

Final Environmental Assessment for the South-Central Florida Metroplex Project

October 2020

Prepared by:

**United States Department of Transportation
Federal Aviation Administration**



Atlanta, GA

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1 Introduction

The National Environmental Policy Act of 1969 (NEPA), [42 United States Code (U.S.C.) § 4321 *et seq.*], requires federal agencies to disclose to decision makers and the interested public a clear, accurate description of the potential environmental impacts that could arise from proposed federal actions. Through NEPA, Congress has directed federal agencies to consider environmental factors in their planning and decision-making processes and to encourage public involvement in decisions that affect the quality of the human environment. As part of the NEPA process, federal agencies are required to consider the environmental effects of a proposed action, reasonable alternatives to the proposed action, and a no action alternative (i.e., analyzing the potential environmental effects of not undertaking the proposed action). The Federal Aviation Administration (FAA) has established a process to ensure compliance with the provisions of NEPA through FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures* (FAA Order 1050.1F).

The Proposed Action, the subject of this Environmental Assessment (EA), is called the South-Central Florida Metroplex Project.¹ The South-Central Florida Metroplex Project seeks to optimize aircraft arrival and departure procedures in the South-Central Florida Metroplex by employing advanced navigational technology. The procedures designed for the South-Central Florida Metroplex Project would be used by aircraft operating under Instrument Flight Rules at the study area airports (“the Study Airports”).

This EA, prepared in accordance with FAA Order 1050.1F, documents the potential effects to the environment that may result from the optimization of Air Traffic Control (ATC) procedures at the Study Airports. These airports were selected based on whether they would be directly served by a proposed procedure and if so, whether they served the required number of annual Instrument Flight Rules (IFR) filed operations under FAA Order 1050.1F. The Study Airports consist of five Major Airports and 16 Satellite Study Airports Identified in **Table 1-1** and further profiled in **Section 1.4**:

Table 1-1 Study Airports by Name and FAA Identifier

Major Study Airports	Satellite Study Airports
Fort Lauderdale/Hollywood International Airport – FLL	Leesburg International Airport – LEE
Orlando International Airport – MCO	Melbourne International Airport – MLB
Miami International Airport – MIA	Miami-Opa Locka Executive Airport – OPF ²
Palm Beach International Airport – PBI	Orlando Executive Airport – ORL
Tampa International Airport – TPA	Punta Gorda Airport – PGD
Satellite Study Airports	St Pete-Clearwater International Airport – PIE
Ocean Reef Club Airport – 07FA	Orlando Sanford International Airport – SFB
Boca Raton Airport – BCT	Sarasota/Bradenton International Airport – SRQ
Fort Lauderdale Executive Airport – FXE	Witham Field Airport – SUA
Kissimmee Gateway Airport – ISM	Miami Executive Airport – TMB
Lakeland Linder Regional – LAL	Venice Municipal Airport – VNC

Source: FAA Design and Implementation Team, ATAC Corporation. 2018
Prepared By: ATAC Corporation, January 2020

¹ The Metroplex initiative was formerly referred to as the Optimization of Airspace and Procedures in the Metroplex (OAPM) initiative. A Metroplex is a geographic area covering several airports, serving major metropolitan areas and a diversity of aviation stakeholders.

² When this Metroplex Project began in 2012, the airport was known as *Opa-Locka Executive Airport*. The name changed in 2014 to *Miami-Opa Locka Executive Airport*. Chapters 1-5 of this EA adopt the revised name for current reference. Other references to the prior name may exist in supporting Appendices due to reference timing and context.

This EA includes the following Chapters and appendices:

- **Chapter 1: Introduction.** Chapter 1 provides basic background information on the air traffic system, the Next Generation Air Transportation System (NextGen) program, Performance-Based Navigation (PBN), the FAA's Metroplex initiative, and information on the South-Central Florida Metroplex and the identified Study Airports.
- **Chapter 2: Purpose and Need.** Chapter 2 discusses the need (i.e., problem) and purpose (i.e., solution) for airspace and procedure optimization in the South-Central Florida Metroplex area, and identifies the Proposed Action.
- **Chapter 3: Alternatives.** Chapter 3 discusses the Proposed Action and the No Action alternatives analyzed as part of the environmental review process and designates the Proposed Action for further analysis.
- **Chapter 4: Affected Environment.** Chapter 4 discusses existing environmental conditions within the South-Central Florida Metroplex area.
- **Chapter 5: Environmental Consequences.** Chapter 5 discusses the potential environmental impacts associated with the Proposed Action and the No Action alternatives.
- **Appendix A: Agency and Public Coordination and List of Receiving Parties.** Appendix A documents agency and public coordination associated with the EA process and lists the local agencies and parties identified to receive copies of the EA documents.
- **Appendix B: List of Preparers.** Appendix B lists the names and qualifications of the principal persons contributing information to this EA.
- **Appendix C: References.** Appendix C provides a compilation of the footnotes that contain references to documents used to prepare this EA.
- **Appendix D: List of Acronyms and Glossary.** Appendix D lists acronyms and provides a glossary of terms used in this EA.
- **Appendix E: Basics of Noise.** Appendix E presents information on aircraft noise as well as the general methodology used to analyze noise associated with aviation projects.
- **Appendix F: South-Central Florida Metroplex Study Team Final Report.** Appendix F contains the conceptual FAA Study Team methodology, findings, and designs used subsequently by the FAA Design and Implementation Team to craft Preliminary and Proposed Final Designs.
- **Appendix G: South-Central Florida Metroplex Design and Implementation Team Report.** Appendix G contains a summary of the design effort and detailed summaries of the Preliminary Final Designs for the Proposed Action air traffic control procedures analyzed in this EA.
- **Appendix H: Flight Schedule.** Appendix H describes the methodology and inputs used to forecast air traffic for the Study Airports described in this EA.
- **Appendix I: Noise Technical Report.** Appendix I presents detailed and technical information on the noise analysis conducted in support of this EA.

- **Appendix J: Comments on the Draft EA and FAA Responses.** Appendix J contains the comments received on the Draft EA during the Draft EA public comment period and the associated FAA responses. This Appendix contains multiple volumes due to the number of comments.

1.1 Project Background

On January 16, 2009, the FAA asked RTCA³ to create a joint government-industry task force to make recommendations for implementation of NextGen operational improvements for the nation's air transportation system. In response, RTCA assembled the NextGen Mid-Term Implementation Task Force (Task Force 5), which included more than 300 representatives from commercial airlines, general aviation, the military, aerospace manufacturers, and airport stakeholders. **Section 1.2.5** discusses the NextGen Program in more detail.

On September 9, 2009, RTCA issued the NextGen Mid-Term Implementation Task Force Report,⁴ which provided the Task Force 5 recommendations. One of these recommendations directed the FAA to undertake planning for implementing Performance-Based Navigation PBN⁵ procedures on a Metroplex basis, including Area Navigation (RNAV) and Required Navigation Performance (RNP), which are discussed further in **Sections 1.2.5.1 and 1.2.5.2**. Based on this recommendation, the FAA began the Metroplex initiative.

The purpose of the Metroplex initiative is to optimize air traffic procedures and airspace on a regional scale. This is accomplished by developing procedures that take advantage of technological advances in navigation, such as RNAV, while ensuring that aircraft not equipped to use RNAV continue to have access to the National Airspace System (NAS). This approach addresses congestion and other factors that reduce efficiency in busy Metroplex areas and accounts for key airports and airspace in the Metroplex. The South-Central Florida Metroplex Study Airports are further discussed in **Section 1.4**. The Metroplex initiative also addresses connectivity with other Metroplex areas. The overall intent is to use limited airspace as efficiently as possible for congested Metroplex areas.⁶

1.2 Air Traffic Control and the National Airspace System

The following sections provide basic background information on air traffic control and the NAS. This information includes a description of the NAS, the role of air traffic control (ATC), the methods air traffic controllers use to provide services within the air traffic control system, and the different phases of aircraft flight within the NAS. Following this discussion, information is provided on the FAA's NextGen program and the Metroplex initiative.

3 RTCA, Inc. is a private, not-for-profit corporation that develops consensus-based recommendations regarding communications, navigation, surveillance (CNS), and air traffic management (ATM) system issues. RTCA functions as a federal advisory committee and includes roughly 400 government, industry, and academic organizations from the United States and around the world. Members represent all facets of the aviation community, including government organizations, airlines, airspace users, airport associations, labor unions, and aviation service and equipment suppliers. More information is available at <http://www.rtca.org>.

4 RTCA, Inc. Executive Summary, *NextGen Mid-Term Implementation Task Force Report*, September 9, 2009.

5 Additional information on Performance-Based Navigation (PBN) is provided at [<https://www.faa.gov/nextgen/cip/pbn/>] (Accessed May 1, 2020)].

6 U.S. Department of Transportation, Federal Aviation Administration, *FAA Response to Recommendations of the RTCA NextGen Mid-Term Implementation Task Force*, January 2010, p. 14.

1.2.1 National Airspace System

Under the Federal Aviation Act of 1958 (49 USC § 40101 *et seq.*), the FAA is delegated control over use of the nation's navigable airspace and regulation of domestic civil and military aircraft operations in the interest of maintaining safety and efficiency. To help fulfill this mandate, the FAA established the NAS. Within the NAS, the FAA provides air traffic services for aircraft takeoffs, landings, and the flow of aircraft between airports through a system of infrastructure (e.g., air traffic control facilities), people (e.g., air traffic controllers, maintenance, and support personnel), and technology (e.g., radar, communications equipment, ground-based navigational aids [NAVAIDs],⁷ etc.) The NAS is governed by various FAA rules and regulations.

The NAS is one of the most complex aviation networks in the world. The FAA continuously reviews the design of all NAS resources to ensure they are effectively and efficiently managed. The FAA Air Traffic Organization (ATO) is the primary organization responsible for managing airspace and flight procedures in the NAS. When changes to the NAS are proposed, the FAA works to ensure that the changes maintain or enhance system safety and improve efficiency. One way to accomplish this mission is to employ emerging technologies to increase system flexibility and predictability.⁸

1.2.2 Air Traffic Control within the National Airspace System

The combination of infrastructure, people, and technology used to monitor and guide (or direct) aircraft within the NAS is referred to collectively as ATC. One of ATC's responsibilities is to maintain safety and expedite the flow of traffic in the NAS by applying defined minimum distances or altitudes between aircraft (referred to as "separation"). This is accomplished through required communications between air traffic controllers and pilots and the use of navigational technologies.

Aircraft operate under two distinct categories of flight rules: Visual Flight Rules (VFR) and Instrument Flight Rules (IFR).⁹ Under VFR, pilots are responsible to "see and avoid" other aircraft and obstacles such as terrain to maintain safe separation. Under IFR, aircraft operators are required to file flight plans and use navigational instruments to operate within the NAS. The majority of commercial air traffic operates under IFR.

Depending on whether aircraft are operating under IFR or VFR, air traffic controllers apply various techniques to maintain separation between aircraft,¹⁰ including the following:

- **Vertical or "Altitude" Separation:** separation between aircraft operating at different altitudes
- **Longitudinal or "In-Trail" Separation:** separation between two aircraft operating along the same flight route, referring to the distance between a lead and a following aircraft

⁷ NAVAIDs are facilities that transmit signals that define key points or routes.

⁸ U.S. Department of Transportation, Federal Aviation Administration, FAA Order JO 7400.2M *Procedures for Handling Airspace Matters* (with Change 1 and Change 2), February 28, 2019.

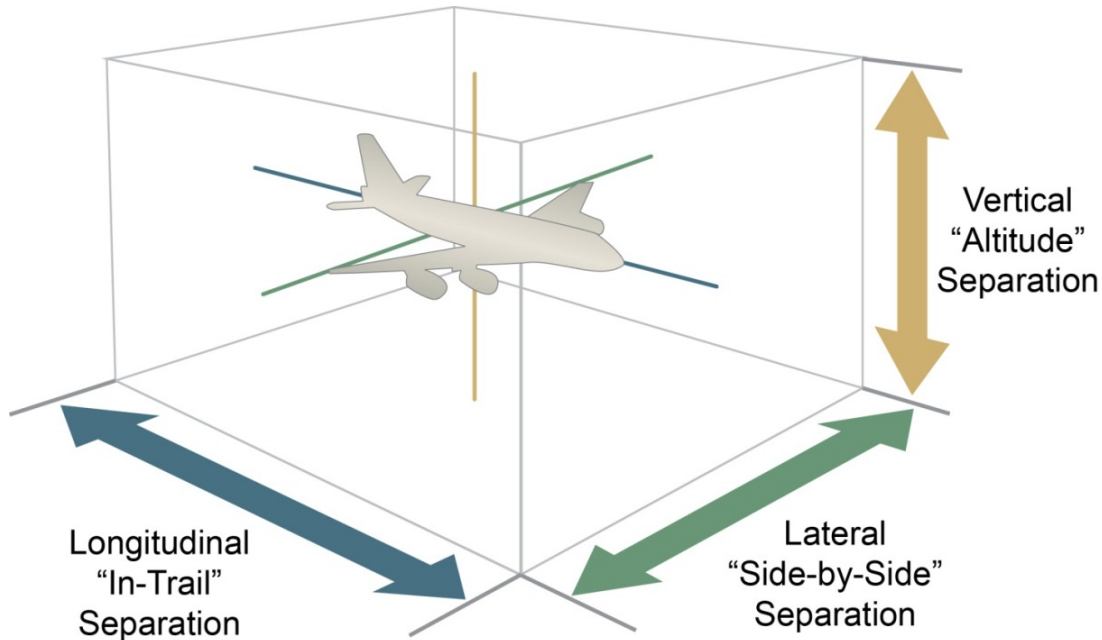
⁹ 14 Code of Federal Regulations (C.F.R.), Part 91.

¹⁰ Defined in FAA Order JO 7110.65Y, *Air Traffic Control*.

- **Lateral or “Side-by-Side” Separation:** separation between aircraft (left or right side) operating along two separate but nearby flight routes.

Exhibit 1-1 depicts the three dimensions around an aircraft used to determine separation.

Exhibit 1-1 Three Dimensions Around an Aircraft



Source: ATAC Corporation, December 2012.
Prepared by: ATAC Corporation, February 2020.

In its effort to modernize the NAS, the FAA is developing instrument ATC procedures that use advanced technologies. A primary technology in this effort is RNAV. RNAV uses technology, including Global Positioning System (GPS), to allow an RNAV-equipped aircraft to fly a more efficient route. This route is based on instrument guidance that references an aircraft's position relative to ground-based NAVAIDs or satellites.

ATC uses a variety of methods and coordination techniques to maintain safety within the NAS, including:

- **Vectors:** Directional headings issued to aircraft to provide navigational guidance and to maintain separation between aircraft and/or obstacles.
- **Speed Control:** Instructions issued to aircraft to reduce or increase aircraft speed to maintain separation between aircraft.
- **Holding Pattern/Ground Hold:** Controllers assign aircraft to a holding pattern in the air or hold aircraft on the ground before departure to maintain separation between aircraft and to manage arrival/departure volume.
- **Altitude Assignment/Level-off:** Controllers assign altitudes to maintain separation between aircraft and/or to protect airspace. This may result in aircraft “leveling off” during ascent or descent.

- **Reroute:** Controllers may change an aircraft's route for a variety of reasons, such as avoidance of inclement weather, to maintain separation between aircraft, and/or to protect airspace.
- **Point-out:** Notification issued by one controller when an aircraft might pass through or affect another controller's airspace and radio communications will not be transferred.

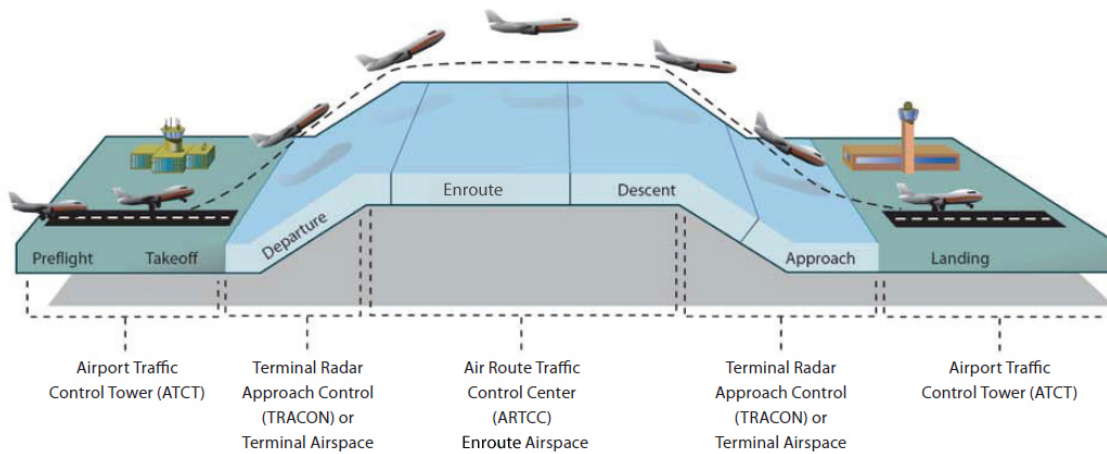
As an aircraft moves from origin to destination, ATC personnel function as a team and transfer control of the aircraft from one controller to the next, and from one ATC facility to the next.

1.2.3 Aircraft Flow within the National Airspace System

An aircraft traveling from airport to airport typically operates through six phases of flight (plus a "preflight" phase). **Exhibit 1-2** depicts the typical phases of flight for a commercial aircraft. These phases include:

- **Preflight (Flight Planning):** The preflight route planning and flight checks performed in preparation for takeoff.
- **Push Back/Taxi/Takeoff:** The aircraft's transition across the airfield from push-back at the gate (i.e., backing away from the gate), taxiing to an assigned runway, and takeoff from the runway.
- **Departure:** The aircraft's in-flight transition from takeoff to the en route phase of flight, during which it climbs to the assigned cruising altitude.
- **En Route:** Generally, the level segment of flight (i.e., cruising altitude) between the departure and destination airports.
- **Descent:** The aircraft's in-flight transition from an assigned cruising altitude to the point at which the pilot initiates the approach to a runway at the destination airport.
- **Approach:** The segment of flight during which an aircraft follows a standard procedure that guides the aircraft to the landing runway.
- **Landing:** Touch-down of the aircraft at the destination airport and taxiing from the runway to the gate or parking position.

Exhibit 1-2 Typical Phases of a Commercial Aircraft Flight



Source: U.S. Department of Transportation, Federal Aviation Administration, Houston Area Air Traffic System (HAATS), Airspace Redesign, Final Environmental Assessment, Figure 1.1.1-1, March 2008.

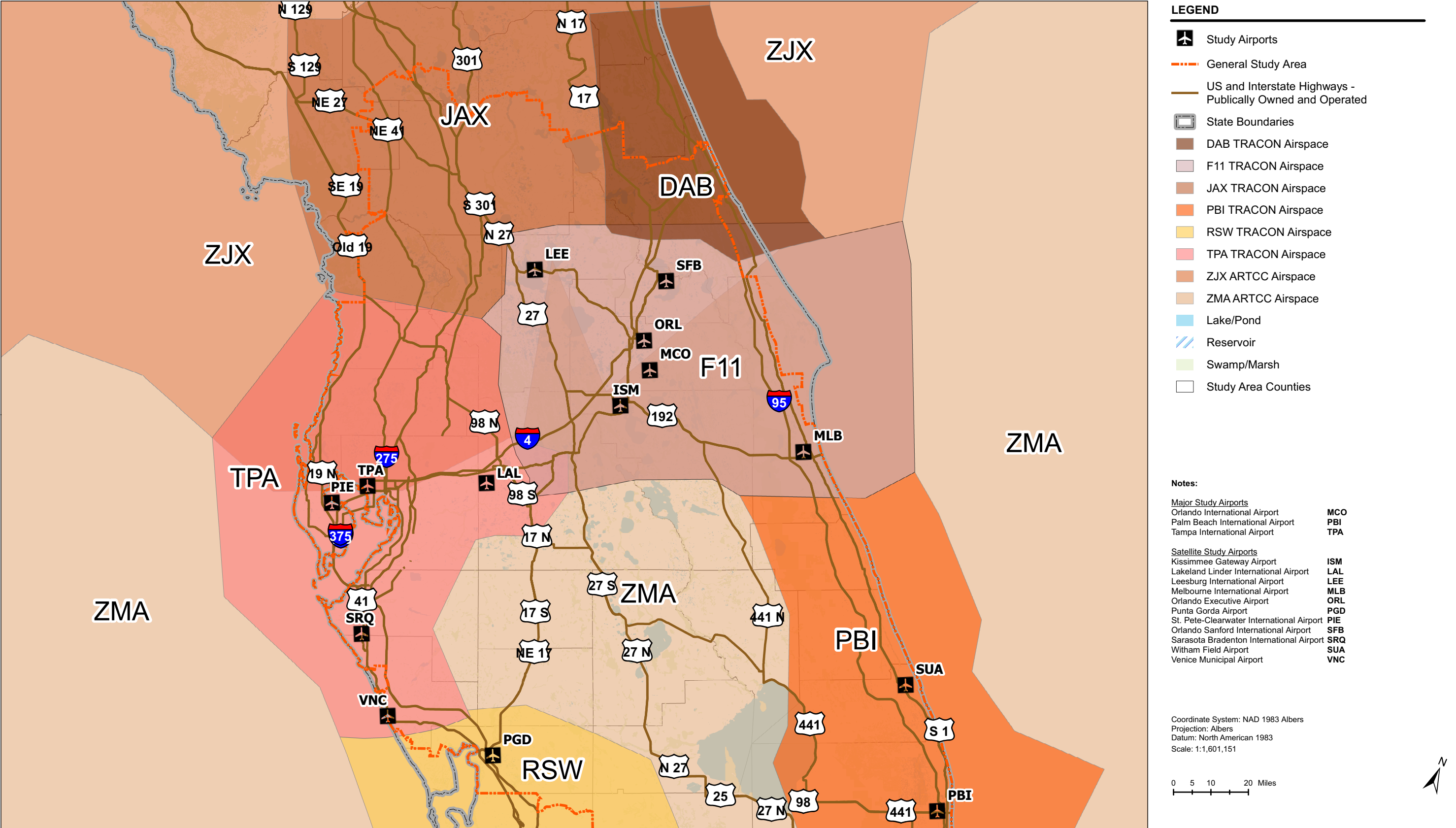
Prepared by: ATAC Corporation, February 2020.

