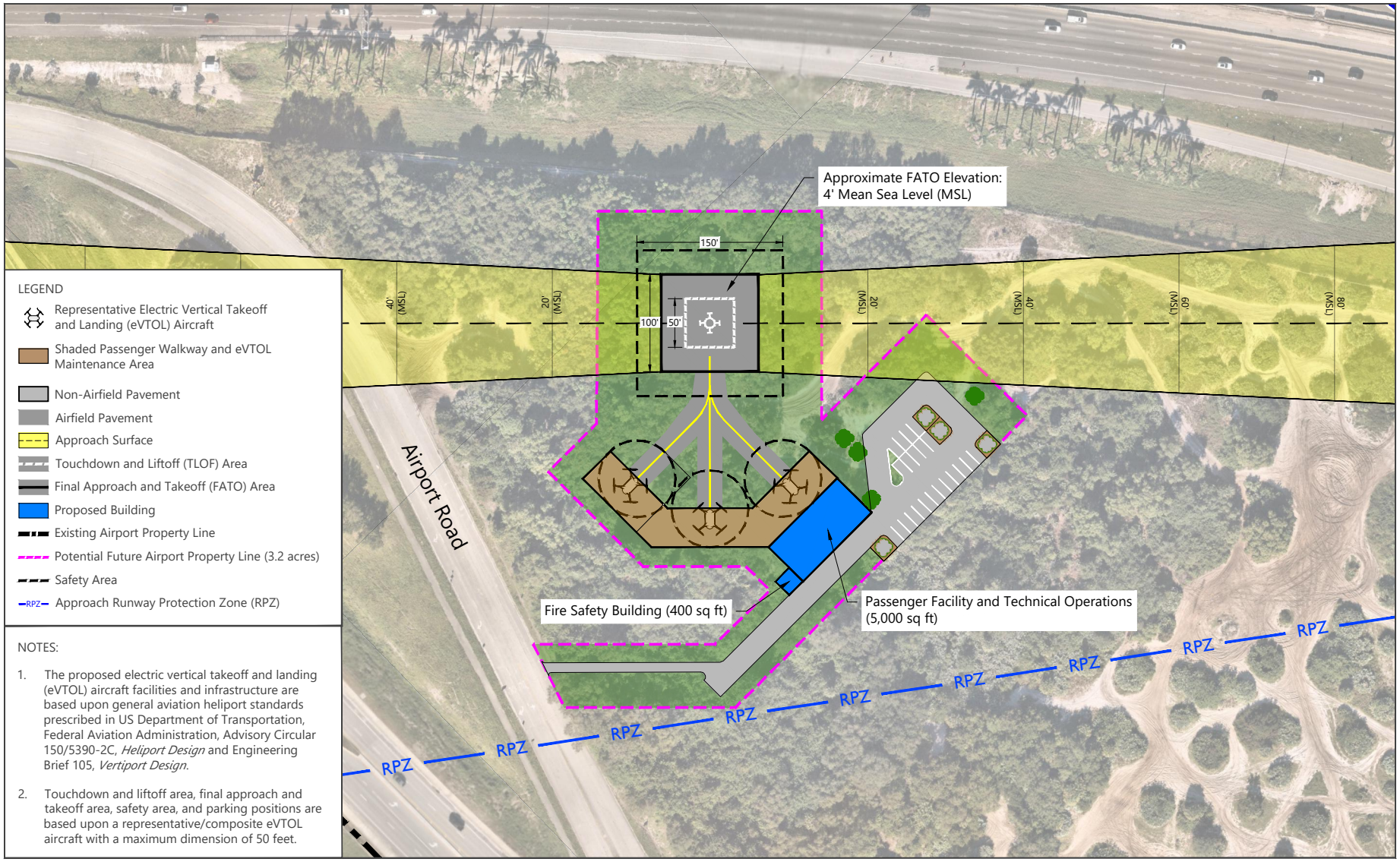
SOURCES: US Department of Transportation, Federal Aviation Administration, Engineering Brief 105, *Vertiport Design*, September 2022; US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5390-2C, *Heliport Design,* April 24, 2012; Ricondo & Associates, Inc., July 2021; Nearmap, Florida, November 2021 (aerial image for visual reference only – may not be to scale).

NORTH 0 150 ft

EXHIBIT 5-23

ADVANCED AIR MOBILITY ALTERNATIVE 3
EAST OF RUNWAY 23 APPROACH END

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\6. Alternatives Analysis\AutoCAD\EVTOL Alternatives\Alternative 3_BCT EVTOL Concepts_Southwest of BRAA Admin Building.dwgLayout: 8.5x11L Plotted: Oct 31, 2023, 01:30PM



SOURCES: US Department of Transportation, Federal Aviation Administration, Engineering Brief 105, *Vertiport Design*, September 2022; US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5390-2C, *Heliport Design,* April 24, 2012; Ricondo & Associates, Inc., July 2021; Nearmap, Florida, November 2021 (aerial image for visual reference only – may not be to scale).

EXHIBIT 5-24

ADVANCED AIR MOBILITY ALTERNATIVE 4
NORTH OF AIRPORT ROAD

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\6. Alternatives Analysis\AutoCAD\EVTOL Alternatives\Alternative 4_BCT EVTOL Concepts.dwgLayout: 8.5x11L Plotted: Oct 31, 2023, 01:31PM

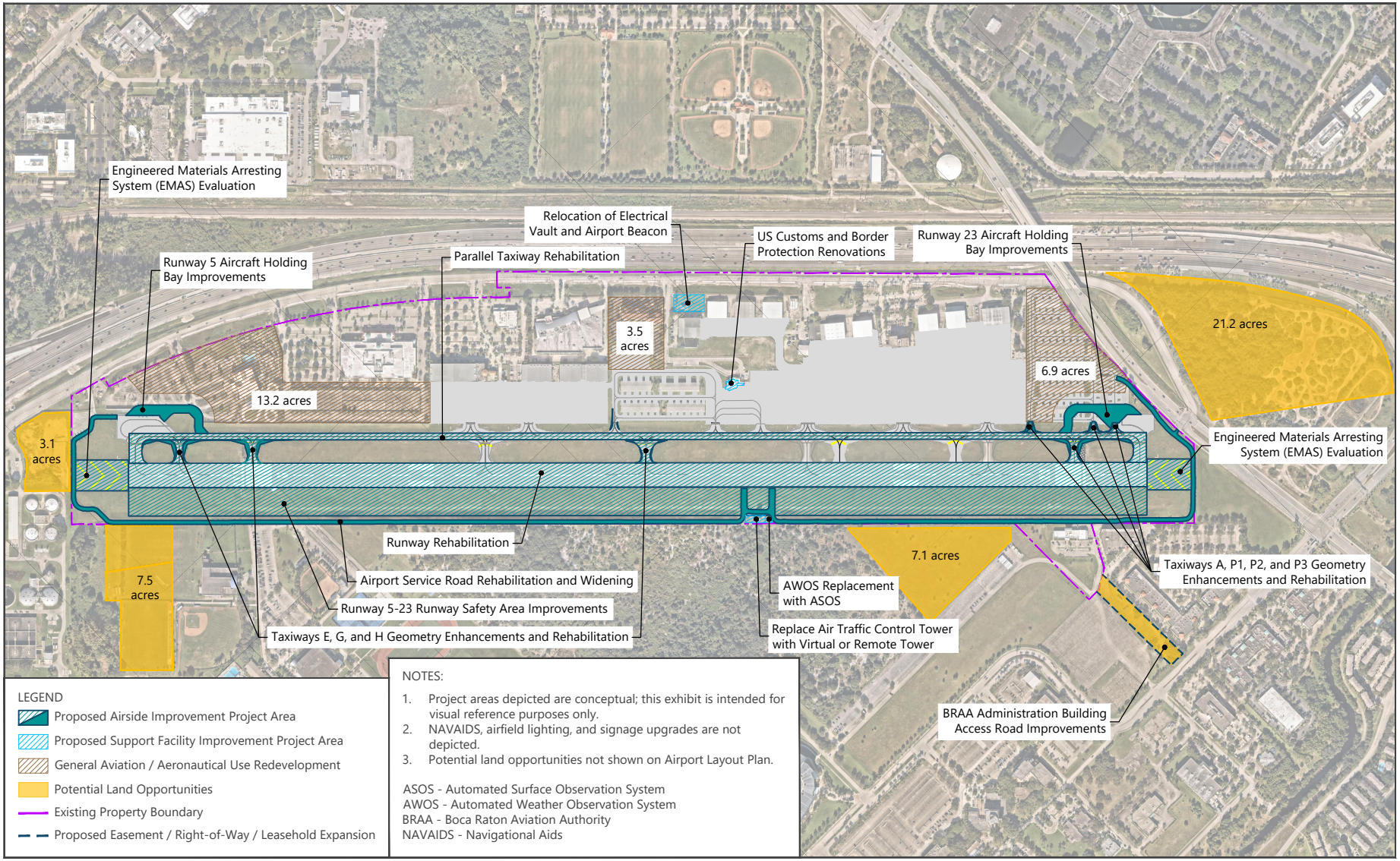
Several adjacent land opportunities at the Airport could be considered to either supplement existing nonaeronautical lands or relocate existing nonaeronautical development to create space for aeronautical development. These areas are identified on Exhibit 5-19. Each parcel, except for the parcel in the Runway 5 RPZ, could provide an opportunity to further diversify the Authority's revenue stream and assist with its financial resiliency initiative.

The development of detailed site plans or alternatives for nonaeronautical development is outside the scope of the MPU; however, it is prudent to identify these areas in this planning study and note the potential for demand-driven nonaeronautical development in the MPU.

5.5 RECOMMENDED AIRPORT IMPROVEMENT PLAN

The Recommended Airport Improvement Plan projects are intended to comply with existing FAA airport design standards, accommodate future demand, modernize and update Airport facilities and equipment, and assist the BRAA in meeting its strategic initiatives. The Recommended Airport Improvement Plan has been discussed with the TAC and aligns with the Authority's goals and objectives. The recommended projects are illustrated on **Exhibit 5-25** and are listed below.

- Runway 5-23 Runway Safety Area Improvements
- Engineered Materials Arresting System (EMAS) Evaluation
- Taxiways A, E, G, H, P1, P2, and P3 Geometry Enhancements
- Runway 5 Aircraft Holding Bay Reconfiguration
- Runway 23 Aircraft Holding Bay Reconfiguration
- Runway and Taxiway Rehabilitation
- Airfield Lighting, Signage, and NAVAID Improvements
- Airport Service Road Rehabilitation and Widening
- Aeronautical Development (Demand Driven Redevelopment)
- AWOS Replacement with AWOS/ASOS
- Replacement of Air Traffic Control Tower with Virtual or Remote Tower
- Relocation of Electrical Vault and Airport Beacon
- US CBP Renovations
- BRAA Administration Building Access Road Improvements
- Potential Land Opportunities



SOURCES: US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 2022; Martinez Geospatial, *BCT Basemap*, April 2021; Nearmap, Florida, November 2021 (aerial image for visual reference only – may not be to scale); Ricondo & Associates, Inc, December 2022.

NORTH 0 900 ft

EXHIBIT 5-25

RECOMMENDED AIRPORT IMPROVEMENT PLAN PROJECTS
20-YEAR PLANNING HORIZON

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6. ENVIRONMENTAL OVERVIEW

This section provides a general overview of the potential environmental consequences and environmental review requirements associated with the Recommended Airport Improvement Plan projects detailed in the MPU. Prior to implementation, the potential environmental effects of each project must be reviewed in accordance with NEPA requirements and implementing guidance in Federal Aviation Administration (FAA) Orders 1050.1F, *Environmental Impacts: Policies and Procedures*, and 5050.4B, *NEPA Implementing Instructions for Airport Actions*, or the latest versions of those Orders at the time of environmental review.

A project is considered ready for environmental review under NEPA when construction is expected to be initiated within the three years after the FAA issues a finding. A project's required level of environmental documentation depends on the project type, the potential environmental effects of the project, and the types of environmental resources that the project could impact. The three levels of environmental documents prepared for NEPA compliance are listed below:

- **Categorical Exclusion (CATEX)**. FAA Order 1050.1F specifies projects that typically do not result in significant adverse impacts. These projects are eligible for a CATEX if no extraordinary circumstances are involved. Documentation to support exclusion is prepared by the airport sponsor.
- **Environmental Assessment** . An EA involves evaluation of the potential environmental effects of a project, and documents whether the project has the potential to result in significant adverse impacts to the environment. The airport sponsor prepares an EA for projects that are not eligible for a CATEX. If no significant impacts would be expected to occur, or if it can be demonstrated that any potential impacts could be mitigated to a level below significance, the FAA may issue a Finding of No Significant Impact. If the adverse environmental impacts cannot be mitigated below a level of significance, further analysis—in the form of an Environmental Impact Statement (EIS)—may be required.
- **Environmental Impact Statement**. An EIS is prepared by the FAA and provides detailed analyses of the environmental effects of a project. The EIS process provides full public disclosure of significant environmental effects, identifies practicable alternatives that would avoid or minimize these adverse effects, and describes mitigation for those effects that cannot be avoided.

6.1 PROJECTS POTENTIALLY ELIGIBLE FOR CATEGORICAL EXCLUSION

Table 6-1 lists the Recommended Airport Improvement Plan projects identified in the MPU and categorizes them by development phases. As this table shows, the majority of the Recommended Airport Improvement Plan projects are potentially eligible for CATEX under NEPA. Table 6-1 also cites the relevant paragraphs in FAA Order 1050.1F that define the potential eligibility for NEPA CATEX. At least one CATEX paragraph is identified for each project indicating the potential eligibility for a CATEX, except projects SF 11 – Replace Airport Traffic Control Tower with Virtual or Remote Tower – Technology Review and Design and SF 13 – Replace Airport Traffic Control Tower with Virtual or Remote Tower. Although potentially eligible, some projects may not qualify because of the project's scale or the presence of extraordinary circumstances (e.g., wetland effects). Furthermore, multiple projects may be assessed together as a single "action" under NEPA if they are connected by implementation timing or proximity, or where one project enables implementation of another. Connected and enabling projects comprising a single action under NEPA may or may not collectively meet the criteria for CATEX eligibility. Therefore, Table 6-1 is merely provided as a reference to support future consideration of NEPA review needs.

TABLE 6-1 (1 OF 3) POTENTIAL CATEGORICAL EXCLUSION ELIGIBILITY

PROJECT NUMBER[1]	PROJECT NAME[2]	PRELIMINARY EVALUATION OF CATEGORICAL EXCLUSION ELIGIBILITY[3]	POTENTIALLY RELEVANT 1050.1F PARAGRAPH(S)[4]
Short-Term (0–5 Years)			
AF 1	Airport Service Road Rehabilitation (Phase 1A) - Design	Potentially Eligible	5-6.4a
PS 1	Marketing Plan Update	Potentially Eligible	5-6.1o
AF 2	Stormwater Improvements and Wildlife Mitigation (Phase 1A) - Design	Potentially Eligible	5-6.4l
SF 1	Tower Radio, Communication, and Electronics Upgrade - Construction	Potentially Eligible	5-6.3c
SF 2	Generator Replacement	Potentially Eligible	5-6.3f
SF 3	Boca Raton Airport Authority (BRAA) Administration Building Renovations	Potentially Eligible	5-6.4h
AF 3	Airport Service Road Rehabilitation (Phase 1B) - Construction	Potentially Eligible	5-6.4a
PS 2	Noise Exposure Map Update	Potentially Eligible	5-6.1n
PS 3	Sustainability Management Plan	Potentially Eligible	5-6.1o
AF 4	NAVAIDS and Airfield Lighting and Signage Upgrades - Construction	Potentially Eligible	5-6.3b
AF 5	Stormwater Improvements and Wildlife Mitigation (Phase 1B) - Construction (Runway Safety Area Improvement Project)	Potentially Eligible	5-6.4l
SF 4	Relocation of Electrical Vault and Airport Beacon - Siting Analysis and Preliminary Engineering	Potentially Eligible	5-6.3b
SF 5	Automated Weather Observing System (AWOS) Replacement - Siting Analysis and Design	Potentially Eligible	5-6.3c
LS 1	BRAA Administration Building Access Road - Design	Potentially Eligible	5-6.4a, 5-6.4r
AF 6	Taxiways A, E, G, H, P (connectors at both runway ends), P3, and P3 Geometry Enhancements and Taxiways E and P9 Rehabilitation - Design	Potentially Eligible	5-6.4e
PS 4	Electrification Master Plan	Potentially Eligible	5-6.1o
SF 6	Relocation of Electrical Vault and Airport Beacon - Design	Potentially Eligible	5-6.3b
SF 7	AWOS Replacement - Construction	Potentially Eligible	5-6.3c
AF 7	Runway 5 - Aircraft Holding Bay Rehabilitation - Design		5-6.4e
LS 2	BRAA Administration Building Access Road - Construction	Potentially Eligible	5-6.4a
AF 8	Taxiway P2 Rehabilitation	Potentially Eligible	5-6.4e
AF 9	Taxiways A, E, G, H, P (connectors at both runway ends only), P3, and P9 Geometry Enhancements and Taxiways E and P9 Rehabilitation - Construction	Potentially Eligible	5-6.4e
PS 5	Underground Utility Mapping	Potentially Eligible	5-6.1o
AF 10	Runway 5 - Aircraft Holding Bay Rehabilitation - Construction	Potentially Eligible	5-6.4e
SF 8	Relocation of Electrical Vault and Airport Beacon - Construction	Potentially Eligible	5-6.3b
AF 11	Engineered Materials Arresting System (EMAS) - Fleet Mix Evaluation	Potentially Eligible	5-6.4e

TABLE 6-1 (2 OF 3) POTENTIAL CATEGORICAL EXCLUSION ELIGIBILITY

PROJECT NUMBER[1]	PROJECT NAME[2]	PRELIMINARY EVALUATION OF CATEGORICAL EXCLUSION ELIGIBILITY[3]	POTENTIALLY RELEVANT 1050.1F PARAGRAPH(S)[4]
Intermediate-Term (6–10 years)			
SE 1	Airport Security Improvements -CCTV Cameras and Associated Infrastructure - Design	Potentially Eligible	5-6.3h
SF 9	US Customs and Border Protection Rehabilitation and Improvements – Design	Potentially Eligible	5-6.4h
AF 12	Engineered Materials Arresting System (EMAS) Rehabilitation (Seam Sealer Replacement)	Potentially Eligible	5-6.4e
SE 2	Airport Security Improvements - Replace Gate Controllers and Keypads	Potentially Eligible	5-6.3h
PS 6	Facilities Management Plan Update	Potentially Eligible	5-6.1o
SF 10	US Customs and Border Protection Rehabilitation and Improvements - Construction	Potentially Eligible	5-6.4h
SE 3	Airport Security Improvements -CCTV Cameras and Associated Infrastructure - Construction	Potentially Eligible	5-6.3h
AF 13	Taxiways A, H, and P9 Rehabilitation - Design	Potentially Eligible	5-6.4e
AF 14	Taxiway P Rehabilitation - Design	Potentially Eligible	5-6.4e
AF 15	Taxiways A, H, and P9 Rehabilitation - Construction	Potentially Eligible	5-6.4e
AF 16	Runway 5-23 Rehabilitation - Design	Potentially Eligible	5-6.4e
AF 17	Taxiways G and P6 Rehabilitation - Design	Potentially Eligible	5-6.4e
AF 18	Taxiway P Rehabilitation - Construction	Potentially Eligible	5-6.4e
AF 19	Runway 5-23 Rehabilitation - Construction - Phase 1	Potentially Eligible	5-6.4e
AF 20	Taxiways G and P6 Rehabilitation - Construction	Potentially Eligible	5-6.4e
Long-Term (11–20 years)			
AF 21	Runway 5-23 Rehabilitation - Construction - Phase 2	Potentially Eligible	5-6.4e
PS 7	Facilities Management Plan Update	Potentially Eligible	5-6.1o
SF 11	Replace Air Traffic Control Tower with Virtual or Remote Tower - Technology Review and Design	Not Eligible[5]	N/A
SF 12	BRAA Administration Building Rehabilitation and Improvements	Potentially Eligible	5-6.4h
SE 4	Airport Security Improvements -CCTV Cameras and Associated Infrastructure – Design	Potentially Eligible	5-6.3h
SF 13	Replace Air Traffic Control Tower with Virtual or Remote Tower	Not Eligible[5]	N/A
AF 22	Improve Runway Safety Area - Install EMAS Runway 5 Departure End – Design	Potentially Eligible	5-6.4e
SE 5	Airport Security Improvements -CCTV Cameras and Associated Infrastructure – Construction	Potentially Eligible	5-6.3h
AF 23	Improve Runway Safety Area - Install EMAS Runway 5 Departure End – Construction	Potentially Eligible	5-6.4e
AF 24	Improve Runway Safety Area - Install EMAS Runway 23 Departure End – Design	Potentially Eligible	5-6.4e
AF 25	Runway 5 Aircraft Holding Bay - Design	Potentially Eligible	5-6.4e
AF 26	Improve Runway Safety Area - Install EMAS Runway 23 Departure End - Construction	Potentially Eligible	5-6.4e
AF 27	Runway 5 Aircraft Holding Bay - Construction	Potentially Eligible	5-6.4e

TABLE 6-1 (3 OF 3) POTENTIAL CATEGORICAL EXCLUSION ELIGIBILITY

PROJECT NUMBER[1]	PROJECT NAME[2]	PRELIMINARY EVALUATION OF CATEGORICAL EXCLUSION ELIGIBILITY[3]	POTENTIALLY RELEVANT 1050.1F PARAGRAPH(S)[4]
Long-Term (11–20 years) continued			
PS 8	Facilities Management Plan Update	Potentially Eligible	5-6.1o
SE 6	Airport Security Improvements - Replace Gate Controllers and Keypads	Potentially Eligible	5-6.3h
AF 28	Runway 23 Aircraft Holding Bay - Design	Potentially Eligible	5-6.4e
AF 29	Runway 23 Aircraft Holding Bay - Construction	Potentially Eligible	5-6.4e
SF 14	AWOS Replacement with ASOS - Siting Analysis and Design	Potentially Eligible	5-6.3c

NOTES:

AF – Airfield; LS – Landside; PS – Planning Study; SF – Support Facility; N/A – Not Applicable

1 The project number corresponds to the individual projects identified on Exhibit 6-1. Project numbers do not necessarily reflect the Airport or funding agency priorities, nor are they intended to be sequential in the number they will be undertaken. Project priorities, along with proposed phasing, will be discussed in Section 9.

2 For environmental processing, certain projects listed separately in this table may be combined if they are connected and/or enabling in nature. This may affect CATEX eligibility.

3 Projects are eligible for a CATEX if they meet the requirements set forth in the cited paragraphs of FAA Order 1050.1F, and no extraordinary circumstances exist (as listed in Paragraph 5.2 of FAA Order 1050.1F). CATEX eligibility should be reassessed when individual projects or groups of projects are ready for environmental review and should include coordination with the FAA to confirm eligibility.

4 The cited paragraphs in FAA Order 1050.1F are:

- 5-6.1n Issuance of grants to prepare noise exposure maps and noise compatibility programs (NCPs) under 49 U.S.C. §§ 47503(2) and 47504, and FAA determinations to accept noise exposure maps and approve NCPs under 14 CFR part 150. (ARP)
- 5-6.1o Issuance of grants that do not imply a project commitment, such as airport planning grants, and grants to states participating in the state block grant program.
- 5-6.3b Establishment, installation, upgrade, or relocation of any of the following on designated airport or FAA property: airfield or approach lighting systems, visual approach aids, beacons, and electrical distribution systems as described in FAA Order 6850.2, *Visual Guidance Lighting Systems*, and other related facilities.
- 5-6.3c Federal financial assistance for, or Airport Layout Plan (ALP) approval of, or FAA installation or upgrade of facilities and equipment, other than radars, on designated airport or FAA property or commercial space launch sites. Facilities and equipment means FAA communications, navigation, surveillance, and weather systems. Weather systems include hygrothermometers, Automated Weather Observing System (AWOS), Automatic Surface Observation System (ASOS), Stand Alone Weather Sensors (SAWS), Runway Visual Range (RVR), and other essentially similar facilities and equipment that provide for modernization or enhancement of the service provided by these facilities. Navigational aids include Very High Frequency Omnidirectional Range (VOR), VOR Test facility (VOT), co-located VORs and Tactical Aircraft Control and Navigation (TACAN) (VORTAC), Low Power TACAN, Instrument Landing System (ILS) equipment or components of ILS equipment (establishment or relocation of an ILS is not included; an EA is normally required; see Paragraph 3-1.2.b(8)), Wide Area Augmentation System (WAAS), Local Area Augmentation System (LAAS), other essentially similar facilities and equipment, and equipment that provides for modernization or enhancement of the service provided by that facility, such as conversion of VOR to VORTAC, conversion to Doppler VOR (DVOR), or conversion of ILS to category II or III standards. FAA Order 6820.10, VOR, VOR/DME and VORTAC Siting Criteria governs the installation of VOR/VOT/VORTAC-type equipment. These facilities are typically located within a 150 feet by 150 feet parcel, with a total structure height reaching approximately 50 feet in height.
- 5-6.3f Installation or replacement of engine generators used in emergencies.
- 5-6.3h Acquisition of equipment required for the safety or security of personnel and property on the airport or commercial space launch site, including safely equipment required by rule or regulation for certification of an airport (see 14 CFR part 139, *Certification and Operation: Land Airports Serving Certain Air Carriers*), or licensing the operation of a commercial space launch site (see 14 CFR part 420, *License to Operate a Launch Site*) and acquisition of snow removal equipment.
- 5-6.4a Access road construction, and construction, relocation, or repair of entrance and service roadways that do not reduce the level of service on local traffic systems below acceptable levels.
- 5-6.4e Federal financial assistance, licensing, or Airport Layout Plan (ALP) approval for the following actions, provided the action would not result in significant erosion or sedimentation, and will not result in a significant noise increase over noise sensitive areas or result in significant impacts on air quality: construction, repair, reconstruction, resurfacing, extending, strengthening, or widening of a taxiway, apron, loading ramp, or runway safety area (RSA), including an RSA using Engineered Material Arresting System (EMAS); or reconstruction, resurfacing, extending, strengthening, or widening of an existing runway. This CATEX includes marking, grooving, fillets, and jet blast facilities associated with any of the above facilities.
- 5-6.4h Federal financial assistance, licensing, or ALP approval for construction or expansion of facilities—such as terminal passenger handling and parking facilities or cargo buildings, or facilities for non-aeronautical uses at existing airports and commercial launch sites—that do not substantially expand those facilities.
- 5-6.4l Federal financial assistance for, licensing or approval of the grading of land, the removal of obstructions to air navigation, or erosion control measures, provided those activities occur on and only affect airport property, a commercial space launch site, or FAA-owned or leased property.
- 5-6.4r Purchase, lease, or acquisition of three acres or less of land with associated easements and rights-of-way for new facilities.

5 Establishment or relocation of facilities, such as Air Route Traffic Control Centers (ARTCC), Airport Traffic Control Towers (ATCT), and off-airport Air Route Surveillance Radars (ARSR), Air Traffic Control Beacons (ATCB), and Next Generation Radar (NEXRAD), represent an action that normally requires an EA.

SOURCE: Ricondo & Associates, Inc., November 2022 (based on U.S. Department of Transportation, Federal Aviation Administration Order 1050.1F: *Environmental Impacts: Policies and Procedures*, July 16, 2015).

6.2 ENVIRONMENTAL CONSIDERATIONS

Known environmental issues relevant to development at BCT are summarized in Section 2.5. Based on the known environmental issues and the anticipated potential effects of the Recommended Airport Improvement Plan projects, the following environmental issues were identified as relevant to the future review of projects pursuant to NEPA, including:

- biological resources
- coastal resources
- Department of Transportation, Section 4(f) Resources
- hazardous materials
- historical, architectural, archeological, and cultural resources
- natural resources and energy supply
- noise and noise-compatible land uses
- water resources

The Recommended Airport Improvement Plan projects that involve construction activities at the Airport are depicted on **Exhibit 6-1**, along with environmental resources (such as wetlands and floodplains) located on and in the vicinity of Airport property.

Table 6-2 lists the Recommended Airport Improvement Plan projects and identifies the environmental resource categories for which project implementation may affect environmental resources that may require further analysis during future environmental review. This section also discusses the evaluation of relevant environmental resource categories for each project. The environmental resource effects identified in Table 6-2 are preliminary and are provided here only as a preliminary indication of issues that may require detailed analyses in a future NEPA review. Further, the potential resource effects identified in Table 6-2 are not intended to affirmatively state that there would be an adverse effect, but instead only identify areas that would require evaluation during the NEPA process. In addition, additional resources may be identified during the scoping process that will require additional NEPA analysis. All Recommended Airport Improvement Plan projects would be subject to some level of review in compliance with NEPA prior to implementation.



SOURCES: Nearmap, October 2022 (aerial photography – for visual reference only, may not be to scale); US Fish and Wildlife Service, National Wetland Inventory and Ricondo & Associates, based on aerial imagery, October 2020 (wetlands); Federal Emergency Management Agency, FIRM Panels 12011C, 12099C, 2019 (floodplains); US Census, TIGER/Line Shapefile, 2019 (water); Ricondo & Associates, Inc., *Airport Layout Plan*, 2012 (Airport property, airfield elements, CIP project areas).

EXHIBIT 6-1

ENVIRONMENTAL CONSIDERATIONS FOR THE RECOMMENDED AIRPORT IMPROVEMENT PLAN

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TABLE 6-2 (1 OF 3) POTENTIAL ENVIRONMENTAL EFFECTS ASSOCIATED WITH THE RECOMMENDED AIRPORT IMPROVEMENT PLAN

PROJECT NUMBER	PROJECT NAME	ENVIRONMENTAL RESOURCES PRESENT [1]			OTHER CATEGORIES THAT MAY REQUIRE ASSESSMENT [1]	
		BIOLOGICAL RESOURCES	COASTAL RESOURCES	WATER RESOURCES	NATURAL RESOURCES AND ENERGY SUPPLY	AIRCRAFT NOISE [2]
Short-Term (0–5 Years)						
AF 1	Airport Service Road Rehabilitation (Phase 1A) – Design	No	No	No	Not Likely	Not Likely
PS 1	Marketing Plan Update	No	No	No	Not Likely	Not Likely
AF 2	Stormwater Improvements and Wildlife Mitigation (Phase 1A) – Design	No	No	No	Not Likely	Not Likely
SF 1	Tower Radio, Communication, and Electronics Upgrade – Construction	No	No	No	Not Likely	Not Likely
SF 2	Generator Replacement	No	No	No	Not Likely	Not Likely
SF 3	BRAA Administration Building Renovations	No	No	No	Likely	Not likely
AF 3	Airport Service Road Rehabilitation (Phase 1B) – Construction	Yes	Yes	Yes	Likely	Not Likely
PS 2	Noise Exposure Map Update	No	No	No	Not Likely	Not Likely
PS 3	Sustainability Management Plan	No	No	No	Not Likely	Not Likely
AF 4	NAVAIDS and Airfield Lighting and Signage Upgrades – Construction	No	No	No	Not Likely	Not Likely
AF 5	Stormwater Improvements and Wildlife Mitigation (Phase 1B) - Construction (Runway Safety Area Improvement Project)	Yes	Yes	Yes	Likely	Not Likely
SF 4	Relocation of Electrical Vault and Airport Beacon – Siting Analysis and Preliminary Engineering	No	No	No	Not Likely	Not Likely
SF 5	Automated Weather Observing System (AWOS) Replacement – Siting Analysis and Design	No	No	No	Not Likely	Not Likely
LS 1	BRAA Administration Building Access Road – Design	No	No	No	Not Likely	Not Likely
AF 6	Taxiways A, E, G, H, P (connectors at both runway ends), P3, and P3 Geometry Enhancements and Taxiways E and P9 Rehabilitation - Design	No	No	No	Not Likely	Not Likely
PS 4	Electrification Master Plan	No	No	No	Not Likely	Not Likely
SF 6	Relocation of Electrical Vault and Airport Beacon – Design	No	No	No	Not Likely	Not Likely
SF 7	AWOS Replacement – Construction	No	No	No	Not Likely	Not Likely
AF 7	Runway 5 - Aircraft Holding Bay Rehabilitation – Design	No	No	No	Not Likely	Not Likely
LS 2	BRAA Administration Building Access Road – Construction	Yes	Yes	Yes	Likely	Not Likely
AF 8	Taxiway P2 Rehabilitation	No	No	No	Not Likely	Not Likely
AF 9	Taxiways A, E, G, H, P (connectors at both runway ends only), P3, and P9 Geometry Enhancements and Taxiways E and P9 Rehabilitation - Construction	Yes	Yes	Yes	Likely	Not Likely
PS 5	Underground Utility Mapping	No	No	No	Not Likely	Not Likely
AF 10	Runway 5 - Aircraft Holding Bay Rehabilitation - Construction	No	No	No	Not Likely	Not Likely
SF 8	Relocation of Electrical Vault and Airport Beacon – Construction	No	No	No	Not Likely	Not Likely
AF 11	Engineered Materials Arresting System (EMAS) - Fleet Mix Evaluation	No	No	No	Not Likely	Not Likely

TABLE 6-2 (2 OF 3) POTENTIAL ENVIRONMENTAL EFFECTS ASSOCIATED WITH THE RECOMMENDED AIRPORT IMPROVEMENT PLAN

PROJECT NUMBER	PROJECT NAME	ENVIRONMENTAL RESOURCES PRESENT [1]			OTHER CATEGORIES THAT MAY REQUIRE ASSESSMENT [1]	
		BIOLOGICAL RESOURCES	COASTAL RESOURCES	WATER RESOURCES	NATURAL RESOURCES AND ENERGY SUPPLY	AIRCRAFT NOISE [2]
Intermediate-Term (6–10 Years)						
SE 1	Airport Security Improvements -CCTV Cameras and Associated Infrastructure – Design	No	No	No	Not Likely	Not Likely
SF 9	US Customs and Border Protection Rehabilitation and Improvements - Design	No	No	No	Not Likely	Not Likely
AF 12	Engineered Materials Arresting System (EMAS) Rehabilitation (Seam Sealer Replacement)	No	No	No	Not Likely	Not Likely
SE 2	Airport Security Improvements - Replace Gate Controllers and Keypads	No	No	No	Not Likely	Not Likely
PS 6	Facilities Management Plan Update	No	No	No	Not Likely	Not Likely
SF 10	US Customs and Border Protection Rehabilitation and Improvements - Construction					
SE 3	Airport Security Improvements -CCTV Cameras and Associated Infrastructure – Construction	No	No	No	Not Likely	Not Likely
AF 13	Taxiways A, H, and P9 Rehabilitation - Design	No	No	No	Not Likely	Not Likely
AF 14	Taxiway P Rehabilitation - Design	No	No	No	Not Likely	Not Likely
AF 15	Taxiways A, H, and P9 Rehabilitation - Construction					
AF 16	Runway 5-23 Rehabilitation - Design	No	No	No	Not Likely	Not Likely
AF 17	Taxiways G and P6 Rehabilitation - Design	No	No	No	Not Likely	Not Likely
AF 18	Taxiway P Rehabilitation - Construction	No	No	No	Not Likely	Not Likely
AF 19	Runway 5-23 Rehabilitation - Construction - Phase 1	No	No	No	Not Likely	Not Likely
AF 20	Taxiways G and P6 Rehabilitation - Construction	No	No	No	Not Likely	Not Likely
Long-Term (11–18 Years)						
AF 21	Runway 5-23 Rehabilitation – Construction Phase 2	No	No	No	Not Likely	Not Likely
PS 7	Facilities Management Plan Update	No	No	No	Not Likely	Not Likely
SF 11	Replace Air Traffic Control Tower with Virtual or Remote Tower – Technology Review and Design	No	No	No	Not Likely	Not Likely
SF 12	BRAA Administration Building Rehabilitation and Improvements	No	No	No	Not Likely	Not Likely
SE 4	Airport Security Improvements -CCTV Cameras and Associated Infrastructure – Design	No	No	No	Not Likely	Not Likely
SF 13	Replace Air Traffic Control Tower with Virtual or Remote Tower	No	No	No	Not Likely	Not Likely
AF 22	Improve Runway Safety Area - Install EMAS Runway 5 Departure End - Design	No	No	No	Not Likely	Not Likely
SE 5	Airport Security Improvements -CCTV Cameras and Associated Infrastructure – Construction	No	No	No	Not Likely	Not Likely
AF 23	Improve Runway Safety Area - Install EMAS Runway 5 Departure End - Construction	Yes	Yes	Yes	Likely	Not Likely

TABLE 6-2 (3 OF 3) POTENTIAL ENVIRONMENTAL EFFECTS ASSOCIATED WITH THE RECOMMENDED AIRPORT IMPROVEMENT PLAN

PROJECT NUMBER	PROJECT NAME	ENVIRONMENTAL RESOURCES PRESENT [1]			OTHER CATEGORIES THAT MAY REQUIRE ASSESSMENT [1]	
		BIOLOGICAL RESOURCES	COASTAL RESOURCES	WATER RESOURCES	NATURAL RESOURCES AND ENERGY SUPPLY	AIRCRAFT NOISE [2]
Long-Term (11–18 Years) continued						
AF 24	Improve Runway Safety Area - Install EMAS Runway 23 Departure End - Design	No	No	No	Not Likely	Not Likely
AF 25	Runway 5 Aircraft Holding Bay – Design	No	No	No	Not Likely	Not Likely
AF 26	Improve Runway Safety Area - Install EMAS Runway 23 Departure End – Construction	Yes	Yes	Yes	Likely	Not Likely
AF 27	Runway 5 Aircraft Holding Bay – Construction	Yes	Yes	Yes	Likely	Not Likely
PS 8	Facilities Management Plan Update	No	No	No	Not Likely	Not Likely
SE 6	Airport Security Improvements - Replace Gate Controllers and Keypads	No	No	No	Not Likely	Not Likely
AF 28	Runway 23 Aircraft Holding Bay – Design	No	No	No	Not Likely	Not Likely
AF 29	Runway 23 Aircraft Holding Bay – Construction	Yes	Yes	Yes	Likely	Not Likely
SF 14	AWOS Replacement with ASOS – Siting Analysis and Design	No	No	No	Not Likely	Not Likely

NOTES:
Green shading indicates the potential need for evaluation in a future environmental review of the project under the National Environmental Policy Act (NEPA).
"Yes" indicates project may affect the environmental resource based on proposed project footprint and known existing environmental conditions.
"No" indicates project is not anticipated to affect the environmental resource based on project footprint and known existing environmental conditions.
"Likely" indicates an assessment of potential impacts may be needed based on project definition.
"Not Likely" indicates an assessment of potential impacts is not likely to be needed based on project definition.
AF – Airfield
LS – Landside
PS – Planning Study
SF – Support Facility
1 Identification of potential environmental issues reflects a qualitative, planning-level review of available environmental conditions; additional review and analysis may be needed for NEPA processing.
2 The noise category includes consideration of potential changes in aircraft noise exposure resulting from project implementation and effects on noise compatible land uses.
SOURCE: Ricondo & Associates, Inc., November 2022.

6.2.1 BIOLOGICAL RESOURCES

As discussed in Section 2.5.1, the potential for habitat on-Airport to support listed species that have a presence in the Airport vicinity has not been confirmed; therefore, additional reviews for potential habitat will be needed as part of the environmental review of any projects constructed in unpaved/undeveloped areas. Actions to manage any tortoise found on Airport property are defined in the Airport's Wildlife Hazard Management Plan and actions to manage burrowing owls are defined in FAC Rule 68A-9.012. If habitat for other state or federally listed species is identified, coordination with the FFWCC and/or USFWS, as applicable, would be required.

Therefore, potential effects on endangered and threatened species should be considered in future NEPA reviews for construction of all Recommended Airport Improvement Plan projects that could potentially disturb unpaved or undeveloped areas. Additionally, if federal funds are pursued for project design, biological resource impact evaluation would be required for the design components of these projects. The following projects, also identified in Table 6-2, affect unpaved land areas on Airport property and have the potential for impacts to threatened or endangered species:

- AF 3 – Airport Service Road Rehabilitation (Phase 1B) – Construction
- AF 5 – Stormwater Improvements and Wildlife Mitigation (Phase 1B) - Construction (Runway Safety Area Improvement Project)
- LS 2 – BRAA Administration Building Access Road – Construction
- AF 9 – Taxiways A, E, G, H, P (connectors at both runway ends only), P3, and P9 Geometry Enhancements and Taxiways E and P9 Rehabilitation - Construction
- AF 23 – Improve Runway Safety Area - Install EMAS Runway 5 Departure End - Construction
- AF 26 – Improve Runway Safety Area - Install EMAS Runway 23 Departure End - Construction
- AF 27 – Runway 5 Aircraft Holding Bay – Construction
- AF 29 – Runway 23 Aircraft Holding Bay – Construction

6.2.2 COASTAL RESOURCES

As discussed in Section 2.5.2, the enforceable policies in the Coastal Management Element of the County's Comprehensive Plan applicable to BCT are related to stormwater runoff and water quality, including meeting water quality regulations and compliance with NPDES regulations.

All Recommended Airport Improvement Plan projects that involve federal funding would need to be evaluated for consistency with the Florida Coastal Management Program (FCMP) via state-level reviews. Consistency determinations will require demonstration of strategies to manage stormwater runoff from construction sites to maintain compliance with water quality regulations for all construction projects, as shown in Table 6-2. Additionally, the following projects increase the amount of airside pavement on Airport property, which will require consideration of stormwater detention enhancements:

- AF 3 – Airport Service Road Rehabilitation (Phase 1B) – Construction
- AF 5 – Stormwater Improvements and Wildlife Mitigation (Phase 1B) - Construction (Runway Safety Area Improvement Project)
- LS 2 – BRAA Administration Building Access Road – Construction

- AF 9 – Taxiways A, E, G, H, P (connectors at both runway ends only), P3, and P9 Geometry Enhancements and Taxiways E and P9 Rehabilitation - Construction
- AF 23 – Improve Runway Safety Area - Install EMAS Runway 5 Departure End - Construction
- AF 26 – Improve Runway Safety Area - Install EMAS Runway 23 Departure End - Construction
- AF 27 – Runway 5 Aircraft Holding Bay – Construction
- AF 29 – Runway 23 Aircraft Holding Bay – Construction

6.2.3 DEPARTMENT OF TRANSPORTATION, SECTION 4(F) RESOURCES

As noted in Section 2.5.3, there are no wildlife or waterfowl refuges or known historic sites located on or surrounding the Airport property boundary, so no Recommended Airport Improvement Plan projects would result in a direct use of a Section 4(f) property.

The potential for an indirect use of a Section 4(f) property could occur if a project results in a significant increase in noise exposure that affects activities at any of the nearby potential Section 4(f) properties (e.g., Countess de Hoernle Park and Mizner Bark Dog Park). A change in the aircraft noise environment would occur if any project would result in an increase in aircraft operations, nighttime operations, or change in aircraft fleet mix; or if any project would cause a change in airfield configuration, runway use, or flight patterns either during construction or after the project is implemented. None of the Recommended Airport Improvement Plan projects are anticipated to change the aircraft noise exposure area at BCT.

Therefore, Recommended Airport Improvement Plan projects are not anticipated to result in a direct or indirect use of a Section 4(f) property.

6.2.4 HAZARDOUS MATERIALS

The Recommended Airport Improvement Plan projects are not anticipated to involve significant effects associated with hazardous materials. No NPL sites were identified within the city of Boca Raton, as noted in Section 2.5.4. No projects involving fuel storage or construction of underground fuel distribution systems are proposed.

Construction activities may involve handling of hazardous materials commonly used during construction; and the potential for encountering unexpected soils during construction exists. Therefore, projects with construction activities will be required to recognize the standard practices in place to comply with applicable federal, state, and local laws and regulations. Additionally, NEPA documentation must demonstrate strategies in place to prevent pollution and handle solid waste associated with construction and demolition activities. Table 6-2 indicates a potential for hazardous materials considerations for all projects involving construction activities.

6.2.5 HISTORICAL, ARCHAEOLOGICAL, ARCHITECTURAL, AND CULTURAL RESOURCES

As identified in Section 2.5.5, no known historic properties are located in or surrounding the Airport property boundary, so no potential effects were identified as requiring consideration in future NEPA reviews of the Recommended Airport Improvement Plan projects.

When advancing plans for future renovation or demolition of existing Airport structures, the age of the structures should be considered to identify if they are eligible for listing in the NRHP (e.g., nearing 50 years of age), because eligible properties are provided the same measure of protection under Section 106 as listed properties.

6.2.6 NATURAL RESOURCES AND ENERGY SUPPLY

Airport construction projects typically consume readily available materials and energy, so any project that involves construction will need to address sufficient availability of energy supply and resources. These projects are identified as "likely" to involve natural resources and energy supply considerations during NEPA review in Table 6-2.

While none of the Recommended Airport Improvement Plan projects have a direct effect on energy and natural resource consumption, such as construction of a new facility that would draw a significant amount of energy or a new operation that would significantly change the amount of water consumed on Airport, airports in general should be considering future demand on electricity supply given industry and community interests in decarbonization, which often involve increased reliance on electricity, such as installation of electric vehicle (EV) charging stations.

Emerging technologies, such as electric vertical take-off and landing (eVTOL) aircraft operations, would have a significant change on electricity demand if implemented at BCT. Therefore, future development beyond the near-, intermediate-, and long-term Recommended Airport Improvement Plan projects are anticipated to require additional consideration of energy supply effects.

6.2.7 NOISE AND NOISE COMPATIBLE LAND USE

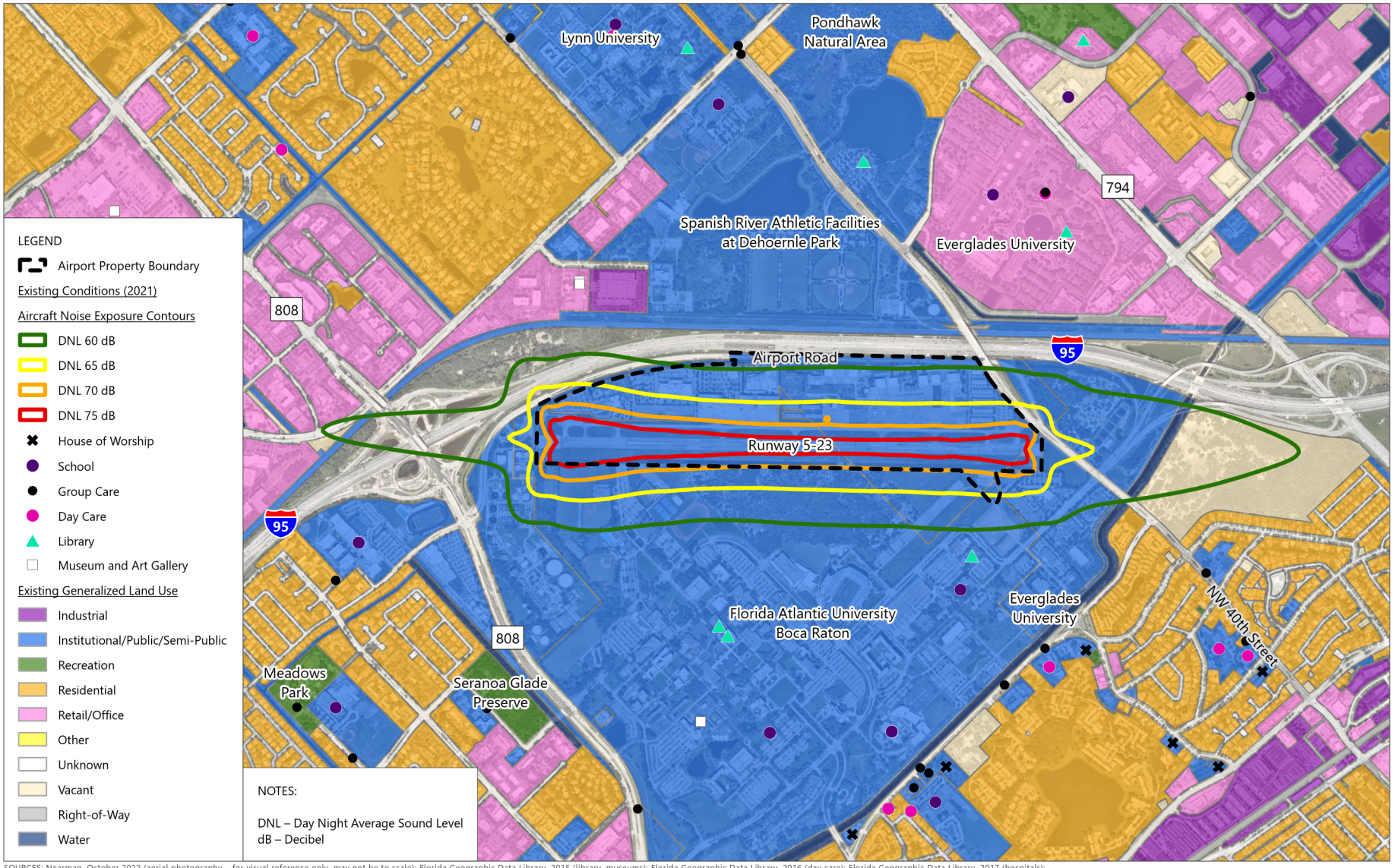
The Recommended Airport Improvement Plan projects are not intended to induce growth in aircraft activity or change the aircraft fleet mix serving BCT. Additionally, none of the Recommended Airport Improvement Plan projects involve a change in the airfield configuration or other change that would affect runway use or flight patterns, as shown in Table 6-2.

Over the forecast period, however, the level of activity at BCT is expected to grow and the aircraft fleet is anticipated to evolve, as discussed in Section 3. These changes, which would occur with or without implementation of the Recommended Airport Improvement Plan projects, will change the noise exposure environment at BCT over time. Therefore, this Master Plan Update includes a planning-level aircraft noise analysis to provide an understanding of the change in noise exposure anticipated over time given the forecast operations growth and fleet changes. The aircraft noise analysis methodology and assumptions are provided in **Appendix H**. **Exhibit 6-2** presents baseline aircraft noise exposure contours for the year 2021, which represent existing conditions. **Exhibits 6-3** and **6-4** present aircraft noise exposure conditions following the implementation of the short-term and intermediate-term Recommended Airport Improvement Plan projects, respectively. Finally, **Exhibit 6-5** presents long-term aircraft noise exposure conditions representative of the end of the planning horizon. As shown, the 65 decibel aircraft noise exposure contours, the FAA threshold of exterior noise compatibility, are not anticipated to noticeably expand off Airport property through the 20-year planning period.

6.2.8 WATER RESOURCES

Water resources in the vicinity of the Airport are shown on Exhibit 6-1 (surface water, wetlands, and 100-year floodplains). For the projects listed in Table 6-2, a potential water resources effect was identified if a project meets one or both of the following conditions:

- The footprint of the project would increase impervious surface area (requiring identification of stormwater management strategies).
- The footprint of the project would overlap with, or be adjacent to, a floodplain, wetland, or other surface water.



SOURCES: Nearmap, October 2022 (aerial photography – for visual reference only, may not be to scale); Florida Geographic Data Library, 2015 (library, museums); Florida Geographic Data Library, 2016 (day care); Florida Geographic Data Library, 2017 (hospitals); Florida Geographic Data Library, 2018 (group care); Florida Geographic Data Library, 2021 (schools, existing land use); Florida Geographic Data Library, 2022 (house of worship); Ricondo & Associates, Inc., January 2023 (noise exposure contours).

NORTH 0 2,000 ft

EXHIBIT 6-2

EXISTING CONDITIONS (2021)
AIRCRAFT NOISE EXPOSURE CONTOURS

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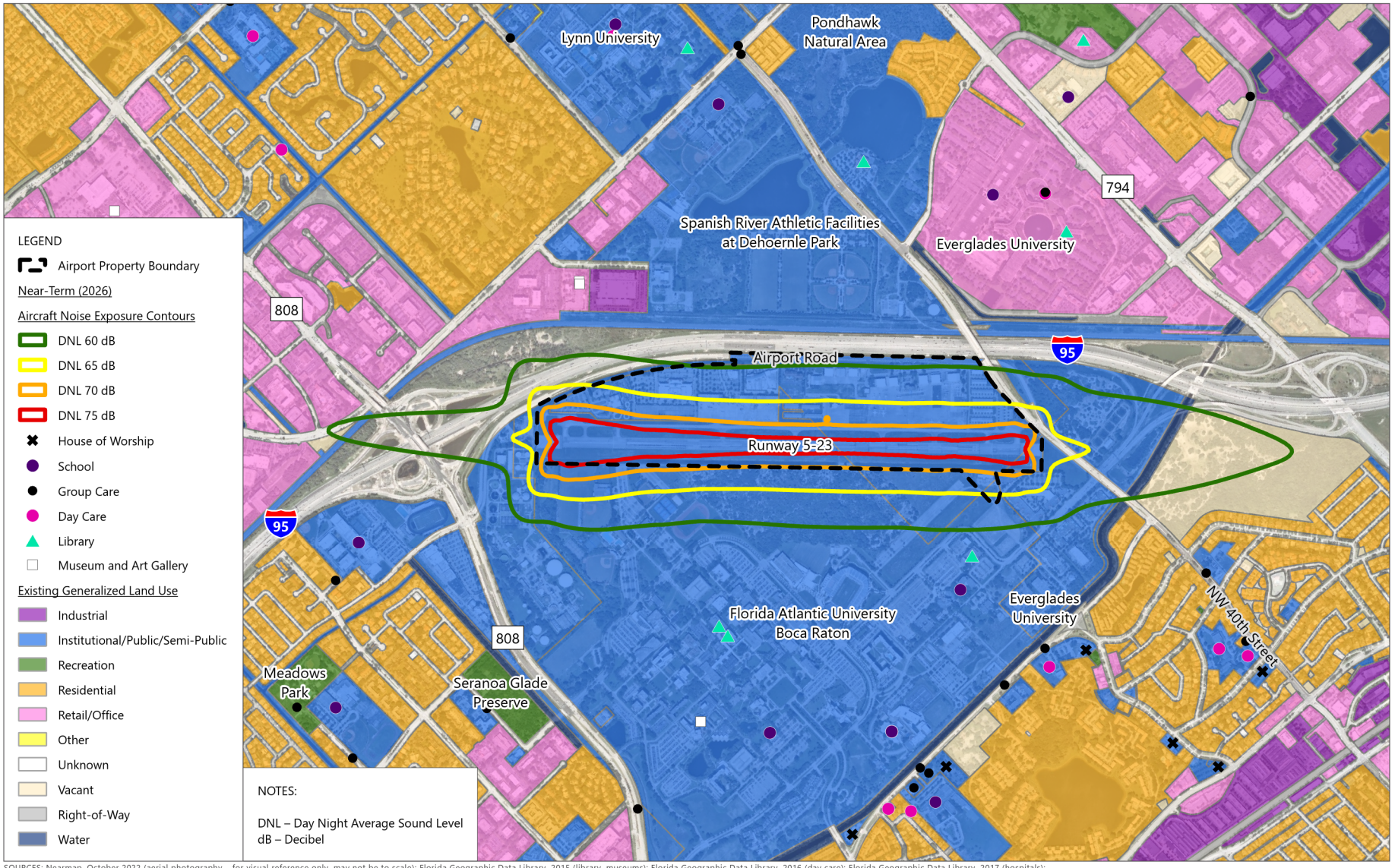

SOURCES: Nearmap, October 2022 (aerial photography – for visual reference only, may not be to scale); Florida Geographic Data Library, 2015 (library, museums); Florida Geographic Data Library, 2016 (day care); Florida Geographic Data Library, 2017 (hospitals); Florida Geographic Data Library, 2018 (group care); Florida Geographic Data Library, 2021 (schools, existing land use); Florida Geographic Data Library, 2022 (house of worship); Ricondo & Associates, Inc., January 2023 (noise exposure contours).

NORTH 0 2,000 ft

EXHIBIT 6-3

NEAR-TERM (2026)
AIRCRAFT NOISE EXPOSURE CONTOURS

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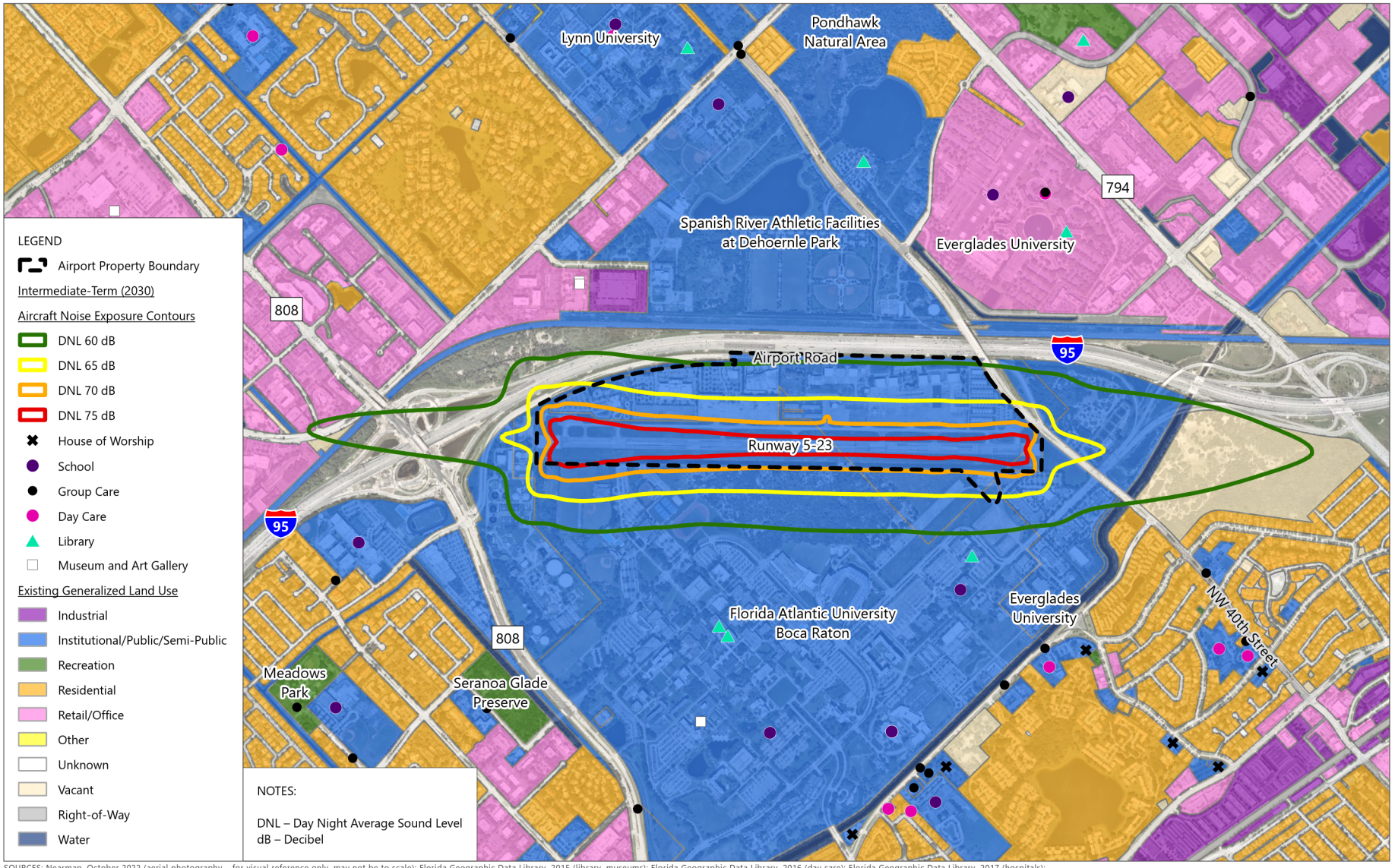

SOURCES: Nearmap, October 2022 (aerial photography – for visual reference only, may not be to scale); Florida Geographic Data Library, 2015 (library, museums); Florida Geographic Data Library, 2016 (day care); Florida Geographic Data Library, 2017 (hospitals); Florida Geographic Data Library, 2018 (group care); Florida Geographic Data Library, 2021 (schools, existing land use); Florida Geographic Data Library, 2022 (house of worship); Ricondo & Associates, Inc., January 2023 (noise exposure contours).

NORTH 0 2,000 ft

EXHIBIT 6-4

INTERMEDIATE-TERM (2030)
AIRCRAFT NOISE EXPOSURE CONTOURS

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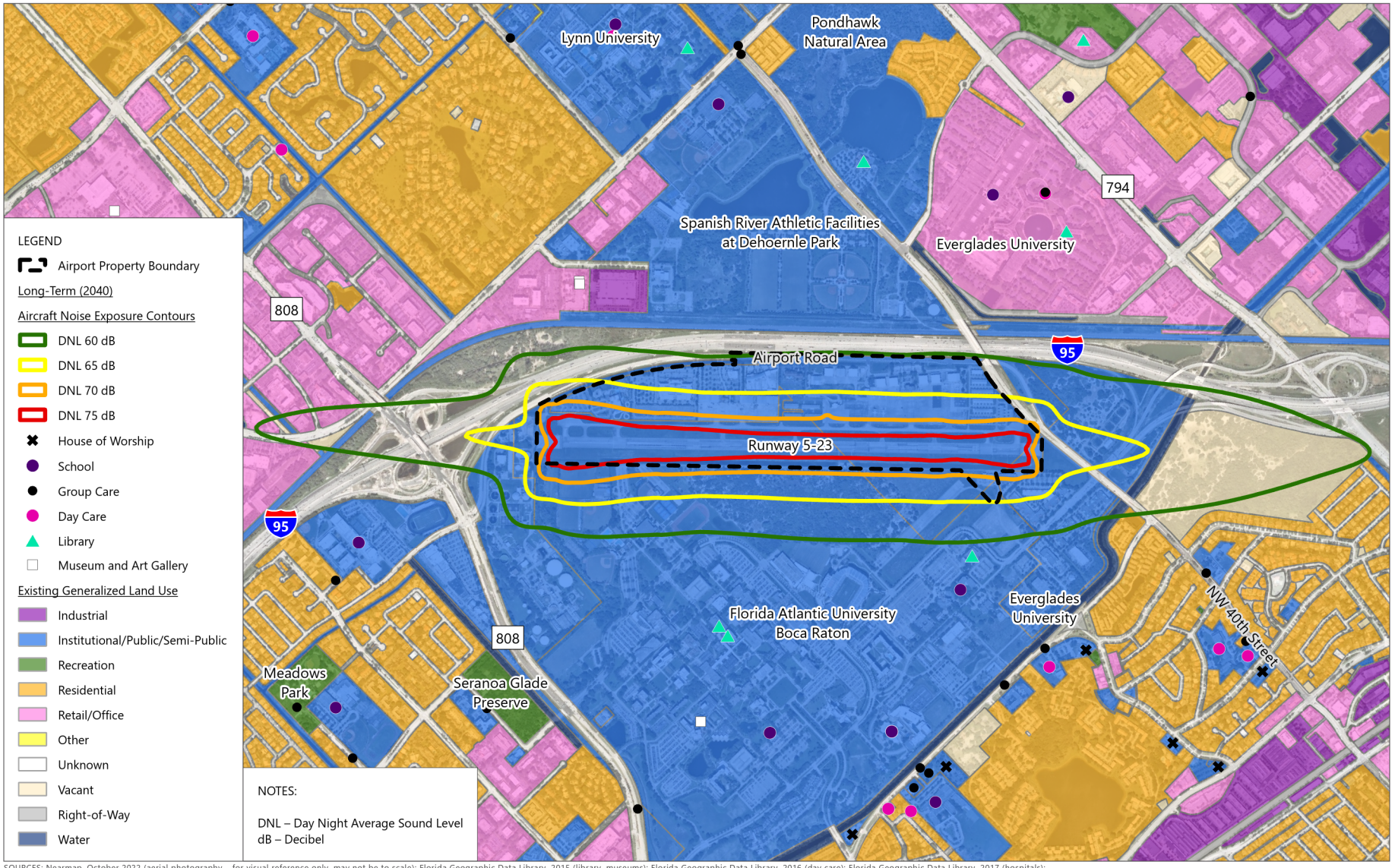

SOURCES: Nearmap, October 2022 (aerial photography – for visual reference only, may not be to scale); Florida Geographic Data Library, 2015 (library, museums); Florida Geographic Data Library, 2016 (day care); Florida Geographic Data Library, 2017 (hospitals); Florida Geographic Data Library, 2018 (group care); Florida Geographic Data Library, 2021 (schools, existing land use); Florida Geographic Data Library, 2022 (house of worship); Ricondo & Associates, Inc., January 2023 (noise exposure contours).

NORTH 0 2,000 ft

EXHIBIT 6-5

LONG-TERM (2040)
AIRCRAFT NOISE EXPOSURE CONTOURS

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6.2.8.1 WETLANDS

On-Airport wetlands identified by the USFWS National Wetland Inventory (NWI) are linear areas present along the Airport property boundary. No Recommended Airport Development Plan project footprints overlap with wetland resources. Future NEPA evaluations may require site visits and delineation of wetland resources on Airport property for projects that occur on undeveloped sites.

Additionally, Recommended Airport Improvement Plan projects that involve construction activities will need to employ strategies to manage stormwater runoff from construction sites to maintain compliance with water quality regulations for all construction projects, as shown in Table 6-2. Additionally, the following projects increase the amount of airside pavement on Airport property, which will require consideration of stormwater detention enhancements to minimize the effects of stormwater runoff on area wetland resources:

- AF 3 – Airport Service Road Rehabilitation (Phase 1B) – Construction
- AF 5 – Stormwater Improvements and Wildlife Mitigation (Phase 1B) - Construction (Runway Safety Area Improvement Project)
- LS 2 – BRAA Administration Building Access Road – Construction
- AF 9 – Taxiways A, E, G, H, P (connectors at both runway ends only), P3, and P9 Geometry Enhancements and Taxiways E and P9 Rehabilitation - Construction
- AF 23 – Improve Runway Safety Area - Install EMAS Runway 5 Departure End - Construction
- AF 26 – Improve Runway Safety Area - Install EMAS Runway 23 Departure End - Construction
- AF 27 – Runway 5 Aircraft Holding Bay – Construction
- AF 29 – Runway 23 Aircraft Holding Bay – Construction

6.2.8.2 FLOODPLAINS

As discussed in Section 2.5.8, approximately 115 acres of Airport property have been identified as being within the 100-year floodplain by the Federal Emergency Management Agency. However, a significant portion of the on-Airport floodplain area has already been paved and developed with structures.

Projects indicated as having water and coastal resources effects in Table 6-1 are all fully or partially in an area designated as floodplain, so construction activities and new projects would be considered a floodplain encroachment. Several of the projects represent a continuation of an existing encroachment, and refined planning of two projects should explore opportunities to avoid the floodplain encroachment through advanced planning and site layout refinement:

- LS 2 – BRAA Administration Building Access Road – Construction
- SF 8 – Relocation of Electrical Vault and Airport Beacon – Construction

If no practicable alternative to siting a project in a floodplain exists and a floodplain encroachment results, the encroachment is not necessarily considered a significant environmental impact under NEPA. The FAA may approve a project involving a floodplain encroachment upon finding that no practicable alternatives are available, and that the project will include measures to minimize harm. The NEPA documentation should explain any alternatives that were analyzed; provide justification for locating the project in the floodplain as the only practicable alternative; and identify applicable mitigation measures, if appropriate, as part of the project in order to minimize potential adverse effects to the natural and beneficial floodplain values.

Thus, depending on the scope of the project, incorporation of floodplain mitigation strategies to minimize impact or harm to floodplains may be required. If further floodplain disruption is unavoidable as a result of a project, then notification of floodplain encroachment would be required as part of the NEPA analysis in compliance with DOT Order 5650.2, Floodplain Management and Protection.

6.2.8.3 GROUNDWATER

Construction of several Recommended Airport Improvement Plan projects, including the taxiway and apron improvements, would increase impervious surface area on the Airport:

- AF 3 – Airport Service Road Rehabilitation (Phase 1B) – Construction
- AF 5 – Stormwater Improvements and Wildlife Mitigation (Phase 1B) - Construction (Runway Safety Area Improvement Project)
- LS 2 – BRAA Administration Building Access Road – Construction
- AF 9 – Taxiways A, E, G, H, P (connectors at both runway ends only), P3, and P9 Geometry Enhancements and Taxiways E and P9 Rehabilitation - Construction
- AF 23 – Improve Runway Safety Area - Install EMAS Runway 5 Departure End - Construction
- AF 26 – Improve Runway Safety Area - Install EMAS Runway 23 Departure End - Construction
- AF 27 – Runway 5 Aircraft Holding Bay – Construction
- AF 29 – Runway 23 Aircraft Holding Bay – Construction

Future NEPA reviews of these projects will need to identify and document future stormwater management strategies to demonstrate the minimization of effects on groundwater quality.

6.3 ENVIRONMENTAL PROCESSING STRATEGY

The FAA can grant conditional or unconditional environmental approval of Recommended Airport Improvement Plan projects depicted on the ALP. Conditional approval applies to projects that require further environmental review before being undertaken; whereas unconditional approval is granted when NEPA compliance has been achieved for all projects depicted on the ALP. Typically, FAA grants conditional approval of projects depicted on an ALP, and individual implementation projects, or groups of projects, will then be subject to NEPA analysis to obtain unconditional approval of the portion(s) of the ALP depicting those projects.

When assessing the environmental review needs for projects identified in a master plan, the dependencies among projects must be considered. Regulations from the Council on Environmental Quality require that connected projects be considered in the same environmental review document (e.g., EA). Per 40 CFR Section 1508.25, "Actions are connected if they: (i) Automatically trigger other actions which may require environmental impact statements. (ii) Cannot or will not proceed unless other actions are taken previously or simultaneously. (iii) Are interdependent parts of a larger action and depend on the larger action for their justification." When proceeding with environmental review and approval of projects that have the potential to be connected to other projects, independent utility must be demonstrated if those potentially connected projects are not considered.

Coordination with the FAA and other stakeholders (e.g., agencies with jurisdiction over affected resources) should occur well in advance of the need for environmental approval to establish FAA's approval authority under Section 163 of the FAA Reauthorization Act of 2018 and to determine how NEPA compliance can be achieved, including identifying any protocols and analyses required to support a compliance determination. Environmental

processing of projects can take several years for an EIS and a year or more for an EA.[1] Projects eligible for CATEX can be processed more quickly (i.e., three to six months). Projects requiring permits from other agencies often require additional time after NEPA processing to obtain the necessary permits; the environmental processing timeline should include this permit processing time.

As the anticipated timing for the Recommended Airport Improvement Plan projects is further evaluated and refined, the environmental factors identified in this section, as well as other emerging environmental issues, should be reflected in the NEPA processing strategy. Ongoing collaboration with the FAA regarding updates and refinements to future project assumptions, such as timing and anticipated impacts, will be critical to maintaining and refining a NEPA processing strategy and associated timeline.

[1] The Council on Environmental Quality established presumptive time limits of 1 year for EAs and 2 years for EISs in 2020, which start with FAA's formal decision to prepare an EA or EIS through issuance of a NEPA finding. These presumptive time limits require completion of refined planning activities and other pre-NEPA efforts that are typically considered part of the NEPA timeline.

7. SUSTAINABILITY STRATEGY

In 2020, BRAA adopted its Strategic Business Plan, which is guided by several initiatives that describe BRAA's intent for sustainable development and operations:

- Plan for financial resiliency in a dynamic and uncertain future environment.
- Develop land use policies and practices that enhance the value of the Airport to business and community stakeholders.
- Promote the Airport's value to the community and its contributions to the regional economy.
- Shape the organizational structure to continue responding to a dynamic operating environment and deliver excellence in all we do.
- Preserve and improve infrastructure assets and the operational integrity of the Airport.

These initiatives highlight the priorities for financial, organizational, and operational resilience and commitment to being a valuable community asset. The MPU itself is a long-term land use plan intended to preserve infrastructure assets by defining a financially viable capital development plan to meet facility needs. To that end, BRAA's sustainability priorities have been woven throughout this MPU. This chapter sets out next steps and considerations to continue to advance and operationalize BRAA's sustainability priorities as related to the Recommended Airport Improvement Plan projects detailed in the MPU. In addition to the MPU, the BRAA intends to prepare a Sustainability Management Plan to define a robust and programmatic approach to managing sustainability at BCT. Therefore, the discussion in this chapter is intended to highlight key sustainability issues and opportunities related to Recommended Airport Improvement Plan projects that may be relevant to BRAA's future sustainability management planning efforts.

Consistent with FAA requirements for Airport Recycling, Reuse, and Waste Reduction (ARRWR) planning as part of master plans, this sustainability strategy discussion includes an evaluation of waste management regulations, practices, and future opportunities at BCT.[1] The broader discussion of sustainability opportunities related to the Recommended Airport Improvement Plan projects follows discussion of the ARRWR plan.

7.1 AIRPORT RECYCLING, REUSE, AND WASTE REDUCTION PLAN

A variety of activities at BCT generate waste, including terminal and airside operations, tenant operations, and construction projects. This ARRWR Plan is being prepared as part of the MPU to consider strategies for reducing waste generation and opportunities for improving recycling and reuse at BCT.

BRAA manages the collection of municipal solid waste (MSW) and recycling (collected as a single stream) at Authority-managed buildings, while tenants are responsible for managing waste at the facilities they operate. The facilities for which BRAA manages waste collection include the ATCT, Administration Building, and CBP Building. All other Airport facilities are tenant-operated. This analysis focuses on BRAA waste management operations and

[1] Frank SanMartin, Manager, Airports Financial Assistance Division, US Department of Transportation, Federal Aviation Administration, memorandum to Regional Airports Division Managers, "ACTION: Guidance on Airport Recycling, Reuse, and Waste Reduction Plans," September 30, 2014.

provides recommendations for improving waste management and recycling at BRAA-managed and tenant-operated facilities.

7.1.1 REGULATORY CONTEXT

The State of Florida has several rules and statutes to support recycling, the following of which pertain to waste management and recycling at BCT:

- A statewide goal of recycling at least 75 percent of MSW by the year 2020 (FAC Rule 62-716.480; Florida Statutes 403,7032, Recycling).
- Products or materials produced using state funds must have recycled content when the Florida Department of Management Services determines that those products or materials are available (Florida Statutes 403.7065, Procurement of products or materials with recycled content).

Palm Beach County maintains a two-stream recycling system in which recyclables are separated into a cardboard-paper-newspaper stream and a plastics-glass-cans stream. To track progress toward the statewide recycling goal of 75 percent by 2020, the Florida Department of Environmental Protection (FDEP) implemented a reporting protocol for counties to report on solid waste management annually. In 2020,[2] Palm Beach County reports diverting 74.4 percent of MSW from landfills through renewable energy and recycling programs.[3]

7.1.2 WASTE MANAGEMENT RESPONSIBILITIES AND QUANTITIES

Two organizations support waste management collection and disposal at BCT.

The Solid Waste Authority (SWA) of Palm Beach County manages a system of integrated waste facilities in the county for recycling, waste diversion, renewable energy, and landfilling processes, including six transfer stations, two waste-to-energy (WTE) facilities, a Recovered Materials Processing Facility for recyclables, a Biosolids Processing Facility, and two landfills. BRAA and Airport tenants contract with a waste provider to haul waste to SWA facilities.

SWA assesses annual tipping fees for waste disposal based on estimates of MSW tonnage generated at BRAA facilities, which is charged as part of the BCT tax bill. BRAA prorates these charges among Airport tenants (and conducts an annual survey of tenant containers to validate the assessed fees). SWA calculates assessment costs based on container size, collection frequency, and estimated weight factors (tons of waste per cubic yard). BRAA and Airport tenants can modify MSW and recycling collection equipment and pickup frequency in response to changes in staff and tenant activity levels and resulting waste generation; this provides the ability to manage waste fees in alignment with demand.

The Fiscal Year 2022/2023 SWA assessment for MSW tonnage was 577.53 tons (estimated). Approximately 48 percent of the MSW is generated from BRAA and Airport tenants and 54 percent is generated from non-aeronautical airport tenants, such as Ashely Furniture, Boomers, Cinemark Movie Theater, and the Marriot Fairfield Inn & Suites. Recycling tonnage is not estimated for the annual assessment because SWA does not charge for the recyclables

[2] Florida Department of Environmental Protection, 2020 Palm Beach County Solid Waste Management Report, *Florida DEP County Reports County Overview Report*, https://floridadep.gov/sites/default/files/Palm_Beach_2.pdf (accessed October 24, 2022).

[3] Palm Beach County was close to achieving the 75 percent recycling goal by 2020; however, the statewide rate was approximately 50 percent. Recommendations for changes to Florida's recycling program are summarized in a report (Florida Department of Environmental Protection, *Florida and the 2020 75% Recycling Goal Final Report*, 2021, available at https://floridadep.gov/sites/default/files/Florida_75_Recycling_Report_17Dec21.pdf [accessed January 31, 2023]).

waste stream. As reported in the annual assessment, four airport facilities provide for the collection of recyclables: the BRAA Administration Building, CBP, Ashley Furniture, and Marriot Fairfield Inn & Suites.

BRAA contracts with Waste Management (WM) for MSW and recyclables collection and transportation to SWA facilities. BCT tenants contract separately for waste removal. Tenants and the BRAA pay for WM disposal services monthly. The base rate for collection is dependent on the quantity, material stream, container size, and frequency of collection; container size and collection frequency can be adjusted to align with demand. Monthly totals also include fuel and administrative charges.[4] A summary of monthly WM waste service fees for BRAA-managed facilities is shown in **Table 7-1**.

TABLE 7-1 WASTE MANAGEMENT FEE SUMMARY

FACILITY	WASTE STREAM	CONTAINER DESCRIPTION	PICKUP FREQUENCY	MONTHLY COST
Administration Building [1]	MSW	1 4-Cubic Yard Container [2]	1 pickup per week	$437.15
	Single-Stream Recycling	1 96-GAL Toter	1 pickup per week	$65.14
Customs and Border Protection (CBP) Building	MSW	1 4-Cubic Yard Container [3]	1 pickup per week	$433.93 [4]
	Single-Stream Recycling	1 96-GAL Toter	1 pickup per week	$65.15

NOTES:
GAL – Gallon
MSW – Municipal Solid Waste
1 Waste generated at the ATCT is disposed of in the MSW and recycling collection containers located at the Administration Building.
2 The MSW container at the Administration Building was downsized from 6-cubic yards to 4-cubic yards in October 2022.
3 The MSW container at the CBP Building was downsized from 6-cubic yard to 4- cubic yard in July 2022.
4 Cost differences between the MSW containers at the CBP and Administration Buildings are due to changes in base rates and fuel charges at the time of the contract start dates.
SOURCE: Waste Management, "Service Agreement," June 2022.

7.1.3 WASTE MANAGEMENT FACILITIES AND PROCEDURES

As discussed above and as shown in Table 7-1, MSW and recyclable collection containers are available at two Airport locations to serve BRAA-managed facilities—a combined location for the Administration Building and the ATCT and a second location for the CBP.

7.1.3.1 CONTRACTUAL AGREEMENT

BRAA has a 3-year contract for MSW hauling and a 1-year contract for recyclables hauling, both set to renew automatically unless the BRAA provides WM with written notice of service termination at least 90 days prior to the end of the existing contract term. The MSW contract covers all non-hazardous solid waste and organic waste. BRAA must obtain written approval from WM to dispose of asbestos-containing materials, petroleum-contaminated soils, demolition debris, or other special waste, as defined in the contract.

The recyclables contract requires all recyclables to be clean, dry, unshredded, empty, loose, and unbagged. Recyclable materials comprise uncoated office and writing paper, magazines, pamphlets, mail, and newspaper; flattened, uncoated cardboard, paperboard boxes; aluminum food and beverage containers, tin or steel cans; glass; and rigid container plastics #1, #2, and #5. Foam, film plastics, plastic bags, napkins, tissue, paper towels, or paper that has been in contact with food are not accepted. BRAA is subject to a contamination charge for disposal of any non-conforming recyclable materials.

[4] The Administrative Charge can be removed by enrolling in paperless statements and automatic payments with WM.

WM offers a Recyclable Material Offset (RMO), which is a price adjustment that could appear as either a charge or credit on a billing statement. The RMO accounts for WM's operating margin and the value of processed recyclables in the global commodities market.[5] If WM is paying more to recycle materials than the material is worth, WM may charge the BRAA a fee for recycling those materials. If WM's recycling costs, including profit margin, are less than the value of the recyclable material, then the BRAA may receive a recycling rebate. The RMO program is dependent on the market economy; recycling rebates are not currently being offered to the BRAA, but they may be in the future if the recyclables market value increases.

7.1.3.2 WASTE COMPOSITION AND WASTE MANAGEMENT PROCEDURES

The MSW stream comprises items typical of an office environment. Given the size of and type of operations at the facilities under the BRAA's jurisdiction, BRAA did not identify the need for, nor does it maintain, written janitorial procedures for waste management. Similarly waste disposal signage and sorting instructions were not identified as necessary given the small scale of waste collection at BRAA facilities.