1.2.4 Air Traffic Control Facilities

The NAS is organized into three-dimensional areas of navigable airspace that are defined by a floor, a ceiling, and a lateral boundary. Each is controlled by different types of ATC facilities including:

- Air Traffic Control Tower:** Controllers at an Air Traffic Control Tower (ATCT) located at an airport provide air traffic services for phases of flight associated with aircraft takeoff and landing. The ATCT typically controls airspace extending from the airport out to a distance of several miles. All major Study Airports (FLL, MCO, MIA, PBI, and TPA) and the following satellite Study Airports have ATCT facilities: BCT, FXE, ISM, LAL, LEE, MLB, OPF, ORL, PGD, PIE, SFB, SRQ, SUA, and TMB. 07FA and VNC do not have ATCT facilities.
- Terminal Radar Approach Control:** Controllers at a Terminal Radar Approach Control (TRACON) provide air traffic service to aircraft as they transition between an airport and the en route phase of flight, and from the en route phase of flight to an airport. This includes the departure, climb, descent, and approach phases of flights. The TRACON airspace is broken down into sectors. As an aircraft moves between sectors, responsibility for it transfers from controller to controller. Controllers maintain separation between aircraft that operate within their sectors. The terminal airspace in the South-Central Florida Metroplex area is controlled by one stand-alone facility (the Central Florida TRACON, referred to as F11) and a number of ATCT co-located facilities at MIA, PBI, and TPA. Southwest Florida International Airport (RSW) has an ATCT/TRACON but is not a Study Airport as does Daytona Beach International Airport (DAB), which is outside the General Study Area (See **Section 4.1** for a description of the General Study Area and related boundary). These airspace lateral boundaries are shown in plan view (i.e. overhead) in **Exhibits 1-3 and 1-4**.

- **Air Route Traffic Control Centers:** Controllers at Air Route Traffic Control Centers (ARTCCs or “Centers”) provide air traffic services during the en route phase of flight. Similar to TRACON airspace, the Center airspace is broken down into sectors. As shown in **Exhibits 1-3 and 1-4**, the South-Central Florida Metroplex is comprised of airspace delegated to the Miami ARTCC (ZMA) located approximately 3 miles northwest of MIA, and the Jacksonville ARTCC (ZJX) located in Hilliard, FL.

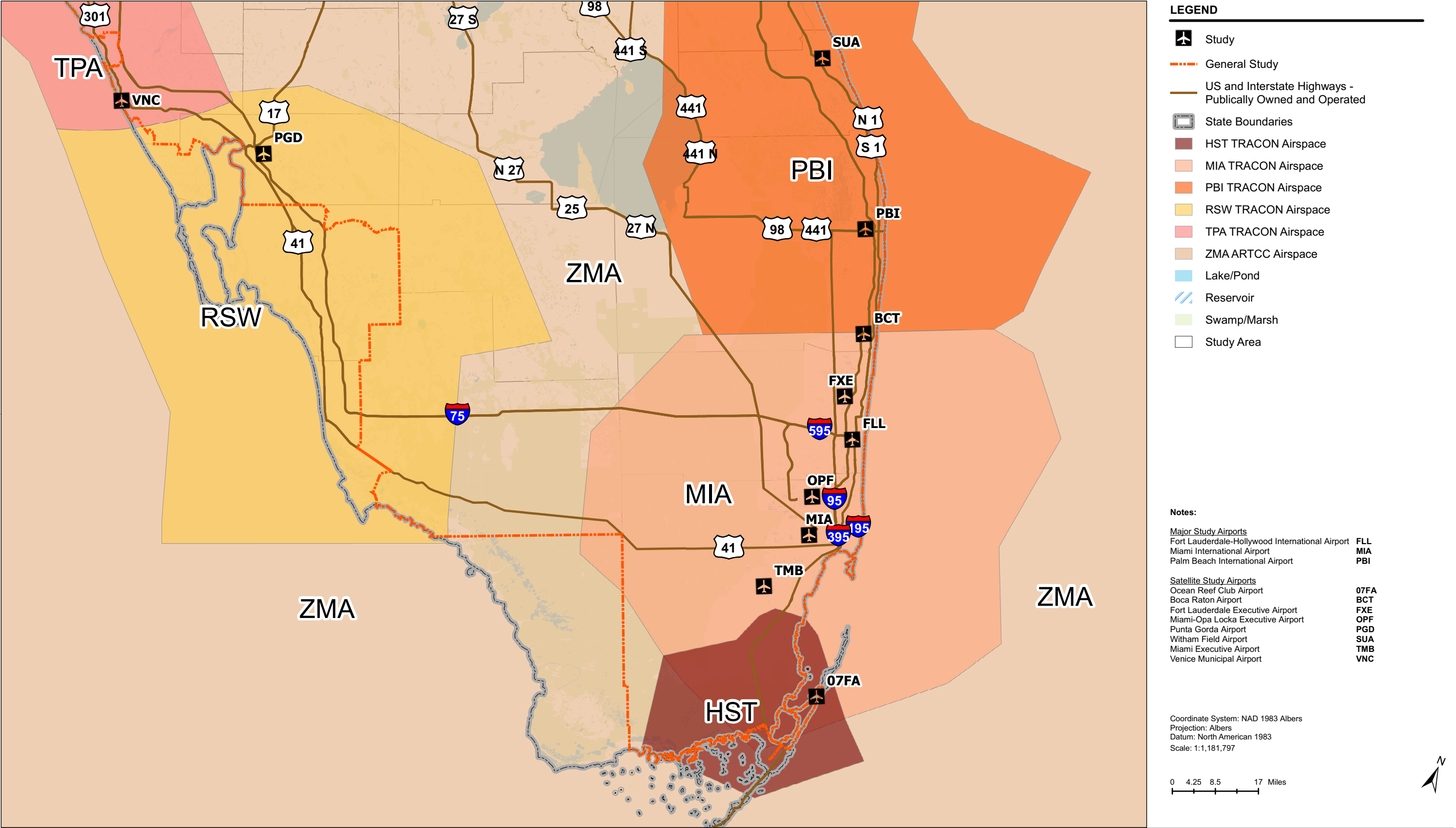


Sources: U.S. Census Bureau, 2018 (2018 TIGER/Line Shapefiles (machine-readable data files), (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). Federal Aviation Administration, 2020 Aeronautical Information Services (Airspace Boundaries), ESRI World Water Bodies 2018 (Ocean and Sea). ESRI 2018 (Shaded Relief). ATAC Corporation, 2020, (2020 General Study Area boundary). Prepared by: ATAC Corporation, August 2020.

Exhibit 1-3

Airspace in the South-Central Florida Metroplex Area North

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Sources: U.S. Census Bureau, 2018 (2018 TIGER/Line Shapefiles (machine-readable data files), (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). Federal Aviation Administration, 2020 Aeronautical Information Services (Airspace Boundaries), ESRI World Water Bodies 2018 (Ocean and Sea). ESRI 2018 (Shaded Relief).ATAC Corporation, 2020, (2020 General Study Area boundary). Prepared by: ATAC Corporation, August 2020.

Exhibit 1-4

Airspace in the South-Central Florida Metroplex Area South

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The following sections discuss how air traffic controllers at these ATC facilities control the phases of flight for aircraft operating under IFR.

1.2.4.1 Departure Flow

As an aircraft operating under IFR, also known as an “IFR aircraft,” departs a runway and follows its assigned heading, it moves from the ATCT airspace, through the terminal airspace, and into en route airspace where it proceeds on a specific route to its destination airport.

Within the terminal airspace, TRACON controllers provide services to aircraft departing from the ATCT airspace to transfer control points referred to as “exit points.” An exit point represents an area along the boundary between terminal airspace and en route airspace. Exit points are generally established near commonly used routes to transfer aircraft efficiently between terminal and en route airspace. When aircraft pass through the exit point, control transfers from TRACON to ARTCC controllers as the aircraft joins a specific route.

Standard Instrument Departures

Departing IFR aircraft use a procedure called a Standard Instrument Departure (SID). A SID provides pilots with defined lateral and vertical guidance to facilitate safe and predictable navigation from an airport through the terminal airspace to a specific route in the en route airspace. A “conventional” SID follows a route defined by ground-based NAVAIDs, may be based on vectoring, or both. Because of the increased precision inherent in RNAV technology, an RNAV SID defines a more predictable route through the airspace than a conventional SID.

Some RNAV SIDs may be designed to include paths called “runway transitions” that serve particular runways at airports. Transitions are a series of fixes leading to/from a common route. They serve as the entry and exit points into terminal and en route airspace. A SID may have several runway transitions serving one or more runways at one or more airports. From the runway transition, aircraft may follow a common path before being directed along one or several diverging routes referred to as “en route transitions.” En route transitions may terminate at exit fixes or continue into en route airspace where aircraft join a specific route.

1.2.4.2 Arrival Flow

An aircraft begins the descent phase of flight within the en route airspace. During descent, the aircraft bound for the destination airport transitions into the terminal airspace through an “entry point.” The entry point represents a point along the boundary between terminal airspace and en route airspace where control of the aircraft transfers from ARTCC to TRACON controllers.

Standard Terminal Arrivals

Aircraft that arrive in the terminal airspace normally follow an instrument procedure called a Standard Terminal Arrival (STAR). Aircraft leaving en route airspace and entering terminal airspace may follow an en route transition from an entry fix to the STAR’s common route in the terminal airspace. From the common route segment, aircraft may follow a runway transition before making an approach to the airport.

1.2.4.3 Required Aircraft Separation

As controllers manage the flow of aircraft into, out of, and within the NAS, they maintain some of the following separation distances between aircraft:¹¹

- **Altitude Separation (vertical):** When operating below 41,000 feet above mean sea level (MSL), two aircraft must be at least 1,000 feet above/below each other until or unless lateral separation is ensured.
- **In-Trail Separation (longitudinal):** Within a radar-controlled area, the minimum distance between two aircraft on the same route (i.e., in-trail) can be between 2.5 to 10 nautical miles (NM),¹² depending on factors such as aircraft Class, weight, and type of airspace.
- **Side-by-Side Separation (lateral):** Similar to in-trail separation, the minimum side-by-side separation between aircraft must be at least three NM in terminal airspace and five NM in en route airspace.
- **Visual Separation:** Aircraft may be separated by visual means when other approved separation is assured before and after the application of visual separation.

1.2.5 Next Generation Air Transportation System

The NextGen program is the FAA's long-term plan to modernize the NAS from a ground-based system of air traffic control to a GPS-based system of air traffic management that allows for the development of PBN (Performance-Based Navigation) procedures.¹³ The Metroplex initiative is a key step in the overall process of transitioning to the NextGen system. Achieving the NextGen system requires implementing RNAV (Area Navigation) and RNP (Required Navigation Performance) PBN procedures and aircraft "auto-pilot" and Flight Management System (FMS) capabilities.¹⁴ RNAV and RNP capabilities are now readily available, and PBN can serve as the primary means aircraft use to navigate along a route. More than 90 percent of U.S. scheduled air carriers are equipped for some level of RNAV. The following sections describe PBN procedures in greater detail.

1.2.5.1 RNAV

Exhibit 1-5 compares conventional and RNAV routes. RNAV enables aircraft traveling through terminal and en route airspace to follow more accurate and better-defined routes. This results in more predictable routes and altitudes that can be pre-planned by the pilot and air traffic control. Predictable routes improve the ability to ensure vertical, longitudinal, and lateral separation between aircraft.

Routes based on ground-based NAVAIDs rely on the aircraft equipment directly communicating with the NAVAID radio signal and are often limited by issues such as line-of-sight and signal reception accuracy. NAVAIDs such as Very High Frequency (VHF) Omnidirectional Ranges (VORs) are affected by variable terrain and other obstructions that can limit their signal accuracy. Consequently, a route that is dependent upon ground-based

¹¹ For a detailed explanation of separation standards, see FAA Order 7110.65Y, *Air Traffic Control*.

¹² A nautical mile is equivalent to 1.15 statute miles.

¹³ U.S. Department of Transportation, Federal Aviation Administration, [<https://www.faa.gov/nextgen/faqs/>] (Accessed February 11, 2020)].

¹⁴ A Flight Management System (FMS) is an onboard computer that uses inputs from various sensors (e.g., GPS and inertial navigation systems) to determine the geographic position of an aircraft and help guide it along its flight path.

NAVAIDS requires at least six NM of clearance on either side of its main path to ensure accurate signal reception. As demonstrated by the dashed lines in **Exhibit 1-5**, this clearance requirement increases with an aircraft's distance from the VOR. In comparison, RNAV signal accuracy requires only two NM of clearance on either side of a route's main path.

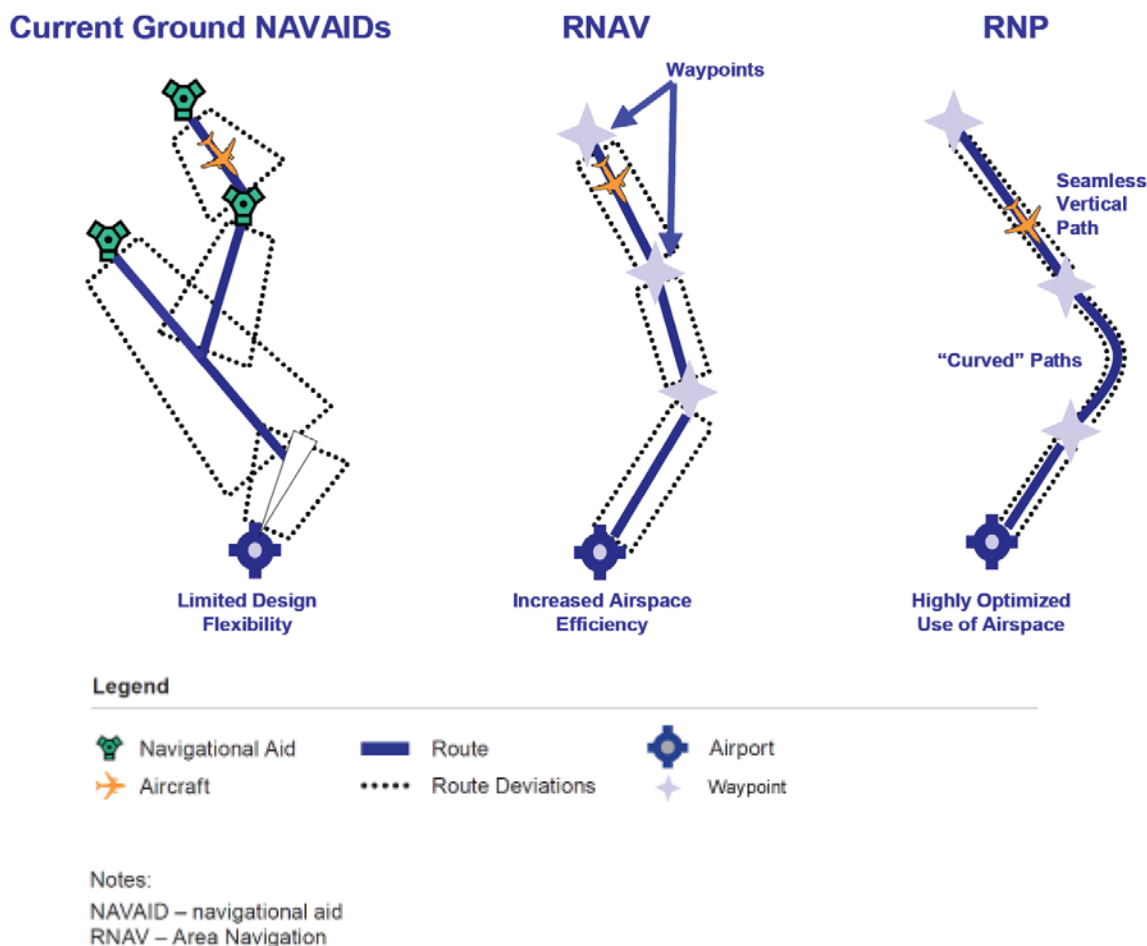
RNAV routes can mirror conventional routes or, by using satellite technology, provide paths within the airspace that were not previously possible with ground-based NAVAIDs.

1.2.5.2 RNP

RNP is an RNAV procedure with signal accuracy that is increased through the use of onboard performance monitoring and alerting systems. A defining characteristic of an RNP operation is the ability for an RNP-capable aircraft navigation system to monitor the accuracy of its navigation (based on the number of GPS satellite signals available to pinpoint the aircraft location) and inform the crew if the required data becomes unavailable.

Exhibit 1-5 compares conventional, RNAV, and RNP procedures. It shows how an RNP-capable aircraft navigation system provides a more accurate location (down to less than a mile from the intended path) and will follow a highly predictable path. The enhanced accuracy and predictability make it possible to implement procedures within controlled airspace that are not always possible under the current air traffic system.

Exhibit 1-5 Navigational Comparison – Conventional/RNAV/RNP



Source: U.S. Department of Transportation, Federal Aviation Administration, "Performance-Based (PBN) Brochure," October 2009.
Prepared by: ATAC Corporation, March 2020.

1.2.5.3 Optimized Profile Descent

An Optimized Profile Descent (OPD)¹⁵ is a flight procedure that allows an aircraft using FMS to fly continuously from the top of descent to landing with minimal level-off segments. **Exhibit 1-6** illustrates an OPD procedure compared to a conventional descent. Aircraft that fly OPDs can maintain higher altitudes and lower thrust for longer periods thereby reducing emissions and noise. As level-off segments are minimized, OPDs reduce the need for communication between controllers and pilots.

1.2.5.4 Optimized Profile Climb

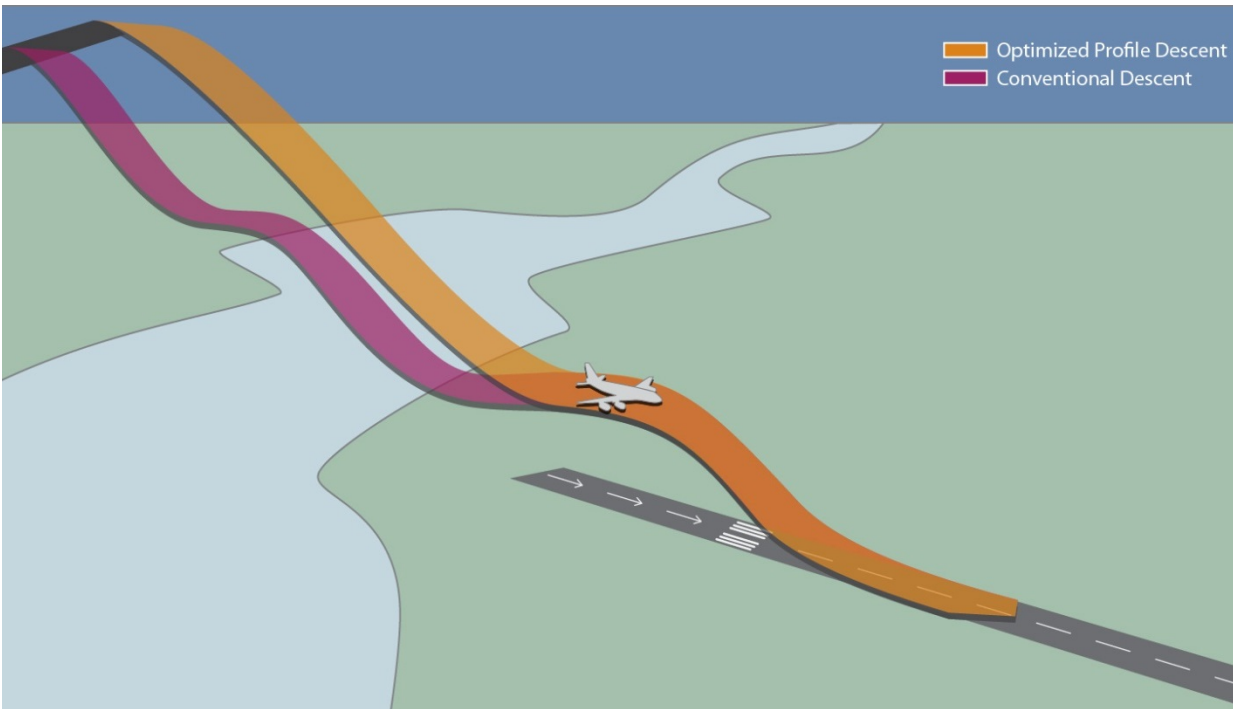
An Optimized Profile Climb (OPC)¹⁶ is similar to OPD, but related to departures. An OPC is a flight procedure that allows an aircraft using FMS to fly continuously from the runway to top of climb with minimal level-off segments. Aircraft that fly OPCs can get to higher altitudes

¹⁵ U.S. Department of Transportation, Federal Aviation Administration. *Concept of Operations for NextGen Alternative Positioning, Navigation, and Timing (APNT)*, p. 78. March 19, 2012.

¹⁶ *Id.* (NOTE: *Idem* is the Latin term meaning "the same" and is abbreviated herein as *Id.* It is used in this document to reference an immediately prior footnote).

sooner with minimal changes in thrust. As level-off segments are minimized, OPCs reduce the need for communications between controllers and pilots.

Exhibit 1-6 Optimized Profile Descent Compared to a Conventional Descent



Source: ATAC Corporation, December 2012.
Prepared by: ATAC Corporation, January 2020

1.2.6 The Metroplex Initiative

As part of the Metroplex initiative, the FAA is designing and implementing RNAV procedures that take advantage of the technology available in a majority of commercial service aircraft. The Metroplex initiative specifically addresses congestion, airports in close geographical proximity, and other limiting factors that reduce the operational efficiency of busy Metroplex airspace. Efficiency is improved by implementing more RNAV-based standard instrument procedures and connecting the routes defined by the standard instrument procedures to high- and low-altitude RNAV routes. Efficiency is further improved by using RNAV to optimize the use of the limited airspace in congested Metroplex environments.

1.3 The South-Central Florida Metroplex

The following sections describe the airspace structure and existing standard instrument procedures of the South-Central Florida Metroplex that would be affected by the South-Central Florida Metroplex Project.

1.3.1 South-Central Florida Metroplex Airspace

Exhibits 1-3 and 1-4, presented previously, depict the plan view (i.e. overhead view) for the airspace structure in the South-Central Florida Metroplex that consists of en route and oceanic airspace delegated to ZJX and ZMA, in addition to the relevant TRACONS. It is

important to note that FAA airspace is a highly complex 3-dimensional area with multiple vertical boundaries. In general total coverage terms, ZJX and ZMA provide air traffic services to 780,864 square miles of airspace covering the southeastern United States and overlay parts of the Gulf of Mexico, the coastal Atlantic Ocean, the Bahamas, and the north Caribbean. ZMA and ZJX are the en route facilities responsible for all private and commercial aircraft traversing within the lateral boundaries when operating under Instrument Flight Rules (IFR) and offers select services to aircraft operating under Visual Flight Rules (VFR).