Administration Building

Approximately eight individuals comprise the BRAA's full time staff, and their offices are located at the Administration Building. In addition to staff offices, the Administration Building contains a garage, conference room, and kitchen. Trash cans are currently located in the restrooms, conference room, garage, and each staff office; these containers are emptied twice a week by janitorial staff. Two mixed recycling containers are located in the kitchen. Typical waste generated at the Administration Building and ATCT includes paper, cardboard, packing supplies, and food scraps. On principle, BRAA staff do not use single-use plastics. Plastic bottles are used infrequently and typically by guests or during events; therefore, plastic does not represent a significant portion of waste generated at the Administration Building. BRAA estimates that approximately 90 percent of its recycling comprises paper and cardboard.

Waste collected from the Administration Building and the ATCT is picked up by janitorial staff and disposed of in the 4-cubic yard dumpster and 96-gallon recycling toter located at the Administration Building. Following observations of dumpster fullness, BRAA downsized the dumpster at the Administration Building in October 2022 from 6-cubic yard to 4-cubic yard. As such, BRAA employed its ability to modify collection equipment in response to activity levels and resulting waste generation. Rightsizing the dumpster to meet waste capacity needs saves BRAA approximately $100 per month.

Customs and Border Protection Building

The CBP building is served by one 4-cubic yard dumpster and one 96-gallon recycling toter. The dumpster at the CBP building was downsized from 6-cubic yard to 4-cubic yard in July 2022 following visual observations, similar to the discussion of the Administration Building above. Rightsizing the dumpster to meet waste needs saves BRAA approximately $100 per month.

International waste is incinerated at the CBP Building in accordance with regulations. BRAA recognizes an opportunity to convert its diesel-fueled incinerator to natural gas to reduce emissions.

[5] Waste Management, *WM Support Center*, https://www.wm.com/us/en/support/faqs/what-are-the-charges-on-my-waste-management-invoice# (accessed October 31, 2022).

7.1.4 WASTE MANAGEMENT GOALS AND ACTIONS

Based on conversations with the BRAA and experience with ARRWR Plans, recommendations were identified to enhance the performance of waste management at BRAA facilities. The preliminary waste management recommendations are listed in **Table 7-2** for BRAA review.

TABLE 7-2 (1 OF 2) WASTE MANAGEMENT OPPORTUNITIES AND RECOMMENDATIONS

OPPORTUNITY	DISCUSSION	RECOMMENDATION
Implement a Two-Stream Recycling System	The BRAA currently maintains a single-stream recycling system because the majority of recyclables are paper products and cardboard. Consider implementing a two-stream recycling system that aligns with the two-stream system operated under Palm Beach County. Consider offering two recycling containers to separate paper and cardboard products from plastics, cans, and glass, at each location where recycling is currently collected (both at the point of disposal and in the MW container for consolidation prior to hauling): one container for cardboard, paper, newspaper, and magazines, and another container for plastic, cans, and glass. This initiative would require the addition of signage to direct BRAA staff on how to properly sort recyclables under a two-stream system.	Monitor operations for changes in the use and/or disposal of plastics, cans, and glass. If the need to increase MSW dumpster capacity from 4 cubic yard to 6 cubic yard at the Administration Building or the CBP is identified, suggest a closer review of waste composition to identify whether an additional single-stream recyclable toter or adding a two-stream recyclable option would avoid the increase in MSW dumpster capacity and associated costs.
Consolidate Administrative Purchases to Minimize Cardboard Waste	BRAA staff at the Administration Building receive package deliveries frequently, which require the disposal of cardboard packaging. Consider consolidating BRAA purchases among staff to reduce the number of packages received and the amount of cardboard waste generated by establishing a purchasing schedule.	Assign purchasing responsibilities to a single Administration Building staff member, collect purchasing requests, and consolidate orders and shipping to a maximum (typical) of one day per week, such as order placement on Fridays.
Improve Recycling in the Administration Building	BRAA expressed interest in improving paper recycling in the Administration Building as most of the recyclable waste generated is paper material. Two recycling containers are currently located in the kitchen and one recycling container is located in the garage of the facility. Approximately nine small recycling containers would be needed to add a paper recycling container to each office and the garage of the Administration Building. As the BRAA maintains a single-stream recycling system, consider accepting mixed recycling in the new containers rather than only paper materials to achieve a greater recycling outcome.	Purchase and deploy 10 recycling bins for distribution to Administrative Building offices and the garage. Designate 1 recycling bin in the kitchen for plastics, glass, and cans. Create and post signage in the kitchen to clarify allowable recyclable materials. Free online tools are available to create recycling signage (e.g., https://www.wm.com/us/en/recycle-right/recycling-resources).
CBP Building Renovations	International waste at BCT is handled at the CBP and is disposed of through incineration. The existing incinerator runs on diesel fuel and is approximately 4 years old. The incinerator is clean burning and produces little smoke or ash. Use of the incinerator for disposing of international waste reduces vehicle miles traveled and hauling emissions that would be associated with hauling the waste off-Airport. To further reduce emissions associated with managing international waste, consider exploring a cleaner burning option than diesel fuel (i.e., natural gas) to run the incinerator. A natural gas line could serve as an energy source for the entire CBP building and could also serve as an energy connection for the incinerator. BRAA staff estimate the incinerator will need to be replaced within the next 5 years; consider replacing the incinerator with a cleaner burning or electric machine.	In the next 2 years, prepare a study to evaluate opportunities to extend a natural gas connection to the CBP facility, a cost analysis of natural gas versus diesel fuel burning incinerators, and a benefits analysis of emissions reductions associated with the equipment change. If justified, have a conversion plan in place to support change as the current incinerator nears the end of its useful life.

TABLE 7-2 (2 OF 2) WASTE MANAGEMENT OPPORTUNITIES AND RECOMMENDATIONS

OPPORTUNITY	DISCUSSION	RECOMMENDATION
Sustainable Construction Practices	Implement construction practices that promote the use of sustainable and recycled materials, such as adopting a requirement for LEED certification or preparation of a construction waste management plan. Employ practices such as safely disposing of toxic or hard-to-recycle materials, sustainable purchasing, tracking waste diversion performance, and conducting a waste stream audit on the building to establish a waste stream baseline.	Adopt a policy that requires contractors to prepare construction waste management plans as part of construction projects in which they prioritize and track the diversion of construction waste from the MSW stream. As part of the future SMP, evaluate the adoption of a LEED certification requirement for projects (given implications beyond waste management), and prioritize the pursuit of construction waste minimization measures as part of the LEED evaluation.
Stockpile and Recycle Asphalt and Concrete	Collect and store asphalt and concrete waste from construction and demolition projects on-Airport for later reuse. Require storage of asphalt and concrete material by the contractor handling the project. Consider tracking the amount of material stockpiled and reused to develop a construction waste diversion metric.	Designate an area for asphalt and concrete stockpiling for storage and future reuse. Require or prioritize the use of stockpile area for constructors to support meeting construction waste management efforts. Require contractors to track quantities of stockpiled, disposed, and reused asphalt and concrete, by project, to compile a dataset supporting a future construction waste diversion metric.
Implement Waste Performance Metrics	Establishing metrics that support managing haul frequency and container size of MSW will provide an indicator of waste diversion success and support achieving cost savings. Track annual waste costs and estimated quantities for MSW and for recyclables.	As part of future SMP, using baseline data defined in this ARRWR Plan, define a metric and goal for waste management performance based on waste and recyclables tonnage capacity and costs.
Identify Opportunities to Partner with Tenants	BCT tenants manage waste at tenant-operated facilities. The BRAA could identify opportunities to partner and engage with tenants on implementing stronger waste management and recycling initiatives specific to waste streams generated by tenant operations. Consider encouraging adjacent tenants to combine waste collection containers and add recycling containers if not available, to support reducing waste fees for both tenants. Consider encouraging tenants to evaluate their collection equipment in response to operational activity and resulting waste generation.	Dedicate time during tenant meetings to the discussion of waste management opportunities, such as adjacent tenants combining containers to reduce costs and add recycling containers. Connect tenants with SWA and/or WM resources to evaluate current waste streams and recommend practices to improve waste diversion.
SWA Partnership	Define a partnership with the County to serve as a role model locally on waste diversion strategies. Consider a site tour of SWA facilities to promote a better understanding of County-level waste processes. Identify relevant strategies that can be promoted and/or shared to establish BRAA-managed facilities as a role model for tenant-operated facilities. Work with SWA to ensure the waste stream of recyclables coming from BCT facilities is compatible with SWA recyclable disposal processes and identify areas where recycling sorting could be improved.	As a first step, consider including an SWA recycling representative as part of the future SMP stakeholder group to develop BRAA and tenant relationships and seek opportunities to support common goals. Alternatively, include an SWA recycling representative in a future tenant meeting to discuss waste management issues at the Airport and identify possible opportunities.

NOTES:
ARRWR Plan – Airport Recycling, Reuse, and Waste Reduction Plan
BCT – Boca Raton Airport
BRAA – Boca Raton Airport Authority
CBP – US Customs Border Protection
LEED – Leadership in Energy and Environmental Design
MSW – Municipal Solid Waste
SMP – Sustainability Management Plan
SWA – Solid Waste Authority
WM – Waste Management
SOURCE: Ricondo & Associates, Inc., January 2023 based on input from the Boca Raton Airport Authority, September 6, 2022, and October 14, 2022.

7.2 SUSTAINABILITY CONSIDERATIONS FOR THE MASTER PLAN UPDATE

The MPU team conducted workshops with BRAA staff to review sustainability issues of interest and potential opportunities for sustainability that support the proposed Recommended Airport Improvement Plan. The intent was to identify considerations that are anticipated to be in alignment with a future Sustainability Management Plan (SMP) and identify actions that can be taken as part of the future SMP to formalize the MPU opportunities along with other operational opportunities. Therefore, the workshop discussions focused on typical sustainability categories relevant to airport planning and operations and identifies opportunities to advance the management of each category as part of the future SMP effort.

The BRAA intends to prepare an SMP, which typically includes the following components:

- Development of a sustainability vision and/or mission statement.
- Identification of sustainability topics to be addressed in the plan; topics are selected through a materiality analysis that identifies topics critical to an organization, such as topics that have a potential impact on an organization and topics that are important to the organization's stakeholders. Example topics include energy, water, and waste.
- Establishment of a sustainability performance baseline for each selected sustainability topic to define, for example, current rates of resource consumption (e.g., energy use and water use).
- Setting of goals with metrics that define a desired future state.
- Identification and prioritization of sustainability actions to improve performance by, for example, reducing consumption use, or expanding community engagement to support Airport development and operations.
- Development of a plan to implement the SMP.
- Involvement of stakeholders.

Table 7-3 summarizes BRAA accomplishments and opportunities related to sustainable Airport operations and development. Opportunities are presented as those related to the implementation of the Master Plan Update's Recommended Airport Improvement Plan and those identified for consideration in the future development of an SMP for BCT.

TABLE 7-3 (1 OF 2) SUSTAINABILITY CONSIDERATIONS

CATEGORY	ACHIEVEMENTS	MASTER PLAN UPDATE OPPORTUNITIES	SMP CONSIDERATIONS TO ADVANCE MASTER PLAN UPDATE OPPORTUNITIES
Energy (Efficiency and Renewables)	▪ BRAA converted taxiway lighting to LED, which is estimated to reduce 270 metric tons of carbon dioxide equivalent over 15 years. ▪ Atlantic Aviation and the Runway 5-23 Condo Association use LED fixtures.	▪ Explore solar opportunities, especially on existing and new BRAA and tenant facility rooftops. ▪ Continue/encourage BRAA and tenant transition to LED, through policy/commitment and tenant encouragement. ▪ Plan for future electrification capacity needs to support EVs, eGSE, eVTOL, etc.	▪ Set energy use and cost baseline (electric, fuel, other) and estimate future business-as-usual scenarios in line with the MPU planning horizon to support setting goals, and tracking energy use given the anticipated increase in electricity demand, and associated costs of energy use. ▪ Explore opportunities to deploy solar at BCT, with a focus on rooftop systems, such as policies for new development and policies/contractual updates for tenant facilities.
GHG Emissions	▪ Cinemark and Signature Flight Support tenants provide EV parking spaces.	▪ Work with the FBOs to support the transition to cleaner aircraft fuels, such as non-leaded avgas and SAF, and electrification of flight such as eVTOL; consider convening an aircraft fuel working group of BRAA and aviation tenants to maintain an ongoing forum for information sharing and strategy alignment. ▪ Establish a policy to guide the electrification of the BRAA fleet and to encourage tenant transitions.	▪ See energy opportunities. ▪ Evaluate the BRAA fleet (vehicle types, electric options, and renewal schedules) and establish a timeline with goals for fleet electrification to support the development of a transition policy. ▪ Benchmark comparably sized GA airports to collect feedback on messaging strategies associated with the carbon footprint of GA operations.
Water	▪ BRAA uses reclaimed water for irrigation (although it does not represent a meaningful cost savings). ▪ Construction of the Airport Road and Beautification project used reclaimed water, and the project was designed to minimize water use through native and drought-resistant landscaping.	▪ Given land use constraints, prioritize below-ground stormwater retention development; BRAA is preparing a stormwater master plan that includes modeling of the 100-year flood event. ▪ Expand the use of reclaimed water for irrigation in new and updated landscaping projects for BRAA projects (and encourage tenants for tenant projects); set guidelines and/or a policy to expand the use of native and drought-resistant landscaping.	▪ Establish potable/reclaimed water use and costs and sanitary sewer costs to support setting goals, tracking use, and quantifying the benefits of water reduction and conservation projects. ▪ Explore opportunities to expand reclaimed water use. ▪ Set guidelines and/or a policy regarding the use of native and drought-resistant landscaping.
Waste	▪ BRAA recycles (see Section 7.1).	▪ Prepare an Airport Recycling, Reuse, and Waste Reduction Plan (provided in Section 7.1).	▪ Formalize implementation of MPU recommendations and incorporate goal(s) and metrics for waste minimization into the SMP.

TABLE 7-3 (2 OF 2) SUSTAINABILITY CONSIDERATIONS

CATEGORY	ACHIEVEMENTS	MASTER PLAN UPDATE OPPORTUNITIES	SMP CONSIDERATIONS TO ADVANCE MASTER PLAN UPDATE OPPORTUNITIES
Community	▪ Ken Day and George Snow foundation and scholarships offered through a BRAA Board endowment. ▪ BRAA offers a paid internship with the goal of providing students an opportunity to work locally and contribute to their local economy and community.	▪ Explore opportunities to engage the community in Airport operations and development.	▪ Formalize a Student Outreach Program to advance BRAA's scholarship and internship initiatives into a robust student engagement program that includes sharing of professional skills and aviation career opportunities, with a focus on schools serving underrepresented communities, to support the future aviation workforce; engagement activities may include airport orientation, speaker series, mentoring, scholarships, certification support. ▪ In support of MPU recommendations, develop a community education campaign to promote the value of the Airport to the local community and contribution to the local economy, in alignment with long-term Airport goals. ▪ Establish BCT as a research/training hub for drones and/or electric aircraft (e.g., UAS Center at San Bernardino International Airport), and consider a partnership with local institutions and universities.
Financial Resiliency	▪ BRAA developed a Strategic Business Plan in 2020, as well as this Master Plan Update, with the intent of establishing a financially resilient future for the Airport.	▪ Establish a Recommended Airport Improvement Plan for the Airport that supports financial resiliency (that is, the ability to recover from unpredictable disruptions). ▪ Develop a financial analysis to confirm the financial viability of the proposed capital improvement program. ▪ Pursue a grant for the development of an SMP to advance BRAA's sustainability priority of financial resiliency.	▪ Continue to revise financial models to ensure responsible fiscal development and financial resiliency.

NOTES:
BCT – Boca Raton Airport
BRAA – Boca Raton Airport Authority
eGSE – Electric Ground Support Equipment
EV – Electric Vehicle
eVTOL – Electric Vertical Take-off and Landing Vehicle
GA – General Aviation
GHG – Greenhouse Gas
LED – Light Emitting Diode
MPU – Master Plan Update
SAF – Sustainable Aviation Fuel
SMP – Sustainability Management Plan
UAS - Unmanned Aircraft Systems
SOURCE: Ricondo & Associates, Inc., January 2023, based on input from the Boca Raton Airport Authority, September 6, 2022, and November 17, 2022.

8. CAPITAL IMPROVEMENT PROGRAM AND IMPLEMENTATION PLAN

8.1 INTRODUCTION

This chapter presents the CIP and implementation plan, as well as the rough order of magnitude (ROM) cost estimates, potential funding sources, and proposed timing associated with each project recommended as part of the MPU. The CIP is intended to provide general implementation guidance for BRAA staff to support decision-making relative to recommended enhancements and development at the Airport. It is assumed and anticipated that adjustments, amendments, or updates to the CIP by BRAA may occur as necessary to support the needs of BCT and/or changing conditions. The information provided in this chapter, which was developed in consultation with BRAA staff, can be used to update the FDOT Joint Automated CIP (JACIP), support capital budgeting, and facilitate discussions with stakeholders.

The CIP considers the ongoing BRAA capital projects and the proposed Recommended Airport Improvement Plan of the MPU. These items are prioritized to leverage federal and state funding opportunities, support Airport operations, and facilitate future development. Capital projects known or anticipated to be funded and implemented by tenants within their respective leasehold areas are not included in the CIP. Similarly, the projects described herein do not include all Airport operating and maintenance project expenditures or capital investments in equipment.

Throughout this chapter, projects are identified using an alpha numeric naming convention based on functional area and BRAA priority. Project priority in some instances correspond with project sequencing due to a variety of factors, including funding considerations. For each alpha numeric designation, the letter prefixes correspond with the following project types:

- Airfield – AF
- Landside Improvements – LS
- Planning Study – PS
- Security – SE
- Support Facility – SF

8.2 POTENTIAL FUNDING SOURCES

Project funding sources include funds from the federal government, grants from the state (FDOT), and local funds from the BRAA. It is important to note that specific project eligibility for federal and state grant funding may vary depending on the type of project. It is necessary to examine the planned development projects in the CIP to determine each project's eligibility for each funding source. The following subsections describe the typical funding sources for airport development projects.

8.2.1 FEDERAL FUNDING

The primary sources of federal funds are the FAA -AIP- grants and programs developed as part of the Bipartisan Infrastructure Law (BIL), such as Airport Infrastructure Grants (AIGs), the Airport Terminal Program (ATP), and Air Traffic Facilities Program.

8.2.1.1 AIRPORT IMPROVEMENT PROGRAM GRANTS

The primary source of FAA funds is the AIP, which was established by the Airport and Airway Improvement Act of 1982 (Public Law 97-248). Since then, the AIP has been amended several times, most recently with the passage of the FAA Reauthorization Act of 2018. Funds obligated for the AIP are drawn from the Airport and Airway Trust Fund, which is supported by user fees, fuel taxes, and other similar revenue sources. Funds deposited into the Airport and Airway Trust Fund are distributed to eligible airports throughout the United States and its territories via FAA grants under appropriation limits established by Congress. Public-use airports are eligible for AIP grant funding when the airport meets the following criteria:

- publicly owned, or
- privately owned, but designated by the FAA as a reliever, or
- privately owned but having scheduled commercial service and at least 2,500 annual enplaned passengers.

In addition to these criteria, the airport must be included in the NPIAS. The NPIAS is published every 2 years; it identifies public-use airports that are important to public transportation and contribute to the needs of civil aviation, national defense, and/or the US Postal Service. BCT is included in the NPIAS as a publicly owned reliever airport.

The FAA distributes federal grants under the AIP to airport operators in two ways: through entitlement grants and discretionary grants. Entitlement grants for GA airports that are included in the NPIAS, such as BCT, are referred to as nonprimary entitlement grants. BRAA is eligible to receive up to $150,000 annually in nonprimary entitlement grants for airfield capital projects and eligible maintenance projects. Discretionary grants are distributed for individual projects based on funding availability and the priority of projects at airports nationwide. Projects given the highest priority according to the AIP are those that satisfy objectives related to safety, security, reconstruction, capacity, and standards. As it relates to GA airports, AIP grants cannot be used for operational costs, maintenance or repair of buildings, or nonaviation development. Any professional services that are necessary for eligible projects, such as planning, surveying, and design, are also eligible; however, operating expenses associated with AIP projects are not eligible. Aviation demand at an airport must justify the projects, which must also meet federal environmental and procurement requirements.

Should the Airport not receive the projected AIP grants, BRAA may have to re-evaluate the phasing of the CIP and/or a project's potential funding eligibility from other sources. Historically, the Airport's eligible projects have received 90 percent to 95 percent AIP participation. The current FAA reauthorization specifies the federal participation for GA airports at 90 percent. BCT received a total of $5.3 million in federal grant funding from FY 2017 through FY 2022.

8.2.1.2 BIPARTISAN INFRASTRUCTURE LAW FUNDS

The BIL was signed into law on November 15, 2021, and provides $15 billion for airport-related projects, such as safety and sustainability projects, as well as terminal, airport-transit connection, and roadway projects. Another $5 billion funds the ATP for terminal projects that:

- Improve aging airport facilities.
- Improve airfield safety.
- Increase capacity.
- Improve energy efficiency.

- Encourage competition.
- Enhance access to historically disadvantaged populations and passengers with disabilities.

BIL funding is allocated over 5 years. Similar to AIP entitlement grants, AIG are allocated to primary airports using a formula based on airport activity. AIG funds for nonprimary airports are allocated based on airport classification in the NPIAS and the aggregated NPIAS eligible development cost for each classification. BCT was allocated $763,000 in FY 2022 and $844,000 in FY 2023. ATP grants are discretionary, and no ATP grants have been assumed as funding for the CIP.

8.2.2 FLORIDA DEPARTMENT OF TRANSPORTATION

The FDOT grant program was established to fund projects related to airport planning and capital improvements that address safety, security or capacity improvements, land acquisition, and economic development. Historically, for projects that receive AIP grants, FDOT contributes up to 50 percent of the remaining share of the project cost. For projects that do not receive AIP funding, FDOT will provide up to 80 percent of the funding for most non-FAA-supported project costs. For economic development projects, FDOT may provide up to 50 percent of the costs to build on-airport, revenue-producing capital improvements or to acquire land.

To be eligible for FDOT funding, projects must be included in the JACIP, which is a cooperative funding program mechanism used by the FAA and FDOT for coordination of annual funding and programming of Florida airport projects. The FDOT develops a 5-year work program based on project priority and funding availability from the projects in the JACIP. BCT received a total of $10.1 million in FDOT grant funding from FY 2017 through FY 2022.

8.2.3 LOCAL FUNDING

Local funds may be provided by BRAA or other local funding agencies for projects not eligible for federal or state funding and to account for shortfalls in funding levels. Local funding shares can be as little as 5 percent for projects that receive a combination of FAA and FDOT grants. For projects not funded through the FAA, the FDOT may fund between 50 and 80 percent of the project costs, thereby requiring the local share to be as much as 50 percent. A project not funded by either the FAA or the FDOT would require BRAA or other local sources to fund the project in its entirety. Local funds are typically obtained from Airport revenues.

8.3 ROUGH ORDER OF MAGNITUDE COSTS

A ROM cost estimate was developed for each project included in the CIP. The ROM cost estimates were developed using 2022 US dollars and escalated at 3.5 percent annually to each project's implementation year. Ultimately, the timing of projects will be determined based on operational demand, funding availability, and environmental approvals. The ROM cost estimates consider both hard and soft program costs to better reflect the overall anticipated project cost.

Due to the conceptual nature of the MPU Recommended Airport Improvement Plan, further refinement of the cost estimates through architectural and engineering analyses should be undertaken as the scope for each project is further defined. **Tables 8-1** presents the ROM cost estimates associated with the CIP.

TABLE 8-1 (1 OF 2) CAPITAL IMPROVEMENT PROGRAM ROUGH ORDER OF MAGNITUDE COSTS

PROJECT ID[1]	FISCAL YEAR	PROJECT DESCRIPTION	ROUGH ORDER OF MAGNITUDE COSTS (ESCALATED)
AF 1	2023	Airport Service Road Rehabilitation (Phase 1A) – Design and Professional Services	$166,666
PS 1	2023	Marketing Plan Update	$200,000
AF 2	2023	Stormwater Improvements and Wildlife Mitigation (Phase 1A) – Design and Professional Services	$250,000
SF 1	2023	Tower Radio, Communication, and Electronics Upgrade – Construction	$400,000
SF 2	2023	Generator Replacement	$250,000
SF 3	2023	BRAA Administration Building Renovations	$120,000
AF 3	2024	Airport Service Road Rehabilitation (Phase 1B) – Construction	$1,930,000
PS 2	2024	Noise Exposure Map Update	$220,000
PS 3	2024	Sustainability Management Plan	$380,000
AF 4	2024	NAVAIDs and Airfield Lighting and Signage Upgrades – Construction	$4,300,000
AF 5	2024	Stormwater Improvements and Wildlife Mitigation (Phase 1B) – Construction	$2,360,000
SF 4	2025	Relocation of Electrical Vault and Airport Beacon – Siting Analysis and Preliminary Engineering	$230,000
SF 5	2025	AWOS Replacement – Siting Analysis and Design	$80,000
LS 1	2025	BRAA Administration Building Access Road – Design	$130,000
AF 6	2025	Taxiways A, E, G, H, P (connectors at both runway ends only), P3, and P9 Geometry Enhancements and Taxiways E and P3 Rehabilitation – Design	$190,000
PS 4	2025	Electrification Master Plan	$170,000
SF 6	2026	Relocation of Electrical Vault and Airport Beacon – Design	$200,000
SF 7	2026	AWOS Replacement – Construction	$820,000
AF 7	2026	Runway 5 – Aircraft Holding Bay Rehabilitation – Design	$110,000
LS 2	2026	BRAA Administration Building Access Road – Construction	$900,000
AF 8	2026	Taxiway P2 Rehabilitation	$40,000
AF 9	2026	Taxiways A, E, G, H, P (connectors at both runway ends only), P3, and P9 Geometry Enhancements and Taxiways E and P3 Rehabilitation – Construction	$1,310,000
PS 5	2027	Underground Utility Mapping	$440,000
AF 10	2027	Runway 5 – Aircraft Holding Bay Rehabilitation – Construction	$700,000
SF 8	2027	Relocation of Electrical Vault and Airport Beacon – Construction	$3,390,000
AF 11	2027	Engineered Materials Arresting System (EMAS) – Fleet Mix Evaluation	$40,000
SE 1	2028	Airport Security Improvements – CCTV Cameras and Associated Infrastructure – Design	$370,000
SF 9	2028	US Customs and Border Protection Rehabilitation and Improvements – Design	$160,000
AF 12	2028	Engineered Materials Arresting System (EMAS) Rehabilitation (Seam Sealer Replacement)	$1,230,000

TABLE 8-1 (2 OF 2) CAPITAL IMPROVEMENT PROGRAM ROUGH ORDER OF MAGNITUDE COSTS

PROJECT ID[1]	FISCAL YEAR	PROJECT DESCRIPTION	ROUGH ORDER OF MAGNITUDE COSTS (ESCALATED)
SE 2	2028	Airport Security Improvements – Replace Gate Controllers and Keypads	$440,000
PS 6	2028	Facilities Management Plan Update	$190,000
SF 10	2029	US Customs and Border Protection Rehabilitation and Improvements – Construction	$830,000
SE 3	2029	Airport Security Improvements – CCTV Cameras and Associated Infrastructure – Construction	$2,550,000
AF 13	2029	Taxiways A, H, and P9 Rehabilitation – Design	$70,000
AF 14	2029	Taxiway P Rehabilitation – Design	$830,000
AF 15	2030	Taxiways A, H, and P9 Rehabilitation – Construction	$450,000
AF 16	2030	Runway 5-23 Rehabilitation – Design	$2,140,000
AF 17	2030	Taxiways G and P6 Rehabilitation – Design	$70,000
AF 18	2031	Taxiway P Rehabilitation – Construction	$5,900,000
AF 19	2032	Runway 5-23 Rehabilitation – Construction – Phase 1	$7,630,000
AF 20	2032	Taxiways G and P6 Rehabilitation – Construction	$480,000
AF 21	2033	Runway 5-23 Rehabilitation – Construction – Phase 2	$7,900,000
PS 7	2033	Facilities Management Plan Update	$220,000
SF 11	2033	Replace Air Traffic Control Tower with Virtual or Remote Tower – Technology Review and Design	$370,000
SF 12	2034	BRAA Administration Building Rehabilitation and Improvements	$760,000
SE 4	2034	Airport Security Improvements – CCTV Cameras and Associated Infrastructure – Design	$460,000
SF 13	2034	Replace Air Traffic Control Tower with Virtual or Remote Tower – Construction	$3,740,000
AF 22	2035	Improve Runway Safety Area – Install EMAS Runway 5 Departure End – Design	$720,000
SE 5	2035	Airport Security Improvements – CCTV Cameras and Associated Infrastructure – Construction	$3,130,000
AF 23	2036	Improve Runway Safety Area – Install EMAS Runway 5 Departure End – Construction	$8,100,000
AF 24	2036	Improve Runway Safety Area – Install EMAS Runway 23 Departure End – Design	$750,000
AF 25	2037	Runway 5 Aircraft Holding Bay – Design	$150,000
AF 26	2037	Improve Runway Safety Area – Install EMAS Runway 23 Departure End – Construction	$8,380,000
AF 27	2038	Runway 5 Aircraft Holding Bay – Construction	$1,320,000
PS 8	2038	Facilities Management Plan Update	$270,000
SE 6	2038	Airport Security Improvements – Replace Gate Controllers and Keypads	$610,000
AF 28	2039	Runway 23 Aircraft Holding Bay – Design	$240,000
AF 29	2040	Runway 23 Aircraft Holding Bay – Construction	$2,030,000
SF 14	2040	AWOS Replacement with ASOS – Siting Analysis and Design	$200,000
Total:			**$82,016,666**

NOTES:

AF – Airfield; ASOS – Automated Surface Observing System; AWOS – Automated Weather Observing System; BRAA – Boca Raton Airport Authority; CCTV – Closed-Circuit Television; LS – Landside Improvements; NAVAID – Navigational Aid; PS – Planning Study; SE – Security; SF – Support Facility

Projects illustrated in green text (AF 1, PS 1, AF 2, SF 1, SF 2, SF 3, and AF 4) are ongoing projects that were initiated during the development of the Capital Improvement Program.

Costs were developed in 2022 US dollars and escalated 3.5 percent annually for inflation.

SOURCES: American Infrastructure Development, Inc., December 2022 (cost estimates); Florida Department of Transportation, *Airport Pavement Evaluation Report: Boca Raton Airport*, 2022; Ricondo & Associates, Inc., July 2023.

8.4 PROJECT DESCRIPTION AND SEQUENCING

The proposed sequencing of projects was separated into three phases representing short-, intermediate-, and long-term improvements:

- short-term improvements – FY 2023 through FY 2027
- intermediate-term improvements – FY 2028 through FY 2032
- long-term improvements – FY 2033 through FY 2040

Although these three phases estimate the general period (in FYs) for future Airport enhancements, periodic re-evaluation of the proposed timing may be necessary. This would allow BRAA to adjust to evolving development needs or priorities due to potential deviations from the operational demand levels contained in the aviation activity forecasts or other unforeseen factors. It is also possible that other enhancements not identified in this implementation plan may be identified in the future to support Airport operations and/or improve operational efficiency.

The following information is provided throughout this section relative to each proposed project identified in the CIP:

- project name, description, and justification
- anticipated project timing
- ROM cost estimate
- potential sources of funding for the project

8.4.1 SHORT-TERM PROJECTS (FY 2023 – FY 2027)

Exhibit 8-1 illustrates the short-term projects. The short-term projects included in the CIP are described as follows:

8.4.1.1 AIRFIELD PROJECTS

Airport Service Road Rehabilitation (Phases 1A and 1B) – Design and Professional Services (AF 1) and Construction (AF 3)

Project AF 1 has been initiated as of July 2023.

This project includes the design, professional services, and construction of approximately 4,000 square yards of additional pavement to widen the existing vehicle service road and relocate portions of the service road to the east and the west of the EMAS at the Runway 5 end.

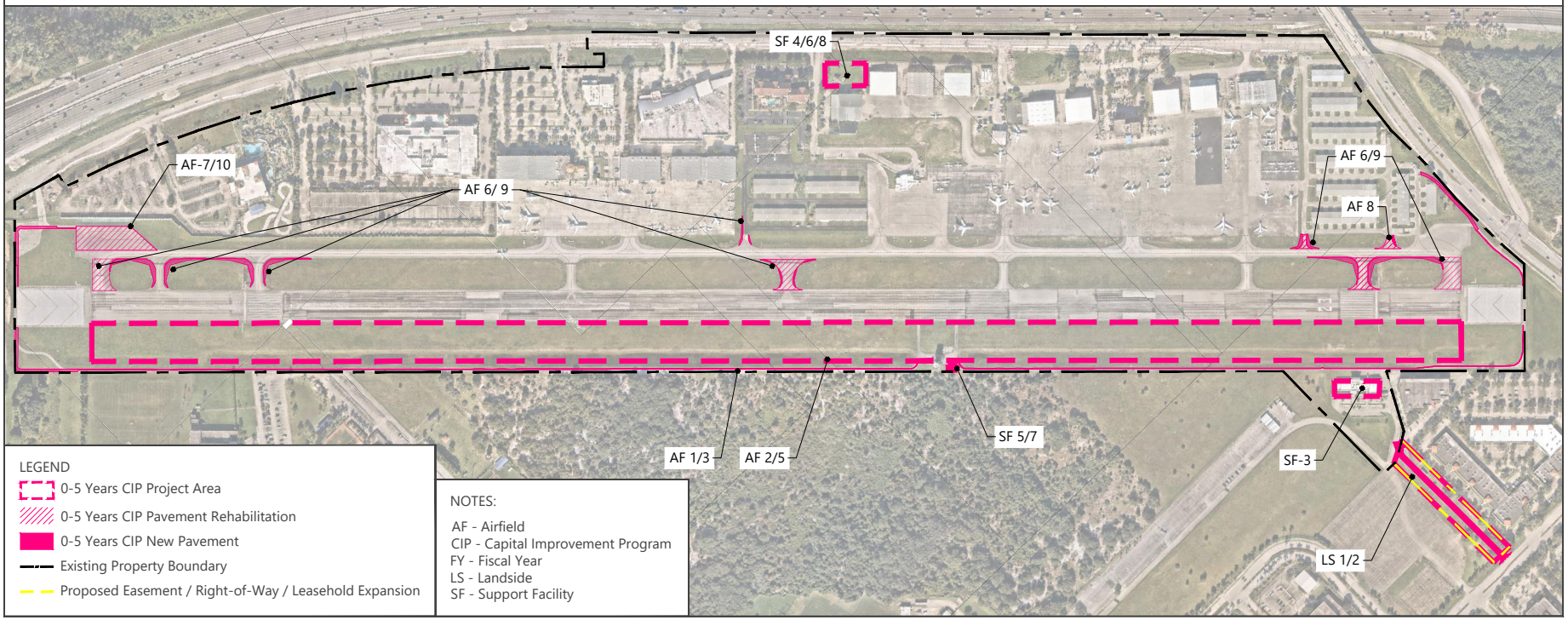
The existing Airport service road, which was last rehabilitated in 2009, is an approximately 9-foot-wide single-lane road that provides vehicle access to the ATCT, serves emergency response vehicles, and allows maintenance and operations vehicles to access various parts of the airfield without crossing the runway. The road is constrained by a fence line on the east side and a drainage basin on the west side. The width of the road and proximity of the fence and drainage swale are not conducive for safely accommodating emergency vehicles and construction equipment. The Airport service road should be widened to accommodate emergency vehicles and rehabilitate the existing road.

- **Anticipated Start Date:** Design and Professional Services (AF 1) – FY 2023; Construction (AF 3) – FY 2024

SHORT-TERM CAPITAL IMPROVEMENT PROGRAM PROJECTS

AF 1 Airport Service Road Rehabilitation (Phase 1A) - Design and Professional Services
AF 2 Stormwater Improvements and Wildlife Mitigation (Phase 1A) - Design and Professional Services
AF 3 Airport Service Road Rehabilitation (Phase 1B) - Construction
AF 4 NAVAIDs and Airfield Lighting and Signage Upgrades - Construction
AF 5 Stormwater Improvements and Wildlife Mitigation (Phase 1B) - Construction
AF 6 Taxiways A, E, G, H, P (connectors at both runway ends only), P3, and P9 Geometry Enhancements and Taxiways E and P3 Rehabilitation - Design
AF 7 Runway 5 - Aircraft Holding Bay Rehabilitation - Design
AF 8 Taxiway P2 Rehabilitation
AF 9 Taxiways A, E, G, H, P (connectors at both runway ends only), P3, and P9 Geometry Enhancements and Taxiways E and P3 Rehabilitation - Construction
AF 10 Runway 5 - Aircraft Holding Bay Rehabilitation - Construction
AF 11 Engineered Materials Arresting System (EMAS) - Fleet Mix Evaluation
LS 1 BRAA Administration Building Access Road - Design
LS 2 BRAA Administration Building Access Road - Construction
PS 1 Marketing Plan Update
PS 2 Noise Exposure Map Update
PS 3 Sustainability Management Plan
PS 4 Electrification Master Plan
PS 5 Underground Utility Mapping
SF 1 Tower Radio, Communication, and Electronics Upgrade - Construction
SF 2 Generator Replacement
SF 3 BRAA Administration Building Renovations
SF 4 Relocation of Electrical Vault and Airport Beacon - Siting Analysis and Preliminary Engineering
SF 5 AWOS Replacement - Siting Analysis and Design
SF 6 Relocation of Electrical Vault and Airport Beacon - Design
SF 7 AWOS Replacement - Construction
SF 8 Relocation of Electrical Vault and Airport Beacon - Construction

Notes:
1 Projects listed in gray are not shown on the exhibit.
2 Projects AF 1, AF 2, AF 4, PS 1, SF 1, SF 2, SF 3 have been initiated as of July 2023.



SOURCES: Ricondo and Associates, Inc., *Airport Layout Plan*, June 2018; Nearmap, Florida, November 2021 (aerial imagery for visual reference only - may not be to scale).

NORTH 0 750 ft

EXHIBIT 8-1

RECOMMENDED CAPITAL IMPROVEMENT PROGRAM PROJECTS
SHORT-TERM (FY 2023 - FY 2027)

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\6. Alternatives Analysis\AutoCAD\MPU Recommended CIP_20230622.dwgLayout: 0-5 Plotted: Oct 31, 2023, 01:46PM

- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** Total ROM Cost – $2,096,666; Design and Professional Services (AF 1) – $166,666; Construction (AF 3) – $1,930,000
- **Funding Source Breakdown:** AIP Entitlement – $149,999 (7 percent); AIG – $1,737,000 (83 percent); FDOT – $162,733 (8 percent); Local – $46,933 (2 percent)

Stormwater Improvements and Wildlife Mitigation (Phases 1A and 1B) – Design and Professional Services (AF 2) and Construction (AF 5)

Project AF 2 has been initiated as of July 2023.

This project includes the design, professional services, and construction necessary to improve portions of the Runway 5-23 RSA and portions of the Airport's open ditch stormwater treatment area adjacent to Airport Road. The improvements could entail covering these stormwater treatment areas with underground stormwater containment systems or a comparable means for subsurface water treatment and retention.

The proposed project would improve (by leveling) the grading for the Runway 5-23 RSA and reduce the potential for wildlife attractants to this area that currently exist because of the open stormwater treatment and retention area. Along Airport Road, the repurposing of surface area currently serving stormwater treatment and retention would offer the opportunity for additional revenue-generating development or uses.

- **Anticipated Start Date:** Design and Professional Services (AF 2) – FY 2023; Construction (AF 5) – FY 2024
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** Total ROM Cost – $2,610,000; Design and Professional Services (AF 2) – $250,000; Construction (AF 5) – $2,360,000
- **Funding Source Breakdown:** AIP Entitlement – $300,001 (12 percent); AIP Discretionary – $1,259,999 (48 percent); AIG – $714,000 (27 percent); FDOT – $238,800 (9 percent); Local – $97,200 (4 percent)

NAVAIDs and Airfield Lighting and Signage Upgrades – Construction (AF 4)

Project AF 4 has been initiated as of July 2023.

During the development of the BCT CIP and implementation plan, Project AF 4, NAVAIDs and Airfield Lighting and Signage Upgrades – Construction, has been initiated.

This project includes the installation of new LED airfield signage, MIRLs, displaced threshold lights, portions of the taxiway edge lighting system, obstruction lights, REILs, new runway circuit conductors, and wind cones. This project will update the existing parallel taxiway name to Taxiway B, and the associated connectors, between the runway and the parallel taxiway, will be designated as B1 through B9, beginning at the Runway 23 approach end.