The ZMA airspace extent covers the southern portion of Florida with a boundary extending from approximately PIE on the Gulf Coast, to TPA then MCO, then to approximately Edgewater on the Atlantic Coast. All en route airspace north of this imaginary line to the General Study Area on the northern boundary is controlled by ZJX. A large portion of the central Florida area is controlled by ZMA down to a much lower altitude than normal en route airspace (i.e. below 18,000 feet MSL) and is largely surrounded by TRACON controlled airspace. Out of the en route environment, TRACONs shown in **Exhibits 1-3 and 1-4** are responsible for aircraft transitioning from en route to arrival and conversely, departure to en route portions of flight.

The TRACON airspace delegated to the facilities previously identified in **Section 1.2.4** is designed to handle the extensive coastal and applicable inland air traffic over each geographic area. Tower facilities under the TRACON airspace generally operate with that specific TRACON facility.

1.3.2 South-Central Florida Metroplex Airspace Constraints

The following provide a general overview of the constraints related to controlling aircraft within the South-Central Florida Metroplex area airspace.

1.3.2.1 Cape Canaveral Space Launch Complex

The South-Central Florida Metroplex area has the unique presence of an active military and civilian space launch complex. The Cape Canaveral area in the northeast Atlantic coast portion of Florida is home to the Cape Canaveral Air Force Station and NASA's Kennedy Space Center. Approximately 34 numbered pad sites (some numbered pads are split into pads A and B and pad numbering is not consecutive) have served as the easternmost launch area for the US since 1950. Currently, five of the launch and recovery complexes are actively used for unmanned launches, primarily by private space companies such as SpaceX and United Launch Alliance. The FAA has four primary restricted airspace areas (R-2932, R-2933, R-2934, and R-2935) and a number of warning areas (W-136 B-F, W-137 A-F and L, W138 A-E and L, W139 C-E, W-470 A-F, and W-497 A-B)¹⁷ that are offshore and are intermittent to continuously active from between the surface and 11,000 feet AGL to an unlimited altitude (see **Section 1.3.2.3**). Any individual or combination of these restricted and warning areas influences aircrew and ATC interaction for arriving and departing traffic along the Atlantic coast of Florida and the larger east coast en route structure.

1.3.2.2 Class B Airspace

Class B airspace is regulatory airspace, generally located around major airports, such as FLL, MCO, MIA, PBI, and TPA. The rules for flying within Class B airspace are more restrictive for

¹⁷ U.S. Department of Transportation, Federal Aviation Administration. *Jacksonville Sectional Aeronautical Chart, 105th Edition*. Effective 30 Jan 2020 to 13 Aug 2020. Issued 5 December 2019.

pilot qualifications and aircraft equipment than for other types of terminal airspace. These rules make for a more orderly flow of traffic within Class B airspace. Class B airspace design and operation has a direct impact on the flow of traffic within the South-Central Florida Metroplex area.

1.3.2.3 South-Central Florida Metroplex Special Use Airspace

Exhibits 1-7 and 1-8 depicts the boundaries of Special Use Airspace (SUA)¹⁸ in the South-Central Florida Metroplex, illustrating the limited available options for entering and exiting the South-Central Florida Metroplex airspace. SUA is airspace with defined vertical and lateral boundaries containing certain hazardous activities such as military flight training and air-to-ground military exercises that must be confined. SUA defined dimensions are identified by an area on the surface of the earth within which certain air traffic activities must be confined or where certain restrictions are imposed on aircraft operations that are not a part of those activities, or both. SUA is an important component of the NAS that allows for the safe use of the airspace by military and non-military air traffic. In addition to aviation activity, SUA can accommodate ground and combined arms training and testing. These areas either limit aircraft activity allowed within the airspace or restrict other aircraft from entering during specific days and/or times. Four types of SUA are found within the South-Central Florida Metroplex:¹⁹

- **Alert Areas:** Alert areas are depicted on an aeronautical chart to inform pilots of areas that may contain a high volume of pilot training or an unusual type of aerial activity, neither of which is hazardous to aircraft. Alert Areas are depicted on aeronautical charts for the information of non-participating pilots.
- **Restricted Area:** Restricted areas contain airspace within which aircraft, while not wholly prohibited, are subject to restrictions when the area is being used. The area denotes the existence of unusual, often invisible hazards to aircraft such as artillery firing, aerial gunnery, or guided missiles. Entering a restricted area without authorization may be extremely hazardous to the aircraft and its occupants. When the area is not being used, control of the airspace is released to the FAA, and ATC may use the area for normal operations.
- **Warning Areas:** A warning area extends from three NM outward from the US coastline that contains activity that may be hazardous to nonparticipating aircraft. The purpose of such warning areas is to warn nonparticipating pilots of the potential danger. A warning area may be located over domestic or international waters or both.
- **Military Operations Area:** A Military Operations Area (MOA) is airspace established outside of Class A airspace to separate/segregate certain nonhazardous military activities from IFR traffic and to identify for VFR traffic where these activities are conducted. MOAs are established to contain certain military activities such as air combat maneuvers, air intercepts, acrobatics, etc.

¹⁸ Witham Field Airport, one of the identified Study Airports, has the FAA identifier "SUA" and although the acronyms are the same as Special Use Airspace, the context is largely separate and uniquely associated where used throughout this document.

¹⁹ U.S. Department of Transportation, Federal Aviation Administration, FAA Order JO 7400.10B, *Special Use Airspace*, February 14, 2020 and Department of Transportation, Federal Aviation Administration, *Airman Information Manual*, Chapter 3-Section 4. Special Use Airspace [https://www.faa.gov/air_traffic/publications/atpubs/aim_html/chap3_section_4.html] (Accessed February 22, 2020)].

Within the General Study Area's 30,454 square miles of land coverage (See **Section 4.1**), 4,010 square miles (13.17%) consist of SUA coverage over the land area. The en route ATC facilities (ZMA and ZJX) are required to ensure that civilian and military aircraft (not under the authority of the United States Armed Forces)²⁰ are routed within the remaining 30,454 square miles of land coverage of non-SUA.

Due to the limited commercial airspace outside of SUA, there can be choke points for arrivals and departures into and out of the South-Central Florida area when SUAs such as Restricted Areas are in effect. As was mentioned in **Section 1.3.2.1**, this is caused by the funneling of air traffic into corridors that avoid SUA.

When developing procedures that transect Restricted Areas, it may be necessary to design a number of procedures to account for some of the limitations imposed on usage inherent with this type of SUA. Accordingly, it is generally less complex, more flexible, and more predictable to design SID and STAR procedures that avoid SUA altogether.

²⁰ Aircraft under the direct control of the military air traffic control facilities are confined to Special Use Airspace (SUA) or departure and arrival patterns near military airfields. The SUA are specific areas of airspace that are used by military aircraft and are provided air traffic control services by the military. The United States military branches are specifically charged with management of that airspace when active.

Notes:

Major Study Airports

Orlando International Airport	MCO
Palm Beach International Airport	PBI
Tampa International Airport	TPA

Satellite Study Airports

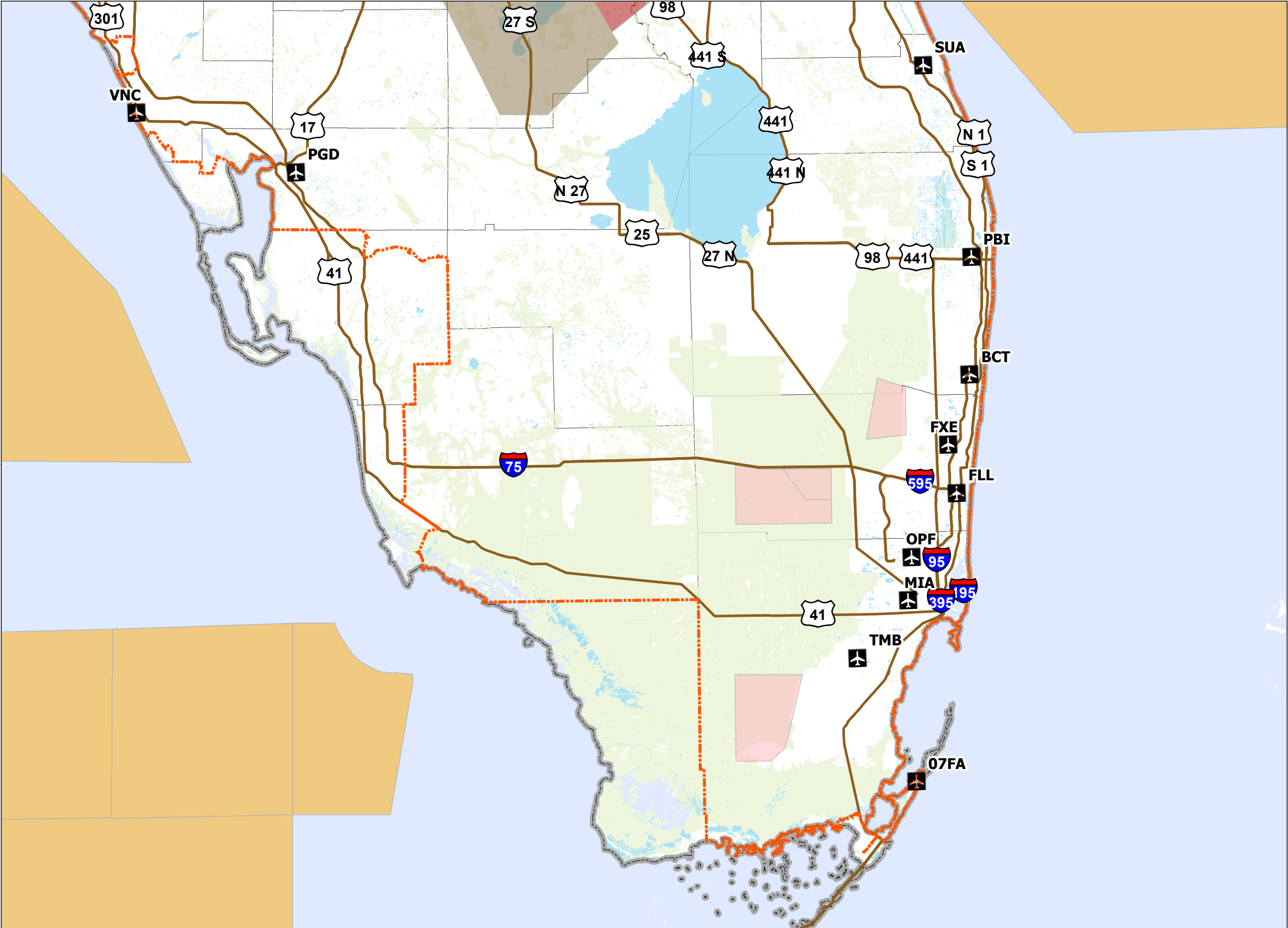
Kissimmee Gateway Airport	ISM
Lakeland Linder International Airport	LAL
Leesburg International Airport	LEE
Melbourne International Airport	MLB
Orlando Executive Airport	ORL
Punta Gorda Airport	PGD
St. Pete-Clearwater International Airport	PIE
Orlando Sanford International Airport	SFB
Sarasota Bradenton International Airport	SRQ
Witham Field Airport	SUA
Venice Municipal Airport	VNC

0 5 10 20 Miles



Special Use Airspace - North

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LEGEND

Study Airports

General Study Area

US and Interstate Highways - Publically Owned and Operated

Type

Alert Area

Military Operations Area

Prohibited Area

Restricted Area

Warning Area

State Boundaries

Lake/Pond

Reservoir

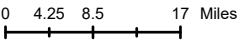
Swamp/Marsh

Ocean or Sea

Study Area Counties

- Notes:**
- Major Study Airports
- | | |
|---|-----|
| Fort Lauderdale-Hollywood International Airport | FLL |
| Miami International Airport | MIA |
| Palm Beach International Airport | PBI |
- Satellite Study Airports
- | | |
|-----------------------------------|------|
| Ocean Reef Club Airport | 07FA |
| Boca Raton Airport | BCT |
| Fort Lauderdale Executive Airport | FXE |
| Miami-Opa Locka Executive Airport | OPF |
| Punta Gorda Airport | PGD |
| Witham Field Airport | SUA |
| Miami Executive Airport | TMB |
| Venice Municipal Airport | VNC |

Coordinate System: NAD 1983 Albers
Projection: Albers
Datum: North American 1983
Scale: 1:1,181,797



Sources: U.S. Census Bureau, 2018 (2018 TIGER/Line Shapefiles (machine-readable data files), (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). Federal Aviation Administration, 2020 Aeronautical Information Services (Airspace Boundaries), ESRI World Water Bodies 2018 (Ocean and Sea). ESRI 2018 (Shaded Relief).ATAC Corporation, 2020, (2020 General Study Area boundary). Prepared by: ATAC Corporation, October 2020.

Exhibit 1-8
Special Use Airspace - South

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1.3.3 STARs and SIDs Serving Study Airports

As of June 1, 2018;²¹ 85 published STARs and SIDs serve the 21 Study Airports identified in **Table 1.1**. These 85 air traffic procedures to the Study Airports can be further characterized:

- 40 are STARs and 45 are SIDs
- 52 are RNAV and 33 are conventional

1.4 South-Central Florida Metroplex Study Airports

Exhibits 1-9 and 1-10 depicts the locations of the 21 South-Central Florida Metroplex Project Study Airports. The Study Airports were selected based on specific FAA criteria: each airport must have a minimum of 700 annual IFR-filed jet operations or 90,000 or more annual propeller aircraft operations. Airports that did not meet these thresholds were not included as Study Airports because the Proposed Action would result in little or no change to their operations.²² In addition, airports where the majority of traffic operates under VFR were also excluded from selection as Study Airports because they would not be directly affected by the Proposed Action. VFR aircraft operating outside controlled airspace are not required to be in contact with ATC. Because these aircraft operate at the pilot's discretion on a "see and be seen" basis that does not required filed flight plans, the FAA generally has limited operational information.

The five major Study Airports are:

Fort Lauderdale/Hollywood International Airport (FLL) serves the northern Miami region of the Atlantic coast and is classified as a public commercial service primary large hub airport under the National Plan of Integrated Airport Systems (NPIAS) for 2019-2023.²³ FLL has two parallel runways (10R-28L and 10L-28R). IFR aircraft arriving to FLL may be assigned one of four RNAV STARs or five conventional STARs. Departing IFR aircraft may be assigned one of six RNAV SIDs or one conventional SID.

Orlando International Airport (MCO) Serves the greater Orlando region and is classified as a public commercial service primary large hub airport under the NPIAS. MCO has four parallel runways (36L-18R, 36R-18L, 35L-17R, and 35R-17L). IFR aircraft arriving to MCO may be assigned one of four RNAV STARs or five conventional STARs. Departing aircraft may be assigned one of six RNAV SIDs or three conventional SIDs.

Miami International Airport (MIA) serves the greater Miami region of the south-central and south Atlantic coast and is classified as a public commercial service primary large hub airport under the NPIAS. MIA has three parallel runways (08L-26R, 08R-26L, and 09-27) and one crosswind runway (12-30). IFR aircraft arriving to MIA may be assigned one of four RNAV

21 The June 1, 2018 date was chosen for the most immediate proximity to the concluding date of the annual Performance Data and Reporting System (PDARS) radar data sample used to define baseline conditions in this EA. References throughout the EA are made to the June 1, 2017-May 30, 2018 period of radar data used for defining the existing conditions in the FL Metroplex Project.

22 U.S. Department of Transportation, Federal Aviation Administration, *1050.1F Desk Reference (Version 2)*, Ch. 11, Noise and Noise-Compatible Land Use, Section 11.1.2, Projects Not Requiring a Noise Analysis, February 2020.

23 U.S. Department of Transportation, Federal Aviation Administration. *National Plan of Integrated Airport Systems, Appendix A: List of NPIAS Airports with 5-Year Forecast Activity and Development Estimate*. September 26, 2018.

[https://www.faa.gov/airports/planning_capacity/npias/reports/media/NPIAS-Report-2019-2023-Appendix-A.pdf (Accessed February 12, 2020)].

STARs or five conventional STARs. Departing IFR aircraft may be assigned one of 11 RNAV SIDs or three conventional SIDs.

Palm Beach International Airport (PBI) serves the West Palm Beach area and is classified as a public commercial service primary medium hub airport under the NPIAS. PBI has two parallel runways (10R-28L and 10L-28R) and one crosswind runway (14-32). IFR aircraft arriving to PBI may be assigned one of four RNAV STARs or five conventional STARs. Departing IFR aircraft may be assigned one of six RNAV SIDs or three conventional SIDs.

Tampa International Airport (TPA) serves the greater Tampa Bay region on the Gulf coast and is classified as a public commercial service primary large hub airport under the NPIAS. TPA has two parallel runways (Runways 1L-19R and 1R-19L) and one crosswind runway (10-28). Aircraft arriving to TPA may be assigned one of two RNAV STARs or one conventional STAR. Departing aircraft may be assigned one of five RNAV SIDs or one conventional SID.

The 16 satellite Study Airports are:

Ocean Reef Club Airport (07FA) serves the Key Largo area on the southeast Atlantic coast and is operated as a privately owned private use airport and is not classified as part of the NPIAS. The airport has one runway (05-23). IFR aircraft arriving to 07FA may be assigned one of five RNAV STARs or four conventional STARs. Departing IFR aircraft are radar vectored and/or have indirect access to other RNAV or conventional routings.

Boca Raton Airport (BCT) serves the Boca Raton area on the Atlantic coast and is classified as a public general aviation reliever airport under the NPIAS. BCT has one runway (05-23). IFR aircraft arriving to BCT may be assigned one of two RNAV STARs or one conventional STAR. Departing IFR aircraft are radar vectored and/or have indirect access to other RNAV or conventional routings.

Fort Lauderdale Executive Airport (FXE) serves the Fort Lauderdale area on the Atlantic coast and is classified as a public general aviation reliever airport under the NPIAS. FXE has two runways (09-27 and 13-31). IFR aircraft arriving to FXE may be assigned one of four RNAV STARs or five conventional STARs. Departing IFR aircraft may be assigned one RNAV SID.

Kissimmee Gateway Airport (ISM) serves the greater Orlando area and is classified as a public general aviation reliever airport under the NPIAS. ISM has two runways (06-24 and 15-33). IFR aircraft arriving to ISM may be assigned one of five RNAV STARs or four conventional STARs. Departing IFR aircraft are radar vectored and/or have indirect access to other RNAV or conventional routings.

Lakeland Linder Regional (LAL) serves the Lakeland area between the greater Tampa and Orlando regions and is classified as a public general aviation reliever airport under the NPIAS. LAL has two runways (05-23 and 09-27). IFR aircraft arriving to LAL may be assigned one RNAV STAR with no conventional STARs. Departing IFR aircraft are radar vectored and/or have indirect access to other RNAV or conventional routings.

Leesburg International Airport (LEE) serves the Leesburg area northwest of Orlando and is classified as a public general aviation airport under the NPIAS. LEE has two runways (03-21 and 13-31). IFR aircraft arriving at LEE may be assigned one of three RNAV STARs or two conventional STARs. Departing IFR aircraft are radar vectored and/or have indirect access to other RNAV or conventional routings.

Melbourne International Airport (MLB) serves the Melbourne and Space Coast Atlantic area and is classified as a public commercial service primary non-hub airport under the NPIAS. MLB has two parallel runways (09L-27R and 09R-27L) and one crosswind runway (05-23). IFR aircraft arriving at MLB may be assigned one RNAV STAR or one conventional STAR. Departing IFR aircraft are radar vectored and/or have indirect access to other RNAV or conventional routings.

Miami-Opa Locka Executive Airport (OPF) serves the greater Miami area 9 miles north of MIA and is classified as a public general aviation reliever airport under the NPIAS. OPF has two parallel runways (09L-27R and 09R-27L) and one crosswind runway (12-30). IFR aircraft arriving at OPF may be assigned one of five RNAV STARs or six conventional STARs. Departing IFR aircraft may be assigned one conventional SID.

Executive Airport (ORL) serves the greater Orlando area and is classified as a public general aviation reliever airport under the NPIAS. ORL has two runways (07-25 and 13-31). IFR aircraft arriving at ORL may be assigned one of five RNAV STARs or four conventional STARs. Departing IFR aircraft are radar vectored and/or have indirect access to other RNAV or conventional routings.

Punta Gorda Airport (PGD) serves the Punta Gorda area and is classified as a public commercial service primary small hub airport under the NPIAS. PGD has three runways (04-22, 09-27, and 15-33). Arriving and departing IFR aircraft are radar vectored and/or have indirect access to other RNAV or conventional routings.

St Pete - Clearwater International Airport (PIE) serves the greater Tampa Bay area and is classified as a public commercial service primary small hub airport under the NPIAS. PIE has two runways (18-36 and 04-22). IFR aircraft arriving at PIE may be assigned one of five RNAV STARs or three conventional STARs. Departing IFR aircraft may be assigned one conventional SID.

Orlando Sanford International Airport (SFB) serves the greater Orlando area and is classified as a public commercial service primary small hub airport under the NPIAS. SFB has three parallel runways (09L-27R, 09C-27C, and 09R-27L) and one crosswind runway (18-36). IFR aircraft arriving at SFB may be assigned one of three RNAV STARs or three conventional STARs. Departing IFR aircraft may be assigned one conventional SID.

Sarasota/Bradenton International Airport (SRQ) serves the Sarasota and Bradenton areas of the central Gulf coast and is classified as a public commercial service primary small hub airport under the NPIAS. SRQ has two runways (04-22 and 14-32). IFR aircraft arriving at SRQ may be assigned one of three RNAV STARs or one conventional STAR. Departing IFR aircraft may be assigned one RNAV SID or one conventional SID.

Witham Field Airport (SUA) serves the Port St Lucie and Stuart area in the east central Atlantic coast and is classified as a public general aviation reliever airport under the NPIAS. SUA has three runways (07-25, 12-30, and 16-34). IFR aircraft arriving at SUA may be assigned one RNAV STAR. Departing IFR aircraft may be assigned one of two RNAV SIDs.

Miami Executive Airport (TMB) serves the greater Miami area and is classified as a public general aviation reliever airport under the NPIAS. TMB has two parallel runways (09L-27R and 09R-27L) and one crosswind runway (13-31). IFR aircraft arriving at TMB may be assigned one of four RNAV STARs or five conventional STARs. Departing IFR aircraft may be assigned one conventional SID.

Venice Municipal Airport (VNC) serves the Venice area on the southern gulf coast and is classified as a public general aviation reliever airport under the NPIAS. VNC has two runways (05-23 and 13-31). IFR aircraft arriving at VNC may be assigned one of two RNAV STARs or one conventional STAR. Departing IFR aircraft may be assigned one conventional SID.