- **Anticipated Start Dat**e: FY 2024
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** $4,300,000
- **Funding Source Breakdown:** FDOT – $3,440,000 (80 percent); Local – $860,000 (20 percent)

Taxiways A, E, G, H, P (connectors at both runway ends only), P3, and P9 Geometry Enhancements and Taxiways E and P3 Rehabilitation – Design (AF 6) and Construction (AF 9)

This project includes the design and construction associated with taxiway geometry enhancements and rehabilitation. The geometry enhancements will add approximately 2,800 square yards of additional pavement to the edge of the existing taxiways and remark the centerlines to comply with FAA guidance. Taxiways A, E, G, H, P (taxiway connectors at both runway ends only), P3, and P9 do not provide the standard TESM and centerline turning radius in accordance with FAA design standards for TDG 2B.

The 2022 FDOT SAPMP evaluated Airport pavements, recorded their condition, and provided recommendations on how to repair and/or extend the life of the pavement. Pavement condition based on the PCI was divided into three categories: (1) 71 through 100, requiring preventative maintenance; (2) 41 through 70, requiring major rehabilitation; and (3) 0 through 40 requiring reconstruction. According to the 2022 FDOT SAPMP, Taxiways E and P3 are forecast to have a PCI of 66 and 69, respectively. FAA Order 5100.38D, Change 1, *AIP Handbook*, identified major rehabilitation projects for pavement sections below a PCI value of 70.

- **Anticipated Start Date:** Design (AF 6) – FY 2025; Construction (AF 9) – FY 2026
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** Total ROM Cost – $1,500,000; Design (AF 6) – $190,000; Construction (AF 9) – $1,310,000
- **Funding Source Breakdown:** AIP Entitlement – $300,000 (20 percent); AIG – $950,000 (63 percent); FDOT – $220,000 (15 percent); Local – $30,000 (2 percent)

Runway 5 Aircraft Holding Bay Rehabilitation – Design (AF 7) and Construction (AF 10)

This project includes the design and construction of pavement rehabilitation for the existing Runway 5 aircraft holding bay, which is approximately 3,500 square yards. The 2022 FDOT SAPMP documented potential pavement rehabilitation needs through FY 2032 and estimated the Runway 5 aircraft holding bay pavement would need to be rehabilitated by FY 2027. According to the 2022 FDOT SAPMP, the Runway 5 holding bay is forecast to have a PCI of 68 in FY 2027.

- **Anticipated Start Date:** Design (AF 7) – FY 2026; Construction (AF 10) – FY 2027
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** Total ROM Cost – $810,000; Design (AF 7) – $110,000; Construction (AF 10) – $700,000
- **Funding Source Breakdown:** FDOT – $648,000 (80 percent); Local – $162,000 (20 percent)

Taxiway P2 Rehabilitation (AF 8)

This project includes the rehabilitation of approximately 300 square yards of Taxiway P2 pavement. The 2022 FDOT SAPMP documented potential pavement rehabilitation needs through FY 2032 and estimated Taxiway P2 may need pavement rehabilitation in the short-term planning period. According to the 2022 FDOT SAPMP, Taxiway P2 is forecast to have a PCI of 67 in FY 2026.

- **Anticipated Start Date:** FY 2026
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** $40,000

- **Funding Source Breakdown:** Local – $40,000 (100 percent)

Engineered Materials Arresting System (EMAS) – Fleet Mix Evaluation (AF 11)

This project includes coordination with the EMAS manufacturer and the subsequent evaluation of the existing EMAS beds. The evaluation will review the ability of the EMAS beds to mitigate reduced RSA lengths considering the evolving fleet, including D-III aircraft. The existing runways use EMAS beds to mitigate design-standard RSA lengths beyond the runway end. The EMAS beds were installed in 2016 and 2017, prior to the D-III critical aircraft designation.

- **Anticipated Start Date:** FY 2027
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** $40,000
- **Funding Source Breakdown:** FDOT – $32,000 (80 percent); Local – $8,000 (20 percent)

8.4.1.2 LANDSIDE PROJECTS

BRAA Administration Building Access Road – Design (LS 1) and Construction (LS 2)

This project includes the design and construction of a new dedicated access road providing connectivity from FAU Boulevard to the BRAA Administration Building, observation area, and ATCT. The new access road would total approximately 2,100 square yards of pavement and include sidewalks, lighting, and a landscaping allowance.

Currently, access to the BRAA Administration Building and ATCT is provided via a parking lot within the leasehold of the FAU Research Park.

- **Anticipated Start Date:** Design (LS 1) – FY 2025; Construction (LS 2) – FY 2026
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** Total ROM Cost – $1,030,000; Design (LS 1) – $130,000; Construction (LS 2) – $900,000
- **Funding Source Breakdown:** FDOT – $824,000 (80 percent); Local – $206,000 (20 percent)

8.4.1.3 SUPPORT FACILITY PROJECTS

Tower Radio, Communication, and Electronics Upgrade – Construction (SF 1)

Project SF 1 has been initiated as of July 2023.

This project includes upgrades to the radio system, communication system, and electronics used within the ATCT. These systems are critical for ensuring separation between aircraft and between aircraft and vehicular ground movements within the airfield environment, as well as for monitoring the airfield electrical components.

- **Anticipated Start Date:** FY 2023
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** $400,000
- **Funding Source Breakdown:** FDOT – $320,000 (80 percent); Local – $80,000 (20 percent)

Generator Replacement (SF 2)

Project SF 2 has been initiated as of July 2023.

This project includes the replacement of a generator supporting the ATCT. The existing generator is reaching the end of its useful life and requires ongoing maintenance. The new generator would support energy-efficient operations. If additional funds remain, then the existing generator supporting the electrical vault will be replaced.

- **Anticipated Start Date:** FY 2023
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** $250,000
- **Funding Source Breakdown:** FDOT – $200,000 (80 percent); Local – $50,000 (20 percent)

BRAA Administration Building Renovations (SF 3)

Project SF 3 has been initiated as of July 2023.

This project includes interior reconfigurations to the BRAA Administration Building, such as a conference room expansion and adjustments to several interior spaces. The renovations will optimize the building layout and provide increased collaboration areas.

- **Anticipated Start Date:** FY 2023
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** $120,000
- **Funding Source Breakdown:** FDOT – $96,000 (80 percent); Local – $24,000 (20 percent)

Relocation of Electrical Vault and Airport Beacon – Siting Analysis and Preliminary Engineering (SF 4), Design (SF 6), and Construction (SF 8)

This project includes a siting analysis and preliminary engineering, design, and construction related to the relocation of the electrical vault and Airport beacon relocation. Equipment from the electrical vault could potentially be relocated to the first floor of the ATCT, and the beacon could be relocated to the top of the ATCT. If the equipment cannot be relocated within the ATCT, then a small standalone vault will be constructed outside the ATCT.

The electrical vault was constructed in the 1990s and is in fair condition. However, relocation of the electrical vault and the Airport beacon is recommended to increase space for future development at BCT.

- **Anticipated Start Date:** Siting Analysis and Preliminary Engineering (SF 4) – FY 2025; Design (SF 6) – FY 2026; Construction (SF 8) – FY 2027
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** Total ROM Cost – $3,820,000; Siting Analysis and Preliminary Engineering (SF 4) – $230,000; Design (SF 6) – $200,000; Construction (SF 8) – $3,390,000
- **Funding Source Breakdown:** FDOT – $2,968,000 (80 percent); Local – $742,000 (20 percent)

AWOS Replacement – Siting Analysis and Design (SF 5) and Construction (SF 7)

This project includes a siting analysis, the design phase, and the construction related to the replacement of the existing AWOS. The existing AWOS III, which was installed in 2013, does not function properly and requires ongoing maintenance.

- **Anticipated Start Date:** Siting Analysis and Design (SF 5) – FY 2025; Construction (SF 7) – FY 2026
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** Total ROM Cost – $900,000; Siting Analysis and Design (SF 5) – $80,000; Construction (SF 7) – $820,000

  Funding Source Breakdown: AIG – $738,000 (82 percent); FDOT – $129,600 (14 percent); Local – $32,400 (4 percent)

8.4.1.4 PLANNING PROJECTS

Short-Term Planning Studies – Marketing Plan Update (PS 1), Noise Exposure Map Update (PS 2), Sustainability Management Plan (PS 3), Electrification Master Plan (PS 4), and Underground Utility Mapping (PS 5)

Project PS 1 has been initiated as of July 2023.

The BRAA will update and/or develop various management and planning studies for BCT, including the Marketing Plan Update, Noise Exposure Map Update, Sustainability Management Plan Update, Electrification Master Plan, and Underground Utility Mapping study. These studies will assist the BRAA in marketing the Airport, revising noise contours, expanding the Authority's commitment to sustainability, and developing a utility atlas to create a comprehensive source of all utilities.

- **Anticipated Start Date:** PS 1 – FY 2023; PS 2 – FY 2024; PS 3 – FY 2024; PS 4 – FY 2025; PS 5 – FY 2027
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):**
  - Marketing Plan Update (PS 1) – $200,000
  - Noise Exposure Map Update (PS 2) – $220,000
  - Sustainability Management Plan (PS 3) – $380,000
  - Electrification Master Plan (PS 4) – $170,000
  - Underground Utility Mapping (PS 5) – $440,000
- **Funding Source Breakdown:**
  - Marketing Plan Update (PS 1) – FDOT – $160,000 (80 percent); Local – $40,000 (20 percent)
  - Noise Exposure Map Update (PS 2) – FDOT – $176,000 (80 percent); Local – $44,000 (20 percent)
  - Sustainability Management Plan (PS 3) – FDOT – $304,000 (80 percent); Local – $76,000 (20 percent)
  - Electrification Master Plan (PS 4) – FDOT – $136,000 (80 percent); Local – $34,000 (20 percent)
  - Underground Utility Mapping (PS 5) – FDOT – $352,000 (80 percent); Local – $88,000 (20 percent)

8.4.2 INTERMEDIATE-TERM PROJECTS (FY 2028 – FY 2032)

Exhibit 8-2 illustrates the intermediate-term projects. The intermediate-term projects identified in the CIP are described as follows:

8.4.2.1 AIRFIELD PROJECTS

Engineered Materials Arresting System (EMAS) Rehabilitation (Seam Sealer Replacement; AF 12)

This project includes resealing the seams between the EMAS blocks at both ends of the Runway to prevent water intrusion. This project has been recommended by the EMAS manufacturer as a mid–life cycle rehabilitation.

- **Anticipated Start Date:** FY 2028
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** $1,230,000
- **Funding Source Breakdown:** FDOT – $984,000 (80 percent); Local – $246,000 (20 percent)

Taxiways A, H, and P9 Rehabilitation – Design (AF 13) and Construction (AF 15)

This project includes the design and construction of approximately 2,200 square yards of pavement associated with the rehabilitation of Taxiways A, H, and P9. The 2022 FDOT SAPMP documented potential pavement rehabilitation needs through FY 2032. Taxiways A, H, and P9 were identified as requiring pavement rehabilitation in FY 2030, FY 2028, and FY 2030, respectively. According to the 2022 FDOT SAPMP, Taxiways A, H, and P9 are forecast to have a PCI of 69, 67, and 69, respectively, in FY 2030.

- **Anticipated Start Date:** Design (AF 13) – FY 2029; Construction (AF 15) – FY 2030
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** Total ROM Cost – $520,000; Design (AF 13) – $70,000; Construction (AF 15) – $450,000
- **Funding Source Breakdown:** FDOT – $416,000 (80 percent); Local – $104,000 (20 percent)

Taxiway P Rehabilitation – Design (AF 14) and Construction (AF 18)

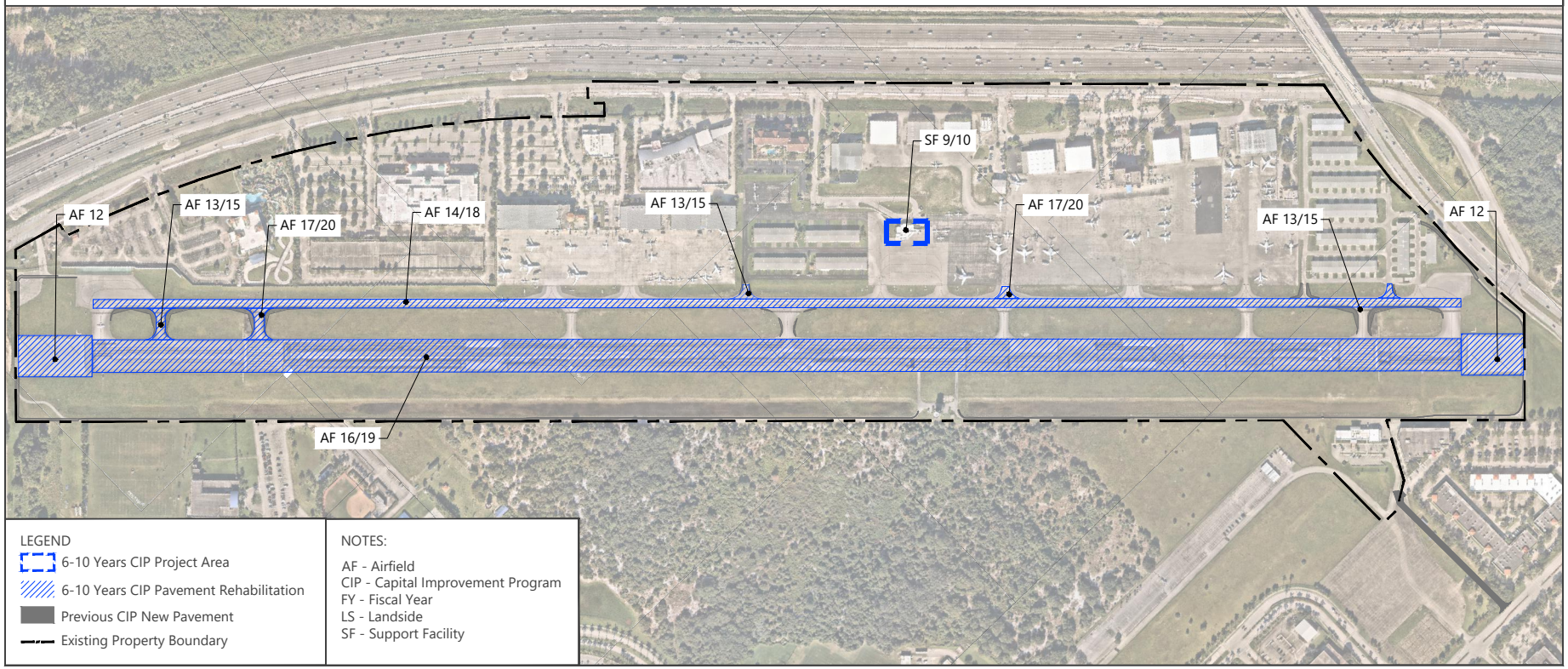
This project includes the design and rehabilitation of approximately 30,000 square yards of pavement associated with the Taxiway P rehabilitation. The 2022 FDOT SAPMP documented potential pavement rehabilitation needs through FY 2032 and estimated Taxiway P will require rehabilitation in FY 2031. According to the 2022 FDOT SAPMP, the oldest pavement section of Taxiway P is forecast to have a PCI of 67 in FY 2031.

- **Anticipated Start Date:** Design (AF 14) – FY 2029; Construction (AF 18) – FY 2031
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** Total ROM Cost – $6,730,000; Design (AF 14) – $830,000; Construction (AF 18) – $5,900,000
- **Funding Source Breakdown:** AIP Entitlement – $300,000 (5 percent); AIP Discretionary – $2,052,000 (30 percent); FDOT – $4,066,400 (60 percent); Local – $311,600 (5 percent)

INTERMEDIATE-TERM CAPITAL IMPROVEMENT PROGRAM PROJECTS

AF 12 Engineered Materials Arresting System (EMAS) Rehabilitation (Seam Sealer Replacement)
AF 13 Taxiways A, H, and P9 Rehabilitation - Design
AF 14 Taxiway P Rehabilitation - Design
AF 15 Taxiways A, H, and P9 Rehabilitation - Construction
AF 16 Runway 5-23 Rehabilitation - Design
AF 17 Taxiways G and P6 Rehabilitation - Design
AF 18 Taxiway P Rehabilitation - Construction
AF 19 Runway 5-23 Rehabilitation - Construction - Phase 1
AF 20 Taxiways G and P6 Rehabilitation - Construction
PS 6 Facilities Management Plan Update
SE 1 Airport Security Improvements - CCTV Cameras and Associated Infrastructure - Design
SE 2 Airport Security Improvements - Replace Gate Controllers and Keypads
SE 3 Airport Security Improvements - CCTV Cameras and Associated Infrastructure - Construction
SF 9 US Customs and Border Protection Rehabilitation and Improvements - Design
SF 10 US Customs and Border Protection Rehabilitation and Improvements - Construction

Notes:
1 Projects listed in gray are not shown on the exhibit.
2 Projects AF 13, AF 14, AF 15, AF 17, AF 18, and AF 20 could be designed and contructed as one project pending funding availability and project justification.



SOURCES: Ricondo and Associates, Inc., *Airport Layout Plan*, June 2018; Nearmap, Florida, November 2021 (aerial imagery for visual reference only - may not be to scale).

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EXHIBIT 8-2

RECOMMENDED CAPITAL IMPROVEMENT PROGRAM PROJECTS
INTERMEDIATE-TERM (FY 2028 - FY 2032)

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Runway 5-23 Rehabilitation – Design (AF 16) and Construction Phase 1 (AF 19)

This project includes the design and Phase 1 construction associated with the rehabilitation of Runway 5-23. The runway rehabilitation was separated into two phases for funding considerations. However, a single phase for rehabilitation would reduce risk and promote quality and efficiency. Phase 1 is anticipated to include rehabilitation of the runway's keel or approximately one half of the length of the runway. The 2022 FDOT SAPMP documented potential pavement rehabilitation needs through FY 2032 and estimated Runway 5-23 will require rehabilitation in FY 2032. Phase 2 is planned to occur in FY 2032 and is designated as a long-term project. According to the 2022 FDOT SAPMP, the oldest pavement section of Runway 5-23 is forecast to have a PCI of 68 in FY 2031.

- **Anticipated Start Date:** Design (AF 16) – FY 2030; Construction (AF 19) – FY 2032
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** Total ROM Cost – $9,770,000; Design (AF 16) – $2,140,000; Construction (AF 19) – $7,630,000
- **Funding Source Breakdown:** AIP Entitlement – $375,000 (4 percent); AIP Discretionary – $3,486,400 (36 percent); FDOT – $5,328,000 (54 percent); Local – $580,600 (6 percent)

Taxiways G and P6 Rehabilitation – Design (AF 17) and Construction (AF 20)

This project includes the design and rehabilitation of approximately 1,900 square yards of pavement associated with the rehabilitation of Taxiways G and P6. The 2022 FDOT SAPMP documented potential pavement rehabilitation needs through FY 2032 and estimated Taxiways G and P6 will require pavement rehabilitation in FY 2032. According to the 2022 FDOT SAPMP, Taxiways G and P6 are forecast to have a PCI of 69 and 70, respectively, in FY 2032.

- **Anticipated Start Date:** Design (AF 17) – FY 2030; Construction (AF 20) – FY 2032
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** Total ROM Cost – $550,000; Design (AF 17) – $70,000; Construction (AF 20) – $480,000
- **Funding Source Breakdown:** FDOT – $440,000 (80 percent); Local – $110,000 (20 percent)

8.4.2.2 PLANNING PROJECTS

Facilities Management Plan Update (PS 6)

This project will update the Airport's Facilities Management Plan. The Facilities Management Plan is recommended to be updated every 5 years to document conditions, identify maintenance and rehabilitation needs, and estimate cost and timeframe for improvements.

- **Anticipated Start Date:** FY 2028
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** $190,000
- **Funding Source Breakdown:** FDOT – $152,000 (80 percent); Local – $38,000 (20 percent)

8.4.2.3 SECURITY PROJECTS

Airport Security Improvements – CCTV Cameras and Associated Infrastructure Design and Construction (SE 1 and SE 3) and Replace Gate Controllers and Keypads (SE 2)

This project includes the design and implementation of Airport security improvements, such as closed-circuit television (CCTV) cameras and the replacement of remote gate controllers and keypads. Additional security improvements include the installation of fiber optic cabling, as well as supporting infrastructure, hardware, and other appurtenances needed to integrate with the Airport's current security systems.

- **Anticipated Start Date:** Design (SE 1) – FY 2028; Replacement of Gate Controllers and Keypads (SE 2) – FY 2028; Construction (SE 3) – FY 2029
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** Total ROM Cost – $3,360,000; Design (SE 1) – $370,000; Replacement of Gate Controllers and Keypads (SE 2) – $440,000; Construction (SE 3) – $2,550,000
- **Funding Source Breakdown:** FDOT – $2,688,000 (80 percent); Local – $672,000 (20 percent)

8.4.2.4 SUPPORT FACILITY PROJECTS

US Customs and Border Protection Rehabilitation and Improvements – Design (SF 9) and Construction (SF 10)

The US CBP facility was constructed in 2018. It is anticipated that by FY 2029 minor improvements, including an air conditioner replacement, security system upgrades, appliance upgrades, a garbage room expansion, and generator upgrades, will be needed. Extending the nearby natural gas line and replacing the existing incinerator will be considered as part of this project.

- **Anticipated Start Date:** Design (SF 9) – FY 2028; Construction (SF 10) – FY 2029
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** Total ROM Cost – $990,000; Design (SF 9) – $160,000; Construction (SF 10) – $830,000
- **Funding Source Breakdown:** FDOT – $792,000 (80 percent); Local – $198,000 (20 percent)

8.4.3 LONG-TERM PROJECTS (FY 2033 – FY 2040)

The long-term projects included in the CIP are described in the following subsections and illustrated on **Exhibit 8-3**.

8.4.3.1 AIRFIELD PROJECTS

Runway 5-23 Rehabilitation – Construction Phase 2 (AF 21)

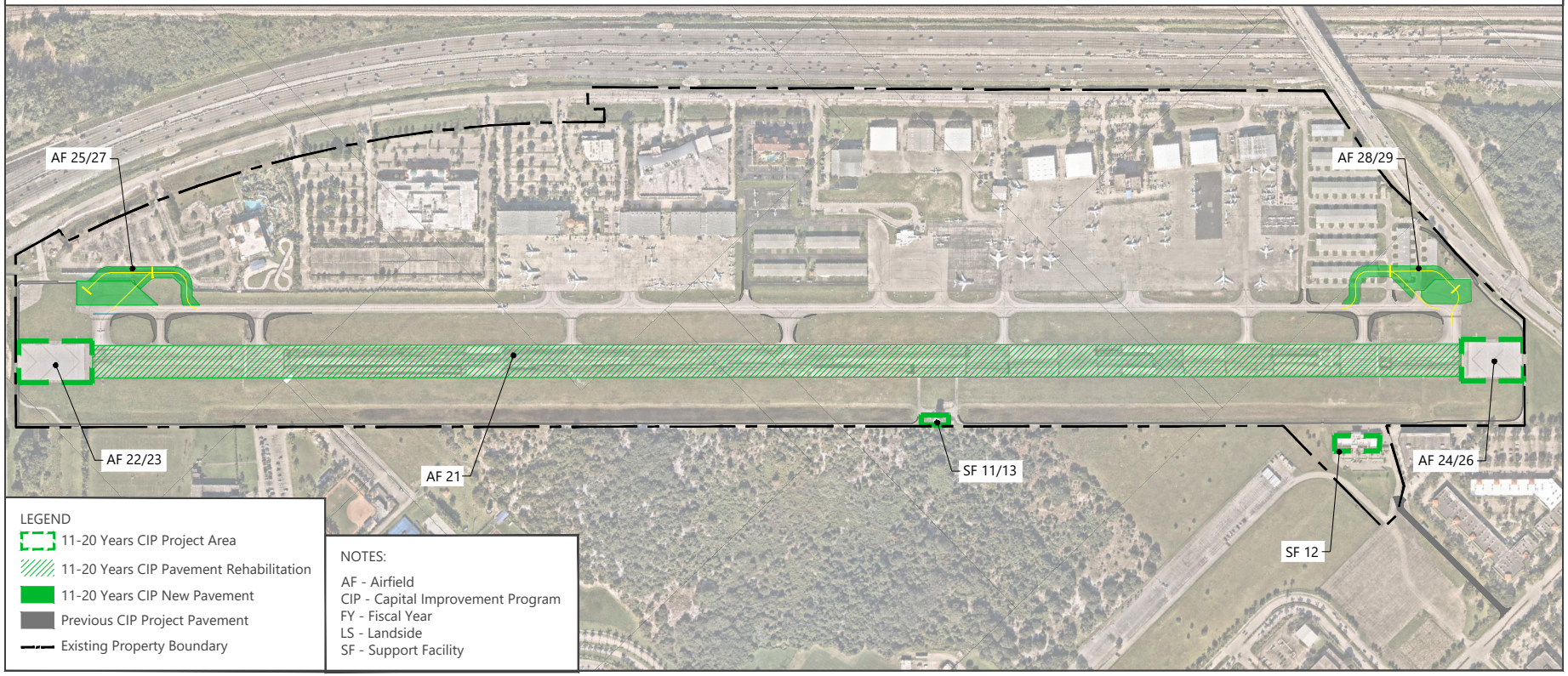
This project includes the construction associated with Phase 2 of the rehabilitation of Runway 5-23. The runway rehabilitation was separated into two phases for funding considerations. However, a single phase for rehabilitation would reduce risk and promote quality and efficiency. The design phase (AF 16) and Phase 1 construction (AF 19) are assumed to have occurred during the intermediate-term project period. Phase 2 is anticipated to include rehabilitation of the outer sections of the runway (excluding the keel) or approximately one half of the length of the runway. The 2022 FDOT SAPMP documented potential pavement rehabilitation needs through FY 2032 and estimated Runway 5-23 will require rehabilitation in FY 2032. According to the 2022 FDOT SAPMP, the oldest pavement section of Runway 5-23 is forecast to have a PCI of 68 in FY 2031.

LONG-TERM CAPITAL IMPROVEMENT PROGRAM PROJECTS

AF 21 Runway 5-23 Rehabilitation - Construction - Phase 2
AF 22 Improve Runway Safety Area - Install EMAS Runway 5 Departure End - Design
AF 23 Improve Runway Safety Area - Install EMAS Runway 5 Departure End - Construction
AF 24 Improve Runway Safety Area - Install EMAS Runway 23 Departure End - Design
AF 25 Runway 5 Aircraft Holding Bay - Design
AF 26 Improve Runway Safety Area - Install EMAS Runway 23 Departure End - Construction
AF 27 Runway 5 Aircraft Holding Bay - Construction
AF 28 Runway 23 Aircraft Holding Bay - Design
AF 29 Runway 23 Aircraft Holding Bay - Construction

PS 7 Facilities Management Plan Update
PS 8 Facilities Management Plan Update
SE 4 Airport Security Improvements - CCTV Cameras and Associated Infrastructure - Design
SE 5 Airport Security Improvements - CCTV Cameras and Associated Infrastructure - Construction
SE 6 Airport Security Improvements - Replace Gate Controllers and Keypads
SF 11 Replace Air Traffic Control Tower with Virtual or Remote Tower - Technology Review and Design
SF 12 BRAA Administration Building Rehabilitation and Improvements
SF 13 Replace Air Traffic Control Tower with Virtual or Remote Tower - Construction
SF 14 AWOS Replacement with ASOS - Siting Analysis and Design

Note: Projects listed in gray are not shown on the exhibit.



SOURCES: Ricondo and Associates, Inc., *Airport Layout Plan*, June 2018; Nearmap, Florida, November 2021 (aerial imagery for visual reference only - may not be to scale).

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EXHIBIT 8-3

RECOMMENDED CAPITAL IMPROVEMENT PROGRAM PROJECTS
LONG-TERM (FY 2033 - FY 2040)

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- **Anticipated Start Date:** FY 2033
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** $7,900,000
- **Funding Source Breakdown:** AIP Entitlement – $375,000 (5 percent); AIP Discretionary – $3,839,000 (48 percent); FDOT – $3,528,000 (45 percent); Local – $158,000 (2 percent)

Improve Runway Safety Area – Install EMAS Runway 5 Departure End – Design (AF 22) and Construction (AF 23)

This project includes the design and construction of the Runway 5 departure end EMAS bed based on the fleet mix evaluation (Project AF 11) and the ability of the EMAS bed to mitigate reduced RSA lengths considering the current aircraft fleet. The existing EMAS bed is forecast to be nearing the end of its useful life. This project would also be an in-kind replacement of the existing EMAS, which is expected to last approximately 20 years and will tentatively require replacement by FY 2036.

- **Anticipated Start Date:** Design (AF 22) – FY 2035; Construction (AF 23) – FY 2036
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** Total ROM Cost – $8,820,000; Design (AF 22) – $720,000; Construction (AF 23) – $8,100,000
- **Funding Source Breakdown:** AIP Entitlement – $450,000 (5 percent); AIP Discretionary – $4,856,000 (55 percent); FDOT – $3,337,600 (38 percent); Local – $176,400 (2 percent)

Improve Runway Safety Area – Install EMAS Runway 23 Departure End – Design (AF 24) and Construction (AF 26)

This project includes the design and construction of the Runway 23 departure end EMAS bed based on the fleet mix evaluation (Project AF 11) and the ability of the EMAS bed to mitigate reduced RSA lengths for the fleet of aircraft. This project would also be an in-kind replacement of the existing EMAS, which is expected to last approximately 20 years and will tentatively require replacement by FY 2037.

- **Anticipated Start Date:** Design (AF 24) – FY 2036; Construction (AF 26) – FY 2037
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** Total ROM Cost – $9,130,000; Design (AF 24) – $750,000; Construction (AF 26) – $8,380,000
- **Funding Source Breakdown:** AIP Entitlement – $150,000 (2 percent); AIP Discretionary – $4,182,400 (46 percent); FDOT – $4,480,000 (49 percent); Local – $317,600 (3 percent)

Runway 5 Aircraft Holding Bay – Design (AF 25) and Construction (AF 27)

This project includes the design and construction of a 32,000-square-foot aircraft holding bay and 19,500 square feet of grass island at the Runway 5 end. Markings would be painted to identify intermediate hold position designations to allow aircraft to queue in the holding bay.

Aircraft could hold at an intermediate holding position marking until cleared to use the bypass taxiway to access the runway end or continue taxiing to the holding position. Additionally, this project would prevent aircraft from holding within the Taxiway P ADG III object-free area (OFA). The aircraft holding bay would accommodate all aircraft that are currently operating at, or are forecast to operate at, BCT. The construction of the Runway 5 aircraft holding

bay will impact existing tenant leaseholds. The project limits, along with the timing, will need to be closely coordinated with the existing tenants.

- **Anticipated Start Date:** Design (AF 25) – FY 2037; Construction (AF 27) – FY 2038
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** Total ROM Cost – $1,470,000; Design (AF 25) – $150,000; Construction (AF 27) – $1,320,000
- **Funding Source Breakdown:** AIP Entitlement – $150,000 (10 percent); AIP Discretionary – $1,038,000 (71 percent); FDOT – $225,600 (15 percent); Local – $56,400 (4 percent)

Runway 23 Aircraft Holding Bay – Design (AF 28) and Construction (AF 29)

This project includes the design and construction of a 39,000-square-foot aircraft holding bay and 24,500 square feet of grass island at the Runway 23 end. Markings would be painted to identify intermediate hold position designations to allow aircraft to queue in the holding bay. The existing holding bay does not meet FAA standards.

Aircraft could hold at an intermediate holding position marking until cleared to use the bypass taxiway to access the runway end or continue taxiing to the holding position. Additionally, this project would prevent aircraft from holding within the Taxiway P ADG III OFA. The aircraft holding bay would accommodate all aircraft that are currently operating at, or are forecast to operate at, BCT. The construction of the Runway 23 aircraft holding bay will impact existing tenant leaseholds. The project limits, along with the timing, will need to be closely coordinated with the existing tenants.

- **Anticipated Start Date:** Design (AF 28) – FY 2039; Construction (AF 29) – FY 2040
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** Total ROM Cost – $2,270,000; Design (AF 28) – $240,000; Construction (AF 29) – $2,030,000
- **Funding Source Breakdown:** AIP Entitlement – $300,000 (13 percent); AIP Discretionary – $1,527,000 (67 percent); FDOT – $354,400 (16 percent); Local – $88,600 (4 percent)

8.4.3.2 PLANNING PROJECTS

Facilities Management Plan Update (PS 7 and PS 8)

BRAA typically updates the Facilities Management Plan every 5 years. The BRAA will develop a Facilities Management Plan Update twice in the long-term projects period.

- **Anticipated Start Date:** PS 7 – FY 2033; PS 8 – FY 2038
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):**
  - PS 7 – $220,000
  - PS 8 – $270,000
- **Funding Source Breakdown:**
  - PS 7 – FDOT – $176,000 (80 percent); Local – $44,000 (20 percent)
  - PS 8 – FDOT – $216,000 (80 percent); Local – $54,000 (20 percent)

8.4.3.3 SECURITY PROJECTS

Airport Security Improvements – CCTV Cameras and Associated Infrastructure Design and Construction (SE 4 and SE 5) and Replace Gate Controllers and Keypads (SE 6)

This project includes the design and implementation of Airport security improvements, such as CCTV cameras and the replacement of remote gate controllers and keypads. Additional security improvements include the installation of fiber optic cabling, as well as supporting infrastructure, hardware, and other appurtenances needed to integrate with the Airport's current security systems.

- **Anticipated Start Date:** Design (SE 4) – FY 2034; Construction (SE 5) – FY 2035; Replace Gate Controllers and Keypads (SE 6) – FY 2038
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** Total ROM Cost – $4,200,000; Design (SE 4) – $460,000; Construction (SE 5) – $3,130,000; Replace Gate Controllers and Keypads (SE 6) – $610,000
- **Funding Source Breakdown:** FDOT – $3,360,000 (80 percent); Local – $840,000 (20 percent)

8.4.3.4 SUPPORT FACILITY PROJECTS

Replace Air Traffic Control Tower with Virtual or Remote Tower – Technology Review and Design (SF 11) and Construction (SF 13)

This project includes the technology review, design, and construction of a replacement ATCT. By the end of the planning horizon, the ATCT will be approximately 40 years old and approaching the end of its useful life. As a substitute for the construction of a new ATCT, it is recommended that the possibility of a remote or virtual tower be explored. A remote or virtual tower could be located on or off Airport property. The MPU is recommending that a technology review of remote or virtual tower technology be conducted in FY 2033. Pending the results of the technology review and subsequent discussion with the FAA and FDOT, a new ATCT may be necessary in the long term.

- **Anticipated Start Date:** Technology and Design (SF 11) – FY 2033; Construction (SF 13) – FY 2034
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** Total ROM Cost – $4,110,000; Technology and Design (SF 11) – $370,000; Construction (SF 13) – $3,740,000
- **Funding Source Breakdown:** FDOT – $3,288,000 (80 percent); Local – $822,000 (20 percent)

BRAA Administration Building Rehabilitation and Improvements (SF 12)

This project includes the rehabilitation and improvements to the BRAA Administration Building. The existing administration building was constructed in 2015 and is in excellent condition. Minor renovations are planned to be completed in FY 2023 to optimize the building layout and collaboration areas. The building is anticipated to require further rehabilitation and improvements in FY 2034 as the building nears 20 years of age.

- **Anticipated Start Date:** FY 2034
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** $760,000
- **Funding Source Breakdown:** FDOT – $608,000 (80 percent); Local – $152,000 (20 percent)

AWOS Replacement with ASOS – Siting Analysis and Design (SF 14)

The BRAA will conduct a siting analysis and design related to replacing the AWOS with an ASOS. A future site that meets NOAA ASOS requirements has not been identified and requires further analysis.

- **Anticipated Start Date:** FY 2040
- **Environmental Documentation:** Categorical Exclusion
- **ROM Cost (Escalated):** $200,000
- **Funding Source Breakdown:** FDOT – $160,000 (80 percent); Local – $40,000 (20 percent)

8.5 CAPITAL IMPROVEMENT PROGRAM

The culmination of the airport master planning process and the implementation plan is the creation of the CIP, which combines the estimated project sequencing by year and ROM costs with anticipated funding sources. Funding levels are estimates, and eligibility percentages may change as projects undergo detailed programming and design development. The estimated costs and potential funding sources represent a master plan level of detail and are based on anticipated funding sources. Projects that have been previously identified and programmed in the existing CIP may have already secured FAA and FDOT grant funding.

BRAA should periodically review the phasing of individual projects in the CIP to determine the need for changes based on variations in forecast demand, available funding, economic conditions, and/or unforeseen factors that influence Airport development. It is also possible that other enhancements not identified in the CIP may be required to support Airport operations and/or improve operational efficiency.

The short-term CIP totals approximately $19.3 million in capital improvements and expenditures; it includes projects such as NAVAIDs and airfield lighting and signage upgrades, stormwater improvements and wildlife mitigation, and the relocation of the electrical vault and Airport beacon. For the short term, estimated FAA AIP entitlement funds total approximately $0.8 million; AIP discretionary funds total approximately $1.3 million; AIG funds total approximately $4.1 million; FDOT funds total approximately $10.5 million; and local funds total approximately $2.7 million. **Table 8-2** presents the short-term CIP funding sources.

The intermediate-term CIP totals approximately $23.3 million; it includes projects such as Phase 1 Runway 5-23 rehabilitation, taxiway rehabilitation, and US CBP facility rehabilitation and improvements. For the intermediate term, estimated FAA AIP entitlement funds total approximately $0.7 million; AIP discretionary funds total approximately $5.5 million; FDOT funds total approximately $14.9 million; and local funds total approximately $2.3 million. **Table 8-3** presents the intermediate-term CIP funding sources.

The long-term CIP totals approximately $39.4 million; it includes projects such as installation of the Runway 5 departure end EMAS, the installation of Runway 23 departure end EMAS, and construction of the Runway 5 and Runway 23 aircraft holding bays. For the long term, estimated FAA AIP entitlement funds total approximately $1.4 million; AIP discretionary funds total approximately $15.4 million; FDOT funds total approximately $19.7 million; and local funds total approximately $2.7 million. **Table 8-4** presents the long-term CIP funding sources.

The overall CIP program is estimated to cost $82.0 million. **Table 8-5** presents the total project costs and **Exhibit 8-4** illustrates the percentage of funding estimated for the entire planning period.

TABLE 8-2 (1 OF 2) SHORT-TERM CAPITAL IMPROVEMENT PROGRAM FUNDING SOURCES

PROJECT ID[1]	PROJECT DESCRIPTION	FISCAL YEAR	TOTAL COST (ESCALATED)	FAA ENTITLEMENT	FAA AIG	AIP DISCRETIONARY	FDOT	LOCAL FUNDS
AF 1	Airport Service Road Rehabilitation (Phase 1A) – Design and Professional Services	2023	$166,666	$149,999	$-	$-	$8,333	$8,333
PS 1	Marketing Plan Update	2023	$200,000	$-	$-	$-	$160,000	$40,000
AF 2	Stormwater Improvements and Wildlife Mitigation (Phase 1A) – Design and Professional Services	2023	$250,000	$150,000	$-	$-	$50,000	$50,000
SF 1	Tower Radio, Communication, and Electronics Upgrade – Construction	2023	$400,000	$-	$-	$-	$320,000	$80,000
SF 2	Generator Replacement	2023	$250,000	$-	$-	$-	$200,000	$50,000
SF 3	BRAA Administration Building Renovations	2023	$120,000	$-	$-	$-	$96,000	$24,000
AF 3	Airport Service Road Rehabilitation (Phase 1B) – Construction	2024	$1,930,000	$-	$1,737,000	$-	$154,400	$38,600
PS 2	Noise Exposure Map Update	2024	$220,000	$-	$-	$-	$176,000	$44,000
PS 3	Sustainability Management Plan	2024	$380,000	$-	$-	$-	$304,000	$76,000
AF 4	NAVAIDs and Airfield Lighting and Signage Upgrades – Construction	2024	$4,300,000	$-	$-	$-	$3,440,000	$860,000
AF 5	Stormwater Improvements and Wildlife Mitigation (Phase 1B) – Construction	2024	$2,360,000	$150,001	$714,000	$1,259,999	$188,800	$47,200
SF 4	Relocation of Electrical Vault and Airport Beacon – Siting Analysis and Preliminary Engineering	2025	$230,000	$-	$-	$-	$184,000	$46,000
SF 5	AWOS Replacement – Siting Analysis and Design	2025	$80,000	$-	$-	$-	$64,000	$16,000
LS 1	BRAA Administration Building Access Road – Design	2025	$130,000	$-	$-	$-	$104,000	$26,000
AF 6	Taxiways A, E, G, H, P (connectors at both runway ends), P3, and P9 Geometry Enhancements and Taxiways E and P9 Rehabilitation – Design	2025	$190,000	$150,000	$-	$-	$36,200	$3,800
PS 4	Electrification Master Plan	2025	$170,000	$-	$-	$-	$136,000	$34,000
SF 6	Relocation of Electrical Vault and Airport Beacon – Design	2026	$200,000	$-	$-	$-	$160,000	$40,000

TABLE 8-2 (2 OF 2) SHORT-TERM CAPITAL IMPROVEMENT PROGRAM FUNDING SOURCES

PROJECT ID	PROJECT DESCRIPTION	FISCAL YEAR	TOTAL COST (ESCALATED)	FAA ENTITLEMENT	FAA AIG	AIP DISCRETIONARY	FDOT	LOCAL FUNDS
SF 7	AWOS Replacement – Construction	2026	$820,000	$-	$738,000	$-	$65,600	$16,400
AF 7	Runway 5 – Aircraft Holding Bay Rehabilitation – Design	2026	$110,000	$-	$-	$-	$88,000	$22,000
LS 2	BRAA Administration Building Access Road – Construction	2026	$900,000	$-	$-	$-	$720,000	$180,000
AF 8	Taxiway P2 Rehabilitation	2026	$40,000	$-	$-	$-	$-	$40,000
AF 9	Taxiways A, E, G, H, P (connectors at both runway ends only), P3, and P9 Geometry Enhancements and Taxiways E and P9 Rehabilitation – Construction	2026	$1,310,000	$150,000	$950,000	$-	$183,800	$26,200
PS 5	Underground Utility Mapping	2027	$440,000	.	$-	$-	$352,000	$88,000
AF 10	Runway 5 – Aircraft Holding Bay Rehabilitation – Construction	2027	$700,000	$-	$-	$-	$560,000	$140,000
SF 8	Relocation of Electrical Vault and Airport Beacon – Construction	2027	$3,390,000	$-	$-	$-	$2,712,000	$678,000
AF 11	Engineered Materials Arresting System (EMAS) – Fleet Mix Evaluation	2027	$40,000	$-	$-	$-	$32,000	$8,000
	Short-Term CIP Projects Funding Summary		**$19,326,666**	**$750,000**	**$4,139,000**	**$1,259,999**	**$10,495,133**	**$2,682,533**

NOTES:

AF – Airfield; AIP – Airport Improvement Program; AIG – Airport Infrastructure Grant; AWOS – Automated Weather Observing System; BRAA – Boca Raton Airport Authority; CIP – Capital Improvement Program; FAA – Federal Aviation Administration; FDOT – Florida Department of Transportation; LS – Landside ; NAVAID – Navigational Aid; PS – Planning Study; SE – Security Improvement; SF – Support Facility

Projects illustrated in green text (AF 1, PS 1, AF 2, SF 1, SF 2, SF 3, and AF 4) are ongoing projects that were initiated during the development of the Capital Improvement Program.

Costs were developed in 2022 US dollars and escalated 3.5 percent annually for inflation.

SOURCES: American Infrastructure Development, Inc., December 2022 (cost estimates); Florida Department of Transportation, *Airport Pavement Evaluation Report: Boca Raton Airport*, 2022; Ricondo & Associates, Inc., July 2023.

TABLE 8-3 INTERMEDIATE-TERM CAPITAL IMPROVEMENT PROGRAM FUNDING SOURCES

PROJECT ID	PROJECT DESCRIPTION	FISCAL YEAR	TOTAL COST (ESCALATED)	FAA ENTITLEMENT	FAA AIG	AIP DISCRETIONARY	FDOT	LOCAL FUNDS
SE 1	Airport Security Improvements – CCTV Cameras and Associated Infrastructure – Design	2028	$370,000	$-	$-	$-	$296,000	$74,000
SF 9	US Customs and Border Protection Rehabilitation and Improvements – Design	2028	$160,000	$-	$-	$-	$128,000	$32,000
AF 12	Engineered Materials Arresting System (EMAS) Rehabilitation (Seam Sealer Replacement)	2028	$1,230,000	$-	$-	$-	$984,000	$246,000
SE 2	Airport Security Improvements – Replace Gate Controllers and Keypads	2028	$440,000	$-	$-	$-	$352,000	$88,000
PS 6	Facilities Management Plan Update	2028	$190,000	$-	$-	$-	$152,000	$38,000
SF 10	US Customs and Border Protection Rehabilitation and Improvements – Construction	2029	$830,000	$-	$-	$-	$664,000	$166,000
SE 3	Airport Security Improvements – CCTV Cameras and Associated Infrastructure – Construction	2029	$2,550,000	$-	$-	$-	$2,040,000	$510,000
AF 13	Taxiways A, H, and P9 Rehabilitation – Design	2029	$70,000	$-	$-	$-	$56,000	$14,000
AF 14	Taxiway P Rehabilitation – Design	2029	$830,000	$150,000	$-	$597,000	$66,400	$16,600
AF 15	Taxiways A, H, and P9 Rehabilitation – Construction	2030	$450,000	$-	$-	$-	$360,000	$90,000
AF 16	Runway 5-23 Rehabilitation – Design	2030	$2,140,000	$-	$-	$-	$1,712,000	$428,000
AF 17	Taxiways G and P6 Rehabilitation – Design	2030	$70,000	$-	$-	$-	$56,000	$14,000
AF 18	Taxiway P Rehabilitation – Construction	2031	$5,900,000	$150,000	$-	$1,455,000	$4,000,000	$295,000
AF 19	Runway 5-23 Rehabilitation – Construction – Phase 1	2032	$7,630,000	$375,000	$-	$3,486,400	$3,616,000	$152,600
AF 20	Taxiways G and P6 Rehabilitation – Construction	2032	$480,000	$-	$-	$-	$384,000	$96,000
	Intermediate-Term CIP Projects Funding Summary		**$23,340,000**	**$675,000**	**$-**	**$5,538,400**	**$14,866,400**	**$2,260,200**

NOTES:

AF – Airfield; AIP – Airport Improvement Program; AIG – Airport Infrastructure Grant; CCTV – Closed-Circuit Television; CIP – Capital Improvement Program; FAA – Federal Aviation Administration; FDOT – Florida Department of Transportation; LS – Landside; PS – Planning Study; SE – Security Improvements; SF – Support Facility

Costs were developed in 2022 US dollars and escalated 3.5 percent annually for inflation.

SOURCES: American Infrastructure Development, Inc., December 2022 (cost estimates); Florida Department of Transportation, *Airport Pavement Evaluation Report: Boca Raton Airport*, 2022; Ricondo & Associates, Inc., July 2023.

TABLE 8-4 LONG-TERM CAPITAL IMPROVEMENT PROGRAM FUNDING SOURCES

PROJECT ID	PROJECT DESCRIPTION	FISCAL YEAR	TOTAL COST (ESCALATED)	FAA ENTITLEMENT	FAA AIG	AIP DISCRETIONARY	FDOT	LOCAL FUNDS
AF 21	Runway 5-23 Rehabilitation – Construction – Phase 2	2033	$7,900,000	$375,000	$-	$3,839,000	$3,528,000	$158,000
PS 7	Facilities Management Plan Update	2033	$220,000	$-	$-	$-	$176,000	$44,000
SF 11	Replace Air Traffic Control Tower with Virtual or Remote Tower – Technology Review and Design	2033	$370,000	$-	$-	$-	$296,000	$74,000
SF 12	BRAA Administration Building Rehabilitation and Improvements	2034	$760,000	$-	$-	$-	$608,000	$152,000
SE 4	Airport Security Improvements – CCTV Cameras and Associated Infrastructure – Design	2034	$460,000	$-	$-	$-	$368,000	$92,000
SF 13	Replace Air Traffic Control Tower with Virtual or Remote Tower	2034	$3,740,000	$-	$-	$-	$2,992,000	$748,000
AF 22	Improve Runway Safety Area – Install EMAS Runway 5 Departure End – Design	2035	$720,000	$150,000	$-	$498,000	$57,600	$14,400
SE 5	Airport Security Improvements – CCTV Cameras and Associated Infrastructure – Construction	2035	$3,130,000	$-	$-	$-	$2,504,000	$626,000
AF 23	Improve Runway Safety Area – Install EMAS Runway 5 Departure End – Construction	2036	$8,100,000	$300,000	$-	$4,358,000	$3,280,000	$162,000
AF 24	Improve Runway Safety Area – Install EMAS Runway 23 Departure End – Design	2036	$750,000	$-	$-	$-	$600,000	$150,000
AF 25	Runway 5 Aircraft Holding Bay – Design	2037	$150,000	$-	$-	$-	$120,000	$30,000
AF 26	Improve Runway Safety Area – Install EMAS Runway 23 Departure End – Construction	2037	$8,380,000	$150,000	$-	$4,182,400	$3,880,000	$167,600
AF 27	Runway 5 Aircraft Holding Bay – Construction	2038	$1,320,000	$150,000	$-	$1,038,000	$105,600	$26,400
PS 8	Facilities Management Plan Update	2038	$270,000	$-	$-	$-	$216,000	$54,000
SE 6	Airport Security Improvements – Replace Gate Controllers and Keypads	2038	$610,000	$-	$-	$-	$488,000	$122,000
AF 28	Runway 23 Aircraft Holding Bay – Design	2039	$240,000	$-	$-	$-	$192,000	$48,000
AF 29	Runway 23 Aircraft Holding Bay – Construction	2040	$2,030,000	$300,000	$-	$1,527,000	$162,400	$40,600
SF 14	AWOS Replacement with ASOS – Siting Analysis and Design	2040	$200,000	$-	$-	$-	$160,000	$40,000
	Long-Term CIP Projects Funding Summary		**$39,350,000**	**$1,425,000**	**$-**	**$15,442,400**	**$19,733,600**	**$2,749,000**

NOTES:

AF – Airfield; AIG – Airport Infrastructure Grant; AIP – Airport Improvement Program; ASOS – Automated Surface Observing System; AWOS – Automated Weather Observing System; BRAA – Boca Raton Airport Authority
CCTV – Closed-Circuit Television; CIP – Capital Improvement Program; EMAS – Engineered Materials Arresting System; FAA – Federal Aviation Administration; FDOT – Florida Department of Transportation; LS – Landside
PS – Planning Study; SE – Security Improvements; SF – Support Facility

Costs were developed in 2022 US dollars and escalated 3.5 percent annually for inflation.

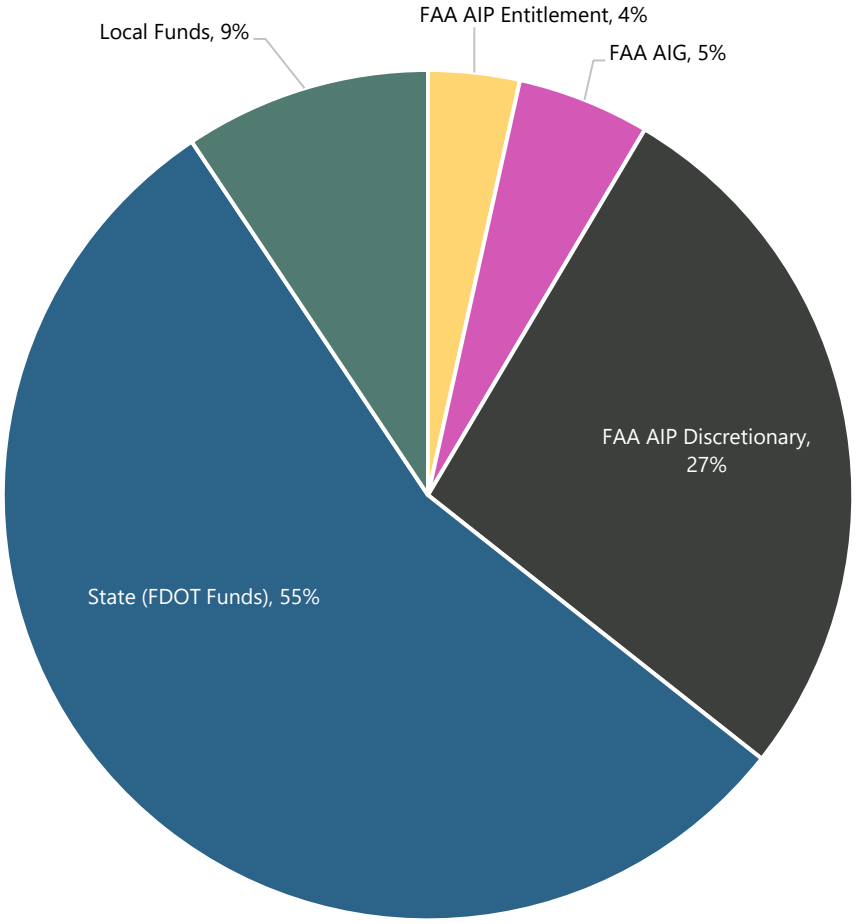
SOURCES: American Infrastructure Development, Inc., December 2022 (cost estimates); Florida Department of Transportation, *Airport Pavement Evaluation Report: Boca Raton Airport*, 2022; Ricondo & Associates, Inc., July 2023.

TABLE 8-5 OVERALL CAPITAL IMPROVEMENT PROGRAM ESTIMATED FUNDING SOURCES

PROJECT DESCRIPTION	TOTAL COST (ESCALATED)	FAA ENTITLEMENT	FAA AIG	AIP DISCRETIONARY	FDOT	LOCAL FUNDS
Short-Term Projects (FY 2023 – FY 2027)	$19,326,666	$750,000	$4,139,000	$1,259,999	$10,495,133	$2,682,533
Intermediate-Term Projects (FY 2028 – FY 2032)	$23,340,000	$675,000	$-	$5,538,400	$14,866,400	$2,260,200
Long-Term Projects (FY 2033 – FY 2040)	$39,350,000	$1,425,000	$-	$15,442,400	$19,733,600	$2,749,000
Overall CIP Funding Summary	**$82,016,666**	**$2,850,000**	**$4,139,000**	**$22,240,799**	**$45,095,133**	**$7,691,733**

NOTES:
AIP – Airport Improvement Program
AIG – Airport Infrastructure Grant
CIP – Capital Improvement Program
FAA – Federal Aviation Administration
FDOT – Florida Department of Transportation
FY – Fiscal Year
Costs were developed in 2022 US dollars and escalated 3.5 percent annually for inflation.
SOURCES: American Infrastructure Development, Inc., December 2022 (cost estimates); Florida Department of Transportation, *Airport Pavement Evaluation Report: Boca Raton Airport*, 2022; Ricondo & Associates, Inc., July 2023.

EXHIBIT 8-4 ESTIMATED PROJECT FUNDING SOURCES



NOTES:
AIP – Airport Improvement Program
AIG – Airport Infrastructure Grant
FAA – Federal Aviation Administration
FDOT – Florida Department of Transportation
Costs were developed in 2022 US dollars.
According to the *2022 US Construction Cost Trends* report prepared by CBRE, construction cost escalation is expected to "stabilize in the 2 percent – 4 percent range in 2023 and 2024, on par with historical averages." For the purpose of this Capital Improvement Program, total project costs were escalated by 3.5 percent annually over the course of the planning period.
SOURCES: American Infrastructure Development, Inc., December 2022 (cost estimates); Florida Department of Transportation, *Airport Pavement Evaluation Report: Boca Raton Airport*, 2022; Ricondo & Associates, Inc., July 2023.

9. FINANCIAL PLAN

This chapter presents a potential funding plan for implementing the projects recommended in the MPU. It also assesses the ability of the Authority to fund the recommended projects. These projects are designed to maintain the Airport and provide the required improvements and facilities through FY 2040.

The actual implementation schedule for the various construction projects recommended in the MPU will be influenced, in part, by demand, funding availability, the Authority's priorities, and other relevant factors, and it may not correspond precisely to the schedule described in this chapter. For the purposes of the illustrative financial analysis, a specific implementation schedule was assumed. However, it should be noted that this schedule and the resulting financial analysis are intended only to demonstrate financial feasibility. Actual funding strategies for each project will be determined nearer to the time of project implementation.

In general, the financial analysis for the MPU was conducted as follows:

- The Airport's existing financial structure was examined, and applicable financial information was obtained.
- A list of proposed capital development projects was compiled, including estimated project construction costs and implementation years (see Chapter 8).
- Potential funding sources were identified, and the potential availability of funding from those sources was analyzed, as applicable.
- Projections of operation and maintenance (O&M) expenses and operating revenues were developed.

9.1 AIRPORT FINANCIAL STRUCTURE

The Airport is publicly owned by the State of Florida and independently operated by BRAA. BRAA also manages numerous tenant facilities at BCT, provides a safe and efficient Airport for the operation of aircraft, promotes the development of Airport property for aviation and related commercial services, obtains and administers FAA grants, and ensures the compatibility of proposed developments within and around the Airport with federal, FDOT, and local standards. The Airport operates on an FY basis, with years ending September 30. Airport staff are responsible for finance, budget, and human resources functions, including the development and administration of budgets and the collection of revenues. The financial records for the Airport are maintained in accordance with generally accepted accounting principles.

BRAA manages and operates the General Operating Fund. The General Operating Fund is used to account for services provided to the general public using the Airport, and its costs are recovered primarily through user rentals, fees, and charges (e.g., building and ground rentals, fuel flowage fees, CBP facility fees). All operations and capital additions are accounted for in the General Operating Fund.

Table 9-1 presents historical revenues and expenses for the Airport from FY 2019 to FY 2022, including budget data for FY 2023. Operating revenues are revenues that are directly associated with the running and operation of the Airport, and they primarily include lease agreement revenue, fuel flowage fees, CBP facility fees, and miscellaneous revenues.

Operating expenses are categorized as personnel, professional, office operating, Airport operations, insurance, ATCT facility, CBP facility, marketing and special events, and CIP operating expenditures. CIP operating expenditures include the costs to develop and maintain planning studies and other non-capital projects that are not depreciated. Overall, operating expenses experienced somewhat faster growth than operating revenues from FY 2019 to FY 2022.

TABLE 9-1 HISTORICAL REVENUES AND EXPENSES

REVENUE AND EXPENSE TYPE	ACTUAL 2019	ACTUAL 2020	ACTUAL 2021	ACTUAL 2022	BUDGET 2023	CAGR 2019–2022
Operating Revenues						
Lease Agreement Revenue	$3,408,707	$4,174,419	$4,296,972	$4,449,975	$4,761,705	9.3%
Fuel Flowage Fees	$810,025	$623,166	$853,378	$1,326,039	$1,155,000	17.9%
CBP Facility Fees	$456,030	$378,415	$486,805	$609,465	$550,000	10.2%
Misc. Revenue	$64,192	$46,461	$59,975	$63,058	$66,298	-0.6%
Total Operating Revenues	**$4,738,954**	**$5,222,461**	**$5,697,131**	**$6,448,537**	**$6,533,002**	**10.8%**
Operating Expenses						
Personnel Expenses	$1,071,209	$1,237,685	$1,184,421	$1,230,603	$1,476,024	4.7%
Professional Expenses	$155,625	$213,955	$213,216	$291,049	$283,080	23.2%
Office Operating Expenses	$263,590	$321,439	$289,096	$346,387	$367,068	9.5%
Airport Operations Expenses	$451,055	$526,381	$805,829	$590,110	$934,027	9.4%
Insurance Expenses	$158,527	$174,135	$247,676	$282,354	$303,380	21.2%
ATCT Facility Expenses	$40,131	$82,579	$106,844	$70,053	$60,798	20.4%
CBP Facility Expenses	$353,165	$319,810	$407,433	$502,217	$523,400	12.5%
Marketing and Special Events Expenses	$180,518	$139,255	$128,072	$155,844	$297,407	-4.8%
CIP Operating Expenditures	$76,788	$1,199,861	$343,729	$389,151	$900,000	71.8%
Total Operating Expenses	**$2,750,608**	**$4,215,100**	**$3,726,315**	**$3,857,769**	**$5,145,184**	**11.9%**

NOTES:
ATCT – Air Traffic Control Tower
CAGR – Compound Annual Growth Rate
CBP – Customs and Border Protection
FDOT – Florida Department of Transportation
NAVAID – Navigational Aid
Years are fiscal years ending September 30.
Columns may not total due to rounding.
SOURCES: Boca Raton Airport Authority, June 2023; Ricondo & Associates, Inc., June 2023.

9.2 FEASIBILITY ANALYSIS

Following the initial development of the CIP funding plan for the MPU, an analysis was conducted to evaluate its feasibility. The presence of positive cash flow, or positive net remaining revenues after operating expenses and CIP project funding, was used to determine the feasibility of the CIP funding plan.

9.2.1 PROJECTED OPERATING EXPENSES

Table 9-2 presents projected operating expenses for FY 2023 (budget) through FY 2040 (Projection Period). Total operating expenses excluding CIP operating expenditures were assumed to increase approximately 3.9 percent per year. No additional O&M expenses associated with specific CIP projects were determined to be necessary.

TABLE 9-2 ACTUAL, BUDGET, AND PROJECTED OPERATING EXPENSES

	ACTUAL 2022	BUDGET 2023	PROJECTED 2025	PROJECTED 2030	PROJECTED 2035	PROJECTED 2040	CAGR 2023–2040
Operating Expenses							
Personnel Expenses	$1,230,603	$1,476,024	$1,740,390	$2,168,843	$2,702,773	$3,368,147	5.0%
Professional Expenses	$291,049	$283,080	$300,319	$348,152	$403,604	$467,888	3.0%
Office Operating Expenses	$346,387	$367,068	$389,423	$451,448	$523,352	$606,708	3.0%
Airport Operations Expenses	$590,110	$934,027	$990,909	$1,148,735	$1,331,699	$1,543,804	3.0%
Insurance Expenses	$282,354	$303,380	$331,299	$412,858	$514,497	$641,157	4.5%
ATCT Facility Expenses	$70,053	$60,798	$64,501	$74,774	$86,683	$100,490	3.0%
CBP Facility Expenses	$502,217	$523,400	$555,275	$643,716	$746,243	$865,100	3.0%
Marketing and Special Events Expenses	$155,844	$297,407	$315,519	$365,773	$424,031	$491,568	3.0%
CIP Operating Expenditures[1]	$389,151	$900,000	$34,000	$0	$0	$0	-100.0%
Total Operating Expenses (Excluding CIP Operating Expenditures)	**$3,468,618**	**$4,245,184**	**$4,687,635**	**$5,614,300**	**$6,732,883**	**$8,084,862**	**3.9%**
Total Operating Expenses	**$3,857,769**	**$5,145,184**	**$4,721,635**	**$5,614,300**	**$6,732,883**	**$8,084,862**	**2.7%**

NOTES:
ATCT – Air Traffic Control Tower
CAGR – Compound Annual Growth Rate
CBP – Customs and Border Protection
CIP – Capital Improvement Program
Years are fiscal years ending September 30.
Columns may not total due to rounding.
1 CIP operating expenditures include the costs to develop and maintain planning studies and other non-capital projects that are not depreciated. These projects are planned to occur in FYs 2023, 2024, 2025, 2027, 2028, 2033, and 2038. Reference Chapter 8 for a complete listing of projects and their corresponding years.
SOURCES: Boca Raton Airport Authority, June 2023 (Actual 2022, Budget 2023); Ricondo & Associates, Inc., June 2023 (projections).

9.2.2 PROJECTED OPERATING REVENUES

Table 9-3 presents projected operating revenues based on the Airport's FY 2023 budget. The following describes the basis by which operating revenues were projected through FY 2040.

- **Lease Agreement Revenue**
  - Lease agreement revenues are budgeted and projected to represent the largest share of operating revenue. Lease agreement revenues were grown at 2.8 percent per year, reflecting a 3.0 percent consumer price index (CPI) assumption and the resulting contractually obligated growth from 2023 to 2040.

- Lease agreement revenues include building rent and hangar rent.

- **Other Revenue**
  - Fuel flowage fees are received through fees charged to the FBOs for fuel deliveries at the Airport. For purposes of this analysis, fuel flowage fees were grown at 5.1 percent per year, reflecting an increase in expected fuel deliveries and price.
  - CBP facility fees are received through fees charged to international landings. CBP facility fees were grown at 3.0 percent per year, the assumed rate of inflation.
  - Miscellaneous revenues include rental car fees, restaurant/office fees, rent surcharge, sales tax credit, and badge revenue. For the purposes of this analysis, miscellaneous revenues were grown at 3.0 percent per year, the assumed rate of inflation.

TABLE 9-3 ACTUAL, BUDGET, AND PROJECTED OPERATING REVENUES

	ACTUAL 2022	BUDGET 2023	PROJECTED 2025	PROJECTED 2030	PROJECTED 2035	PROJECTED 2040	CAGR 2023–2040
Operating Revenues							
Lease Agreement Revenue	$4,449,975	$4,761,705	$5,028,167	$5,761,206	$6,598,779	$7,578,899	2.8%
Fuel Flowage Fees	$1,326,039	$1,155,000	$1,274,843	$1,631,713	$2,088,482	$2,673,116	5.1%
CBP Facility Fees	$609,465	$550,000	$583,495	$676,431	$784,168	$909,066	3.0%
Total Misc. Revenue	$63,058	$66,298	$70,335	$81,538	$94,525	$109,580	3.0%
Total Operating Revenues	**$6,448,537**	**$6,533,002**	**$6,956,840**	**$8,150,888**	**$9,565,954**	**$11,270,661**	**3.3%**

NOTES:
CAGR – Compound Annual Growth Rate
CBP – Customs and Border Protection
Years are fiscal years ending September 30.
Columns may not total due to rounding.
SOURCES: Boca Raton Airport Authority, June 2023 (Actual 2022, Budget 2023); Ricondo & Associates, Inc., June 2023 (projections).

9.2.3 APPLICATION OF REVENUES – CASH FLOW ANALYSIS

Table 9-4 presents the funds remaining after operating expenses are deducted from Airport revenues. The resulting analysis shows cash available for capital projects remains positive throughout the MPU planning period, indicating the assumed use of Airport funds (cash) to fund various projects in the CIP is reasonable and feasible in the context of projected revenues and expenses.

TABLE 9-4 PROJECTED CASH FLOW

	ACTUAL 2022	BUDGET 2023	PROJECTED 2025	PROJECTED 2030	PROJECTED 2035	PROJECTED 2040	CAGR 2023–2040
Lease Agreement Revenue	$4,449,975	$4,761,705	$5,028,167	$5,761,206	$6,598,779	$7,578,899	2.8%
Fuel Flowage Fees	$1,326,039	$1,155,000	$1,274,843	$1,631,713	$2,088,482	$2,673,116	5.1%
CBP Facility Fees	$609,465	$550,000	$583,495	$676,431	$784,168	$909,066	3.0%
Misc. Revenue	$63,058	$66,298	$70,335	$81,538	$94,525	$109,580	3.0%
Total Operating Revenues before Interest Income	**$6,448,537**	**$6,533,002**	**$6,956,840**	**$8,150,888**	**$9,565,954**	**$11,270,661**	**3.3%**
Interest Income	$73,391	$200,000	$208,080	$229,737	$253,648	$280,048	2.0%
Total Operating Revenues	**$6,521,928**	**$6,733,002**	**$7,164,920**	**$8,380,625**	**$9,819,602**	**$11,550,709**	**3.2%**
Less:							
O&M Expenses	$3,468,618	$4,245,184	$4,687,635	$5,614,300	$6,732,883	$8,084,862	3.9%
Debt Service	$0	$0	$0	$0	$0	$0	N/A
Net Operating Revenues before CIP Operating Expenditures	**$3,053,310**	**$2,487,818**	**$2,477,285**	**$2,766,325**	**$3,086,720**	**$3,465,847**	**2.0%**
Less:							
CIP Operating Expenditures	$389,151	$900,000	$34,000	$0	$0	$0	-100.0%
CIP Capital Expenditures	$0	$212,333	$91,800	$532,000	$640,400	80,600	-5.5%
Net Operating Revenues after CIP	**$2,664,159**	**$1,375,484**	**$2,351,485**	**$2,234,325**	**$2,446,320**	**$3,385,247**	**5.4%**

NOTES:
CAGR – Compound Annual Growth Rate
CBP – Customs and Border Protection
CIP – Capital Improvement Program
N/A – Not Applicable
O&M – Operation and Maintenance
Years are fiscal years ending September 30.
Columns may not total due to rounding.
SOURCES: Boca Raton Airport Authority, June 2023 (Actual 2022, Budget 2023); Ricondo & Associates, Inc., June 2023 (projections).

9.3 CONCLUSIONS AND RECOMMENDATIONS

Based on the analyses documented in this chapter, implementation of the CIP appears to be financially feasible given the funding sources anticipated to be available to the Airport through the planning period. The projected available Airport funds appear to be adequate to fund applicable portions of the CIP.

As implementation of the CIP progresses, Airport management, in conjunction with the Authority, should continually assess the financial feasibility of each project included in the CIP. Future considerations regarding the funding of the CIP include the following:

- Traffic growth: As applicable, the financial plan was developed and analyzed in consideration of the FAA-approved aviation activity forecast developed for the Airport (see Chapter 3). Actual year-to-year aircraft operations will likely deviate from the forecast. Significant changes in aircraft operations levels may impact revenues and expenses.
- Availability of AIP funds: The potential funding plan for the CIP assumes the FAA will continue to authorize and appropriate AIP funds for eligible projects. Because the level of authorized and appropriated AIP funds may vary

from year to year, alternative funding sources may need to be identified if grants cannot be obtained for certain eligible projects.

- Availability of FDOT funds: The potential funding plan for the CIP assumes the FDOT will continue to provide, through the Florida Aviation Grant Program, discretionary grant funding for which the Airport is eligible. Because the level of FDOT funds may vary from year to year, alternative funding sources may need to be identified if grants cannot be obtained for certain eligible projects.

The Authority should consider the following recommendations for enhancing the financial position of the Airport:

- Conduct periodic assessments of operating and maintenance activities to determine if specific activities are being conducted as efficiently as possible and continue to take advantage of opportunities to implement sustainable practices, development, and technologies (e.g., alternative fuel vehicles, solar/wind power, green roofs).
- Periodically evaluate the mix of aeronautical and nonaeronautical development to ensure the Authority continues to maintain its strategic objective regarding financial resiliency.
- Continue to pursue adjacent land opportunities that would support expanded aeronautical and nonaeronautical activities, as discussed in Chapter 5.
- Maximize funding opportunities that may supplement or replace "typical" airport capital development funding sources. Examples may include public-private partnerships for third-party financing, economic development grants, and tax incentives for private facility development.
- As current leases expire, review terms/rates of current leases to determine the most appropriate lease terms and rates given market conditions, specific land/facility uses, and opportunity costs.

10. AIRPORT LAYOUT PLAN

The ALP drawing set for BCT is a graphic representation of the Airport Improvement Plan recommended for the 20-year planning horizon. This section briefly describes each drawing in the ALP set. **Appendix I** presents the ALP Review Checklist in accordance with FAA guidance found in SOP 2.0, *Standard Procedure for FAA Review and Approval of Airport Layout Plans*.

The ALP drawings were developed and produced as a 24-inch by 36-inch plans set using AutoCAD. To provide vertical and horizontal accuracy for the ALP set, a digitized map was developed and used as a base for the majority of the drawings (i.e., those that require an airport base map). The coordinates, elevations, and aerial photogrammetry are in US survey feet. The horizontal datum is the Florida State Plane, East Zone Coordinate System, North American Datum of 1983/1990 (NAD 83/90) adjustment. The vertical datum is the North American Vertical Datum of 1988 (NAVD 88).

The base mapping was developed from a combination of aerial photography and ground surveys. The aerial photography was performed in December 2020, and the ground surveys were completed in April 2021. This information was developed in accordance with FAA and National Geodetic Survey (NGS) requirements, as prescribed in the following:

- AC 150/5300-16B, *General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey*, July 8, 2019.
- AC 150/5300-17C, *Standards for Using Remote Sensing Technologies in Airport Surveys*, September 30, 2011.
- AC 150/5300-18B, *General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collection and Geographic Information System (GIS) Standards*, May 21, 2009.

In addition to the aerial photography and planimetric mapping, a control survey was established using the BCT Primary Airport Control Station and Secondary Airport Control Stations. The NAVAIDs and other Airport planimetric features not collected by photogrammetric methods were also surveyed. The survey data were collected and formatted in accordance with the previously listed Acs and survey metrics (feet, NAD 83 and NAVD 88) and submitted to the FAA through the AGIS web portal.

10.1 TITLE SHEET

Sheet 01, Title Sheet, lists the drawings within the ALP set. It also provides a location and vicinity map. The location map depicts the Airport's location within Palm Beach County, which is in southeastern Florida. The Airport is bound by Spanish River Boulevard (State Road 800) to the north, FAU to the east, State Road 808 to the south, and Interstate 95 to the west. The vicinity map shows the approximate location of the Airport and surrounding major roadways.

10.2 AIRPORT DATA SHEET

Sheet 02, Airport Data Sheet, contains a series of data tables and a list of abbreviations and acronyms used throughout the ALP set:

- Airport Data Table – This table lists existing and future characteristics specific to the Airport, such as Airport elevation, service level, role, reference code, design aircraft, owner, Airport reference point, temperature information, and available NAVAIDs.

- Runway Data Table – This table is a compiled tabulation of information relating specifically to the runway at the Airport. Various existing and future specifications are listed for the existing and future runway, including runway orientation, dimensions, ADG, critical aircraft, available lighting and NAVAIDs, RPZs, and RSAs, as defined in FAA AC 150/5300-13B, *Airport Design*.
- Taxiway Data Table – This table provides information on the existing and future taxiways at the Airport, including taxiway designation, taxiway width, shoulder width, and taxiway safety area and TOFA sizes.
- Wind Rose and Wind Coverage Table – This table presents the Airport wind roses. The wind data depicted on this sheet were obtained from the NOAA National Climatic Data Center. Wind data are provided for all weather conditions, VMC (ceiling at or above 1,000 feet and visibility greater than or equal to 3 miles), and IMC (ceiling below 1,000 feet and/or visibility less than 3 miles). These components provide information on the percentage of time a runway end or a combination of runway ends is available for arrivals. When combined, the coverage is intended to be 95 percent or greater. Wind coverage is summarized for each runway end and combination of runway ends.
- Declared Distances Table – This table shows the existing and future declared distances applicable to Runway 5-23.
- Non-Standard Conditions Table – This table presents the FAA design standard and existing non-standard conditions at BCT, and it notes possible improvements or status of the MOS.
- Abbreviations/Acronyms – This sheet also includes a list of abbreviations and acronyms used throughout the ALP plans package.

10.3 EXISTING AIRPORT LAYOUT PLAN

Sheet 03 presents the Existing ALP, which depicts current conditions at the Airport as of September 2023. Existing conditions were obtained from the aerial photogrammetry surveys and augmented with drawings provided by BRAA. The ALP sheet illustrates the Airport in its entirety at a scale of 1-inch equals 180 feet. Major features of the ALP include the runway, taxiways, aprons, NAVAIDs, existing facilities, roadway system, and non-Airport facilities surrounding BCT property, among other features. This drawing also includes runway approach surfaces, runway end elevations, runway high and low points, true azimuths for each runway end, and the angle of declination (magnetic north), including the annual rate of change for the magnetic declination. The Existing ALP also includes pertinent clearance and dimensional information associated with the runway and taxiways, such as RSAs and RPZs. Imaginary elements are included on the drawing sheet, including the Airport reference point, ground contours, and other FAA-required dimensional data. The Non-Standard Conditions Table and MOS table present the non-standard conditions at BCT and the approval date and description of each existing MOS.

10.4 FUTURE AIRPORT LAYOUT PLAN

Sheet 04 presents the Future ALP, which depicts the proposed Airport development projects and enhancements necessary to meet forecast demand over the 20-year planning horizon. Future airfield, landside, support facility, and demand-driven improvements depicted on the Future ALP include the following:

- Airport Service Road Widening and Rehabilitation
- AWOS Replacement
- Taxiways A, E, G, H, P (connectors at both runway ends only), P3, and P9 Geometry Enhancements

- Relocation of Electrical Vault and Airport Beacon
- Construction of BRAA Administration Building Access Road
- Construction of Runway 5 Aircraft Holding Bay
- Construction of Runway 23 Aircraft Holding Bay
- Construction of Airport Observation Area

Together with the Airport Data Sheet (Sheet 02) and the Existing ALP (Sheet 03), this sheet serves as an overview of BCT for the FAA and FDOT, as well as BRAA, as grants and other federal and state funding for future improvements are considered. The Future ALP (Sheet 04) requires the approval of the FAA before BRAA can receive federal and state funds for future Airport improvements depicted on the Future ALP.

10.5 AIRPORT AIRSPACE DRAWING

Sheet 05 of the ALP drawing set provides the Airport Airspace Drawing. To preserve the safe operation of aircraft in the airspace around an airport, the FAA adopted 14 CFR Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*. Subpart C of 14 CFR Part 77 establishes imaginary surfaces for determining obstructions to air navigation, which are illustrated on the Airport Airspace Drawing. This sheet also illustrates physical features on and around the Airport, including existing obstructions that penetrate the 14 CFR Part 77 imaginary surfaces. The imaginary surfaces are defined as follows:

- Primary Surface – Longitudinally centered on the runway, this surface extends 200 feet beyond each end of the runway and has an elevation equal to that of the runway centerline. The width of the primary surface is that prescribed for the most precise instrument approach procedure, existing or planned, for either end of the runway. The primary surface for the Airport's runway is 500 feet wide.
- Approach Surfaces – These surfaces are longitudinally centered along the extended centerline and extend outward and upward from each end of the primary surface. The size and slope of the approach surface are based on the type of approach, existing or planned, for that runway end. The inner edge of the approach surface is the same width as the primary surface. However, its overall length, slope, and outermost width may vary.
- Transitional Surfaces – These surfaces extend outward and upward from the lateral edges of all primary and approach surfaces at a slope of 7 to 1 until the surface reaches 150 feet above the established Airport elevation of 12.9 feet.
- Horizontal Surface – This surface is a plane located 150 feet above the established Airport elevation of 12.9 feet. Its perimeter consists of arcs of specific radii connected by lines tangential to the arcs. The arcs are centered on the midpoint of the ends of all primary surfaces and extend for a horizontal distance of 10,000 feet.
- Conical Surface – This surface extends outward and upward from the periphery of the horizontal surface at a slope of 20 to 1, for a lateral distance of 4,000 feet.

14 CFR Part 77 surfaces correspond to available NAVAIDs and types of approaches available to a runway end. **Table 10-1** summarizes the 14 CFR Part 77 imaginary surfaces associated with each runway end at the Airport.

TABLE 10-1 TITLE 14 CODE OF FEDERAL REGULATIONS PART 77 IMAGINARY SURFACES BY RUNWAY END

	RUNWAY 5	RUNWAY 23
Approach Type	NP	NP
Primary Surface Width (feet)[1]	500	500
Transitional Surface Width (feet)[2]	5,000	5,000
Conical Surface Width (feet)[3]	4,000	4,000
Horizontal Surface Radius (feet)[4]	10,000	10,000
Approach Surface Width – Inner (feet)[5]	500	500
Approach Surface Width – Outer (feet)	3,500	3,500
Approach Surface Length (feet)	10,000	10,000
Approach Slope	34:1	34:1

NOTES:
NP – Non-Precision
1 The primary surface is centered on the runway centerline.
2 The transitional surface extends outward and upward from the lateral edges of the primary and approach surfaces
3 The conical surface begins at the edge of the horizontal surface.
4 The horizontal surface begins at the midpoint of the ends of the primary surface.
5 The approach surface begins at the edge of the primary surface.
SOURCES: Title 14 Code of Federal Regulations Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*, July 21, 2010; US Department of Transportation, Federal Aviation Administration, *Airport/Facility Directory*, February 18, 2019; Ricondo & Associates, Inc., July 2023.

Sheet 05 also identifies obstructions to these surfaces by type (e.g., tree, pole, building), elevation, surface penetrated, and proposed disposition. Currently, 28 obstructions to 14 CFR Part 77 surfaces have been identified at BCT. Of these 28 obstructions, 0 are in the approach surface, 0 are in the primary surface, 22 are in the transitional surface, 4 are in the horizontal surface, and 2 are in the conical surface. Of the identified obstructions, 16 are classified as a tree or vegetation and 12 are manmade structures.

Although the evaluation of 14 CFR Part 77 surfaces is required by the FAA as part of the ALP set, the primary purpose of the regulation is to provide notice to the FAA of the proposed construction or alteration of structures. FAA AC 150/5300-13B, *Airport Design*, and FAA Order 8260.3E, *United States Standard for Terminal Instrument Procedures (TERPS)*, provide details on the evaluation of imaginary surfaces and contain additional guidance useful for the prioritization and disposition of obstructions. The FAA also has summarized the applicable processes and references for airport sponsors regarding establishing, maintaining, and prioritizing clear approach and departure surfaces in a policy guidance memorandum, *Approach and Departure Surface Protection*, dated September 19, 2022.