LEGEND

Study Airports

General Study Area

US and Interstate Highways - Publically Owned and Operated

State Boundaries

Lake/Pond

Reservoir

Swamp/Marsh

Ocean or Sea

Study Area Counties

Notes:

<u>Major Study Airports</u>	
Orlando International Airport	MCO
Palm Beach International Airport	PBI
Tampa International Airport	TPA

<u>Satellite Study Airports</u>	
Kissimmee Gateway Airport	ISM
Lakeland Linder International Airport	LAL
Leesburg International Airport	LEE
Melbourne International Airport	MLB
Orlando Executive Airport	ORL
Punta Gorda Airport	PGD
St. Pete-Clearwater International Airport	PIE
Orlando Sanford International Airport	SFB
Sarasota Bradenton International Airport	SRQ
Witham Field Airport	SUA
Venice Municipal Airport	VNC

Coordinate System: NAD 1983 Albers
 Projection: Albers
 Datum: North American 1983
 Scale: 1:1,601,151

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LEGEND

Study Airports

General Study Area

US and Interstate Highways -
Publically Owned and Operated

State Boundaries

Lake/Pond

Reservoir

Swamp/Marsh

Ocean or Sea

Study Area Counties

Notes:

Major Study Airports

Fort Lauderdale-Hollywood International Airport	FLL
Miami International Airport	MIA
Palm Beach International Airport	PBI

Satellite Study Airports

Ocean Reef Club Airport	07FA
Boca Raton Airport	BCT
Fort Lauderdale Executive Airport	FXE
Miami-Opa Locka Executive Airport	OPF
Punta Gorda Airport	PGD
Witham Field Airport	SUA
Miami Executive Airport	TMB
Venice Municipal Airport	VNC

Coordinate System: NAD 1983 Albers
 Projection: Albers
 Datum: North American 1983
 Scale: 1:1,181,797

0 4.25 8.5 17 Miles

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As shown in **Table 1-2**, from June 1, 2017 to May 30, 2018 approximately 73.5 percent of all IFR traffic within the South-Central Florida Metroplex area operated at the major Study Airports (FLL, MCO, MIA, PBI, TPA).

Table 1-2 Distribution of IFR Traffic under FAA Control Among All Study Airports²⁴

Airport	IFR Annual Operations	Percent of Total Annual Operations
Fort Lauderdale/Hollywood International Airport – FLL	306,272	16.4%
Orlando International Airport – MCO	342,297	18.4%
Miami International Airport – MIA	409,095	21.9%
Palm Beach International Airport – PBI	118,654	6.4%
Tampa International Airport – TPA	193,974	10.4%
Ocean Reef Club Airport – 07FA	4,393	0.2%
Boca Raton Airport – BCT	26,029	1.4%
Fort Lauderdale Executive Airport – FXE	52,706	2.8%
Kissimmee Gateway Airport – ISM	24,455	1.3%
Lakeland Linder Regional – LAL	20,719	1.1%
Leesburg International Airport – LEE	10,654	0.6%
Melbourne International Airport – MLB	32,701	1.8%
Miami-Opa Locka Executive Airport – OPF	54,611	2.9%
Orlando Executive Airport – ORL	27,231	1.5%
Punta Gorda Airport – PGD	20,045	1.1%
St Pete-Clearwater International Airport – PIE	44,151	2.4%
Orlando Sanford International Airport – SFB	65,858	3.5%
Sarasota/Bradenton International Airport – SRQ	44,808	2.4%
Witham Field Airport – SUA	22,535	1.2%
Miami Executive Airport – TMB	37,833	2.0%
Venice Municipal Airport – VNC	6,352	0.3%
Total IFR Operations	1,865,373	100.0%

Source: U.S. Department of Transportation, Federal Aviation Administration. Operations Network: Tower Counts [<https://aspm.faa.gov/opsnet/sys/Airport.asp>, <https://aspm.faa.gov/tfms/sys/main.asp> (Accessed October 2019)].

Prepared by: ATAC Corporation, March 2020.

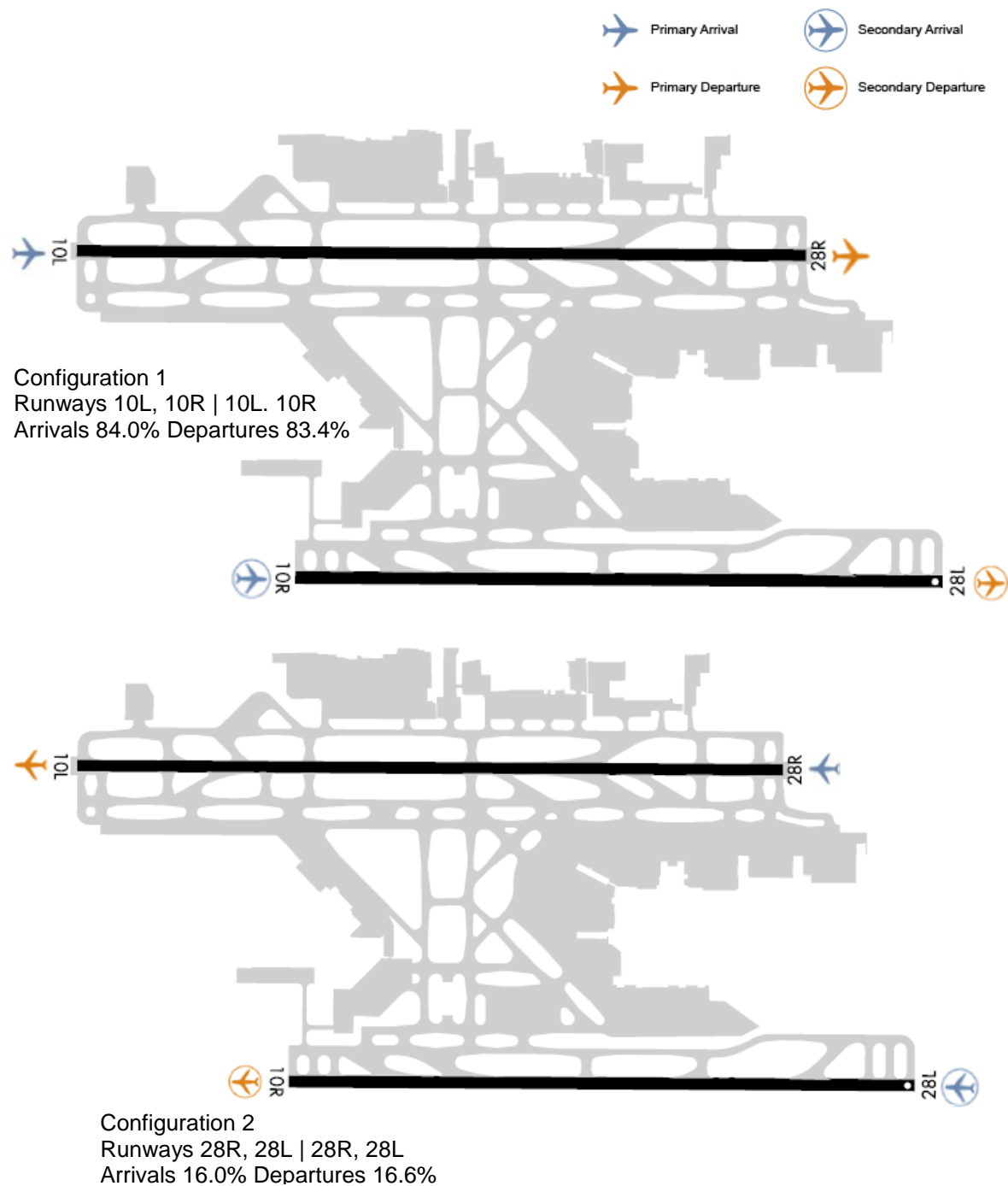
1.4.1 Major Study Airport Runway Operating Configurations

Each major Study Airport operates under several different runway operating configurations depending on factors such as weather, prevailing wind, and air traffic conditions. As a result, it is possible for the runway ends used for arrivals and departures to change several times throughout a day. Controllers use different runway operating configurations depending on prevailing conditions.

Exhibits 1-11 to 1-15 illustrate the primary runway operating configurations at the five major Study Airports. These configurations are based on the FAA's Aviation System Performance Metrics (ASPM) for June 2017 to May 2018.

²⁴ Radar data obtained from the FAA's Performance Data Analysis and Reporting System (PDARS) identified 1,741,841 flight tracks to and from the Study Airports between June 1, 2017 and May 30, 2018.

Exhibit 1-11 FLL Runway Operating Configurations

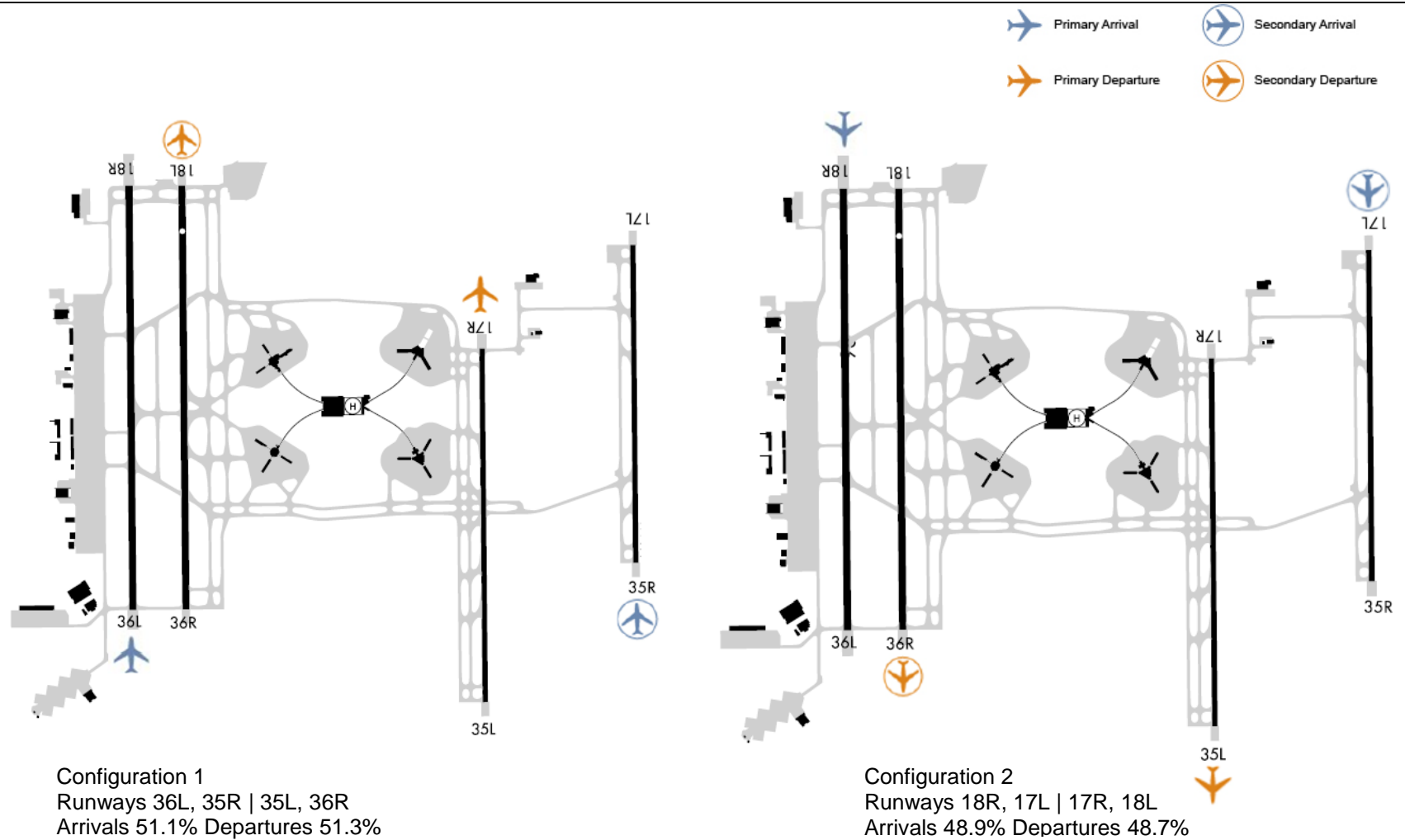


Source: U.S. Department of Transportation, Federal Aviation Administration. *Airport Diagrams* [http://www.faa.gov/airports/runway_safety/diagrams/ (Accessed March 2020)]. ASPM: *Efficiency Report for FLL* [<https://aspm.faa.gov/apm/sys/main.asp> (Accessed July 2018)].

Prepared By: ATAC Corporation, March 2020.

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Exhibit 1-12 MCO Runway Operating Configurations

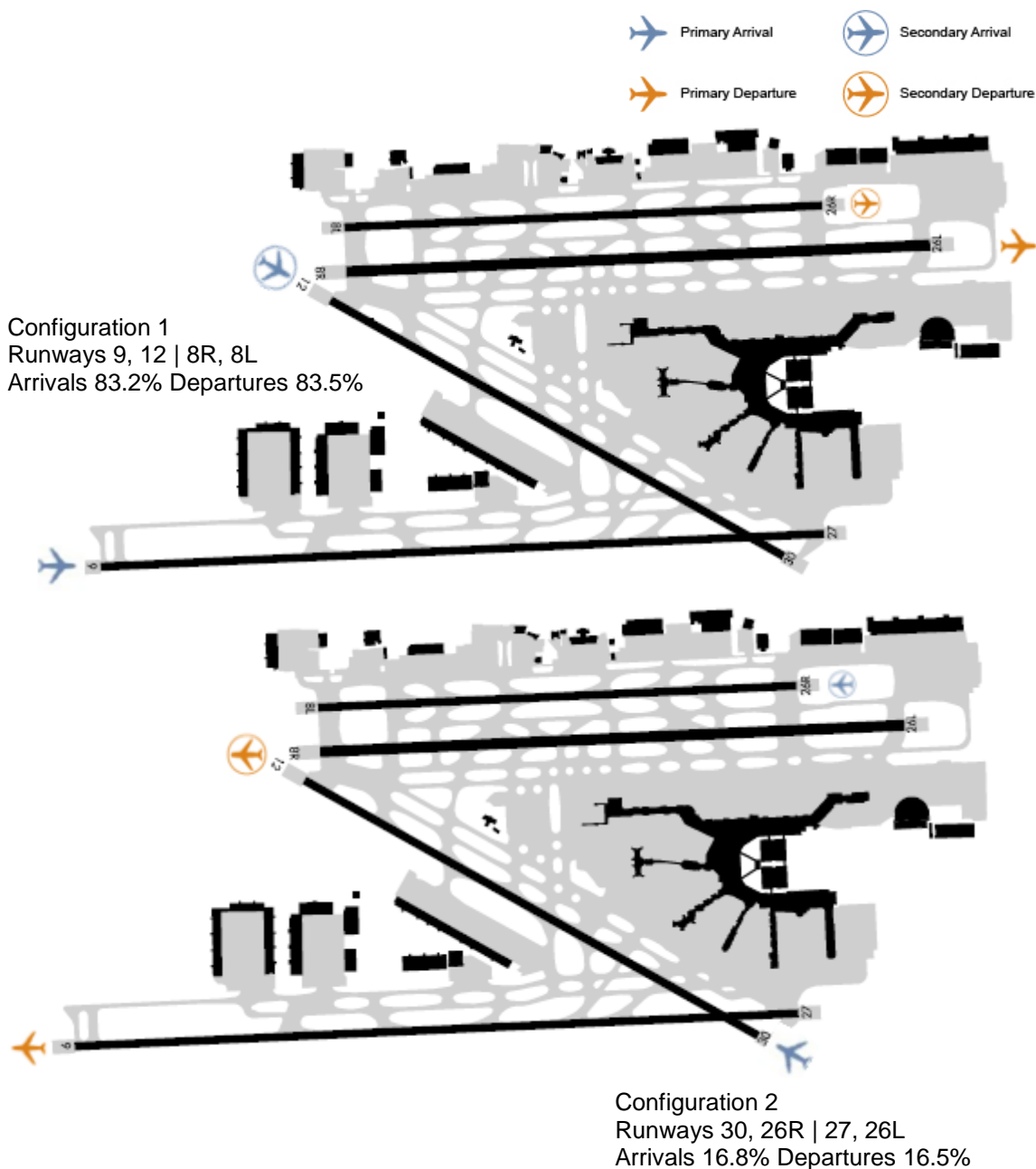


Source: U.S. Department of Transportation, Federal Aviation Administration. *Airport Diagrams* [http://www.faa.gov/airports/runway_safety/diagrams/ (Accessed March 2020)]. *ASPM: Efficiency Report for MCO* [<https://aspm.faa.gov/apm/sys/main.asp> (Accessed July 2018)].

Prepared By: ATAC Corporation, March 2020.

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Exhibit 1-13 MIA Runway Operating Configurations

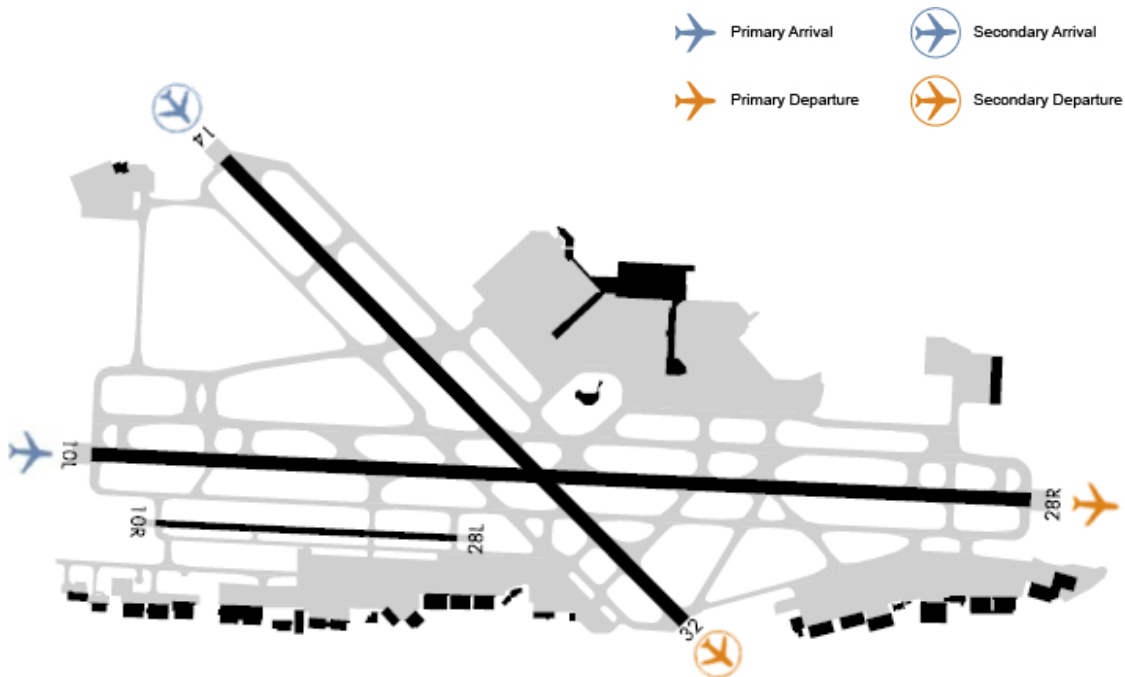


Source: U.S. Department of Transportation, Federal Aviation Administration. *Airport Diagrams* [http://www.faa.gov/airports/runway_safety/diagrams/] (Accessed March 2020). ASPM: *Efficiency Report for MIA* [<https://aspm.faa.gov/apm/sys/main.asp>; (Accessed July 2018)].

Prepared By: ATAC Corporation, March 2020.

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Exhibit 1-14 PBI Runway Operating Configurations



Configuration 1
Runways 10L, 14 | 10L, 14
Arrivals 79.1% Departures 77.4%



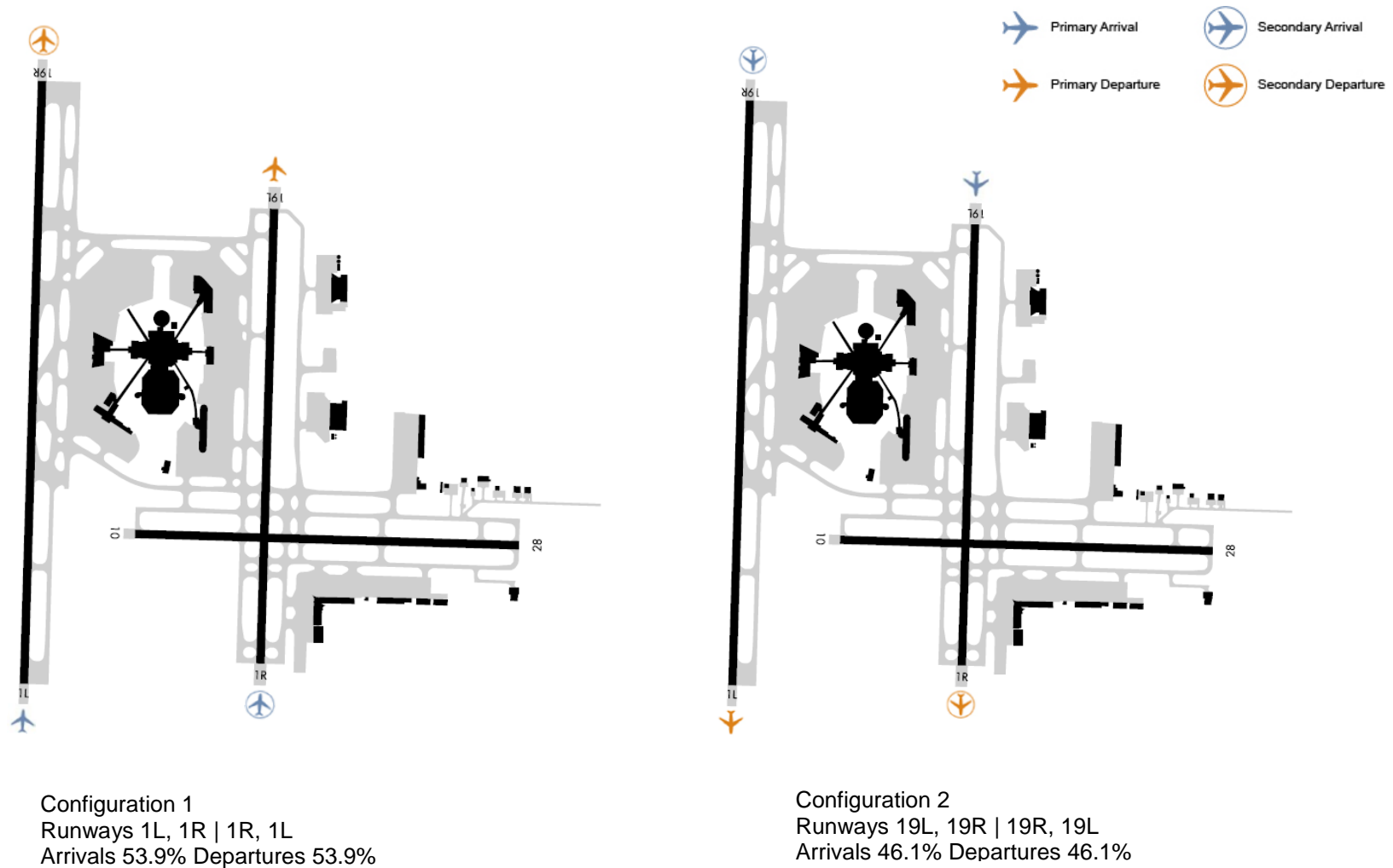
Configuration 2
Runways 28R, 32 | 28R, 32
Arrivals 20.9% Departures 22.6%

Source: U.S. Department of Transportation, Federal Aviation Administration. *Airport Diagrams* [http://www.faa.gov/airports/runway_safety/diagrams/ (Accessed March 2020)]. ASPM: *Efficiency Report for PBI* [<https://aspm.faa.gov/apm/sys/main.asp>; (Accessed July 2018)].