Sheets 05 also presents the runway profile view, which includes the existing runway alignment, elevations, line of sight, and approach surfaces. **Table 10-2** summarizes the runway elevations depicted on Sheet 05.

TABLE 10-2 SUMMARY OF RUNWAY ELEVATIONS

	RUNWAY 5	RUNWAY 23
Runway End Elevation (feet)	11.5	12.7
Runway Threshold Elevation (feet)	11.5	12.7
Runway Touchdown Zone Elevation (feet)	12.2	12.8
Runway High Point Elevation (feet)	12.9	
Runway Low Point Elevation (feet)	11.5	
Runway Safety Area Length Beyond Runway Departure End (feet)	300	350
Effective Runway Gradient	.02%	

NOTE:
1 Runway elevations listed in Table 10-2 represent feet Above Mean Sea Level (AMSL).
SOURCE: Ricondo & Associates, Inc., July 2023.

10.6 INNER APPROACH PLAN AND PROFILE

Sheets 06 and 07 depict the inner portions of the runway approach surfaces at BCT. These sheets consist of scaled drawings of the areas immediately beyond the existing runway ends, including the RPZs off each runway end. The function of the RPZ is to enhance the protection of people and property on the ground. According to the FAA, the mitigation of incompatible land uses within the RPZ is best achieved through airport owner control over RPZs. Control is preferably exercised through the acquisition of sufficient property in the RPZ and includes clearing RPZ areas (and maintaining them clear) of incompatible objects and activities. The RPZs at BCT contain several incompatible land uses, including public roadways, parking lots, a recreational field, the City of Boca Raton utilities service complex, and several office buildings.

The inner approach surface drawings depict the location of roadways, structures, ground elevations, and other manmade or natural features within the inner approach areas. The drawings also depict objects that penetrate existing and proposed approach surfaces or violate the primary surface criteria. The sheets are organized by each runway end; only obstructions illustrated on each sheet are reported in the data table provided. A total of 107 runway inner approach surface-penetrating obstructions were identified, including 70 penetrating obstructions to the Runway 5 inner approach surfaces and 37 penetrating obstructions to the Runway 23 inner approach surfaces. Similar to the Part 77 obstructions, many of the penetrations were identified as a tree or other vegetation. Overall, 52 obstructions were identified as vegetation, and 55 were identified as manmade structures.

10.7 DEPARTURE SURFACE DRAWING

Sheets 08 and 09 of the ALP set depict the departure surface for each runway end with an existing or future instrument departure procedure, as prescribed in FAA Order 8260.3E, *United States Standard for Terminal Instrument Procedures (TERPS)*, and AC 150/5300-13B, *Airport Design*. Both runway ends at BCT have published instrument departure procedures.

According to AC 150/5300-13B, the departure surface begins at the elevation of the departure end of the runway and extends laterally the width of the usable runway. From the edge of the usable runway, the surface rises laterally to 150 feet to a point 500 feet on either side of the runway centerline. The departure surface rises along the extended runway centerline, with a slope of 40 to 1, until reaching approximately 304 feet above the runway end elevation.

The sheets consist of scaled plan and profile drawings of the area within the 40-to-1 departure surface. The drawings depict the locations of potential obstructions. The sheets also include obstruction tables listing objects, departure surface penetrations, object top elevation, and proposed disposition. Overall, 103 penetrating obstructions were identified in the departure surfaces at BCT, including 86 penetrating obstructions to the Runway 5 departure surface and 17 penetrating obstructions to the Runway 23 departure surface. Of the 103 obstructions, 37 were identified as a tree or vegetation. The FAA recommends that obstacles penetrating the departure surface be evaluated through the Obstacle Evaluation / Airport Airspace Analysis (OE/AAA) process.

10.8 LAND USE DRAWING

Sheet 10 of the ALP set provides the Land Use Drawing, which illustrates the on-Airport land use and City of Boca Raton future land use. The on-Airport land use categories generally comply with the September 15, 2022 *Draft FAA Policy Regarding Processing Land Use Changes on Federally Acquired or Federally Conveyed Airport Land*. The on-Airport land use areas are depicted with various hatch patterns and are summarized below:

- Airfield (Aeronautical Use) – includes the land area reserved for activities supporting and sustaining the safe and efficient operation of aircraft, including land devoted to airfield facilities, such as the runway and taxiways, and property within the limits of the RPZs, RSA, and ROFA.
- Aeronautical Use – includes any activity that involves, makes possible, is required for the safety of, or is otherwise directly related to, the operation of aircraft. This area includes the non-movement areas, aircraft parking aprons, taxilanes, aircraft hangars and adjacent parking areas, FBOs, fuel facilities, BRAA Administration Building (including airport maintenance), US Customs and Border Protection facility, air traffic control tower, and airfield electrical vault.
- Non-Aeronautical Use – includes all areas within the Airport boundary that are not currently being used or planned to be used for aeronautical purposes, including the recreational center, movie theater, parking garage, restaurant, retail buildings, hotel, and aircraft observation area.
- Non-Aeronautical Redevelopment Areas – includes land currently used by the recreational center, movie theater parking garage, and hotel. These areas could be converted to aeronautical use pending redevelopment opportunities and amendments to existing leaseholds.

10.9 EXHIBIT 'A' AIRPORT PROPERTY INVENTORY MAP

The Exhibit 'A' Airport Property Inventory Map was developed as a separate package and is included in **Appendix J**, along with the SOP 3.00, *SOP for FAA Review of Exhibit 'A' Airport Property Inventory Maps*, Exhibit 'A' Review Checklist. The Exhibit 'A' Airport Property Inventory Map provides an overview of land conveyances associated with the Airport and illustrates the properties that were released and the avigation easements that have been obtained. These land conveyances aid in creating the Airport property boundary used in the ALP drawing sheets. A table is included in the Exhibit 'A' Airport Property Inventory Map package that details the following information for each parcel: parcel identification number, current property owner, BRAA property interest, property interest document type and date, recording information, date of filing, grant information, acres, and property inventory type.

DRAFT - *FOR DISCUSSION PURPOSES ONLY*

Airport Layout Plan

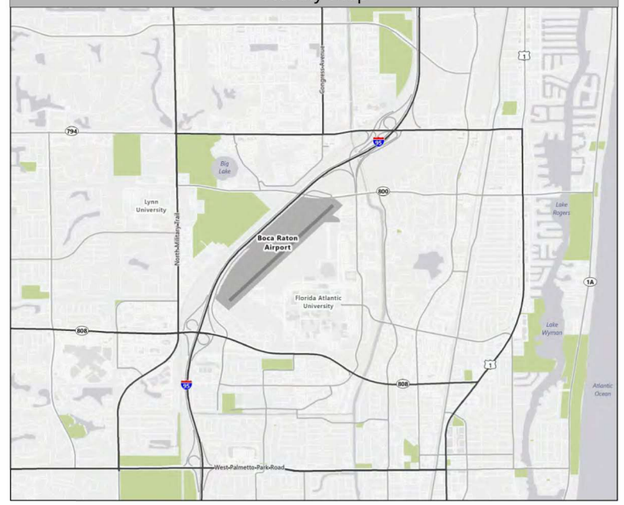
Boca Raton Airport (BCT)
Boca Raton, Florida

Prepared For:
Boca Raton Airport Authority
November 2023

Location Map



Vicinity Map



Executive Director

Clara Bennett

Deputy Director

Scott Kohut

Boca Raton Airport Authority

Bob Tucker	Chairman
Randy Nobles	Vice-Chairman
Cheryl Budd	Secretary & Treasurer
Mitch Fogel	Board Member
Melvin Pollack	Board Member
Gene Folden	Board Member
James R. Nau	Board Member

DRAFT

FAA Approval

FDOT Approval

Florida Department of Transportation | Date:

Airport Approval

Boca Raton Airport - Executive Director | Date:

Sheet Index

Sheet Number	Title	Revision	Date
1	Title Sheet		
2	Airport Data Sheet		
3	Existing Airport Layout Plan		
4	Future Airport Layout Plan		
5	Airport Airspace Drawing		
6	Inner Approach Plan & Profile | Runway 5		
7	Inner Approach Plan & Profile | Runway 23		
8	Departure Surface Drawing | Runway 5		
9	Departure Surface Drawing | Runway 23		
10	Land Use Drawing		

NOTE: PROPERTY MAP INFORMATION INCORPORATED INTO STAND-ALONE EXHIBIT "A" PROPERTY MAP, DATED JULY 2023.

Notes
Acceptance of this report by the FAA does not in any way constitute a commitment on the part of the FAA to participate in any development depicted therein nor does it indicate that the proposed development is environmentally acceptable in accordance with appropriate public laws.

FAA's approval of this Airport Layout Plan (ALP) represents acceptance of the general location of future facilities depicted. During the preliminary design phase, the airport owner is required to resubmit for approval final locations, heights and exterior finish of structures which could adversely affect safety, efficiency or utility of the airport. FAA concern is obstructions, impact on electronic aids or adverse effect on controller view of aircraft approaches and ground movement areas.

BOCA RATON AIRPORT
BOCA RATON AIRPORT AUTHORITY
903 NW 35TH STREET
BOCA RATON, FL 33431
PHONE (561)931-2202

RICONDO
RICONDO & ASSOCIATES, INC.
3504 LAKE LYNDA DRIVE, SUITE 165
ORLANDO, FL 32817
PHONE (407) 381-5730

N
MAGNETIC NORTH DECLINATION = 7° 9' W (APRIL 2022)
TRUE NORTH
0 NTS
GRAPHICAL SCALE IN FEET

NO.	REVISIONS	DATE

TITLE SHEET

BOCA RATON AIRPORT
BOCA RATON, FLORIDA

DRAWN BY: AB
CHECKED BY: BW

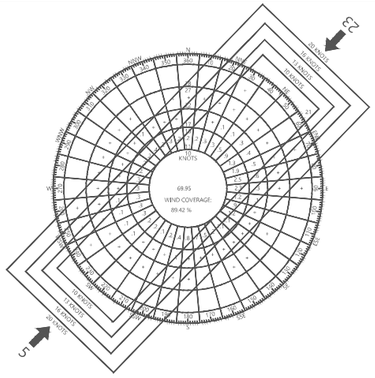
PREPARED BY:
RICONDO & ASSOCIATES, INC.

DATE:
NOVEMBER 2023

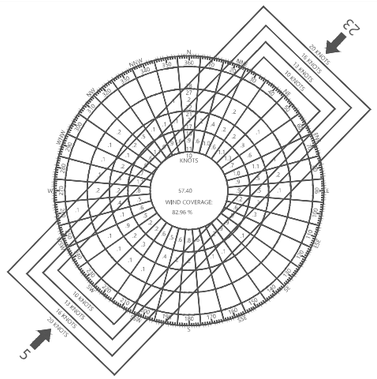
Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\11. Airport Layout Plan Set\AutoCAD\01-BCT_Title_Sheet.dwg_Layout: 01_Title Sheet_Nov 06, 2023, 12:41pm

DRAFT - *FOR DISCUSSION PURPOSES ONLY*

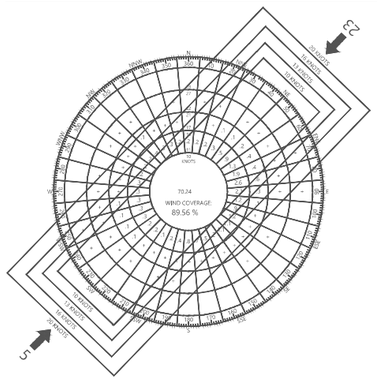
ALL WEATHER WIND ROSE



IFR WIND ROSE



VFR WIND ROSE



SOURCE: National Oceanic and Atmospheric Administration - National Climatic Data Center, 722022 Digital Data for Boca Raton Airport, Boca Raton, Florida, January 1, 2010 - December 31, 2019 (55,923 observations)

EXISTING TAXIWAY DATA

NAME	ADG	TDG	EXISTING TAXIWAY WIDTH	FAA STANDARDS				LIGHTING	OBJECTS INSIDE TSA AND TOFA	SEPARATION FROM TAXIWAY CL TO FIXED MOVABLE OBJECT
				SHOULDER	TSA	TOFA	TESM			
B	III	2B	40'	15'	118'	171'	7.5'	MITL	YES	74.5'
B1	III	2B	84'	15'	118'	171'	7.5'	MITL	NO	85.5'
B2	III	2B	56'	15'	118'	171'	7.5'	MITL	NO	85.5'
B3	III	2B	54'	15'	118'	171'	7.5'	MITL	NO	85.5'
B4	III	2B	54'	15'	118'	171'	7.5'	MITL	NO	85.5'
B5	III	2B	56'	15'	118'	171'	7.5'	MITL	NO	85.5'
B6	III	2B	54'	15'	118'	171'	7.5'	MITL	NO	85.5'
B7	III	2B	56'	15'	118'	171'	7.5'	MITL	NO	85.5'
B8	III	2B	56'	15'	118'	171'	7.5'	MITL	NO	85.5'
B9	III	2B	81'	15'	118'	171'	7.5'	MITL	NO	85.5'
P1	I	1B	25'	10'	49'	89'	5.0'	MITL	NO	44.5'
P2	I	1B	25'	10'	49'	89'	5.0'	MITL	NO	44.5'
P3	I	1B	20'	10'	49'	89'	5.0'	MITL	YES	37.6'
P4	III	2B	60'	15'	118'	171'	7.5'	MITL	NO	85.5'
P5	III	2B	60'	15'	118'	171'	7.5'	MITL	NO	85.5'
P6	III	2B	50'	15'	118'	171'	7.5'	MITL	NO	85.5'
P7	III	2B	50'	15'	118'	171'	7.5'	MITL	NO	85.5'
P8	III	2B	50'	15'	118'	171'	7.5'	MITL	NO	85.5'
P9	I	1B	25'	10'	49'	89'	5.0'	MITL	NO	44.5'
P10	III	2B	50'	15'	118'	171'	7.5'	MITL	NO	85.5'
P11	III	2B	50'	15'	118'	171'	7.5'	MITL	NO	85.5'

ABBREVIATIONS/ACRONYMS

AOA	AIRPORT OPERATIONS AREA	NPI	NON-PRECISION INSTRUMENT
ARP	AIRPORT REFERENCE POINT	NTS	NOT TO SCALE
ASOS	AUTOMATED SURFACE OBSERVATION SYSTEM	OCS	OBSTACLE CLEARANCE SURFACE
ATCT	AIRPORT TRAFFIC CONTROL TOWER	OFA	OBJECT FREE AREA
APV	APPROACH WITH VERTICAL GUIDANCE	OL	OBSTRUCTION LIGHT
BRL	BUILDING RESTRICTION LINE	OM	OBSTRUCTION MARKING
CL	CENTERLINE	PACS	PRIMARY AIRPORT CONTROL STATION
EL	ELEVATION	PAPI	PRECISION APPROACH PATH INDICATOR
FAA	FEDERAL AVIATION ADMINISTRATION	PCN	PAVEMENT CLASSIFICATION NUMBER
FAR	FEDERAL AVIATION REGULATION	RDC	RUNWAY DESIGN CODE
GPS	GLOBAL POSITIONING SYSTEM	REIL	RUNWAY END IDENTIFIER LIGHTS
HP	HIGH POINT	ROFA	RUNWAY OBJECT FREE AREA
IFR	INSTRUMENT FLIGHT RULES	RPZ	RUNWAY PROTECTION ZONE
LAT	LATITUDE	RSA	RUNWAY SAFETY AREA
LAWRS	LIMITED AVIATION WEATHER REPORTING STATION	R/W	RUNWAY
LONG	LONGITUDE	SACS	SECONDARY AIRPORT CONTROL STATION
LP	LOW POINT	SMALL	SMALL AIRCRAFT (LESS THAN 12,500 POUNDS)
MIRL	MEDIUM INTENSITY RUNWAY LIGHTING	TDZE	TOUCHDOWN ZONE ELEVATION
MITL	MEDIUM INTENSITY TAXIWAY LIGHTING	TESM	TAXIWAY EDGE SAFETY MARGIN
MOS	MODIFICATION OF DESIGN STANDARDS	T/L	TAXILANE
MSL	MEAN SEA LEVEL	TOFA	TAXIWAY OBJECT FREE AREA
NAD83	NORTH AMERICAN DATUM OF 1983	TSA	TAXIWAY SAFETY AREA
NAVD88	NORTH AMERICAN VERTICAL DATUM OF 1988	T/W	TAXIWAY
NCDC	NATIONAL CLIMATIC DATA CENTER	VFR	VISUAL FLIGHT RULES
NCEI	NATIONAL CENTERS OF ENVIRONMENTAL INFORMATION	WS	WIND SOCK

ALL WEATHER WIND ROSE

CROSSWIND COMPONENT	RUNWAY 5-23 - RUNWAY COVERAGE		
	ALL WEATHER	IFR WEATHER	VFR WEATHER
10.5 KTS (12 mph)	89.42%	82.96%	89.56%
13 KTS (15 mph)	95.06%	90.33%	95.17%
16 KTS (18.4 mph)	99.20%	96.62%	99.27%

DECLARED DISTANCES

	EXISTING	FUTURE
RUNWAY 5		
TAKE-OFF RUN AVAILABLE (TORA)	6,276'	SAME
TAKE-OFF DISTANCE AVAILABLE (TODA)	6,276'	SAME
ACCELERATE STOP DISTANCE AVAILABLE (ASDA)	6,276'	SAME
LANDING DISTANCE AVAILABLE (LDA)	5,580'	SAME
RUNWAY 23		
TAKE-OFF RUN AVAILABLE (TORA)	6,276'	SAME
TAKE-OFF DISTANCE AVAILABLE (TODA)	6,276'	SAME
ACCELERATE STOP DISTANCE AVAILABLE (ASDA)	6,276'	SAME
LANDING DISTANCE AVAILABLE (LDA)	5,898'	SAME

RUNWAY 5-23 DATA

DESCRIPTION		EXISTING		FUTURE	
		RUNWAY 5	RUNWAY 23	RUNWAY 5	RUNWAY 23
RUNWAY DESIGN CODE (RDC)		D/III/4000	D/III/4000	SAME	SAME
CRITICAL AIRCRAFT		GULFSTREAM G550		SAME	
APPROACH REFERENCE CODE (APRC)		B/II/4000	B/II/4000	SAME	SAME
DEPARTURE REFERENCE CODE (DPRC)		B/II	B/II	SAME	SAME
RUNWAY LENGTH		6,276'		SAME	
RUNWAY WIDTH		150'		SAME	
TRUE BEARING		044°	224°	SAME	SAME
MAGNETIC BEARING		049°	229°	SAME	SAME
RUNWAY SHOULDER WIDTH		0'		SAME	
BLAST PAD LENGTH		339.7'	278'	SAME	SAME
BLAST PAD WIDTH		190.1'	184'	SAME	SAME
RUNWAY END ELEVATION (MSL)		11.5'	12.7'	SAME	SAME
RUNWAY END COORDINATES	LATITUDE	26° 22' 20.321" N	26° 23' 04.773" N	SAME	SAME
	LONGITUDE	80° 06' 51.821" W	80° 06' 03.591" W	SAME	SAME
DISPLACED THRESHOLD COORDINATES	LATITUDE	26° 22' 25.251" N	26° 23' 02.096" N	SAME	SAME
	LONGITUDE	80° 06' 46.473" W	80° 06' 06.496" W	SAME	SAME
DISPLACED THRESHOLD DISTANCE		696'	378'	SAME	SAME
DISPLACED RUNWAY THRESHOLD ELEVATION (MSL)		11.5'	12.7'	SAME	SAME
RUNWAY TOUCHDOWN ZONE ELEVATION (MSL)		12.2'	12.8'	SAME	SAME
HIGHEST POINT ON RUNWAY CENTERLINE (MSL)		12.85'		SAME	
LOWEST POINT ON RUNWAY CENTERLINE (MSL)		11.46'		SAME	
EFFECTIVE GRADIENT (IN %)		0.02%		SAME	
PAVEMENT STRENGTH BY:	PCN	32 /F/A/X/T		SAME	
PAVEMENT STRENGTH BY:	WHEEL LOADING (x 1000 lbs.)	66(S)		SAME	
		95(D)		SAME	
		N/A		SAME	
SURFACE COMPOSITION		ASPHALT		SAME	
SURFACE CONDITION		GOOD		SAME	
SURFACE TREATMENT		GROOVED		SAME	
RUNWAY LIGHTING		MIRL		SAME	
RUNWAY MARKING		NON-PRECISION		SAME	
NAVAIDS		PAPI-4, AIRPORT BEACON, GPS	PAPI-4, AIRPORT BEACON, GPS/VOR	SAME	SAME
APPROACH LIGHTING		REIL	REIL	SAME	SAME
APPROACH VISIBILITY MINIMUMS		7/8-MILE	7/8-MILE	SAME	SAME
AERONAUTICAL SURVEY REQUIRED FOR APPROACH		VERTICALLY GUIDED	VERTICALLY GUIDED	SAME	SAME
PART 77 APPROACH CATEGORY		TYPE C (NPI)	TYPE C (NPI)	SAME	SAME
PART 77 APPROACH SLOPE		34:1	34:1	SAME	SAME
THRESHOLD SITING SURFACE (TSS) SLOPE - ADVISORY CIRCULAR 150/5300-13B		TYPE 4 (20:1)	TYPE 4 (20:1)	SAME	SAME
TERPS DEPARTURE SURFACE/OCS SLOPE		YES (40:1)	YES (40:1)	SAME	SAME
GLIDEPATH QUALIFICATION SURFACE (GQS) SLOPE		30:1	30:1	SAME	SAME
APPROACH RUNWAY PROTECTION ZONE (RPZ)	LENGTH	1,700'	1,700'	SAME	SAME
	INNER WIDTH	1,000'	1,000'	SAME	SAME
	OUTER WIDTH	1,510'	1,510'	SAME	SAME
DEPARTURE RUNWAY PROTECTION ZONE (RPZ)	LENGTH	1,700'	1,700'	SAME	SAME
	INNER WIDTH	500'	500'	SAME	SAME
	OUTER WIDTH	1,010'	1,010'	SAME	SAME
RUNWAY SAFETY AREA (RSA) (SEE NOTE #1)	LENGTH BEYOND RUNWAY DEPARTURE END	278'	340'	SAME	SAME
	WIDTH	400'	400	SAME	SAME
RUNWAY OBJECT FREE AREA (ROFA) (SEE NOTE #2)	LENGTH BEYOND RUNWAY DEPARTURE END	278'	340'	SAME	SAME
	WIDTH	570'	570'	SAME	SAME
OBSTACLE FREE ZONE (OFZ)	LENGTH BEYOND RUNWAY DEPARTURE END	200'	200'	SAME	SAME
	WIDTH	400'	400'	SAME	SAME
PRECISION OBSTACLE FREE ZONE (POFZ)	LENGTH	N/A	N/A	N/A	N/A
	WIDTH	N/A	N/A	N/A	N/A
INNER APPROACH OBSTACLE FREE ZONE	LENGTH	N/A	N/A	N/A	N/A
	WIDTH	N/A	N/A	N/A	N/A

NON-STANDARD CONDITIONS TABLE

DESIGN STANDARD	FAA STANDARD - RDC D-III	EXISTING CONDITIONS	NOTES
Runway Safety Area Width and Length Beyond Runway End (see note #1)	Width: 500' Length Beyond Runway End: 1,000'	Width: 400' Length Beyond Runway 5 Departure End: 277.97' Length Beyond Runway 23 Departure End: 339.72'	Width: Possible improvements noted on Airport Layout Plan (see Sheet 4) Length Beyond Runway End: None (EMAS in place)
Runway Object Free Area Width and Length Beyond Runway End (see note #2)	Width: 800' Length Beyond Runway End: 1,000'	Width: 570' (250' east of the runway centerline and 320' west of the runway centerline) Length Beyond Runway 5 Departure End: 277.97' Length Beyond Runway 23 Departure End: 339.72'	Renew existing MOS during the next runway rehabilitation/reconstruction or as requested by FAA. Reference 2023 Airport Master Plan Technical Report, Appendix F.
Runway Centerline to Parallel Taxiway	400'	240'	Renew existing MOS during the next runway rehabilitation/reconstruction or as requested by FAA. Reference 2023 Airport Master Plan Technical Report, Appendix F.
Taxiway Object Free Area	171'	160'	An MOS may be necessary during the next parallel taxiway rehabilitation/reconstruction or as requested by the FAA.

Notes:

1. According to FAA AC 150/5300-13B, Airport Design, the standard runway safety area (RSA) dimensions for a runway with an RDC of D-III are 500' wide and extend 1,000' beyond the end of the runway. The dimensions of the existing RSA at BCT are 400' wide and extend 278' beyond the Runway 5 departure end and 340' beyond the Runway 23 departure end. Both ends of the runway have engineered material arresting system (EMAS) to mitigate existing site constraints pertaining to the length of available RSA. The existing dimensions are depicted on the Existing ALP Sheet.

2. According to FAA AC 150/5300-13B, *Airport Design*, the standard runway object free area (ROFA) dimensions for a runway with an RDC of D-III are 800' wide and extend 1,000' beyond the end of the runway. The dimensions of the existing ROFA at BCT are 570' wide (250' east of the runway centerline and 320' west of the runway centerline). The existing ends of the ROFAs are co-located with the existing ends of the RSAs and extend 278' beyond the Runway 5 departure end and 340' beyond the Runway 23 departure end. The existing dimensions are depicted on the Existing ALP Sheet.

AIRPORT DATA

DESCRIPTION		EXISTING	FUTURE
AIRPORT IDENTIFIER		BCT	SAME
AIRPORT AREA (ACRES)		215	SAME
AIRPORT ELEVATION (MSL)		12.9	SAME
AIRPORT REFERENCE CODE (ARC)		D-III	SAME
AIRPORT REFERENCE POINT (ARP)	LATITUDE	26° 22' 42.548" N	SAME
	LONGITUDE	80° 06' 27.707" W	SAME
MEAN MAXIMUM TEMPERATURE - HOTTEST MONTH		92° F - AUGUST	SAME
DESIGN AIRCRAFT (AIRFIELD)		GULFSTREAM G550	SAME
AIRPORT NAVAIDS		AIRPORT BEACON, VOR, GPS, PAPI-4, REIL	SAME
MISCELLANEOUS FACILITIES		AWOS III	SAME
MAGNETIC VARIATION	DECLINATION	7° 9' W	SAME
	ANNUAL RATE OF CHANGE	0° 06' W	SAME
	DATE	APRIL 2022	SAME
	SOURCE	NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	SAME
NPIAS SERVICE LEVEL		RELIEVER	SAME
STATE SERVICE LEVEL		RELIEVER	SAME

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N

MAGNETIC NORTH DECLINATION = 7° 9' W (APRIL 2022)

TRUE NORTH

0 NTS

GRAPHICAL SCALE IN FEET

NO.	REVISIONS	DATE

AIRPORT DATA SHEET

BOCA RATON AIRPORT
BOCA RATON, FLORIDA

DRAWN BY: AB/MG

CHECKED BY: BW

PREPARED BY:
RICONDO & ASSOCIATES, INC.

DATE:
NOVEMBER 2023

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\11. Airport Layout Plan Set\AutoCAD\02-BCT_Data_Sheet.dwg_Layout: 01_Data Sheet_Nov 30, 2023, 12:27pm

DRAFT - *FOR DISCUSSION PURPOSES ONLY*

EXISTING BUILDING INDEX

NO.	BUILDING	Elevation (MSL)
A	BRAA Administration Building	35.1'
A1	T-Hangars	26.1'
A2	T-Hangars	26.4'
A3	T-Hangars	28.4'
A4	T-Hangars	27.0'
A5	T-Hangars	29.1'
A6	T-Hangars	27.2'
A7	T-Hangars	27.4'
A8	T-Hangars	26.9'
B	US Customs and Border Protection Facility	31.1'
B1	Hangar with Office (Reliable Jet Maintenance)	46.2'
B2	Hangar with Office (Atlantic Aviation)	51.3'
B3	Conventional Hangar (Atlantic Aviation)	51.3'
B4	Conventional Hangar (Atlantic Aviation)	45.7'
B5	Hangar with Office (Atlantic Aviation)	45.4'
B6	Conventional Hangar (Atlantic Aviation)	35.3'
B7	Conventional Hangar (Atlantic Aviation)	35.0'
B8	Conventional Hangar (Atlantic Aviation)	36.2'
B9	Hangar with Office (Private)	47.4'
C10	T-Hangars (Runway 5-23 Hangar Condominium Association)	27.7'
C11	T-Hangars (Runway 5-23 Hangar Condominium Association)	30.7'
C12	T-Hangars (Runway 5-23 Hangar Condominium Association)	27.7'
C13	T-Hangars (Runway 5-23 Hangar Condominium Association)	29.1'
H1	Fairfield Inn & Suites by Marriot Boca Raton	67.5'
L1	Convential Hangar with Office	33.5'
M1	Cinemark Movie Theatre	89.9'
M2	Cinemark Movie Theatre Parking Garage	37.5'
V1	Fixed Base Operator (Signature Flight Support and Vida Jets)	64.7'
V2	Conventional Hangar (Boca Aircraft Maintenance)	55.0'
V3	Fixed Base Operator (Signature Flight Support)	54.0'
V4	Fixed Base Operator (Signature Flight Support)	53.7
3100	Boomers Recreational Complex	56.2'
3700	Atlantic Aviation (FBO)	66.6'
3960	Lynn University Flight Training	30.8'
3350	City Furniture	58.9'
3320	Restaurant / Retail / Office Building	36.0'

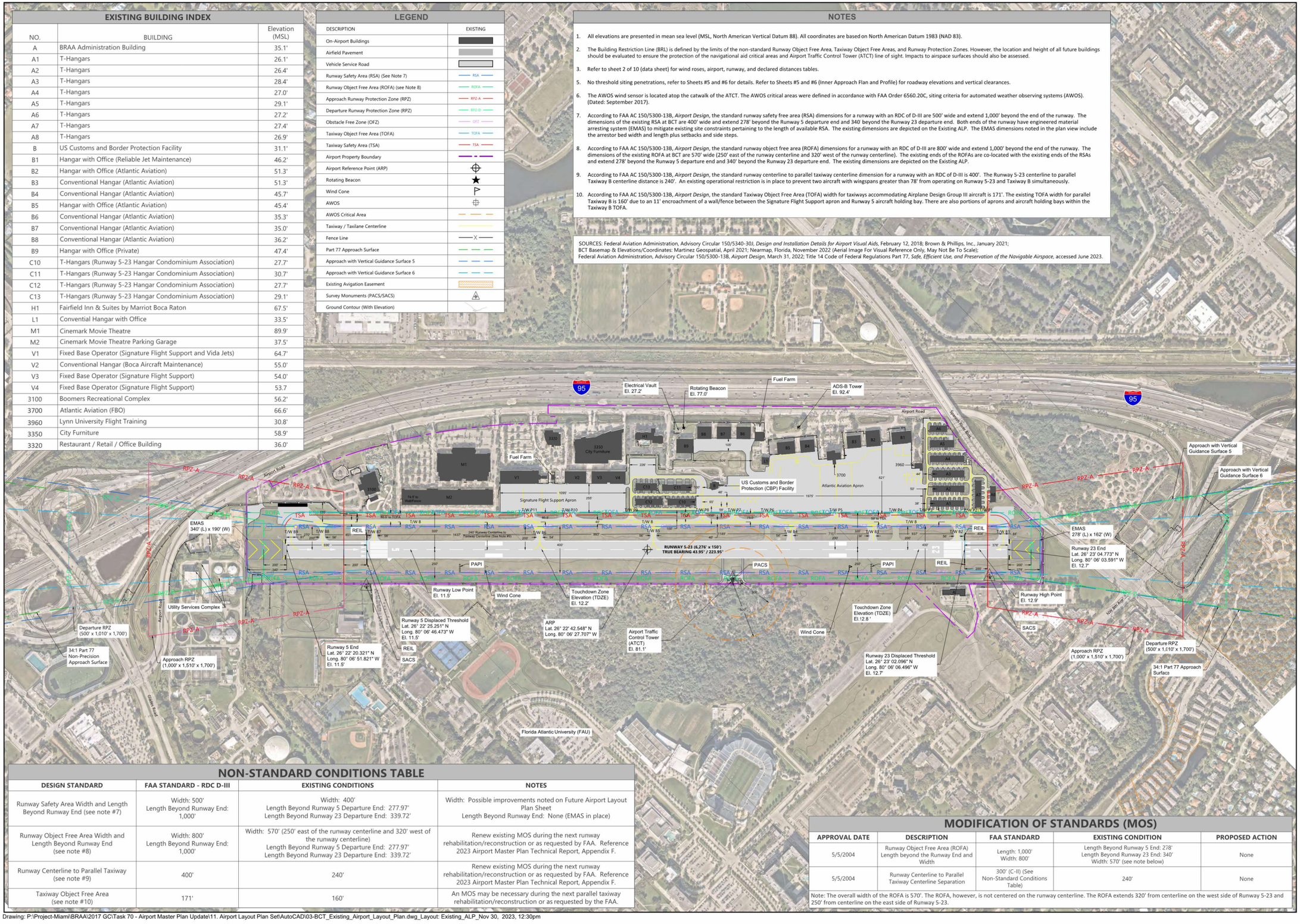
LEGEND

DESCRIPTION	EXISTING
On-Airport Buildings	
Airfield Pavement	
Vehicle Service Road	
Runway Safety Area (RSA) (See Note 7)	RSA
Runway Object Free Area (ROFA) (see Note 8)	ROFA
Approach Runway Protection Zone (RPZ)	RPZ-A
Departure Runway Protection Zone (RPZ)	RPZ-D
Obstacle Free Zone (OFZ)	OFZ
Taxiway Object Free Area (TOFA)	TOFA
Taxiway Safety Area (TSA)	TSA
Airport Property Boundary	
Airport Reference Point (ARP)	
Rotating Beacon	
Wind Cone	
AWOS	
AWOS Critical Area	
Taxiway / Taxilane Centerline	
Fence Line	
Part 77 Approach Surface	
Approach with Vertical Guidance Surface 5	
Approach with Vertical Guidance Surface 6	
Existing Avigation Easement	
Survey Monuments (PACS/SACS)	
Ground Contour (With Elevation)	

NOTES

1. All elevations are presented in mean sea level (MSL, North American Vertical Datum 88). All coordinates are based on North American Datum 1983 (NAD 83).
2. The Building Restriction Line (BRL) is defined by the limits of the non-standard Runway Object Free Area, Taxiway Object Free Areas, and Runway Protection Zones. However, the location and height of all future buildings should be evaluated to ensure the protection of the navigational aid critical areas and Airport Traffic Control Tower (ATCT) line of sight. Impacts to airspace surfaces should also be assessed.
3. Refer to sheet 2 of 10 (data sheet) for wind roses, airport, runway, and declared distances tables.
5. No threshold siting penetrations, refer to Sheets #5 and #6 for details. Refer to Sheets #5 and #6 (Inner Approach Flan and Profile) for roadway elevations and vertical clearances.
6. The AWOS wind sensor is located atop the catwalk of the ATCT. The AWOS critical areas were defined in accordance with FAA Order 6560.20C, siting criteria for automated weather observing systems (AWOS). (Dated: September 2017).
7. According to FAA AC 150/5300-13B, *Airport Design*, the standard runway safety free area (RSA) dimensions for a runway with an RDC of D-III are 500' wide and extend 1,000' beyond the end of the runway. The dimensions of the existing RSA at BCT are 400' wide and extend 278' beyond the Runway 5 departure end and 340' beyond the Runway 23 departure end. Both ends of the runway have engineered material arresting system (EMAS) to mitigate existing site constraints pertaining to the length of available RSA. The existing dimensions are depicted on the Existing ALP. The EMAS dimensions noted in the plan view include the arrestor bed width and length plus setbacks and side steps.
8. According to FAA AC 150/5300-13B, *Airport Design*, the standard runway object free area (ROFA) dimensions for a runway with an RDC of D-III are 800' wide and extend 1,000' beyond the end of the runway. The dimensions of the existing ROFA at BCT are 570' wide (250' east of the runway centerline and 320' west of the runway centerline). The existing ends of the ROFAs are co-located with the existing ends of the RSAs and extend 278' beyond the Runway 5 departure end and 340' beyond the Runway 23 departure end. The existing dimensions are depicted on the Existing ALP.
9. According to FAA AC 150/5300-13B, *Airport Design*, the standard runway centerline to parallel taxiway centerline dimension for a runway with an RDC of D-III is 400'. The Runway 5-23 centerline to parallel Taxiway B centerline distance is 240'. An existing operational restriction is in place to prevent two aircraft with wingspans greater than 78' from operating on Runway 5-23 and Taxiway B simultaneously.
10. According to FAA AC 150/5300-13B, *Airport Design*, the standard Taxiway Object Free Area (TOFA) width for taxiways accommodating Airplane Design Group III aircraft is 171'. The existing TOFA width for parallel Taxiway B is 160' due to an 11' encroachment of a wall/fence between the Signature Flight Support apron and Runway 5 aircraft holding bay. There are also portions of aprons and aircraft holding bays within the Taxiway B TOFA.

SOURCES: Federal Aviation Administration, Advisory Circular 150/5340-30J, *Design and Installation Details for Airport Visual Aids*, February 12, 2018; Brown & Phillips, Inc., January 2021;
BCT Basemap & Elevations/Coordinates: Martinez Geospatial, April 2021; Nearmap, Florida, November 2022 (Aerial Image For Visual Reference Only, May Not Be To Scale);
Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 31, 2022; Title 14 Code of Federal Regulations Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*, accessed June 2023.



NON-STANDARD CONDITIONS TABLE

DESIGN STANDARD	FAA STANDARD - RDC D-III	EXISTING CONDITIONS	NOTES
Runway Safety Area Width and Length Beyond Runway End (see note #7)	Width: 500' Length Beyond Runway End: 1,000'	Width: 400' Length Beyond Runway 5 Departure End: 277.97' Length Beyond Runway 23 Departure End: 339.72'	Width: Possible improvements noted on Future Airport Layout Plan Sheet Length Beyond Runway End: None (EMAS in place)
Runway Object Free Area Width and Length Beyond Runway End (see note #8)	Width: 800' Length Beyond Runway End: 1,000'	Width: 570' (250' east of the runway centerline and 320' west of the runway centerline) Length Beyond Runway 5 Departure End: 277.97' Length Beyond Runway 23 Departure End: 339.72'	Renew existing MOS during the next runway rehabilitation/reconstruction or as requested by FAA. Reference 2023 Airport Master Plan Technical Report, Appendix F.
Runway Centerline to Parallel Taxiway (see note #9)	400'	240'	Renew existing MOS during the next runway rehabilitation/reconstruction or as requested by FAA. Reference 2023 Airport Master Plan Technical Report, Appendix F.
Taxiway Object Free Area (see note #10)	171'	160'	An MOS may be necessary during the next parallel taxiway rehabilitation/reconstruction or as requested by the FAA.

MODIFICATION OF STANDARDS (MOS)

APPROVAL DATE	DESCRIPTION	FAA STANDARD	EXISTING CONDITION	PROPOSED ACTION
5/5/2004	Runway Object Free Area (ROFA) Length beyond the Runway End and Width	Length: 1,000' Width: 800'	Length Beyond Runway 5 End: 278' Length Beyond Runway 23 End: 340' Width: 570' (see note below)	None
5/5/2004	Runway Centerline to Parallel Taxiway Centerline Separation	300' (C-II) (See Non-Standard Conditions Table)	240'	None

Note: The overall width of the ROFA is 570'. The ROFA, however, is not centered on the runway centerline. The ROFA extends 320' from centerline on the west side of Runway 5-23 and 250' from centerline on the east side of Runway 5-23.

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MAGNETIC NORTH DECLINATION = 7° 9' W (APRIL 2022)
TRUE NORTH
0 90 180 360
GRAPHICAL SCALE IN FEET

NO.	REVISIONS	DATE

EXISTING AIRPORT LAYOUT PLAN

BOCA RATON AIRPORT
BOCA RATON, FLORIDA

DRAWN BY: AB
CHECKED BY: BW

PREPARED BY:
RICONDO & ASSOCIATES, INC.

DATE:
NOVEMBER 2023

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\11. Airport Layout Plan Set\AutoCAD\03-BCT_Existing_Airport_Layout_Plan.dwg_Layout: Existing_ALP_Nov 30, 2023, 12:30pm

DRAFT - *FOR DISCUSSION PURPOSES ONLY*

EXISTING BUILDING INDEX

NO.	BUILDING	Elevation (MSL)
A	BRAA Administration Building	35.1'
A1	T-Hangars	26.1'
A2	T-Hangars	26.4'
A3	T-Hangars	28.4'
A4	T-Hangars	27.0'
A5	T-Hangars	29.1'
A6	T-Hangars	27.2'
A7	T-Hangars	27.4'
A8	T-Hangars	26.9'
B	US Customs and Border Protection Facility	31.1'
B1	Hangar with Office (Reliable Jet Maintenance)	46.2'
B2	Hangar with Office (Atlantic Aviation)	51.3'
B3	Conventional Hangar (Atlantic Aviation)	51.3'
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B6	Conventional Hangar (Atlantic Aviation)	35.3'
B7	Conventional Hangar (Atlantic Aviation)	35.0'
B8	Conventional Hangar (Atlantic Aviation)	36.2'
B9	Hangar with Office (Private)	47.4'
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C11	T-Hangars (Runway 5-23 Hangar Condominium Association)	30.7'
C12	T-Hangars (Runway 5-23 Hangar Condominium Association)	27.7'
C13	T-Hangars (Runway 5-23 Hangar Condominium Association)	29.1'
H1	Fairfield Inn & Suites by Marriot Boca Raton	67.5'
L1	Convential Hangar with Office	33.5'
M1	Cinemark Movie Theatre	89.9'
M2	Cinemark Movie Theatre Parking Garage	37.5'
V1	Fixed Base Operator (Signature Flight Support and Vida Jets)	64.7'
V2	Conventional Hangar (Boca Aircraft Maintenance)	55.0'
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3700	Atlantic Aviation (FBO)	66.6'
3960	Lynn University Flight Training	30.8'
3350	City Furniture	58.9'
3320	Restaurant / Retail / Office Building	36.0'

LEGEND

DESCRIPTION	EXISTING	FUTURE
On-Airport Buildings		
Airfield Pavement		
Vehicle Service Road		
Stormwater Improvements	N/A	
Runway Safety Area (RSA) (See Note 7)	RSA	Same
Runway Object Free Area (ROFA) (see Note 8)	ROFA	Same
Approach Runway Protection Zone (RPZ)	RPZ-A	Same
Departure Runway Protection Zone (RPZ)	RPZ-D	Same
Obstacle Free Zone (OFZ)	OFZ	Same
Taxiway Object Free Area (TOFA)	TOFA	TOFA
Taxiway Safety Area (TSA)	TSA	Same
Taxiway / Taxilane Centerline		
Avigation Easements		
Airport Reference Point (ARP)		Same
Rotating Beacon		
Wind Cone		
AWOS		Same
AWOS Critical Area		Same
Airport Property Boundary		Same
Fence Line	X	Same
Parking/Landside Improvements	N/A	
Structure/Pavement To Be Demolished	N/A	
Future Easement / Right of Way	N/A	
Part 77 Approach Surface		Same
Approach with Vertical Guidance Surface 5		Same
Approach with Vertical Guidance Surface 6		Same
Survey Monuments (PACS/SACS)		Same
Non-Aeronautical Redevelopment Areas (See Note 11)	N/A	
Ground Countour (With Elevation)		Same

NOTES

1. All elevations are presented in mean sea level (MSL, North American Vertical Datum 88). All coordinates are based on North American Datum 1983 (NAD 83).
2. The Building Restriction Line (BRL) is defined by the limit of the non-standard Runway Object Free Area, Taxiway Object Free Areas, and Runway Protection Zones. However, the location and height of all future buildings should be evaluated to ensure the protection of the navigational aid critical areas and Airport Traffic Control Tower (ATC) line of sight. Impacts to airspace surfaces should also be assessed.
3. Refer to Sheet 2 (Airport Data Sheet) for wind roses, and airport data, runway data, and declared distances tables.
4. There are no threshold siting surface penetrations; refer to Sheets #6 and #7 for details.
5. Refer to Sheets #6 and #7 for roadway elevations and vertical clearances.
6. Existing electrical vault equipment to be relocated to the first floor of the ATCT or in a separate building (immediately adjacent to the ATCT) and the rotating beacon will be relocated atop the ATCT.
7. According to FAA AC 150/5300-13B, *Airport Design*, the standard runway safety free area (RSA) dimensions for a runway with an RDC of D-III are 500' wide and extend 1,000' beyond the end of the runway. The dimensions of the existing RSA at BCT are 400' wide and extend 278' beyond the Runway 5 departure end and 340' beyond the Runway 23 departure end. Both ends of the runway have engineered materials arresting system (EMAS) to mitigate existing site constraints pertaining to the length of available RSA. The EMAS dimensions noted in the plan view include the arrestor bed width and length plus setbacks and side steps. The airport is pursuing a project to study the widening of the RSA east of Runway 5.
8. According to FAA AC 150/5300-13B, *Airport Design* the standard runway object free area (ROFA) dimensions for a runway with an RDC of D-III are 800' wide and extend 1,000' beyond the end of the runway. The dimensions of the existing ROFA at BCT are 570' wide (250' east of the runway centerline and 320' west of the runway centerline). The existing ends of the ROFAs are co-located with the existing ends of the RSAs and extend 278' beyond the Runway 5 departure end and 340' beyond the Runway 23 departure end. The dimensions are depicted on the ALP.
9. According to FAA AC 150/5300-13B, *Airport Design* the standard runway centerline to parallel taxiway centerline dimension for a runway with an RDC of D-III is 400'. The Runway 5-23 centerline to parallel Taxiway B centerline distance is 240'. An existing operational restriction is in place to prevent two aircraft with wingspans greater than 78' from operating on Runway 5-23 and Taxiway B simultaneously.
10. According to FAA AC 150/5300-13B, *Airport Design* the standard taxiway object free area (TOFA) width for taxiways accommodating airplane design group (ADG) III aircraft is 171'. The existing TOFA width for parallel Taxiway B is 160' due to an 11' encroachment of a wall/fence between the signature flight support apron and Runway 5 aircraft holding bay. There are also portions of aprons and aircraft holding bays within the Taxiway B TOFA.
11. Existing nonaeronautical land to be converted to aeronautical development, pending redevelopment opportunities and amendments to existing leaseholds.

SOURCES: Federal Aviation Administration, Advisory Circular 150/5340-30J, *Design and Installation Details for Airport Visual Aids*, February 12, 2018; Brown & Phillips, Inc., January 2021; BCT Basemap & Elevations/Coordinates: Martinez Geospatial, April 2021; Nearmap, Florida, November 2022 (Aerial Image For Visual Reference Only, May Not Be To Scale); Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 31, 2022; Title 14 Code of Federal Regulations Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*, accessed June 2023.

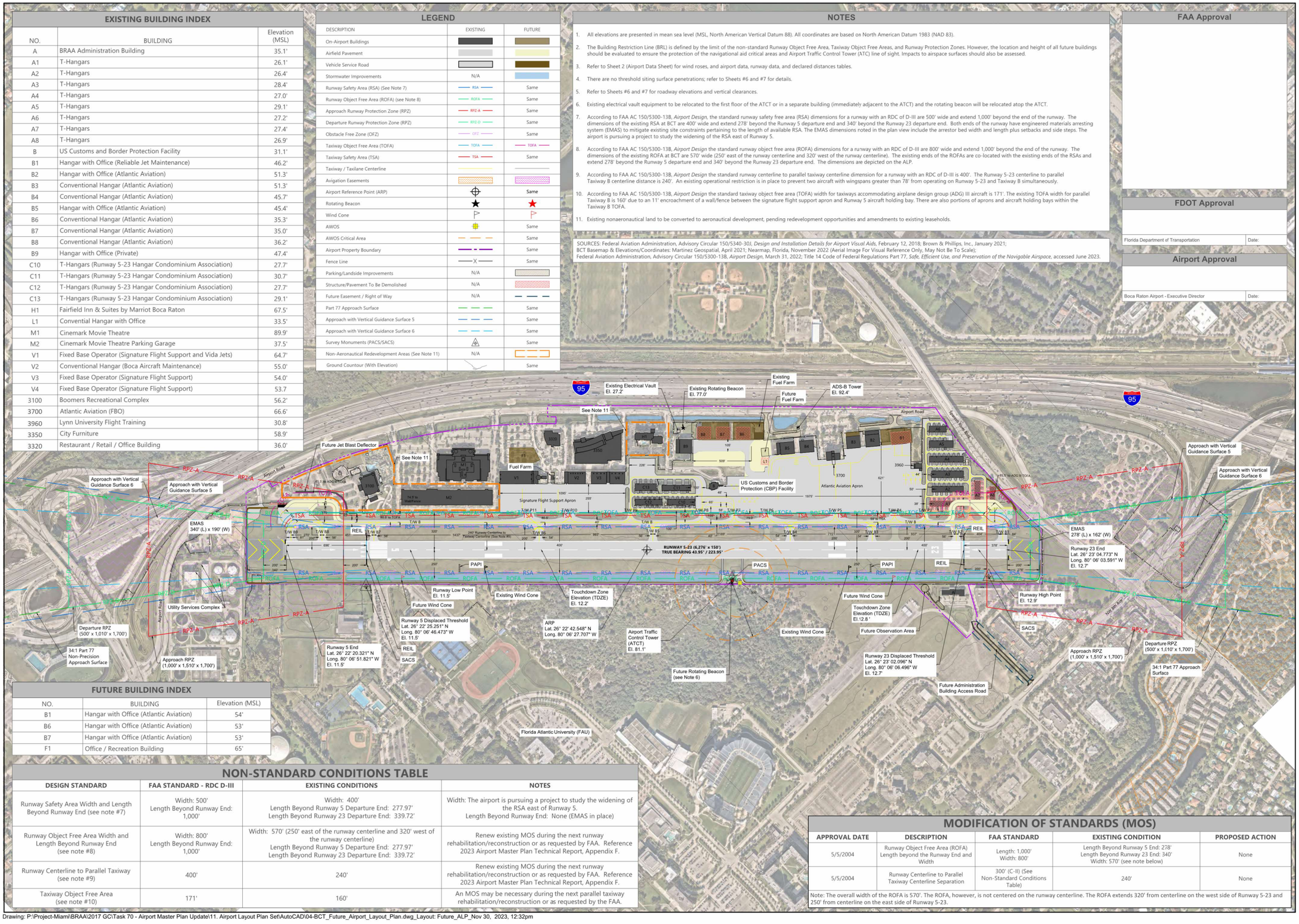
FAA Approval

FDOT Approval

Florida Department of Transportation | Date:

Airport Approval

Boca Raton Airport - Executive Director | Date:



FUTURE BUILDING INDEX

NO.	BUILDING	Elevation (MSL)
B1	Hangar with Office (Atlantic Aviation)	54'
B6	Hangar with Office (Atlantic Aviation)	53'
B7	Hangar with Office (Atlantic Aviation)	53'
F1	Office / Recreation Building	65'

NON-STANDARD CONDITIONS TABLE

DESIGN STANDARD	FAA STANDARD - RDC D-III	EXISTING CONDITIONS	NOTES
Runway Safety Area Width and Length Beyond Runway End (see note #7)	Width: 500' Length Beyond Runway End: 1,000'	Width: 400' Length Beyond Runway 5 Departure End: 277.97' Length Beyond Runway 23 Departure End: 339.72'	Width: The airport is pursuing a project to study the widening of the RSA east of Runway 5. Length Beyond Runway End: None (EMAS in place)
Runway Object Free Area Width and Length Beyond Runway End (see note #8)	Width: 800' Length Beyond Runway End: 1,000'	Width: 570' (250' east of the runway centerline and 320' west of the runway centerline) Length Beyond Runway 5 Departure End: 277.97' Length Beyond Runway 23 Departure End: 339.72'	Renew existing MOS during the next runway rehabilitation/reconstruction or as requested by FAA. Reference 2023 Airport Master Plan Technical Report, Appendix F.
Runway Centerline to Parallel Taxiway (see note #9)	400'	240'	Renew existing MOS during the next runway rehabilitation/reconstruction or as requested by FAA. Reference 2023 Airport Master Plan Technical Report, Appendix F.
Taxiway Object Free Area (see note #10)	171'	160'	An MOS may be necessary during the next parallel taxiway rehabilitation/reconstruction or as requested by the FAA.

MODIFICATION OF STANDARDS (MOS)

APPROVAL DATE	DESCRIPTION	FAA STANDARD	EXISTING CONDITION	PROPOSED ACTION
5/5/2004	Runway Object Free Area (ROFA) Length beyond the Runway End and Width	Length: 1,000' Width: 800'	Length Beyond Runway 5 End: 278' Length Beyond Runway 23 End: 340' Width: 570' (see note below)	None
5/5/2004	Runway Centerline to Parallel Taxiway Centerline Separation	300' (C-II) (See Non-Standard Conditions Table)	240'	None

Note: The overall width of the ROFA is 570'. The ROFA, however, is not centered on the runway centerline. The ROFA extends 320' from centerline on the west side of Runway 5-23 and 250' from centerline on the east side of Runway 5-23.

BOCA RATON AIRPORT

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RICONDO & ASSOCIATES, INC.
3504 LAKE LYNDA DRIVE, SUITE 165
ORLANDO, FL 32817
PHONE (407) 381-5730

MAGNETIC NORTH DECLINATION = 7° 9' W (APRIL 2022)
TRUE NORTH

0 180 360 720
GRAPHICAL SCALE IN FEET

NO.	REVISIONS	DATE

FUTURE AIRPORT LAYOUT PLAN

BOCA RATON AIRPORT
BOCA RATON, FLORIDA

DRAWN BY: AB

CHECKED BY: BW

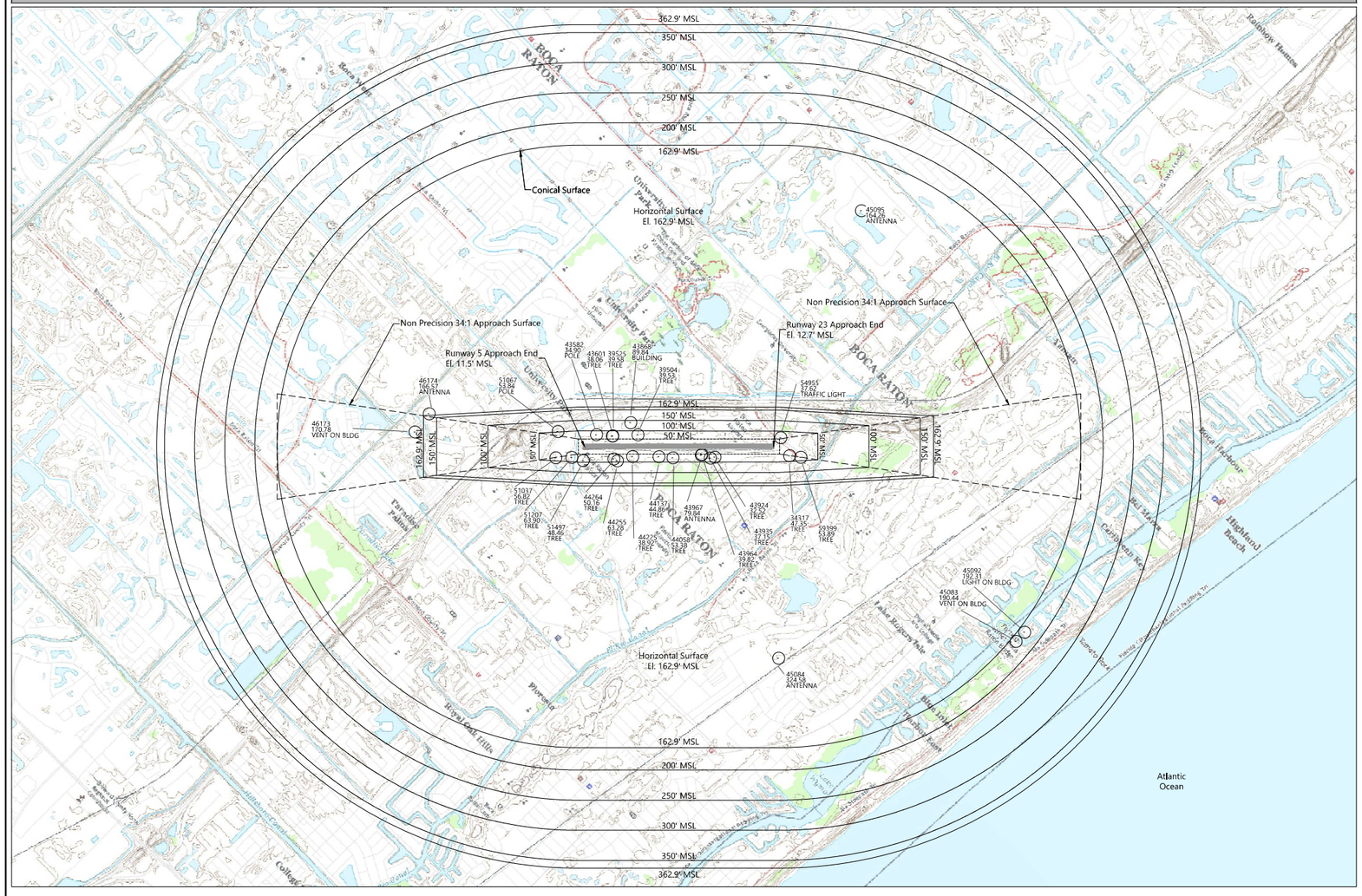
PREPARED BY:
RICONDO & ASSOCIATES, INC.

DATE:
NOVEMBER 2023

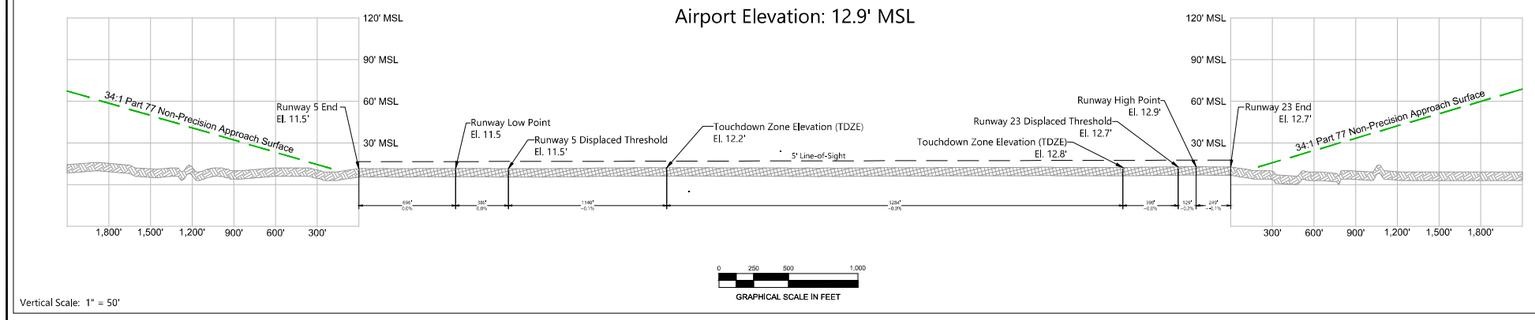
Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\11. Airport Layout Plan Set\AutoCAD\04-BCT_Future_Airport_Layout_Plan.dwg_Layout: Future_ALP_Nov 30, 2023, 12:32pm

DRAFT - *FOR DISCUSSION PURPOSES ONLY*

PLAN VIEW

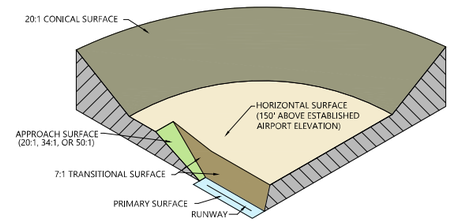


PROFILE VIEW



Vertical Scale: 1" = 50'

TYPICAL 14 CFR PART 77 OBSTRUCTION SURFACES



NOTES:

1. All elevations are Mean Sea Level (MSL, NAVD 88).
2. All coordinates are based on North American Datum 1983 (NAD 83).
3. Obstructions to the inner portions of the Part 77 approach surfaces are depicted on Sheets 6 and 7.
4. The horizontal surface is 150' above the Airport Reference Point (ARP).
5. Height restriction zoning and ordinances are in accordance with Part II - Code of Ordinances, Chapter 3, Article II, *Airport Surfaces and Airspace Height Limitations* for the City of Boca Raton.

OBSTRUCTION DATA TABLE

Obstruction Number	Obstruction Type	Elevation (ft MSL)	Penetration (ft)	Part 77 Surface	Part 77 Disposition
00001	Control Tower	81.10	21.45	Transitional	Lighted
34317	Tree	47.35	23.87	Transitional	Trim or Remove
39504	Tree	39.53	8.24	Transitional	Trim or Remove
39525	Tree	39.58	13.09	Transitional	Trim or Remove
43582	Pole	34.90	3.29	Transitional	Install OL
43601	Tree	38.06	12.91	Transitional	Trim or Remove
43868	Building	89.84	1.05	Transitional	Install OL
43924	Tree	32.53	4.91	Transitional	Trim or Remove
43935	Tree	37.15	5.42	Transitional	Trim or Remove
43964	Tree	39.82	25.54	Transitional	Trim or Remove
43967	Antenna	79.84	62.53	Transitional	Install OL
44058	Tree	53.38	23.17	Transitional	Trim or Remove
44137	Tree	44.86	19.89	Transitional	Trim or Remove
44225	Tree	38.92	14.96	Transitional	Trim or Remove
44255	Tree	63.28	19.02	Transitional	Trim or Remove
44264	Tree	50.16	25.08	Transitional	Trim or Remove
45083	Vent on Bldg	190.44	18.80	Conical	Install OL
45084	Antenna	324.59	161.74	Horizontal	Install OL
45092	Light on Bldg	192.31	19.00	Conical	Install OL
45095	Antenna	164.26	1.41	Horizontal	Install OL
46173	Vent on Bldg	170.76	7.93	Horizontal	Install OL
46174	Antenna	166.57	3.72	Horizontal	Install OL
51037	Tree	56.82	21.45	Transitional	Trim or Remove
51067	Pole	53.84	2.00	Transitional	Install OL
51207	Tree	63.90	34.31	Transitional	Trim or Remove
51497	Tree	48.46	5.87	Transitional	Trim or Remove
54955	Traffic Light	37.62	19.25	Transitional	Install OL
59399	Tree	53.89	20.05	Transitional	Trim or Remove

TABLE NOTES:
OL - Obstruction Light

LEGEND

- Runway Centerline Profile
- Composite Ground Profile
- 34:1 Part 77 Non-Precision Approach Surface

SOURCES: USGS Quad Map, 2021.; Martinez Geospatial, Inc. (MTZ), November 1, 2022.; Title 14 Code of Federal Regulations Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*, accessed June 2023.

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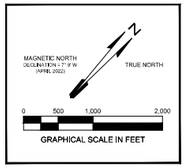


NO.	REVISIONS	DATE

AIRPORT AIRSPACE DRAWING

BOCA RATON AIRPORT
BOCA RATON, FLORIDA

DRAWN BY: AB/MG

CHECKED BY: CFP

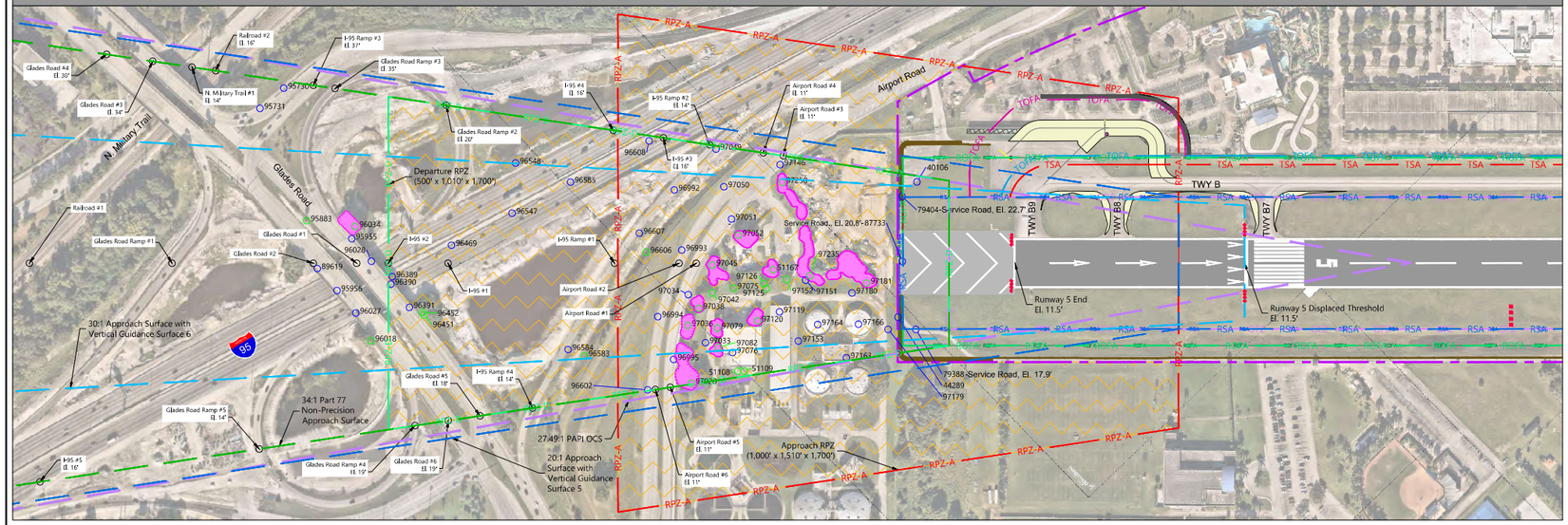
PREPARED BY:
RICONDO & ASSOCIATES, INC.

DATE:
NOVEMBER 2023

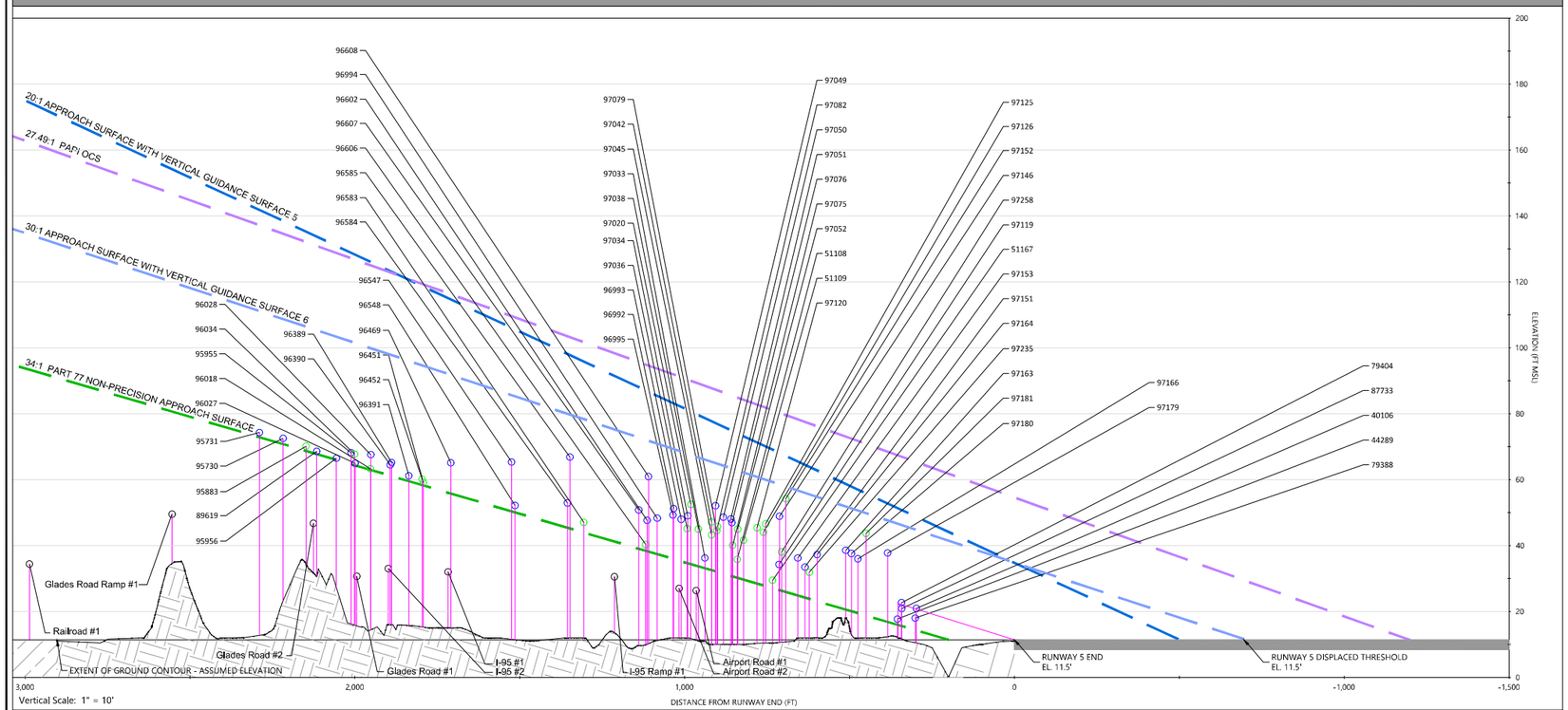
Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\11. Airport Layout Plan Set\AutoCAD\05-BCT_Airport_Airspace_Drawing.dwg, Layout: 05_Airspace_Nov 30, 2023, 12:48pm

DRAFT - *FOR DISCUSSION PURPOSES ONLY*

PLAN VIEW



PROFILE VIEW



LEGEND

Vegetative Obstructions	34:1 Part 77 Non-Precision Approach Surface	Runway Safety Area (RSA)	RSA
Non-Vegetative Obstructions	20:1 Approach Surface with Vertical Guidance 5	Runway Object Free Area (ROFA)	ROFA
Group of Vegetative Obstructions	30:1 Approach Surface with Vertical Guidance 6	Approach Runway Protection Zone (RPZ)	RPZ-A
Future Taxiway	27.49:1 Precision Approach Surface Path Indicator (PAPI) Obstacle Clearance Surface (OCS)	Departure Runway Protection Zone (RPZ)	RPZ-D
Composite Ground Profile	Airport Property Boundary	Obstacle Free Zone (OFZ)	OFZ
Area Beyond Extent of Ground Contour Data	Extended Runway Centerline	Proposed Avigation Easements	

OBSTRUCTION DATA TABLE

Obstruction Number	Obstruction Type	Elevation (ft MSL)	Approach Surface with Vertical Guidance Surface 5 Penetration (ft)	Approach Surface with Vertical Guidance Surface 6 Penetration (ft)	Part 77 Approach Surface Penetration (ft)	PAPI OCS Penetration (ft)	Proposed Disposition
40106	Road	20.91	N/A	N/A	6.65	N/A	OL/OM
44289	Fence	17.70	N/A	N/A	1.75	N/A	OL/OM
51108	Tree	35.80	N/A	N/A	5.58	N/A	Trim/Remove
51109	Tree	41.60	N/A	N/A	11.92	N/A	Trim/Remove
51167	Tree	29.44	N/A	N/A	2.36	N/A	Trim/Remove
79388	Road	17.99	N/A	N/A	3.63	N/A	OL/OM
79404	Road	22.69	N/A	N/A	7.11	N/A	OL/OM
87733	Road	20.87	N/A	N/A	5.30	N/A	OL/OM
87740	Road	22.48	N/A	N/A	6.59	N/A	OL/OM
89619	Light Pole	68.57	N/A	N/A	0.83	N/A	OL/OM
90880	Building	152.36	N/A	N/A	10.59	N/A	OL/OM
95730	Light Pole	72.50	N/A	N/A	1.77	N/A	OL/OM
95731	Light Pole	74.29	N/A	N/A	1.45	N/A	OL/OM
95883	Tree	70.11	N/A	N/A	1.42	N/A	Trim/Remove
95955	Light Pole	68.15	N/A	N/A	3.49	N/A	OL/OM
95956	Light Pole	66.45	N/A	N/A	0.46	N/A	OL/OM
96018	Tree	63.29	N/A	N/A	0.35	N/A	Trim/Remove
96027	Light Pole	64.91	N/A	N/A	0.60	N/A	OL/OM
96028	Light Pole	67.56	N/A	N/A	4.65	N/A	OL/OM
96034	Tree	67.73	N/A	N/A	3.37	N/A	Trim/Remove
96389	Light Pole	65.17	N/A	N/A	4.12	N/A	OL/OM
96390	Light Pole	64.49	N/A	N/A	3.31	N/A	OL/OM
96391	Light Pole	61.16	N/A	N/A	1.65	N/A	OL/OM
96451	Tree	59.12	N/A	N/A	0.90	N/A	Trim/Remove
96452	Tree	60.11	N/A	N/A	1.77	N/A	Trim/Remove
96469	Light Pole	65.09	N/A	N/A	9.32	N/A	OL/OM
96547	Light Pole	65.33	N/A	N/A	14.97	N/A	OL/OM
96548	Light Pole	52.16	N/A	N/A	2.11	N/A	OL/OM
96583	Tree	47.02	N/A	N/A	3.11	N/A	Trim/Remove
96584	Light Pole	52.91	N/A	N/A	7.54	N/A	OL/OM
96585	Light Pole	66.83	N/A	N/A	21.67	N/A	OL/OM
96602	Light Pole	47.64	N/A	N/A	9.28	N/A	OL/OM
96606	Tree	40.31	N/A	N/A	1.92	N/A	Trim/Remove
96607	Light Pole	50.78	N/A	N/A	11.76	N/A	OL/OM
96608	Light Pole	60.92	N/A	N/A	22.77	N/A	OL/OM
96992	Light Pole	51.18	N/A	N/A	15.29	N/A	OL/OM
96993	Light Pole	47.96	N/A	N/A	12.73	N/A	OL/OM
96994	Light Pole	48.28	N/A	N/A	10.91	N/A	OL/OM
96995	Light Pole	49.25	N/A	N/A	13.29	N/A	OL/OM
97020	Tree	52.47	N/A	N/A	18.04	N/A	Trim/Remove
97033	Light Pole	36.21	N/A	N/A	3.08	N/A	OL/OM
97034	Light Pole	49.01	N/A	N/A	14.36	N/A	OL/OM
97036	Tree	45.14	N/A	N/A	10.44	N/A	Trim/Remove
97038	Tree	44.98	N/A	N/A	11.28	N/A	Trim/Remove
97042	Tree	47.15	N/A	N/A	14.63	N/A	Trim/Remove
97045	Tree	43.21	N/A	N/A	10.69	N/A	Trim/Remove
97049	Light Pole	52.07	N/A	N/A	19.90	N/A	OL/OM
97050	Light Pole	48.60	N/A	N/A	17.13	N/A	OL/OM
97051	Light Pole	48.04	N/A	N/A	17.24	N/A	OL/OM
97052	Tree	44.98	N/A	N/A	14.80	N/A	Trim/Remove
97075	Tree	40.07	N/A	N/A	9.43	N/A	Trim/Remove
97076	Vent on Building	46.91	N/A	N/A	16.21	N/A	OL/OM
97079	Tree	44.50	N/A	N/A	12.44	N/A	Trim/Remove
97082	Tree	45.71	N/A	N/A	13.72	N/A	Trim/Remove
97119	Vent on Building	34.27	N/A	N/A	7.76	N/A	OL/OM
97120	Tree	45.38	N/A	N/A	16.92	N/A	Trim/Remove
97125	Tree	46.59	N/A	N/A	18.90	N/A	Trim/Remove
97126	Tree	44.02	N/A	N/A	16.12	N/A	Trim/Remove
97146	Light Pole	48.85	N/A	N/A	22.38	N/A	OL/OM
97151	Utility Pole	33.47	N/A	N/A	9.28	N/A	OL/OM
97152	Tree	54.16	N/A	N/A	28.26	N/A	Trim/Remove
97153	Light Pole	36.21	N/A	N/A	11.37	N/A	OL/OM
97163	Vent on Building	38.54	N/A	N/A	17.99	N/A	OL/OM
97164	Light on Tank	37.25	N/A	N/A	14.14	N/A	OL/OM
97166	Light on Tank	35.96	N/A	N/A	16.49	N/A	OL/OM
97179	Light Pole	37.74	N/A	N/A	20.91	N/A	OL/OM
97180	Light Pole	37.57	N/A	N/A	17.53	N/A	OL/OM
97181	Tree	43.69	N/A	N/A	24.94	N/A	Trim/Remove
97235	Tree	31.86	N/A	N/A	8.06	N/A	Trim/Remove
97258	Tree	38.06	N/A	N/A	11.78	N/A	Trim/Remove

TABLE NOTES:
OL - Obstruction Light
OM - Obstruction Marking

NOTES

1. All elevations are in feet and reference the North American Vertical Datum 1988 (NAVD88).
2. Obstruction number corresponds to survey data point number.
3. Due to frequency of obstructions, vegetation clusters were identified for clarity. The highest elevation of each cluster is identified and displayed.
4. All road and rail heights include clearance height as defined in Title 14 Code of Federal Regulations Part 77:
   Service Road = 10'
   Public Road = 15'
   Highway = 17'
   Railroad = 23'
5. No object penetrations to the threshold siting, TERPS vertical guidance, and precision approach path indicator (PAPI) obstacle clearance surfaces (OCS) were identified.

SOURCES: Federal Aviation Administration, Advisory Circular 150/5340-30J, *Design and Installation Details for Airport Visual Aids*, February 12, 2018; Brown & Phillips, Inc., January 2021; BCT Basemap & Elevations/Coordinates: Martinez Geospatial, April 2021; Nearmap, Florida, November 2022 (Aerial Image For Visual Reference Only, May Not Be To Scale); Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 31, 2022; Title 14 Code of Federal Regulations Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*, accessed June 2023.

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PHONE (407) 381-5730

MAGNETIC NORTH DECLINATION = 7° 9' W (APRIL 2022)
TRUE NORTH
0 100 200 400
GRAPHICAL SCALE IN FEET

NO.	REVISIONS	DATE

INNER APPROACH PLAN & PROFILE RUNWAY 5

BOCA RATON AIRPORT
BOCA RATON, FLORIDA

DRAWN BY: AB/MD

CHECKED BY: BW

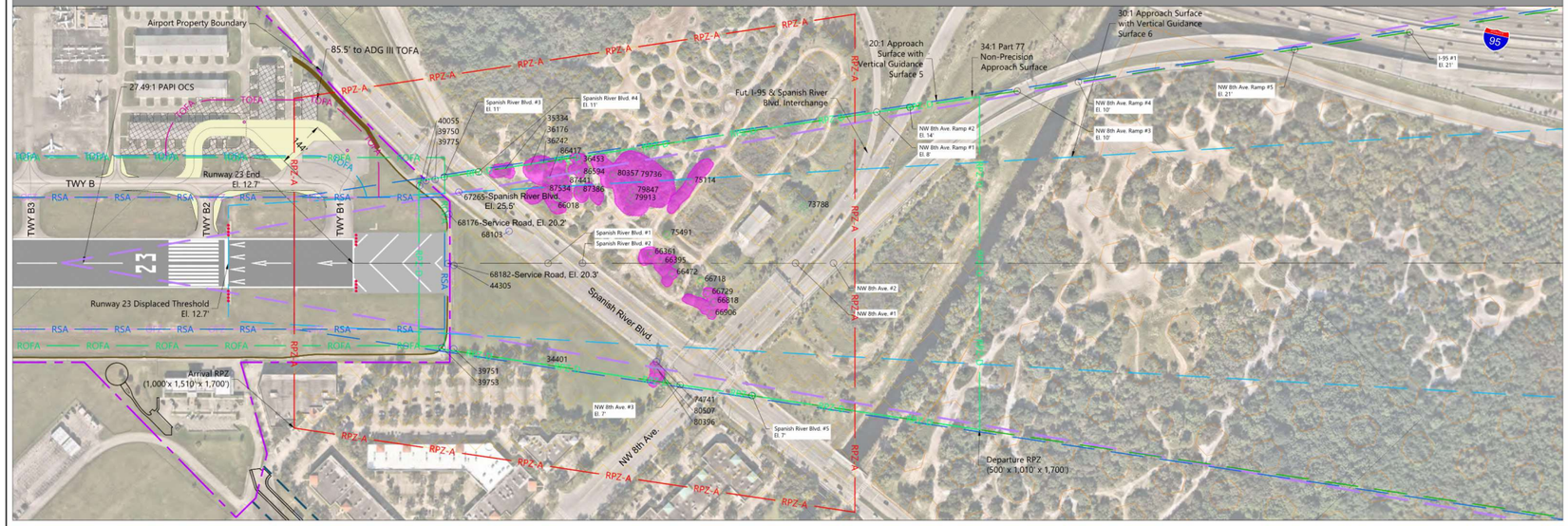
PREPARED BY:
RICONDO & ASSOCIATES, INC.