Prepared By: ATAC Corporation, March 2020

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Exhibit 1-15 TPA Runway Operating Configurations



Source: U.S. Department of Transportation, Federal Aviation Administration. *Airport Diagrams* [http://www.faa.gov/airports/runway_safety/diagrams/ (Accessed March 2020)]. ASPM: *Efficiency Report for TPA* [<https://aspm.faa.gov/apm/sys/main.asp> (Accessed July 2018)].

Prepared By: ATAC Corporation, March 2020.

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2 Purpose and Need

The FAA has prepared this Final EA to evaluate the potential environmental impacts associated with implementation of new RNAV-based flight procedures for the South-Central Florida Metroplex (Proposed Action). As required by FAA Order 1050.1F, an EA must include a discussion of the underlying purpose and need for the Proposed Action. This includes a discussion of the problem(s) being addressed and what the FAA plans to achieve by implementing the Proposed Action. The following sections describe the need for the Proposed Action (i.e. the existing issues in the South-Central Florida Metroplex that would be addressed by the Proposed Action), as well as the Proposed Action itself.

2.1 The Need for the Proposed Action

In the context of an EA, “need” describes the problem that the Proposed Action is intended to resolve. The problem in this case is the inefficiency of the existing aircraft flight procedures in the South-Central Florida Metroplex. RNAV-based SIDs and STARs have been in effect in the South-Central Florida Metroplex for nearly 20 years. However, since these procedures were first implemented, RNAV design criteria and guidance have been regularly updated as experience has been gained in the design and use of RNAV procedures. As a consequence, older RNAV procedures do not take full advantage of current RNAV design capabilities and have become increasingly less efficient.

Efficiency in air traffic operations can take many forms that involve distance, time, and/or delay.²⁵ A flight crew manages aircraft systems and condition, situational aircraft phase-of-flight activity, multi-party communication externally and internally, and on-board passenger/crew activities. The Air Traffic personnel are managing known aircraft in their geographic responsibility; monitoring weather factors; attending to aircraft entering, transiting, and exiting a defined air traffic area; and the time and 3-dimensional aspects of aircraft in their geographic responsibility. Finally, airports are conducting activities influencing arrival and departure times such as runway inspections, temporary movement surface closures, and monitoring weather conditions for potential safety mitigation. Each of these factors influences the distance, time, and/or delay efficiency of the air traffic system.

Focusing on the air traffic and air crew components, arrival and departure procedures serving the South-Central Florida Metroplex can be improved to increase the efficient use of the airspace to the benefit of pilots, controllers, and the general public. Additionally, conventional procedures lack efficiencies inherent in RNAV-based design. This is because they rely on technology that cannot provide specific and precise navigational benefits for aircraft, including predetermined speeds or altitudes. Furthermore, as discussed in **Section 1.2.5.1**, conventional procedures are subject to lateral and vertical flight path limitations eliminated through use of RNAV technology. RNAV procedures can reduce the need for controllers to employ vectoring and speed adjustments, thus reducing controller and pilot workload. In turn, this adds efficiency to an air traffic system by enhancing predictability, flexibility, and route segregation. By taking advantage of the increased benefits associated with RNAV technology, the FAA is better able to meet its primary missions as mandated by Congress – to provide for the efficient use of airspace, to develop plans and policy for the use of the

²⁵ U.S. Department of Transportation, Federal Aviation Administration.
[https://www.faa.gov/data_research/aviation_data_statistics/operational_metrics/ (Accessed April 29, 2020)].

navigable airspace, and to assign by regulation or order the use of the airspace necessary to ensure the safety of aircraft and the efficient use of airspace.

The following sections describe the problem in greater detail. Explanations of the technical terms and concepts used in this chapter are found in **Chapter 1, Background**.

2.1.1 Description of the Problem

There are several issues associated with the arrival and departure procedures currently implemented in the South-Central Florida Metroplex. These issues are predominantly caused by inefficient lateral and vertical paths, procedures lacking adequate runway transitions, conflicts between arriving and departing traffic, and delays associated with the close proximity of the major Study Airports and surrounding satellite Study Airports.

Many of the procedures serving the major Study Airports lack procedural de-confliction (laterally or vertically segregated flows). Task complexity increases without procedural de-confliction, including increased usage of radar vectors and level-offs which in turn increases the need for communication between pilots and controllers. The application of Performance Based Navigation (PBN) allows for the development of structured procedures that are deconflicted from each other reducing the potential for operational errors. The lack of procedural deconfliction requires some arrival and departure flight paths to intersect, requiring controllers to direct pilots to level off or vector from the procedure to maintain adequate vertical and lateral separation between aircraft. Examples include aircraft interacting between FLL and MIA often experiencing more than one segment of level-off during flight. These complex, converging interactions require more frequent controller-to-pilot and controller-to-controller communication and reduce the efficient use of the airspace.

Many of the Study Airports are underserved by procedures. 07FA, BCT, ISM, LAL, LEE, and ORL have no SIDs serving them. Currently MLB has no RNAV procedures serving the airport. Lastly, 07FA, BCT, FXE, ISM, LAL, LEE, MCO, MLB, OPF, ORL, PGD, PIE, SFB, and TMB do not have any RNAV SIDs serving them.

Predictability is reduced due to a lack of RNAV procedures serving satellite airports. RNAV routes allow controllers to know the expected location of aircraft, their altitudes (i.e., where and how high), and speeds (i.e., how fast and when) at key points along a flight path. Procedures that provide these elements result in more predictable routes for both controllers and pilots.

Similarly, underutilized en route transitions limit the number of entry and exit points when transitioning from Terminal to en route (ARTCC) airspace. As a result, multiple arriving and departing traffic flows must be sequenced over the same points, increasing both controller and pilot workload and complexity. One example involves PBI departures to the west and northwest which experience delays as they are sequenced over a single point, often requiring extensive coordination between controllers from different sectors. Furthermore, some departure procedures are inefficient due to design constraints, and there are an insufficient number of departure procedures serving many Study Airports during all operating configurations. Again, these issues lead to an increase in controller-to-pilot and controller-to-controller communication and reduce flexibility in the management of the airspace.

The FAA's ability to meet one of its primary missions as mandated by Congress – to provide for the efficient use of airspace – is impeded as a result of these types of inefficiencies. Therefore, the problem is the inability to fully employ the additional efficiency provided by

current RNAV design criteria and guidance. By developing RNAV procedures that take full advantage of current design criteria and guidance, the air traffic system would experience increased efficiency demonstrated by enhanced predictability, route segregation, and flexibility.

It is important to note that a key design constraint is safety. Any proposed change to a procedure to resolve a problem must not compromise safety, and if possible must enhance safety. Although the current procedures are less efficient, they meet current FAA safety criteria.

2.1.2 Causal Factors

The inefficiencies and resulting complexities associated with existing procedures are the primary foundation for the problem in the South-Central Florida Metroplex. A problem (or need) is best addressed by examining the circumstances or factors that cause it. Addressing the causal factors behind the problem will help develop a reasonable alternative designed to resolve the problem (i.e., meet the “purpose”).

As summarized above, several issues have been identified as causes for the inefficiencies in the Metroplex. For purposes of this EA, these issues were grouped into three key causal factors:

- Lack of predictable standard routes defined by procedures to/from airport runways to/from en route airspace
- Complex converging and dependent route procedure interactions
- Lack of flexibility in the efficient transfer of traffic between the en route and terminal area airspace

These three causal factors are discussed in the following sections.

2.1.2.1 Lack of Predictable Standard Routes Defined by an Insufficient Number of RNAV Procedures and Insufficient Airport Runway Transitions

Predictable standard routes allow both pilots and controllers to know ahead of time how, where, and when an aircraft should be operated along a defined route. This also allows controllers and pilots to better plan airspace use and the control of aircraft in the given volume of airspace. A predictable route may include expected locations (where), altitudes (where and how high), and speeds (how fast and when) at key points. A procedure that provides these elements results in a more predictable route for the pilot and controller.

Aircraft performance and/or piloting technique can vary and, as a result, may also play a factor in reducing predictability. Because conventional procedures are less precise and predictable than RNAV procedures, controllers will use vectoring, as well as instructions governing speed and altitude level-offs, to ensure safe vertical and lateral separation between aircraft. As discussed in **Section 1.2.6.1**, RNAV procedures enable aircraft to follow more accurate and better-defined direct flight routes in areas covered by GPS-based navigational aids. This allows for predictable routes with fixed locations and altitudes that can be planned ahead of time by the pilot and air traffic control.

The following sections describe some of the issues with predictability in the South-Central Florida Metroplex airspace.

Current Procedures Do Not Take Full Advantage of RNAV Capabilities

As shown in **Table 2-1**, the Study Airports are currently served by 52 RNAV procedures and 33 conventional procedures. Most of the current procedures serving the Study Airports were first developed decades ago and do not utilize the advancements that have been made to PBN procedures that have been developed since then. Because the current RNAV procedures were developed decades ago, they were designed in conjunction with conventional routes, as many aircraft could not fly RNAV routes when they were designed. Because conventional procedures are dependent on the location of ground-based navigational aids, the locations where procedures could be established were limited due to factors such as terrain and location of ground-based navigational aids. Accordingly, the RNAV procedures developed were limited based on the placement of conventional procedures. As a result, the overall benefit that could have been gained for RNAV-equipped aircraft has not been fully realized.

Table 2-1 South-Central Florida Metroplex – Existing STAR and SID Procedures

Airport(s) Served	Gate Served ²⁶	Procedure Name	Procedure Type	Transitions (en route/runway)
ARRIVALS (STARs)				
07FA, MIA, TMB	N	ANNEY	Conventional	3/0
07FA, FLL, FXE, MIA, OPF, TMB	N	BLUFI	Conventional	1/0
07FA, FLL, FXE, MIA, OPF, TMB	SW	CURSO	RNAV	2/0
07FA, MIA, OPF, TMB	NW	CYPRESS	Conventional	3/0
07FA, MIA, TMB	SE	FLIPR	RNAV	2/0
07FA, MIA, TMB	SE	FOWEE	Conventional	4/0
07FA, MIA, TMB	N, NE	HILEY	RNAV	3/0
07FA, MIA, OPF, TMB	NW	SSCOT	RNAV	2/0
BCT	N	CAYSL	RNAV	3/2
BCT	NW	PRRIE	RNAV	3/2
BCT, PBI	N	TUXXI	Conventional	2/0
FLL, FXE, OPF	SE	DEKAL	Conventional	3/0
FLL, FXE, MIA, OPF, TMB	SW	DVALL	Conventional	2/0
FLL, FXE, OPF	N, NE	FISEL	RNAV	5/0
FLL, FXE, OPF	NW	FORTL	Conventional	3/0
FLL, FXE, OPF	N, NE	GISSH	Conventional	4/0
FLL, FXE, OPF	NW	JINGL	RNAV	2/0
FLL, FXE, OPF	SE	WAVUN	RNAV	1/0
ISM, LEE, MCO, ORL, SFB	S	BAIRN	RNAV	3/0
ISM, MCO, MLB	N	BITHO	Conventional	1/0
ISM, MCO, ORL	N	BUGGZ	RNAV	2/0
ISM, LEE, MCO, MLB, ORL, SFB	SW	COSTR	RNAV	5/0
ISM, LEE, MCO, ORL, SFB	N, NE	CWRLD	RNAV	3/0
ISM, LEE, MCO, ORL, SFB	S	GOOFY	Conventional	3/4
ISM, MCO, ORL	N	LEESE	Conventional	4/0
ISM, LEE, MCO, ORL, SFB	SW	MINEE	Conventional	4/0
ISM, MCO, ORL	N	PIGLT	RNAV	2/0
LAL, PIE, SRQ, TPA	W	BLOND	RNAV	1/2
ORL, SFB	N	CORLL	Conventional	1/0

26 Directional arrival and departure gates are explained further in this EA at: Section 1.2.4.2 *Arrival Flow*, Exhibit 2-7, and Section 2.2.3 *Improve Flexibility and Transitioning Aircraft Traffic*.

Table 2-1 South-Central Florida Metroplex – Existing STAR and SID Procedures

Airport(s) Served	Gate Served	Procedure Name	Procedure Type	Transitions (en route/runway)
ARRIVALS CONT...				
PBI	NE	FRWAY	RNAV	3/0
PBI, SUA	NW	WLACE	RNAV	3/0
PIE, TPA	SE	BRDGE	Conventional	3/2
PIE, TPA	NE	DADES	RNAV	2/2
PIE, TPA	NW	DARBS	Conventional	1/0
PIE, TPA	SE	DEAKK	RNAV	3/2
PIE, TPA	NW	FOOXX	RNAV	1/2
PIE, TPA	NE	LZARD	Conventional	2/2
SRQ, VNC	NW	CLAMP	Conventional	1/0
SRQ, VNC	NW	TEEGN	RNAV	1/2
SRQ, VNC	N	TRAPR	RNAV	1/2
DEPARTURES (SIDs)				
FLL	N	ARKES	RNAV	0/4
FLL	SE	BAHMA	RNAV	0/2
FLL	E	BEECH	RNAV	0/2
FLL, FXE	All	FORT LAUDERDALE	Conventional	0/0
FLL	NE	PREDI	RNAV	0/4
FLL	NW	THNDR	RNAV	0/4
FLL	NE	ZAPPA	RNAV	0/4
MCO	All	CITRUS	Conventional	0/0
MCO	N	JAGUAR	Conventional	1/0
MCO	N	MCCOY	Conventional	0/0
MCO	All	ORLANDO	Conventional	0/0
MIA	NW, N, NE	BSTER	RNAV	4/4
MIA	S, SE, E	DEEEP	RNAV	3/4
MIA	SE	EONNS	RNAV	0/8
MIA	N	HEDLY	RNAV	0/8
MIA	NW, N, NE	HITAG	RNAV	4/4
MIA	S, SE, E	JONZI	RNAV	3/4
MIA, OPF, TMB	All	MIAMI	Conventional	0/0
MIA	S	MNATE	RNAV	0/8
MIA	NE	PADUS	RNAV	0/8
MIA	NW, N, NE	POTTR	Conventional	4/3
MIA	E	SKIPS	RNAV	0/8
MIA	S, SE, E	SOUBY	Conventional	3/3
MIA	NE	VALLY	RNAV	0/8
MIA	NW	WINCO	RNAV	0/8
MLB	All	MELBOURNE	Conventional	0/0
PBI	S	BUFIT	RNAV	1/4
PBI	W	LMORE	RNAV	1/4
PBI	E	MIXAE	RNAV	1/4
PBI	All	PALM BEACH	Conventional	0/0
PBI	NE	SLIDZ	RNAV	1/4
PBI	NW	TBIRD	RNAV	1/4
PIE	All	ST PETE	Conventional	0/0
SFB	All	SANFORD	Conventional	0/0
SRQ	All	SARASOTA	Conventional	0/0
SRQ, VNC	NW	SRKUS	RNAV	3/3

Table 2-1 South-Central Florida Metroplex – Existing STAR and SID Procedures

Airport(s) Served	Gate Served	Procedure Name	Procedure Type	Transitions (en route/runway)
DEPARTURES CONT...				
SUA	E	BRNGR	RNAV	1/6
SUA	NW	SNDLR	RNAV	1/6
TPA	N	BAYPO	RNAV	1/6
TPA	SE	CROWD	RNAV	1/6
TPA	N	ENDED	RNAV	0/6
TPA	S	GANDY	RNAV	1/6
TPA	All	LGTNG	Conventional	0/6
TPA	W	SYKES	RNAV	2/6
TPA	All	TAMPA	Conventional	0/0

Note: Radar vectors are not a defined route and therefore are not included in runway transition counts.

Source: U.S. Department of Transportation, Federal Aviation Administration, Instrument Flight Procedures Information Gateway [https://www.faa.gov/air_traffic/flight_info/aeronav/procedures/] (Accessed June 2018). Federal Aviation Administration, Coded Instrument Flight Procedures (CIFP), Accessed June 2018.

Prepared by: ATAC Corporation, March 2020.

Since the implementation of the existing RNAV procedures, RNAV design criteria and guidance have been regularly updated as experience has been gained in the design and use of RNAV procedures. Consequently, the older RNAV procedures in effect in the South-Central Florida Metroplex do not take full advantage of current RNAV design capabilities and have become increasingly less efficient. This inefficiency has grown increasingly unwarranted, as over the last two decades the percentage of RNAV equipped aircraft has increased substantially. When the Study Team commenced, all major airports examined within the South Florida Metroplex project had greater than 94% RNAV capable aircraft.²⁷ Maintaining the current conventional procedures and the RNAV procedures that coexist with them decreases flight route predictability by reducing the efficiency of the airspace and increasing complexity due to increased controller and pilot workload.

Lack of Runway Transitions

As discussed in **Section 1.4.1**, the major Study Airports operate under many different runway operating configurations depending on factors such as weather, wind direction, and air traffic conditions. As a result, it is possible for the runway ends used for arrivals and departures to change several times throughout a day. Because of the high level of aircraft traffic, especially during peak periods, not providing procedures for each runway end contributes to a less efficient air traffic system.

All of the major Study Airports in the Metroplex experience high levels of aircraft traffic. As shown in **Table 2-1** preceding, many of the procedures serving the major Study Airports lack runway transitions to some or all of the runways. The lack of runway transitions requires controllers to use vectors to direct aircraft to their final approach. The extensive vectoring required results in more frequent controller-to-pilot and controller-to-controller communication, increasing controller and pilot workload and reducing predictability.

²⁷ Original document named: *Optimization of Airspace and Procedures in the Metroplex (OAPM) Study Team Final Report South-Central Florida Metroplex*, referred to herein as Appendix F. *South-Central Florida Metroplex Study Team Final Report*, September 2012.

Lack of Predictable Satellite Airport Procedures

The existing procedures for the satellite Study Airports do not allow for predictable segregation of routes between air traffic arriving to or departing from these satellite Study Airports and neighboring major Study Airports. 07FA, BCT, ISM, LAL, LEE, and ORL have no SIDs serving them. Currently, MLB currently has no RNAV procedures serving the airport. Lastly, 07FA, BCT, FXE, ISM, LAL, LEE, MCO, MLB, OPF, ORL, PGD, PIE, SFB, and TMB do not have any RNAV SIDs serving them. The lack of RNAV procedures for the satellite Study Airports increases workload for both controllers and pilots and reduces predictability.

2.1.2.2 Complex Converging and Dependent Route Procedure Interactions

In some areas, the separation between arrival and departure flight routes (e.g., lateral separation between two routes or vertical separation between crossing routes) does not allow for efficient use of the airspace. This requires that controllers carefully observe aircraft activity along the nearby or crossing flight routes and be prepared to provide air traffic services to ensure standard separation is maintained.²⁸ For example, where arrival and departure flight routes intersect, flight level-offs may be required for either arrivals or departures to ensure adequate vertical separation between aircraft. In some cases, arriving and departing aircraft on nearby flight routes may need to be vectored to ensure safe lateral separation. In other cases, controllers may need to issue point-outs (a physical or automated action taken by a controller to transfer the radar identification of an aircraft to another controller if the aircraft will or may enter the airspace or protected airspace of another controller and radio communications will not be transferred).

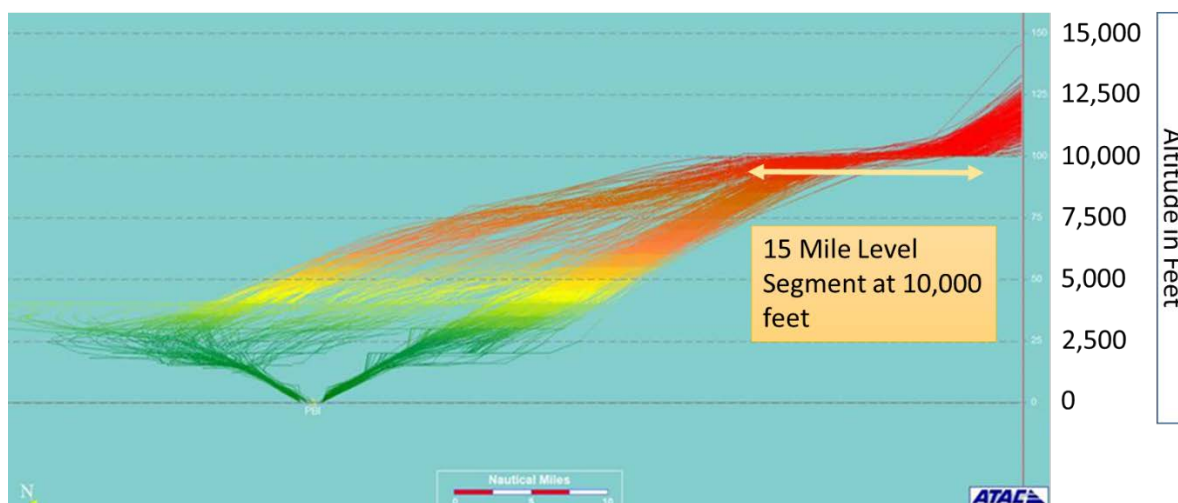
Because the procedures currently in use in the South-Central Florida Metroplex do not take full advantage of RNAV capabilities, multiple procedures share the same NAVAIDs. This may result in conflicts such as aircraft flying at different speeds along adjacent routes, requiring greater separation to prevent operations at similar altitudes or occupation of the same airspace. To avoid potential conflicts, controllers may need to reroute aircraft by issuing vectors or directing aircraft to level off. This increases pilot and controller workload and system complexity.

PBI Arrivals

Aircraft arriving to PBI (and other airports) are frequently required to level off during descent to maintain vertical separation from other arriving and departing aircraft. Aircraft operating on the FRWAY, SLIDZ, and WLACE at PBI typically experience periods of level-off of more than 10 NM. Similarly, aircraft operating on SIDs departing other airports the South-Central Florida Metroplex may also experience periods of level-off. **Exhibit 2-1** shows the vertical profiles for aircraft arriving PBI on the WLACE STAR. As shown by the red lines, aircraft using the WLACE STAR are directed to level off for approximately 15-20 NM at 10,000 feet above mean sea level (MSL). Extended level-offs often result in increased controller-to-pilot communication and may require traffic alerts to pilots of the proximity of other aircraft or point-outs to other controllers responsible for neighboring airspace sectors. This adds to the complexity of managing and operating in the airspace due to higher controller workload, increased controller-to-pilot communication, and inefficient use of aircraft performance capabilities during descent or climb.

²⁸ Areas where the lateral or vertical separation distances are inadequate to allow efficient use of the airspace are referred to as "confliction points" by air traffic controllers.

Exhibit 2-1 WLACE STAR to PBI – Flight Track Vertical Profile



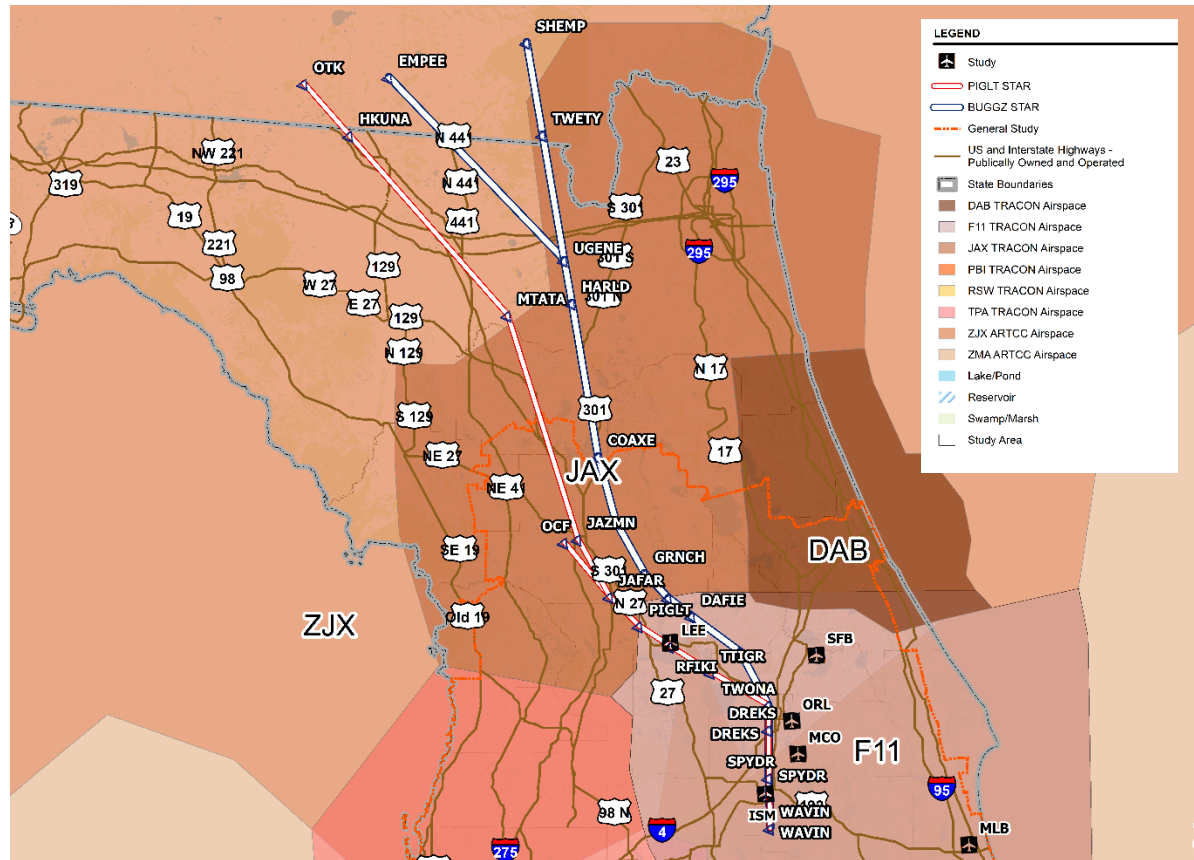
Source: Performance Data and Reporting System (PDARS) radar data, June 1, 2017 to May 30, 2018, ATAC Corporation.

Prepared by: ATAC Corporation, March 2020.

MCO Arrivals

On a south flow, there is limited time to sequence the BUGGZ and PIGLT arrivals. The arrivals are also too high on the routes and conflict with departures. Aircraft usually join the STARs in the middle of the procedure, requiring additional vectoring and increasing the complexity of the operations. **Exhibits 2-2** and **2-3** depict the procedures which converge at the TWONA waypoint.

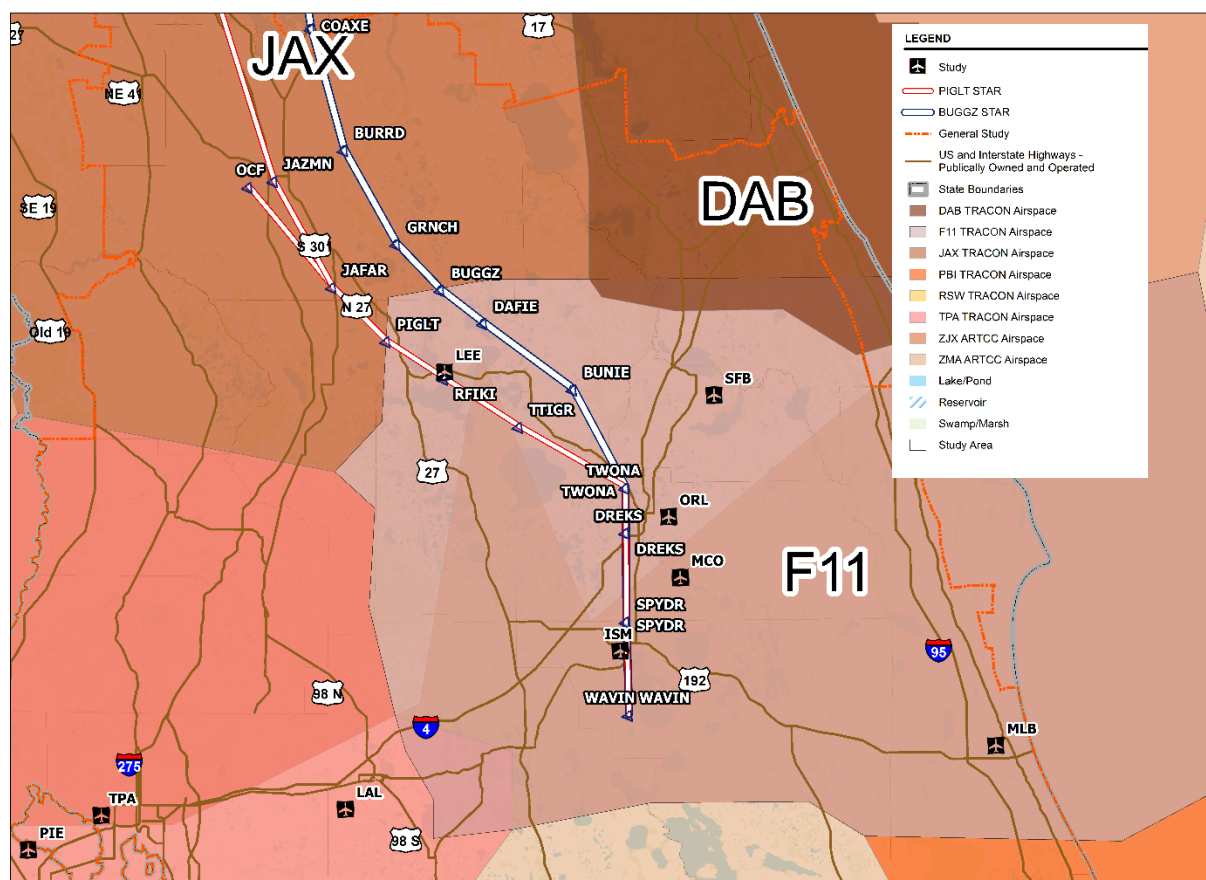
Exhibit 2-2 MCO BUGGZ and PIGLT STARs (Full Procedure View)



Source: U.S. Census Bureau, 2018 (2018 TIGER/Line Shape files (machine-readable data files), (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). Federal Aviation Administration, 2020 Aeronautical Information Services (Airspace Boundaries), ESRI World Water Bodies 2018 (Ocean and Sea). ESRI 2018 (Shaded Relief). ATAC Corporation, 2019, (2019 General Study Area boundary)

Prepared by: ATAC Corporation, March 2020.

Exhibit 2-3 MCO BUGGZ and PIGLT STARs (MCO Focused View)



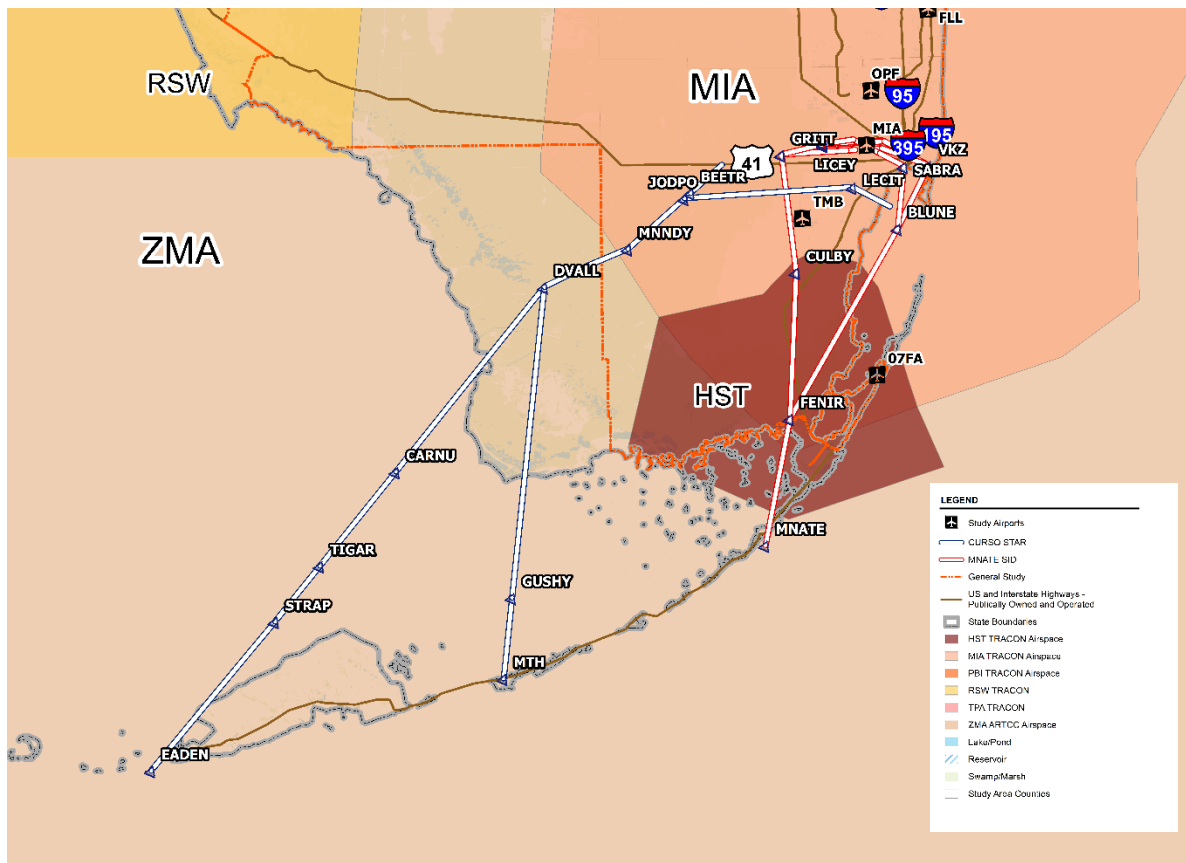
Source: U.S. Census Bureau, 2018 (2018 TIGER/Line Shape files (machine-readable data files), (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). Federal Aviation Administration, 2020 Aeronautical Information Services (Airspace Boundaries), ESRI World Water Bodies 2018 (Ocean and Sea). ESRI 2018 (Shaded Relief). ATAC Corporation, 2019, (2019 General Study Area boundary)

Prepared by: ATAC Corporation, March 2020.

MIA Arrivals/Departures

The MNATE SID accounts for approximately 15% of all MIA jet departures. The MNATE departures and CURSO arrivals interact within the airspace surrounding MIA and are not procedurally de-conflicted. These interactions require controllers to level off the procedures creating less than optimal climb and descent profiles. **Exhibits 2-4 and 2-5** depict the procedures and the interactions south of MIA.

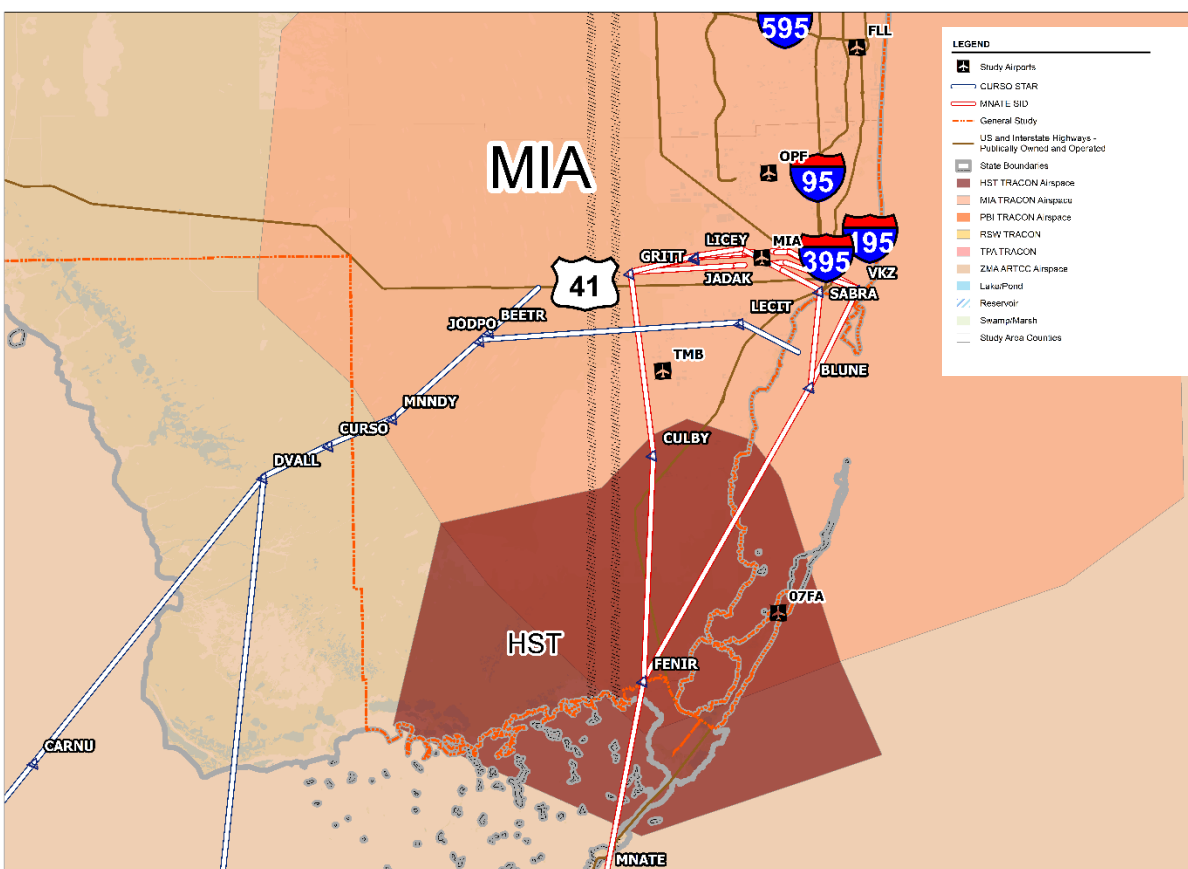
Exhibit 2-4 MIA CURSO STAR and MNATE SID (Full Procedure View)



Source: U.S. Census Bureau, 2018 (2018 TIGER/Line Shape files (machine-readable data files), (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). Federal Aviation Administration, 2020 Aeronautical Information Services (Airspace Boundaries), ESRI World Water Bodies 2018 (Ocean and Sea). ESRI 2018 (Shaded Relief). ATAC Corporation, 2019, (2019 General Study Area boundary).

Prepared by: ATAC Corporation, March 2020.

Exhibit 2-5 MIA CURSO STAR and MNATE SID (MIA Focused View)



Source: U.S. Census Bureau, 2018 (2018 TIGER/Line Shape files (machine-readable data files), (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). Federal Aviation Administration, 2020 Aeronautical Information Services (Airspace Boundaries), ESRI World Water Bodies 2018 (Ocean and Sea). ESRI 2018 (Shaded Relief). ATAC Corporation, 2019, (2019 General Study Area boundary).

Prepared by: ATAC Corporation, March 2020.

2.1.2.3 Lack of Flexibility in the Efficient Transfer of Traffic between the En Route and Terminal Area Airspace

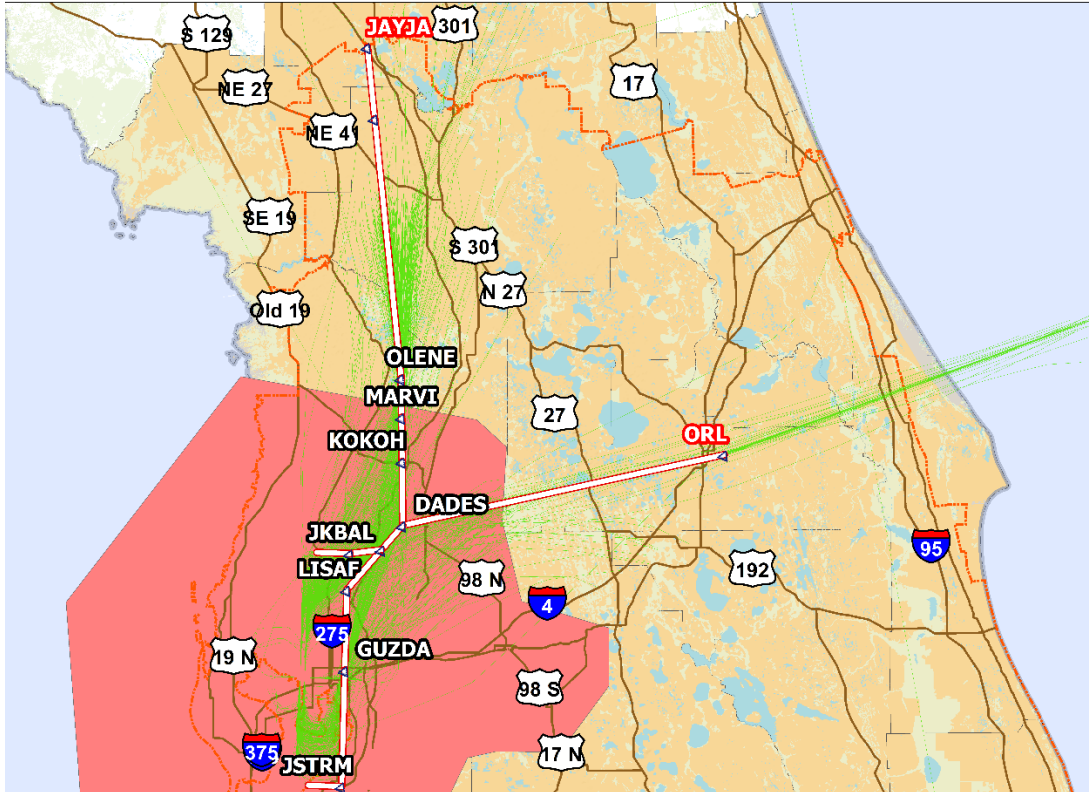
Flexibility allows controllers to plan for and adapt to traffic demands, which change frequently throughout the day. Although commercial flights are scheduled, delays in other regions of the U.S. or severe weather along a route may cause aircraft to enter or exit the en route and terminal area airspace at times not previously scheduled. Controllers require options to manage shifting traffic demand.

Factors such as too few entry or exit points, requiring multiple aircraft flows to be sequenced over the same point, can increase the amount of vectoring needed to merge traffic and maintain safe separation. In addition, too few departure procedures can increase airspace complexity and workload for both controllers and pilots. The following sections further discuss flexibility issues specific to South-Central Florida Metroplex airspace.

TPA DADES Southbound Arrivals

Exhibit 2-6 depicts the DADES arrival into TPA. Currently, there are only two en route transitions for aircraft arriving on the procedure. Previous studies determined aircraft rarely follow the procedure path, and when they do, they are forced to level off for extended periods of time. The flight path of the procedure increases complexity of operations because it is near other flight procedure paths into and out of TPA and surrounding airports in the area.

Exhibit 2-6 TPA – DADES STAR



Source: South-Central Florida Metroplex D&I Team TARGETS File, 2019; U.S. Census Bureau, 2016 (2016 TIGER/Line Shape files (machine-readable data files), American Community Survey - 2010-2014 5-Year Estimates); ESRI, Inc., 2016 (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). ESRI World Water Bodies 2018 (Ocean and Sea). ATAC Corporation, 2019, (2019 General Study Area boundary).

Prepared by: ATAC Corporation, March 2020.