DATE:
NOVEMBER 2023

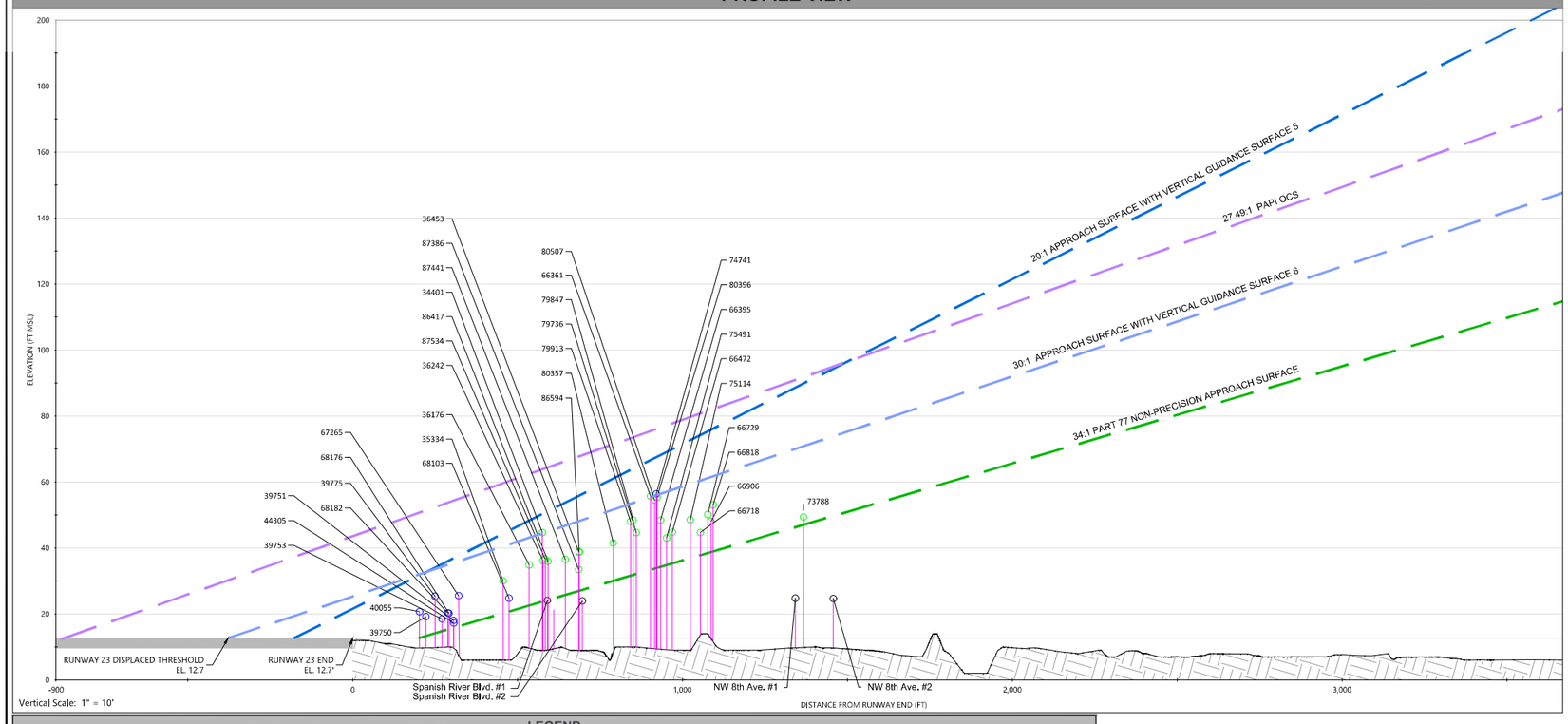
Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\11. Airport Layout Plan Set\AutoCAD\06-07-BCT_Approach_Sheets.dwg_Layout: Runway 05_Nov 30, 2023, 12:35pm

DRAFT - *FOR DISCUSSION PURPOSES ONLY*

PLAN VIEW



PROFILE VIEW



LEGEND

Vegetative Obstructions	34:1 Part 77 Non-Precision Approach Surface	Runway Safety Area (RSA)	RSA	Existing Avigation Easements	
Non-Vegetative Obstructions	20:1 Approach Surface with Vertical Guidance 5	Runway Object Free Area (ROFA)	ROFA		
Group of Vegetative Obstructions	30:1 Approach Surface with Vertical Guidance 6	Approach Runway Protection Zone (RPZ)	RPZ-A		
Future Taxiway	27.49:1 Precision Approach Surface Path Indicator (PAPI) Obstacle Clearance Surface (OCS)	Departure Runway Protection Zone (RPZ)	RPZ-D		
Composite Ground Profile	Airport Property Boundary	Obstacle Free Zone (OFZ)	OFZ		
Area Beyond Extent of Ground Contour Data	Extended Runway Centerline	Proposed Avigation Easements			

OBSTRUCTION DATA TABLE

Obstruction Number	Obstruction Type	Elevation (ft MSL)	Approach Surface with Vertical Guidance Surface 5 Penetration (ft)	Approach Surface with Vertical Guidance Surface 6 Penetration (ft)	Part 77 Approach Surface Penetration (ft)	PAPI OCS Penetration (ft)	Proposed Disposition
34401	Tree	44.68	N/A	N/A	20.95	N/A	Trim/Remove
36176	Tree	34.88	N/A	N/A	12.33	N/A	Trim/Remove
36242	Tree	36.16	N/A	N/A	12.37	N/A	Trim/Remove
36453	Tree	38.71	N/A	N/A	11.72	N/A	Trim/Remove
39750	Fence	19.18	N/A	N/A	5.84	N/A	OL/OM
39751	Fence	18.03	N/A	N/A	2.28	N/A	OL/OM
39753	Road	18.48	N/A	N/A	3.71	N/A	OL/OM
39775	Road	25.36	N/A	N/A	11.14	N/A	OL/OM
40055	Road	20.67	N/A	N/A	7.86	N/A	OL/OM
44305	Fence	17.25	N/A	N/A	1.43	N/A	OL/OM
66018	Tree	21.23	10.66	N/A	12.44	N/A	Trim/Remove
66361	Tree	55.70	20.44	0.31	22.34	N/A	Trim/Remove
66395	Tree	48.45	12.42	N/A	14.18	N/A	Trim/Remove
66472	Tree	44.83	7.91	N/A	9.52	N/A	Trim/Remove
66718	Tree	44.69	5.64	N/A	6.88	N/A	Trim/Remove
66729	Tree	50.16	10.55	N/A	11.69	N/A	Trim/Remove
66818	Tree	53.07	13.07	N/A	14.13	N/A	Trim/Remove
66906	Tree	48.10	8.24	N/A	9.33	N/A	Trim/Remove
67265	Road	25.53	N/A	N/A	9.27	N/A	OL/OM
68103	Road	24.77	0.24	N/A	4.03	N/A	OL/OM
68176	Road	20.19	0.20	N/A	4.80	N/A	OL/OM
68182	Road	20.31	0.41	N/A	5.02	N/A	OL/OM
73788	Tree	49.38	2.52	N/A	2.38	N/A	Trim/Remove
74741	Light Pole	56.36	20.66	N/A	22.48	N/A	OL/OM
75114	Tree	48.55	10.28	N/A	11.65	N/A	Trim/Remove
75491	Tree	43.03	6.55	N/A	8.24	N/A	Trim/Remove
79736	Tree	44.65	10.46	N/A	12.55	N/A	Trim/Remove
79847	Tree	48.45	14.50	N/A	16.63	N/A	Trim/Remove
79913	Tree	48.03	14.27	N/A	16.44	N/A	Trim/Remove
80357	Tree	41.53	9.09	N/A	11.48	N/A	Trim/Remove
80396	Tree	55.33	18.99	N/A	21.37	N/A	Trim/Remove
80507	Tree	54.51	18.92	N/A	20.77	N/A	Trim/Remove
86417	Tree	35.94	2.13	N/A	11.71	N/A	Trim/Remove
86594	Tree	38.93	4.38	N/A	11.91	N/A	Trim/Remove
87386	Tree	33.45	3.63	N/A	6.48	N/A	Trim/Remove
87441	Tree	36.51	7.26	N/A	10.75	N/A	Trim/Remove
87534	Tree	36.65	9.37	N/A	12.68	N/A	Trim/Remove

TABLE NOTES:
OL - Obstruction Light
OM - Obstruction Marking

NOTES

1. All elevations are in feet and reference the North American Vertical Datum 1988 (NAVD88).
2. Obstruction number corresponds to survey data point number.
3. Due to frequency of obstructions, vegetation clusters were identified for clarity. The highest elevation of each cluster is identified and displayed.
4. All road and rail heights include clearance height as defined in Title 14 Code of Federal Regulations Part 77:
   Service Road - 10'
   Public Road - 15'
   Highway - 17'
   Railroad - 23'
5. No object penetrations to the threshold siting, TERPS vertical guidance, and precision approach path indicator (PAPI) obstacle clearance surfaces (OCS) were identified.

SOURCES: Federal Aviation Administration, Advisory Circular 150/5340-30J, *Design and Installation Details for Airport Visual Aids*, February 12, 2018; Brown & Phillips, Inc., January 2021; BCT Basemap & Elevations/Coordinates: Martinez Geospatial, April 2021; Nearmap, Florida, November 2022 (Aerial Image For Visual Reference Only, May Not Be To Scale); Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 31, 2022; Title 14 Code of Federal Regulations Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*, accessed June 2023.

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ORLANDO, FL 32817
PHONE (407) 381-5730

MAGNETIC NORTH DECLINATION = 7° 9' W (APRIL 2022)
TRUE NORTH
0 100 200 400
GRAPHICAL SCALE IN FEET

NO.	REVISIONS	DATE

INNER APPROACH PLAN & PROFILE RUNWAY 23

BOCA RATON AIRPORT
BOCA RATON, FLORIDA

DRAWN BY: AB/MD
CHECKED BY: BW

PREPARED BY:
RICONDO & ASSOCIATES, INC.

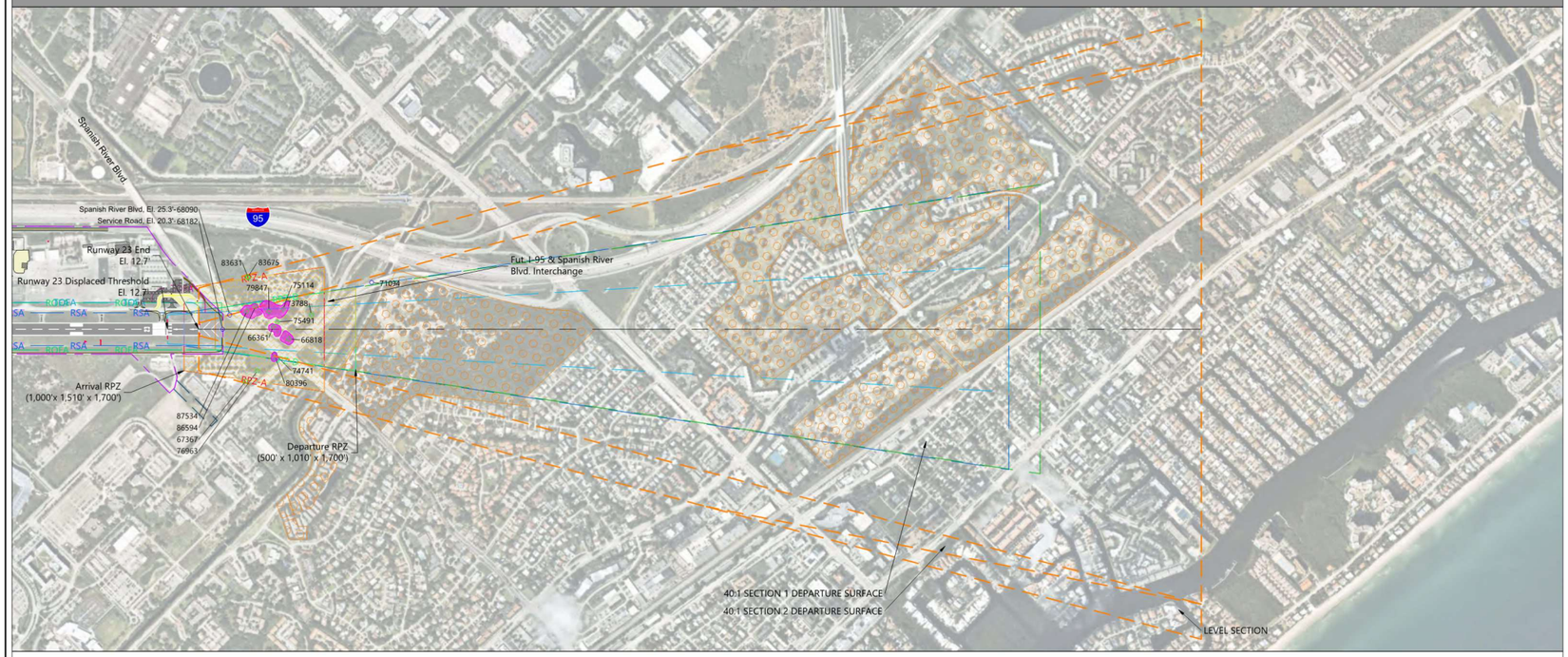
DATE:
NOVEMBER 2023

SHEET 7 OF 10

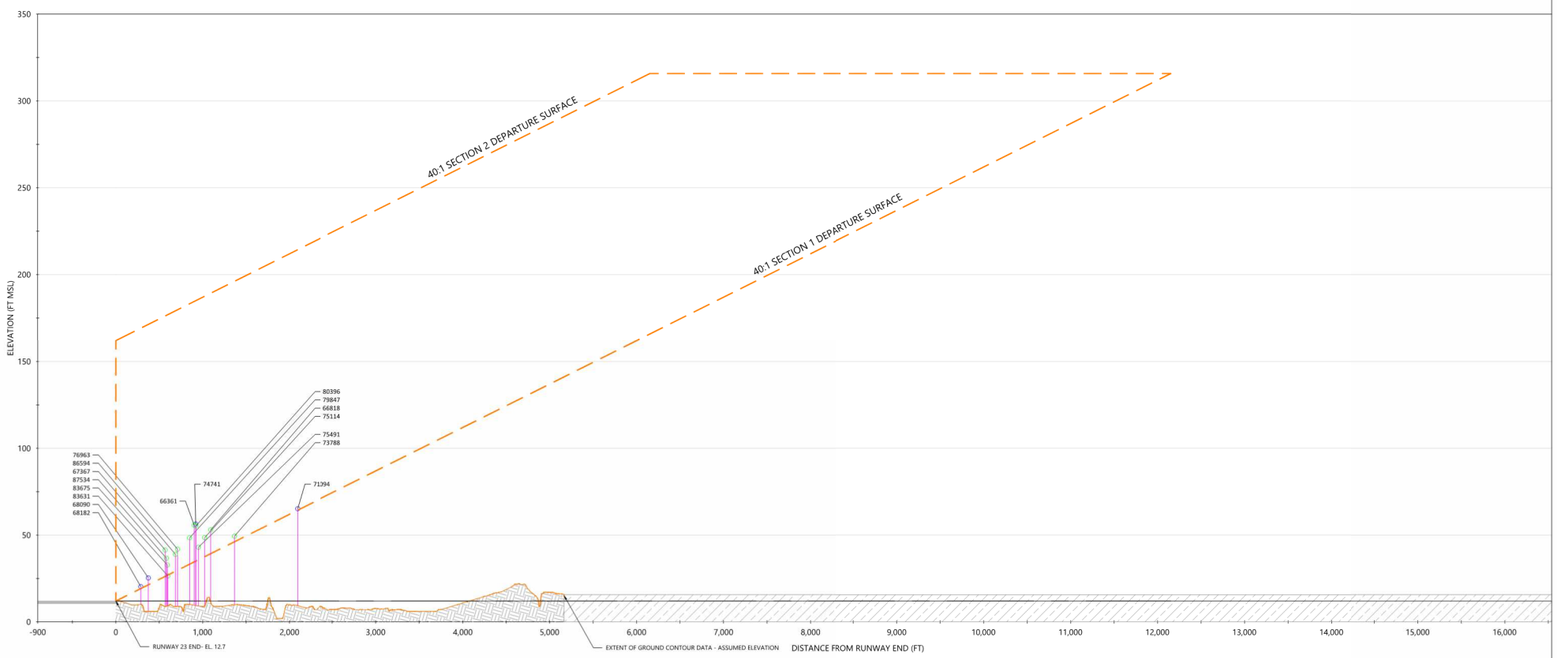
Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\11. Airport Layout Plan Set\AutoCAD\06-07-BCT_Approach_Sheets.dwg_Layout: Runway 23_Nov 30, 2023, 12:36pm

DRAFT - *FOR DISCUSSION PURPOSES ONLY*

PLAN VIEW



PROFILE VIEW



Vertical Scale: 1" = 20'

OBSTRUCTION DATA TABLE

Obstruction Number	Obstruction Type	Elevation (ft MSL)	Departure Surface/OCS Penetration (ft)	Proposed Disposition
66361	Tree	55.70	20.44	Trim/Remove
66818	Tree	53.07	13.07	Trim/Remove
67367	Tree	41.41	0.20	Trim/Remove
68090	Road	25.32	3.04	OL/OM
68182	Road	20.31	0.41	OL/OM
71094	Light Pole	65.20	0.14	OL/OM
73788	Tree	49.38	2.52	Trim/Remove
74741	Light Pole	56.36	20.66	OL/OM
75114	Tree	48.55	10.28	Trim/Remove
75491	Tree	43.03	6.55	Trim/Remove
76963	Tree	41.88	6.11	Trim/Remove
79847	Tree	48.45	14.50	Trim/Remove
80396	Tree	55.33	18.99	Trim/Remove
83631	Tree	26.48	14.48	Trim/Remove
83675	Tree	32.75	7.14	Trim/Remove
86594	Tree	38.93	4.38	Trim/Remove
87534	Tree	36.65	9.37	Trim/Remove

TABLE NOTES:
OL - Obstruction Light
OM - Obstruction Marking

LEGEND

- Vegetative Obstructions
- Non-Vegetative Obstructions
- Group of Vegetative Obstructions
- Future Taxiway
- Composite Ground Profile
- Area Beyond Extent of Ground Contour Data
- Airport Property Boundary
- Extended Runway Centerline
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Approach Runway Protection Zone (RPZ)
- Departure Runway Protection Zone (RPZ)
- Obstacle Free Zone (OFZ)
- Proposed Avigation Easements
- Existing Avigation Easements

NOTES

1. All elevations are in feet and reference the North American Vertical Datum (NAVD 88).
2. Obstruction number corresponds to survey data point number.

SOURCES: Brown & Phillips, Inc., January 2021; BCT Basemap & Elevations/Coordinates: Martinez Geospatial, April 2021; Nearmap, Florida, November 2022 (Aerial Image For Visual Reference Only, May Not Be To Scale); Federal Aviation Administration Advisory Circular 150/5300-13B, *Airport Design*, March 31, 2022.

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PHONE (407) 381-5730

MAGNETIC NORTH DECLINATION = 7° 9' W (APRIL 2022)
TRUE NORTH
0 400 800 1,600
GRAPHICAL SCALE IN FEET

NO.	REVISIONS	DATE

DEPARTURE PLAN & PROFILE RUNWAY 5

BOCA RATON AIRPORT
BOCA RATON, FLORIDA

DRAWN BY: AB/MD
CHECKED BY: BW

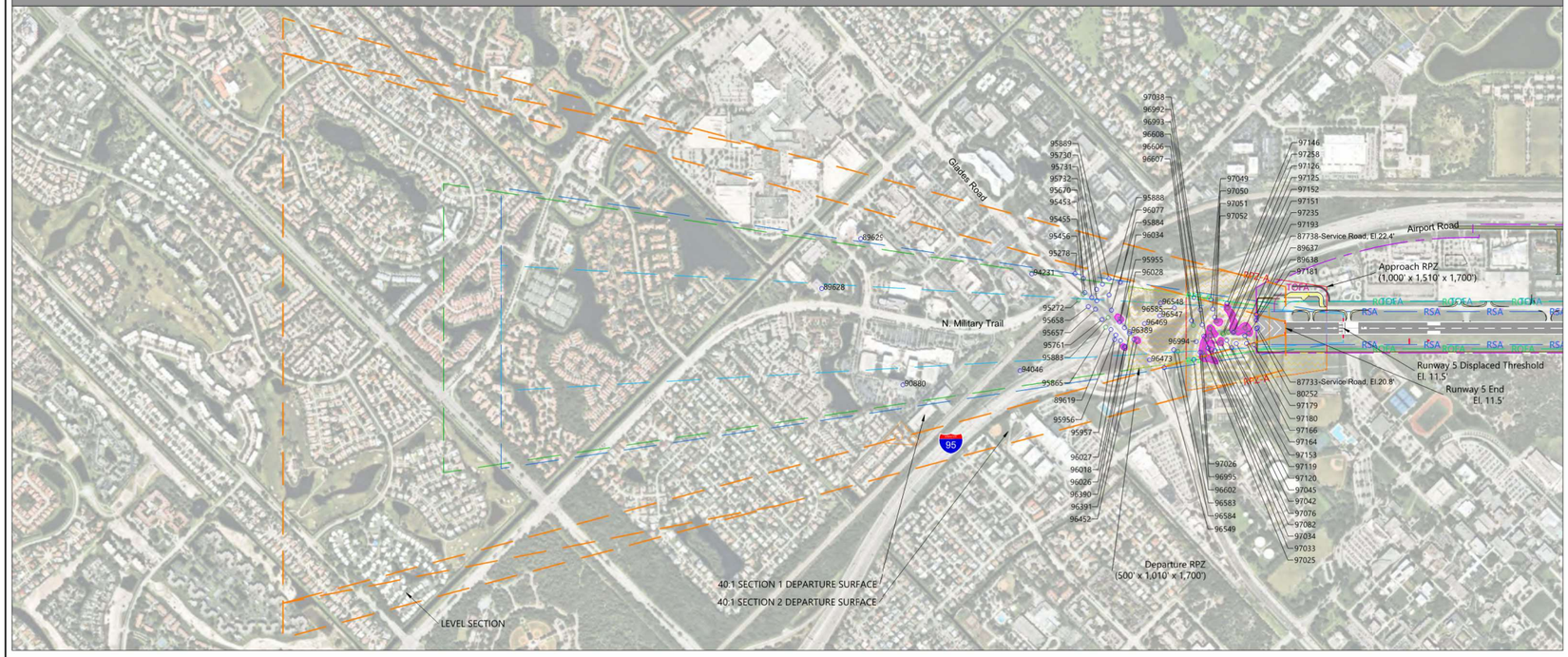
PREPARED BY:
RICONDO & ASSOCIATES, INC.

DATE:
NOVEMBER 2023

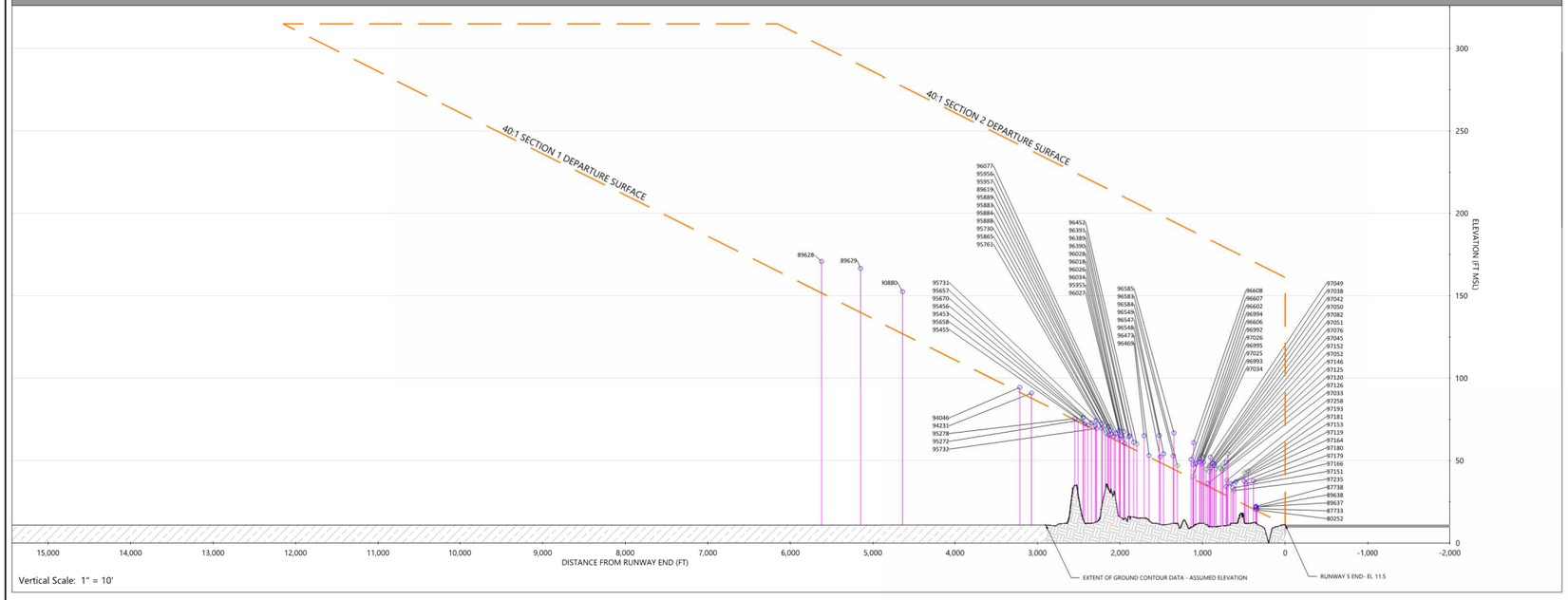
Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\11. Airport Layout Plan Set\AutoCAD\08-09-BCT_Departure_Sheets.dwg_Layout: Runway 5_Nov 30, 2023, 12:37pm

DRAFT - *FOR DISCUSSION PURPOSES ONLY*

PLAN VIEW



PROFILE VIEW



Vertical Scale: 1" = 10'

OBSTRUCTION DATA TABLE

Obstruction Number	Obstruction Type	Elevation (ft MSL)	Departure Surface/OCS Penetration (ft)	Proposed Disposition
80252	Fence	20.28	0.01	OL/OM
87733	Road	20.87	0.93	OL/OM
87738	Road	22.35	1.93	OL/OM
89619	Light Pole	68.57	4.28	OL/OM
89628	Vent on Building	170.78	18.82	OL/OM
89629	Antenna	166.57	26.41	OL/OM
89637	Fence	21.91	1.64	OL/OM
89638	Fence	21.68	1.42	OL/OM
90880	Building	152.36	25.15	OL/OM
94046	Utility Pole	94.37	2.61	OL/OM
94231	Vent on Building	90.95	2.72	OL/OM
95272	Tree	74.38	0.29	Trim/Remove
95278	Utility Pole	75.48	0.33	OL/OM
95453	Utility Pole	75.83	3.22	OL/OM
95455	Traffic Light	72.50	0.36	OL/OM
95456	Tree	76.34	3.69	Trim/Remove
95657	Traffic Light	71.22	2.31	OL/OM
95658	Traffic Light	71.39	0.26	OL/OM
95670	Traffic Light	72.84	2.78	OL/OM
95730	Light Pole	72.50	5.67	OL/OM
95731	Light Pole	74.29	5.66	OL/OM
95732	Light Pole	69.52	0.98	OL/OM
95761	Light Pole	69.52	2.55	OL/OM
95865	Tree	66.62	0.79	Trim/Remove
95883	Tree	70.11	5.02	Trim/Remove
95884	Light Pole	66.02	1.89	OL/OM
95888	Light Pole	65.68	0.83	OL/OM
95889	Light Pole	70.88	6.02	OL/OM
95955	Light Pole	68.15	6.48	OL/OM
95956	Light Pole	66.45	3.65	OL/OM
95957	Light Pole	64.91	1.75	OL/OM
96018	Tree	63.29	3.08	Trim/Remove
96026	Light Pole	60.48	0.46	OL/OM
96027	Light Pole	64.91	3.54	OL/OM
96028	Light Pole	67.56	7.37	OL/OM
96034	Tree	67.73	6.31	Trim/Remove
96077	Light Pole	63.29	1.83	OL/OM
96389	Light Pole	65.17	6.56	OL/OM
96390	Light Pole	64.49	5.78	OL/OM
96391	Light Pole	61.16	3.86	OL/OM
96452	Tree	60.11	3.81	Trim/Remove
96469	Light Pole	65.09	10.97	OL/OM
96473	Light Pole	53.16	0.55	OL/OM
96547	Light Pole	65.33	15.82	OL/OM
96548	Light Pole	52.16	2.91	OL/OM
96549	Light Pole	54.23	3.22	OL/OM
96583	Tree	47.02	2.98	Trim/Remove
96584	Light Pole	52.91	7.64	OL/OM
96585	Light Pole	66.83	21.73	OL/OM
96602	Light Pole	47.64	4.41	OL/OM
96606	Tree	40.31	0.97	Trim/Remove
96607	Light Pole	50.78	10.91	OL/OM
96608	Light Pole	60.92	21.50	OL/OM
96992	Light Pole	51.18	13.96	OL/OM
96993	Light Pole	47.96	11.30	OL/OM
96994	Light Pole	48.28	9.81	OL/OM
96995	Light Pole	49.25	11.97	OL/OM
97025	Tree	51.90	15.85	Trim/Remove
97026	Tree	53.19	16.51	Trim/Remove
97033	Light Pole	36.21	1.34	OL/OM
97034	Light Pole	49.01	12.84	OL/OM
97038	Tree	44.98	9.62	Trim/Remove
97042	Tree	47.15	12.80	Trim/Remove
97045	Tree	43.21	8.86	Trim/Remove
97049	Light Pole	52.07	8.16	OL/OM
97050	Light Pole	48.60	15.14	OL/OM
97051	Light Pole	48.04	15.15	OL/OM
97052	Tree	44.98	12.61	Trim/Remove
97076	Vent on Building	46.91	14.11	OL/OM
97082	Tree	45.71	11.81	Trim/Remove
97119	Vent on Building	34.27	5.03	OL/OM
97120	Tree	45.38	14.48	Trim/Remove
97125	Tree	46.59	16.34	Trim/Remove
97126	Tree	44.02	13.59	Trim/Remove
97146	Light Pole	48.85	8.08	OL/OM
97151	Utility Pole	33.47	6.20	OL/OM
97152	Tree	54.16	25.44	Trim/Remove
97153	Light Pole	36.21	8.39	OL/OM
97164	Light on Tank	37.25	10.90	OL/OM
97166	Light on Tank	35.96	12.70	OL/OM
97179	Light Pole	37.74	8.56	OL/OM
97180	Light Pole	37.57	13.82	OL/OM
97181	Tree	43.69	21.05	Trim/Remove
97193	Tree	42.73	19.04	Trim/Remove
97235	Tree	31.86	4.92	Trim/Remove
97258	Tree	38.06	9.01	Trim/Remove

TABLE NOTES:
OL - Obstruction Light
OM - Obstruction Marking

NOTES

1. All elevations are in feet and reference the North American Vertical Datum (NAVD 88).
2. Obstruction number corresponds to survey data point number.

LEGEND

Vegetative Obstructions
Non-Vegetative Obstructions
Group of Vegetative Obstructions
Future Taxiway
Composite Ground Profile
Area Beyond Extent of Ground Contour Data
Airport Property Boundary
Extended Runway Centerline
Runway Safety Area (RSA)
Runway Object Free Area (ROFA)
Approach Runway Protection Zone (RPZ)
Departure Runway Protection Zone (RPZ)
Obstacle Free Zone (OFZ)
Proposed Avigation Easements
Existing Avigation Easements

SOURCES: Brown & Phillips, Inc., January 2021; BCT Basemap & Elevations/Coordinates: Martinez Geospatial, April 2021; Nearmap, Florida, November 2022 (Aerial Image For Visual Reference Only, May Not Be To Scale); Federal Aviation Administration Advisory Circular 150/5300-13B, *Airport Design*, March 31, 2022.

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MAGNETIC NORTH DECLINATION = 7° 9' W (APRIL 2023)
TRUE NORTH
0 400 800 1,600
GRAPHICAL SCALE IN FEET

NO.	REVISIONS	DATE

DEPARTURE PLAN & PROFILE RUNWAY 23

BOCA RATON AIRPORT
BOCA RATON, FLORIDA

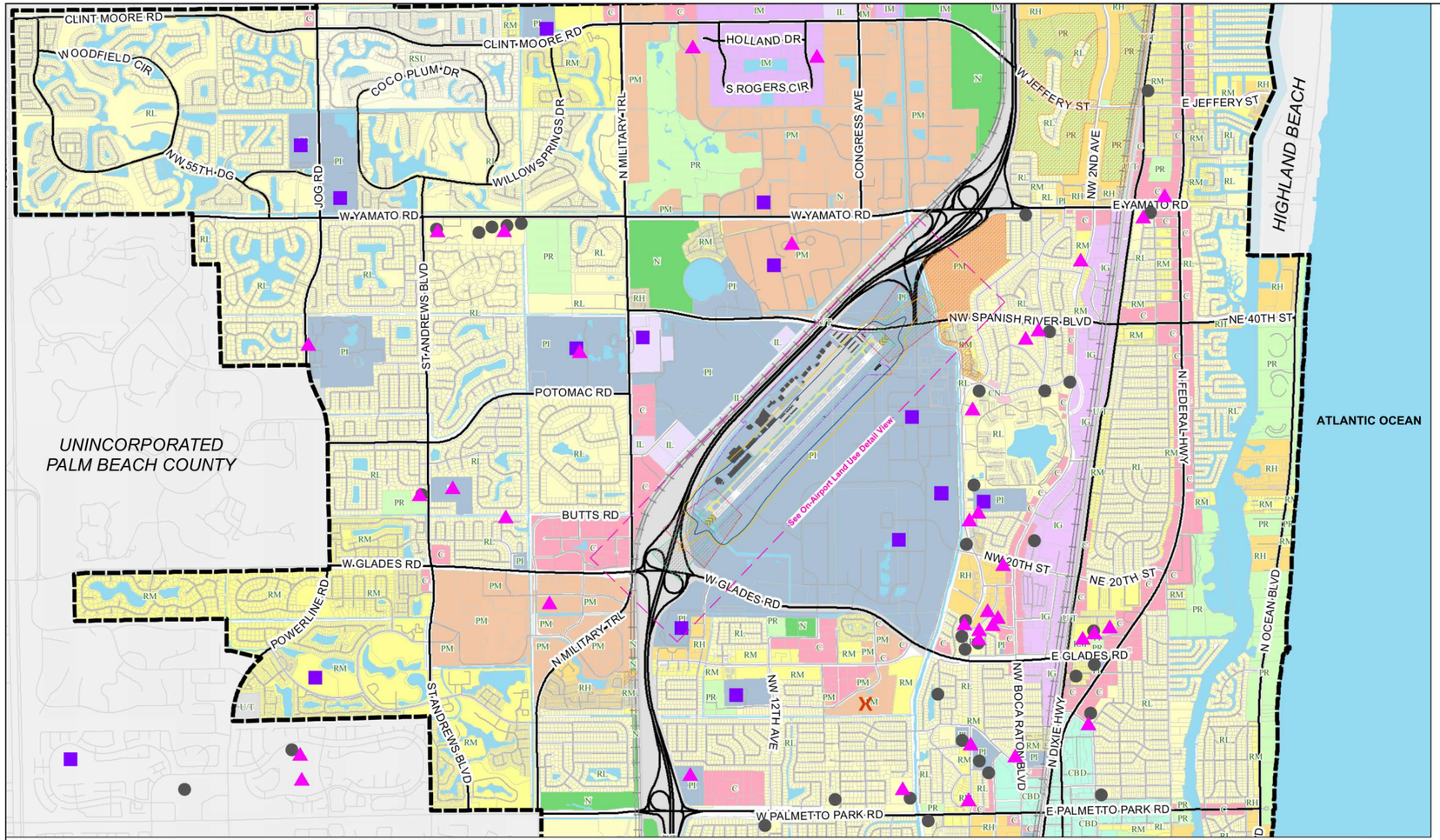
DRAWN BY: AB/MD
CHECKED BY: BW

PREPARED BY:
RICONDO & ASSOCIATES, INC.

DATE:
NOVEMBER 2023

Drawing: P:\Project-Miami\BRAA\2017 GC\Task 70 - Airport Master Plan Update\11. Airport Layout Plan Set\AutoCAD\08-09-BCT_Departure_Sheets.dwg_Layout: Runway 23_Nov 30, 2023, 12:37pm

DRAFT - *FOR DISCUSSION PURPOSES ONLY*



LEGEND

ON-AIRPORT LAND USE

- Aeronautical Use
- Airfield (Aeronautical Use)
- Non-Aeronautical
- Non-Aeronautical Redevelopment Areas (See Note 3)

OTHER

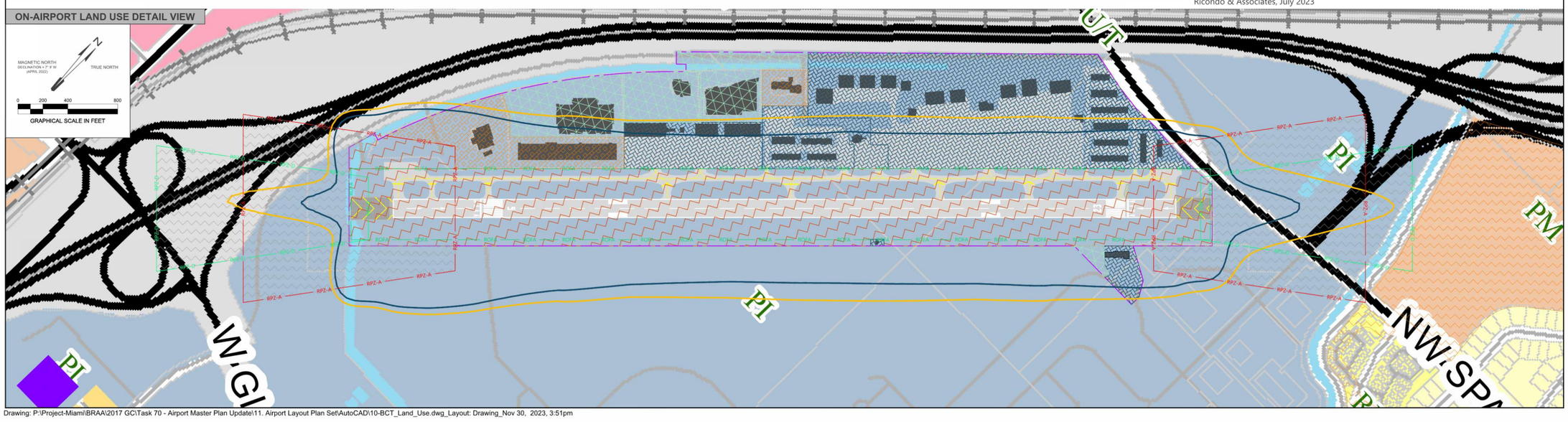
- Existing Avigation Easement
- Proposed Avigation Easement
- On-Airport Buildings
- Airfield Pavement
- Runway Object Free Area (ROFA)
- Approach Runway Protection Zone (RPZ)
- Departure Runway Protection Zone (RPZ)
- Airport Property Boundary
- 2021 65-decibel DNL Noise Contour
- 2040 65-decibel DNL Noise Contour
- Water
- House of Worship
- School
- Day Care
- Hospital

CITY OF BOCA RATON 2022 FUTURE LAND USE

- RSU - Residential Semi Urban
- RL - Residential Low
- RM - Residential Medium
- RMH - Residential Medium-High
- Residential High
- C - Commerical
- CN - Neighborhood Commercial
- CBD - Central Business Dist
- PM - Planned Mobility
- IL - Light Industrial
- IG - General Industrial
- IM - Manufacturing Industrial
- PI - Institutional
- PR - Recreation & Open Space
- N - Conservation
- U/T - Utility / Transporation
- City Limits

NOTES:
1. The City of Boca Raton airport zoning ordinance is contained in the *Code of Ordinances of Boca Raton, Florida, Chapter 28 Zoning, Article VII, Airport Zoning*
2. DNL - Day-Night Average Sound Level
3. Existing nonaeronautical land, designated with orange hatch, to be converted to aeronautical development, pending redevelopment opportunities and amendments to existing leaseholds.

SOURCES: City of Boca Raton, *2022 Comprehensive Plan*
Map: Future Land Use 2040, August 22, 2022;
Draft FAA Policy Regarding Processing Land Use Changes on Federally Acquired or Federally Conveyed Airport Land, September 2022
Ricondo & Associates, July 2023



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N
TRUE NORTH
MAGNETIC NORTH DECLINATION = 7° 9' W (APRIL 2022)
0 800 1,600 3,200
GRAPHICAL SCALE IN FEET

NO.	REVISIONS	DATE

LAND USE DRAWING

BOCA RATON AIRPORT
BOCA RATON, FLORIDA

DRAWN BY: CFP
CHECKED BY: BW

PREPARED BY:
RICONDO & ASSOCIATES, INC.

DATE:
NOVEMBER 2023

SHEET 10 OF 10