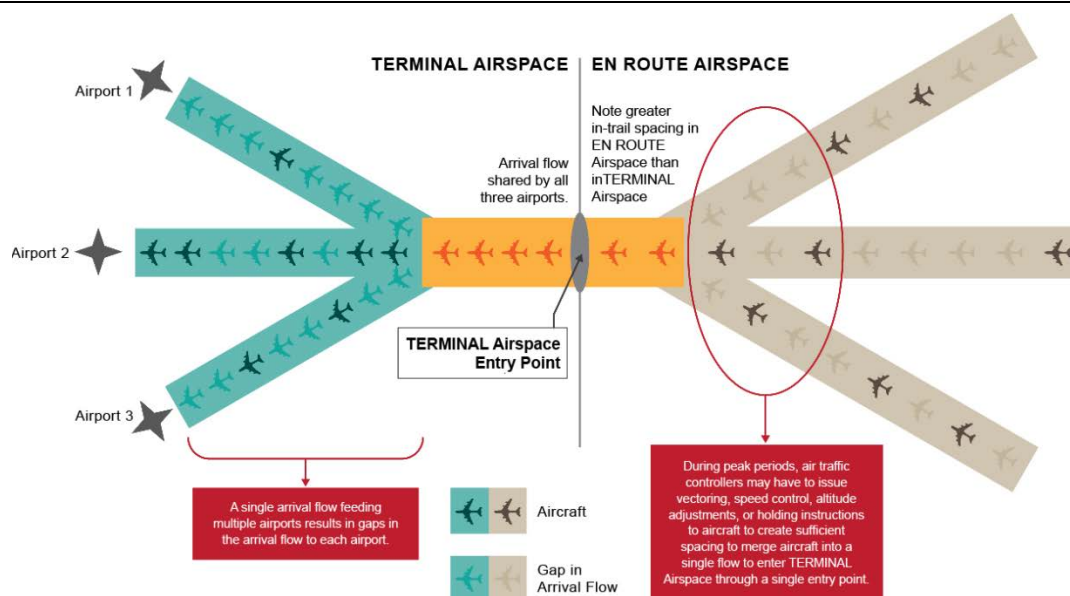
Exhibit 2-7 illustrates how aircraft arrivals are sequenced in the en route airspace and then merged to enter terminal airspace through a single-entry gate. Aircraft arriving from en route airspace must be merged into a single arrival flow before entering terminal airspace through an entry gate. This is similar to automobile traffic travelling in multiple freeway lanes merging into one lane before exiting a freeway. The process of multiple lanes of traffic merging into one lane can cause congestion. In terms of air traffic, to maintain safe separation, controllers must create sufficient gaps between aircraft along a route to safely line up aircraft from multiple streams. This may require controllers to employ airspace management techniques such as vectoring aircraft off procedures or directing pilots to reduce speed, which can

increase congestion. The need to employ these management techniques results in increased workload for both the controller and pilot.

Aircraft destined for the Study Airports share arrival procedures that enter the terminal airspace on a single arrival flow through an entry point. Aircraft are then split from a single arrival flow and issued instructions to the final approaches to the various runways at the different Study Airports. Similar to what is depicted in **Exhibit 2-3**, gaps in the flow to the individual Study Airports can develop after aircraft are sequenced and directed to the final approaches to the Study Airport runways.

To some extent, the gaps can be closed if controllers direct the rear aircraft to increase speed along the arrival route to the airport. However, at this critical phase of flight, when aircraft are descending and maneuvering to the final approach to a runway, the feasibility of making significant speed adjustments and reducing the gaps in the arrival flow is limited.

Exhibit 2-7 Airspace Entry Point, Single Arrival Flow, with Multi-Airport Traffic Sequencing

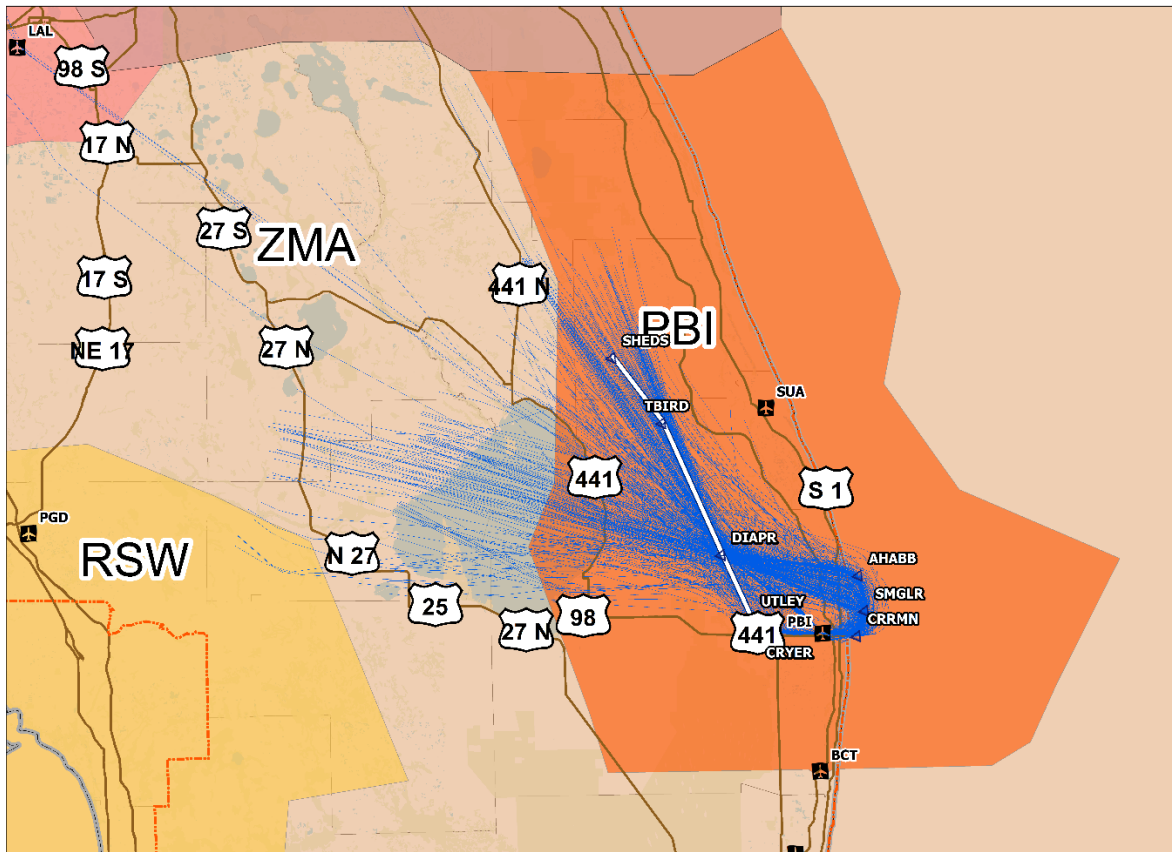


Source: Federal Aviation Administration, July 2012.
Prepared by: ATAC Corporation, March 2020.

PBI TBIRD North/Northwest Departures

Exhibit 2-8 depicts departures to the north or northwest, most of which are assigned to the TBIRD SID. This results in multiple aircraft that eventually will need to fly in different directions all using the same initial flight path. This causes unnecessary congestion and complexity, with a corresponding increase in workload for pilots and air traffic controllers. Sequencing departing aircraft over the DIAPR waypoint and managing adequate separation prior to vectoring them in different directions results in increased complexity and reduced flexibility. This in turn increases controller and pilot workloads and reduces the overall flexibility of the system.

Exhibit 2-8 PBI TBIRD SID to the North/Northwest



Notes:

Source: South-Central Florida Metroplex D&I Team TARGETS File, 2019; U.S. Census Bureau, 2018 (2018 TIGER/Line Shape files (machine-readable data files), U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). Federal Aviation Administration, 2020 Aeronautical Information Services (Airspace Boundaries), ESRI World Water Bodies 2018 (Ocean and Sea). ESRI 2018 (Shaded Relief). ATAC Corporation, 2019, (2019 General Study Area boundary).

Prepared by: ATAC Corporation, March 2020.

In addition, departing aircraft may conflict with arriving aircraft when sequenced over the same point. There are several consequences that result from arrivals and departures to and from the Study Airports using common arrival and departure procedures and terminal airspace entry and exit points. These consequences include:

- The need to merge arriving aircraft into a single arrival flow at each entry point can increase flight time and distances.
- Gaps in the final arrival flows do not allow for the formation of a constant stream of aircraft to the Study Airports.
- Merging departing aircraft into single departure streams for each exit point requires controllers to create greater separation between subsequent departures from the same airport than would otherwise be required if the routes were separated.

- Holding aircraft on the runway to protect enough airspace to allow for adequate separation leads to departure delays, especially during peak travel periods.
- The need for additional controller-to-pilot communication to issue the variety of instructions required to merge and desegregate the flow of aircraft adds to the workload of both controllers and pilots.
- Options for controllers to redirect aircraft to avoid bad weather or more efficiently handle sequencing are limited when the pilot does not have the runway in sight due to low visibility.

Departure Procedures Unavailable for All Operating Configurations

Certain departure procedures within the Metroplex are only available for use during one-runway operating configuration. Other departure procedures may be available during multiple-runway operating configurations; however, inefficient altitude restraints and exit point locations increase the complexity of these procedures and increase both controller and pilot workload. Over all, a lack of procedures decreases the flexibility for controllers and pilots.

2.2 Purpose of the Proposed Action

The purpose of the Proposed Action is to address the issues discussed in the previous sections in order to improve the efficiency of the procedures and airspace utilization in the South-Central Florida Metroplex. To meet this goal, the Proposed Action would optimize procedures serving the Study Airports, while maintaining or enhancing safety, in accordance with the FAA's mandate under federal law. This goal would be achieved by reducing dependence on ground-based NAVAID technology in favor of more efficient satellite-based navigation, such as RNAV. Specifically, the objectives of the Proposed Action are as follows:

- Improve the predictability in transitioning air traffic between en route and terminal area airspace and between terminal area airspace area and the runways
- Improve the segregation of arrivals and departures in terminal area and en route airspace
- Improve the flexibility in transitioning aircraft traffic between en route and terminal area airspace and between terminal area airspace area and the runways

The FAA expects that the frequency of controller/pilot communication would decrease, reducing both controller and pilot workload by decreasing the complexity of the procedures. Improvements from RNAV procedures would reduce the need for vectoring and level flight segments, resulting in more predictable traffic flows.

Each objective of the Proposed Action is discussed in greater detail below.

2.2.1 Improve the Predictability of Transitioning Air Traffic

As discussed in **Section 2.1.2.1**, the lack of up-to-date RNAV procedures requires controllers to use air traffic management techniques such as vectoring to ensure safe vertical and lateral separation between aircraft during the arrival and departure phases of flight. As a result, controllers and pilots experience a more complex workload. In addition, there are an insufficient number of runway transitions to and from the runways at each of the Study Airports. Finally, there is a lack of RNAV procedures to and from the satellite airports,

preventing pilots from filing (submitting a flight plan to ATC) their preferential arrival or departure with predictable flight expectations. These factors affect predictability within the South-Central Florida Metroplex.

This objective can be measured with the following criteria:

- Ensure that the majority of STARs and SIDs to and from the Study Airports are based on RNAV technology utilizing the most current RNAV criteria (measured by count of RNAV STARs and SIDs for an individual Study Airport)
- Increase the number of runway transitions (measured by count of runway transitions for all STAR procedures)

2.2.2 Segregate Arrivals and Departures

As discussed in **Section 2.1.2.2**, aircraft are frequently required to level off to ensure adequate separation between different traffic flows. RNAV procedures can be designed with capabilities such as speed control and altitude restrictions that segregate aircraft on the route while reducing controller and pilot workload by reducing the complexity of the procedures. One objective of the Proposed Action is to implement procedures that would better segregate arrivals and departures within the airspace. This objective can be measured by number of RNAV STARs and/or SIDs that can be used independently to/from Study Airports.

2.2.3 Improve Flexibility in Transitioning Aircraft Traffic

As discussed in **Section 2.1.2.3**, the limited number of available transitions and associated procedures constrain efficiency in the terminal and en route transitional airspace. This requires merging multiple traffic flows before aircraft arrive at and depart from terminal airspace. One objective of the Proposed Action is to minimize the need for merging traffic flows by increasing the number of transitions and procedures that are dedicated to specific Study Airports. This objective can be measured with the following criteria:

- Where possible, increase the number of available transitions compared with the No Action alternative (measured by number of exit/entry points)
- Where possible, increase the number of RNAV STARs and SIDs compared with the No Action alternative (measured by total count of RNAV STARs and RNAV SIDs for each of the Study Airports)

2.3 Criteria Application

The FAA will evaluate the Proposed Action to determine how well it meets the purpose and need based on the measurable criteria and objectives described above. The evaluation of alternatives will include the No Action alternative, under which the existing (June 1, 2017 to May 30, 2018) air traffic procedures serving the Study Airports would remain unchanged except for planned procedure modifications, independent of the South-Central Florida Metroplex Project, which were or are expected to be approved for implementation. The criteria are intended to help compare the Proposed Action with the No Action alternative.

2.4 Description of the Proposed Action

The Proposed Action would implement RNAV SID, STAR, T-routes, final approach procedures, and transitions in the South-Central Florida Metroplex. This would improve the predictability and segregation of air traffic routes, as well as increase flexibility and efficiency in providing air traffic services. The Proposed Action is described in detail in **Chapter 3, Alternatives**.

Implementation of the Proposed Action would not increase the number of aircraft operations at the Study Airports. Furthermore, the Proposed Action does not involve physical construction of any facilities such as additional runways or taxiways, and does not require permitting or other approvals or actions at either the state or local level. Therefore, the implementation of the proposed changes to procedures in the South-Central Florida Metroplex would not require any physical alterations.

2.5 Required Federal Actions to Implement Proposed Action

Implementing the Proposed Action requires the FAA to publish new or revised STARs, SIDs, T-Routes, final approach procedures, and transitions and undertake controller training.

2.6 Agency Coordination

On July 25, 2019, the FAA distributed a “Notice of Intent to Prepare an Environmental Assessment” (NOI) letter to 590 federal, state, regional, and local officials as well as to agencies and tribes. A clarification letter was sent on August 16, 2019 to ensure recipients understood the timing of project scope revisions. The FAA sent the early notification letter to:

1. Advise agencies and tribes of the initiation of the EA study
2. Request background information about the General Study Area established for the EA (See **Section 4.1**)
3. Provide an opportunity to advise the FAA of any issues, concerns, policies, or regulations that may affect the environmental analysis that the FAA will undertake in the EA.

On July 28, 2019, a legal notice in English and Spanish was published in the South Florida Sun Sentinel, the Tampa Bay Times, the Orlando Sentinel, the Fort Meyers News-Press, the Miami Herald, and El Nuevo Herald newspapers. A total of 15 emails were received in response to the NOI, including three from agencies (National Park Service, Florida Department of Transportation Bureau of Historic Preservation, and the Environmental Protection Agency), and one from the Seminole Tribe of Oklahoma requesting Consultation with the FAA that was later rescinded on further clarification of the project.

On April 8, 2019, the FAA initiated Section 106 consultation with the Tribal Historic Preservation Officers (THPOs) from the Miccosukee Tribe of Florida, Mississippi Band of Choctaw Indians, Seminole Nation of Oklahoma, Seminole Tribe of Florida, Poarch Band of Creek Indians, and the Muscogee (Creek) Nation that may have interests within the General Study Area in accordance with Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. § 470 et seq.) and the implementing regulations at 36 C.F.R. Part 800.

Consultation with the Florida State Historic Preservation Officer (SHPO) seeking concurrence with FAA's proposed analysis methodology was initiated on May 6, 2020 and concluded on September 18, 2020.

Appendix A includes a copy of the notice of intent letter (and attachments), affidavits of newspaper publication, a list of the receiving agencies, Tribal consultation details, and community engagement efforts, as well as federal agency outreach and FAA exchanges/responses.

3 Alternatives

The alternatives analysis is prepared pursuant to Council on Environmental Quality (CEQ) regulations and Federal Aviation Administration (FAA) guidance provided in FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures* (FAA Order 1050.1F). This chapter discusses the following topics:

- Alternative Development Process
- Alternatives Overview
- Comparison of Alternatives
- Listing of Federal Laws and Regulations

The technical terms and concepts discussed in this Chapter are explained in **Chapter 1, Background**.

3.1 South-Central Florida Metroplex Project Alternative Development

Developing alternatives for the South-Central Florida Metroplex Project was a multi-step process that began with the formation of the South-Central Florida Metroplex Study Team (Study Team). The Study Team defined operational issues related to improving efficiency, reducing complexity, and improving predictability in the South-Central Florida Metroplex and recommended conceptual designs for procedures that would address these issues.²⁹ The recommended procedures were reported to the South-Central Florida Metroplex Design and Implementation (D&I) Team for further consideration and procedure development. The D&I Team designed individual procedures based on the Study Team's recommendations. Each procedure that the D&I Team designed had to meet several design criteria as well as the project's purpose and need. As discussed in **Chapter 2**, the purpose and need for the Proposed Action is to address existing inefficiencies with South-Central Florida Metroplex aircraft arrival and departure procedures. The FAA rejected individual procedures if, on their own merit, they did not meet the purpose and need of the project. During the design process, the D&I Team held an extensive series of public outreach meetings to introduce the South-Central Florida Metroplex Project to relevant organizations, communities, and officials to gather feedback on the proposed designs (see **Appendix A**). The feedback received from this community engagement was instructive and considered in the alternative development process.

The Proposed Action alternative that this Environmental Assessment (EA) evaluates is a package of many individual, interrelated procedures combined into one alternative. These procedures were considered and evaluated in combination with one another to determine whether the alternative would meet the project's purpose and need. The FAA considered multiple versions of each air traffic procedure. Several versions were not carried forward as they failed to meet the purpose of the project. More detail on the various iterations of each procedure can be found in **Appendix F** and **Appendix G**.

²⁹ Appendix F, *South-Central Florida Metroplex Study Team Final Report*, September 2012.

The following sections describe the alternative development process the FAA used to create and evaluate a series of procedures that, when employed together, would enhance the air traffic efficiency to the South-Central Florida Metroplex.

3.1.1 South-Central Florida Metroplex Study Team

In May 2012, the South-Central Florida Metroplex Study Team began work to identify operational problems in the South-Central Florida Metroplex and define potential solutions to those problems. The Study Team included experts on the Air Traffic Control (ATC) system for the South-Central Florida Metroplex. The Study Team's work was completed following a multi-step process that included:

1. working collaboratively with local aviation facilities and industry stakeholders to identify and characterize existing issues in the South-Central Florida Metroplex
2. proposing conceptual procedure designs and airspace changes to address these issues
3. identifying the expected benefits and potential risks associated with the conceptual designs

During the first two steps above, the Study Team held outreach meetings with local FAA ATC facilities, industry representatives, and other stakeholders including the Department of Defense, business and general aviation interests, and airports.³⁰ These outreach meetings were held to learn more about the challenges of operating aircraft in the South-Central Florida Metroplex, including identifying operational challenges associated with existing procedures and potential solutions that would increase efficiency in the airspace. The Study Team also worked to analyze the expected benefits of the potential solutions identified with support of the Metroplex National Analysis Team (NAT). The NAT is a resource that provides support in data collection, visualization, simulation, modeling, and analysis. Finally, the Study Team engaged with specialized experts to help identify the benefits and risks associated with the conceptual procedure designs. The specialized experts were from various FAA lines of business, including environmental, safety, and airports.

The Study Team identified several performance-based navigation (PBN) solutions expected to improve efficiency in the South-Central Florida Metroplex. The proposed modifications were conceptual in nature and did not include a detailed technical assessment to evaluate the feasibility of the procedures. A detailed technical assessment of the proposed solutions was reserved for the D&I Team to conduct.³¹ The Study Team issued its Final Report (**Appendix F**) in September 2012.

3.1.2 South-Central Florida Metroplex Design and Implementation Team

Beginning in October 2014, the D&I Team began work on the procedure designs. The D&I Team consisted of participants from FAA ATC facilities, the National Air Traffic Controllers Association (NATCA), ATC subject matter experts (SMEs), aviation industry representatives, representatives from the FAA's Central Service Center and other FAA lines of business, and various support contractors. The first step in the D&I process was to prioritize the Study Team

³⁰ *Id.*

³¹ *Id.*

proposals based on complexity, interdependencies with other procedures, and the degree of potential benefit to the Metroplex. The D&I Team then divided into workgroups to further develop and refine the Study Team proposals into preliminary designs. Finally, the preliminary designs were brought to the whole D&I Team for review and, if necessary, modification. Following completion of the designs, the D&I Team engaged the public (i.e., local residents, the general public, and stakeholders) by holding a series of informational meetings on the South-Central Florida Metroplex Project. Feedback received during the community engagement process was considered and incorporated in the proposed designs as appropriate. In developing the proposed procedures, the D&I Team was responsible for following regulatory and technical guidance, as well as meeting criteria and standards in three general categories:

1. **Performance Based Navigation (PBN) Design Criteria and Air Traffic Control Regulatory Requirements** – Flight procedure design is subject to requirements found in several FAA Orders:
 - a. FAA Order 8260.58B, *The United States Standard Performance Based Navigation (PBN) Instrument Procedure Design*, August 24, 2020.
 - b. FAA Joint Order 7110.65Y, *Air Traffic Control*, (with Change 1 and Change 2) August 15, 2019.
 - c. FAA Order 8260.3D, *United States Standards for Terminal Instrument Procedures (TERPS)*, February 16, 2018.
 - d. FAA Order 7100.41A, *Performance Based Navigation Implementation Process*, April 29, 2016.
 - e. FAA Order 8260.19I, *Flight Procedures and Airspace*, June 29, 2020.
 - f. FAA Order 8260.46G, *Departure Procedure (DP) Program*, November 9, 2018.These FAA Orders collectively define the majority of processes, procedures, and methods for PBN flight procedure design, amendment, and implementation. Requirements governing air traffic control procedures, air traffic management, and appropriate technical terminology are additionally considered as integral process components.
2. **Operational Criteria** – Operational criteria were consistent with the purpose and need for the project. This includes increasing efficiency and flexibility while decreasing complexity in air traffic management. These criteria were evaluated using full-motion simulators, stationary simulators, and/or flight training devices. These criteria were also evaluated for many procedures using real-time Human-in-the-Loop Simulations (HITLs)³² and I-Sim³³. These simulations further validated that operations in the South-Central Florida Metroplex would not be limited by the proposed procedures. The simulations helped ensure that aircraft could fly the proposed procedure as designed without any negative effects on efficiency (e.g., pilot workload).

32 A Human-in-the-Loop (HITL) simulation is conducted to evaluate the feasibility of Proposed Final Designs (PFDs). Prior to HITL simulation activities, industry partners used flight simulators to evaluate the PFDs. The HITL simulation creates an interactive environment similar to the operational areas of terminal and en route facilities for controllers to evaluate interactions among procedures and assess their workability.

33 I-Sim is an ATAC/Kongsberg simulation program that provides fast-time “desktop” evaluation of procedures and was also used by the Design Team to assess South-Central Florida Metroplex proposed procedures.

3. **Safety Factors** – Proposed changes were evaluated using the FAA’s Air Traffic Organization (ATO) Safety Management System (SMS).³⁴ The SMS is the system for assessing and managing the safety of ATC and navigation services in the National Airspace System (NAS). If a proposed change introduced a new hazard or increased the severity and/or likelihood of an existing hazard, the design was adjusted or the hazard was mitigated to acceptable levels. In compliance with SMS requirements, the proposed changes were evaluated by a Safety Risk Management Panel (SRMP) following a five-step process: (1) system analysis, (2) identify hazards, (3) analyze safety risk, (4) assess safety risk, and (5) control safety risk.³⁵

3.1.2.1 Community Engagement in Design Process

As part of the Metroplex design process, the D&I Team undertook community engagement. This included a number of meetings, briefings, and/or public workshops in the General Study Area. Depending on the type of community outreach meeting, the D&I Team invited stakeholders, such as the Study Airport sponsors; local, state, and federal elected officials; user groups including pilots and air carriers; and/or the public to attend. The goal was to educate and involve the participants, including the communities, about this Metroplex project. During the different events, the D&I Team discussed the FAA’s NextGen program on a national level. Specific information was provided about this Metroplex project, including graphics containing current and notional future flight paths.³⁶ The D&I Team invited comments from attendees about the preliminary designs. The D&I Team then considered the comments in the development of the procedures. Topical responses were developed for comments raised during the community engagement process.

3.1.2.2 Alternative Design Process

The South-Central Florida Metroplex consists of airspace delegated to those ATC facilities identified in **Section 1.2.4**. While the D&I Team focused on aircraft operations at the identified five major Study Airports, they also evaluated operations at 16 satellite Study Airports (see **Section 1.4**). The D&I Team made every effort to minimize changes to existing flight tracks below 10,000 feet and, if possible, to consider whether some satellite airports could be removed from the designs. Additional information can be found in **Appendix G**, Section 2, of this Final EA.

While the design of one procedure into one airport can be a fairly simple process, the South-Central Florida Metroplex D&I Team was charged with providing a more complete and integrated solution to air traffic complexities and inefficiencies over a large area. The D&I Team worked to design procedures that would remain laterally separated from each other to the extent feasible.

Arrival procedure designs that remain laterally separated are most efficient when they allow aircraft to descend at or near idle speed, unaffected by other procedures or obstructions. As aircraft arrive into and depart from congested airspace, interaction between procedures increases substantially. This increase in interactions among aircraft operating on different procedures reduces available design options.

34 U.S. Department of Transportation, Federal Aviation Administration, FAA Order JO 1000.37B, *Air Traffic Organization Safety Management System*, October 31, 2018.

35 U.S. Department of Transportation, Federal Aviation Administration, FAA Order 8040.4B, *Safety Risk Management Policy*, May 2, 2017.

36 More details on the D&I Team Community Engagement process can be found in Appendix A.

Departure procedure designs are most efficient when they allow aircraft to climb unrestricted to cruising altitude. Although a majority of departures in the South-Central Florida Metroplex will often accommodate unrestricted climbs, the procedure designs allow for complex interactions among arrivals and departures to the five major Study Airports and the 16 satellite Study Airports.

PBN procedure designs were developed with lateral routings, crossing points, and altitude restrictions that were as optimal as possible, considering the constraints inherent in the South-Central Florida Metroplex. Over a multi-month period, the D&I Team worked to meet Proposed Final Design milestones at the 25, 50, 75, 90, and 100 percent design levels. To reach each of these milestones, the D&I Team considered a multitude of factors and continuously refined its designs based on industry input, feedback gained during community engagement mentioned in **Section 3.1.2.1**, design solution tools such as design and testing software, aircraft simulator results, HITL controller simulations, and the criteria described above. The combined final procedure designs in this Final EA are the Proposed Action. The following sections provide two examples of the process used to develop procedures carried forward as part of the Proposed Action.

FLL FEELX SID

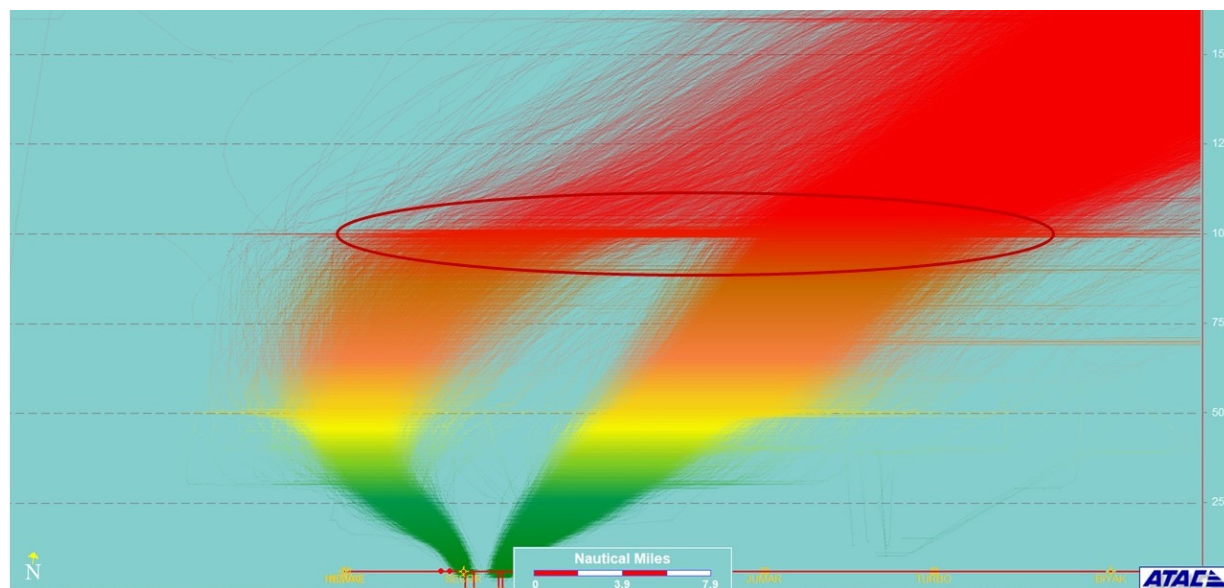
The development of the proposed final design FEELX SID serving FLL provides a good example of the alternative development process. The FAA developed and evaluated several notional versions of the proposed FLL FEELX SID. The first version evaluated the Study Team's recommendation for various improvements to departures from FLL to the northeast. The second version was the D&I Team's preliminary design procedure based on the Study Team recommendations. Finally, after several revisions, the D&I team produced a proposed final design of the procedure.

Departures from FLL to the northeast represent approximately 23 percent of all jet departures from the airport. Currently, FLL provides a published departure procedure to the northeast, called the PREDA SID. The current PREDA SID requires aircraft to incur level-offs for approximately 15 to 20 NM at 10,000 feet MSL to comply with inefficient procedures currently in place. The Study Team identified several issues resulting from these conditions, including the need to combine the PREDA and ZAPPA SIDs. The continuance of two northeast bound procedures was determined not to be required as they increase airspace complexity.

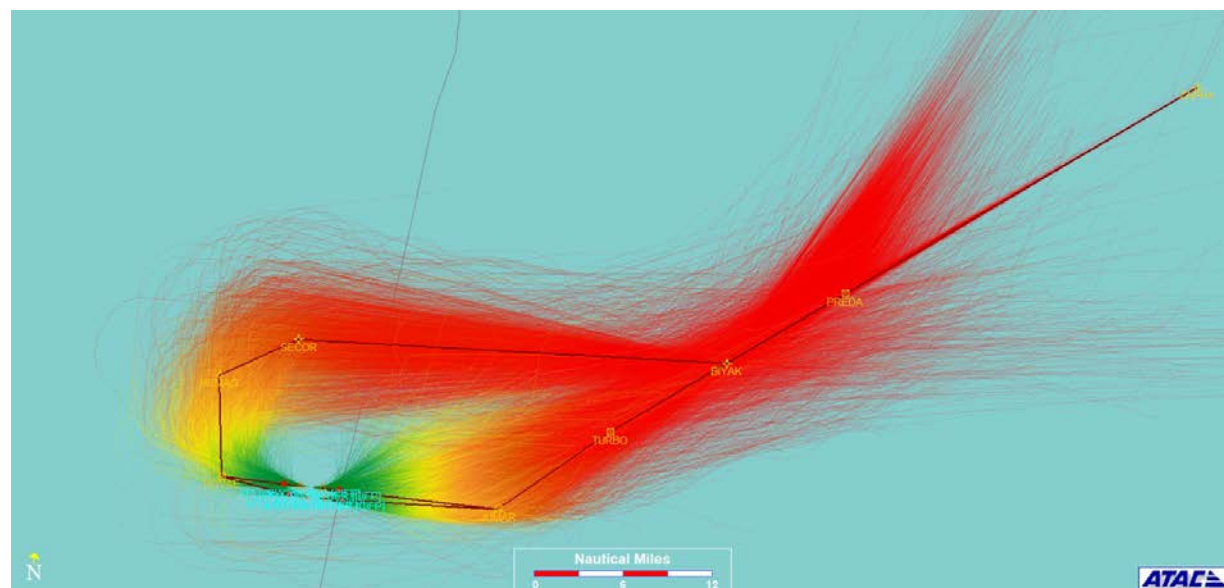
Exhibit 3-1 depicts current flight tracks for aircraft operating on the PREDA and ZAPPA SIDs. In the vertical profile, the area circled in red indicates where departures are required to level off. In the plan view, the flight tracks depict aircraft being vectored from runways and aircraft being vectored off the route, going direct to TURBO, BIYAK, and PREDA waypoints, thereby reducing the repeatability and predictability of the route.

Exhibit 3-1 Current Procedures – FLL PREDA and ZAPPA SIDs

Vertical Profile



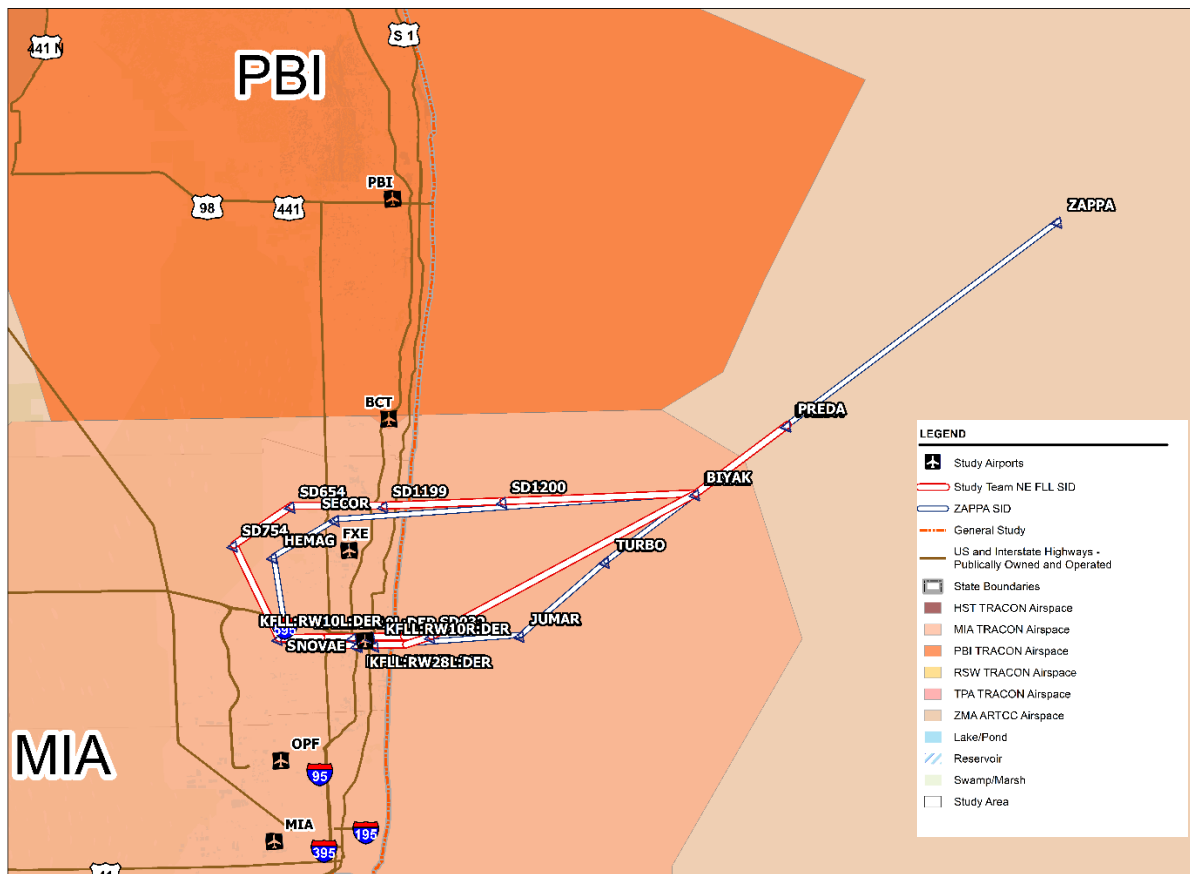
Plan View



Source: South-Central Florida Metroplex Study Team Final Report, September 2012. ATAC Corporation, PDARS radar data, June 1, 2017- May 30, 2018.
Prepared by: ATAC Corporation, March 2020.

The Study Team recommended creation of a notional single RNAV SID (referred to generically as the “Study Team NE FLL SID”) design to address the issues identified with northeast departures at FLL. **Exhibit 3-2** depicts the Study Team’s recommendations compared with the existing procedure for aircraft departing from FLL on the PREDA and ZAPPA SIDs.

Exhibit 3-2 Current FLL PREDA and ZAPPA SIDs with Notional Study Team NE FLL SID

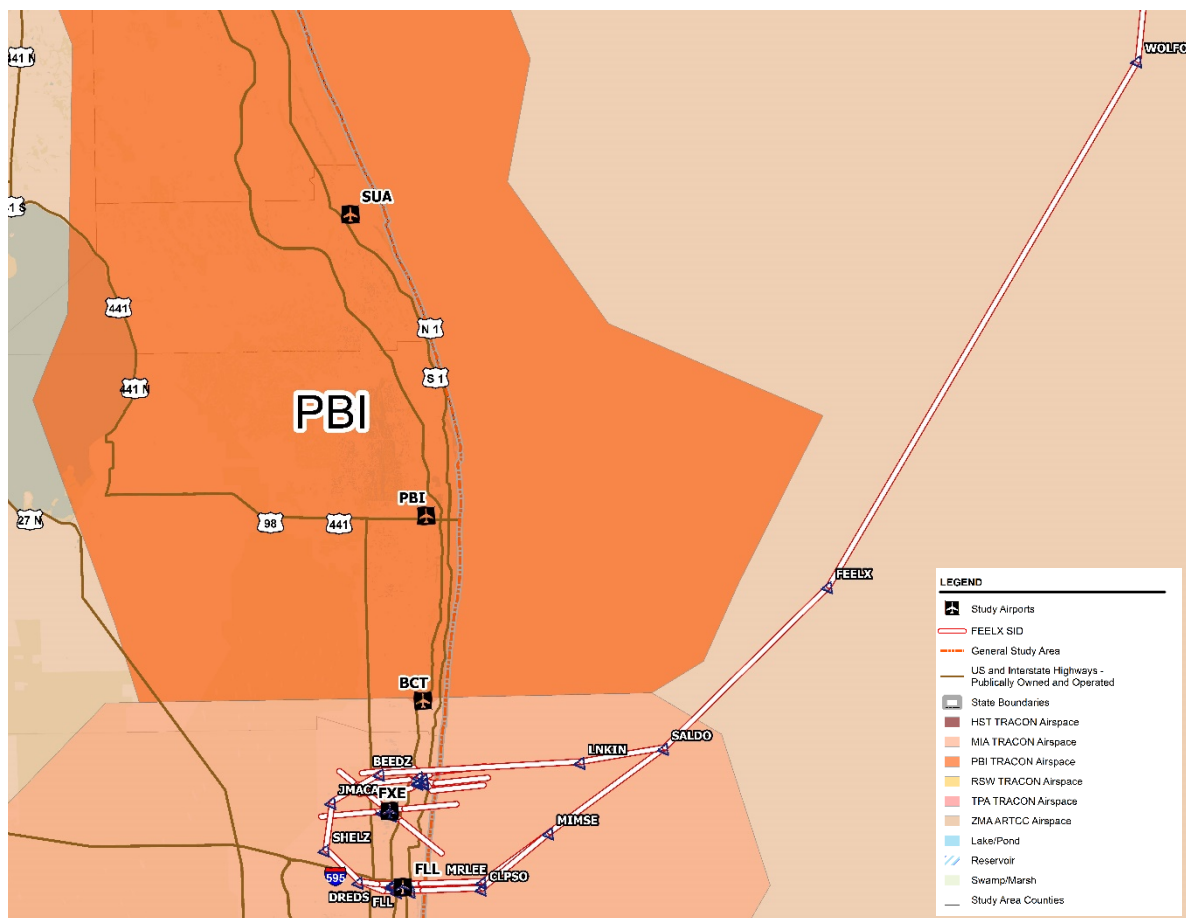


Source: South-Central Florida Metroplex Study Team Final Report, September 2012. Road Network File, U.S. Census Bureau, 2017 (2017 TIGER/Line Shape files (machine-readable data files), County Boundary File, US Census Bureau, (2017 TIGER/Line Shape files (machine-readable data files); Airports file, Federal Aviation Administration, 2018 Coded Instrument Flight Procedures (CIFP). Shaded Relief, 2018. ATAC Corporation, 2019, (2019 General Study Area boundary).

Prepared by: ATAC Corporation, March 2020.

Based on the Study Team recommendations, the D&I Team developed the preliminary design FEELX SID. The D&I Team modified the preliminary design FEELX SID several times to increase the efficiency of the design and to ensure the procedure complied with current regulatory procedure design criteria. In addition, the D&I Team proposed adding FXE to the procedure. **Exhibit 3-3** depicts the proposed final design for the FEELX SID.

Exhibit 3-3 Proposed Final Design – FLL FEELX SID



Source: South-Central Florida Metroplex D&I Team TARGETS File, 2020; Road Network File, U.S. Census Bureau, 2017 (2017 TIGER/Line Shape files (machine-readable data files), County Boundary File, US Census Bureau, (2017 TIGER/Line Shape files (machine-readable data files); Airports file, Federal Aviation Administration, 2018 Coded Instrument Flight Procedures (CIFP). Shaded Relief, 2018. ATAC Corporation, 2019, (2019 General Study Area boundary).

Prepared by: ATAC Corporation, October 2020.

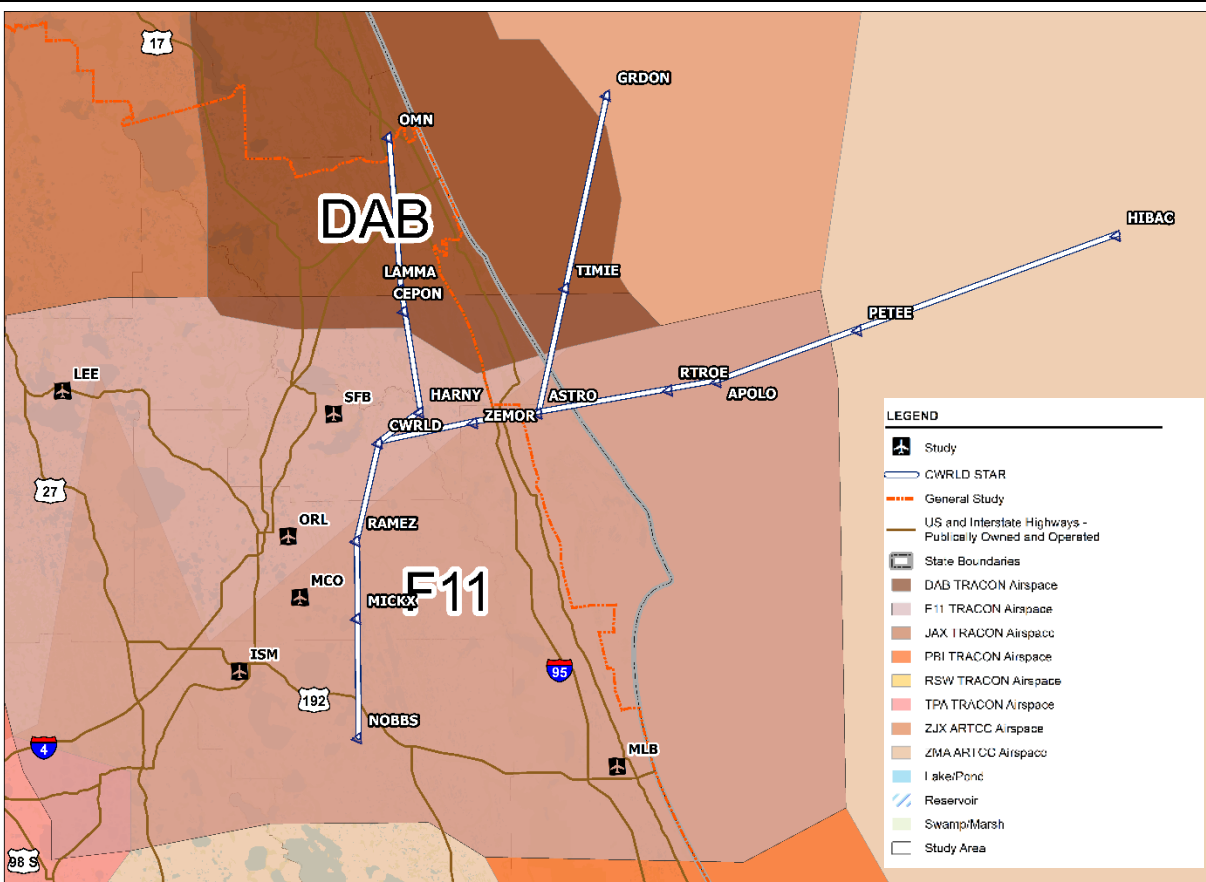
MCO NE STARs – CWRLD STAR/ALINA and SNFLD STARs

The FAA developed and evaluated several versions of arrival procedures that would serve MCO from the northeast to replace the current CWRLD STAR (Standard Terminal Arrival). The first notional versions considered the Study Team’s recommendations that are identified in the following discussion. The D&I Team also noted satellite airport traffic conflicts with MCO arrivals on the CWRLD STAR. Stakeholders requested that the D&I Team develop new procedures with optimized lateral and vertical guidance. Additional analysis by the D&I Team identified concerns regarding proposed aircraft routings, regulatory procedure design criteria, and HITL design considerations. Careful consideration of these elements led to the proposed final designs of the ALINA and SNFLD STARs to replace the CWRLD STAR.

Exhibit 3-4 depicts the current CWRLD STAR with three transitions that serve as collection points for aircraft transitioning from the en route ARTCC guidance to the TRACON guidance: the OMN transition from the north, the GRDON transition from the northeast, and the HIBAC

transition from the east. These three transitions feed air traffic to the CWRLD waypoint, then continuing on the procedure while descending to land at MCO.

Exhibit 3-4 Current Procedures – MCO CWRLD STAR



Source: South-Central Florida Metroplex D&I Team TARGETS File, 2019; Road Network File, U.S. Census Bureau, 2017 (2017 TIGER/Line Shape files (machine-readable data files), County Boundary File, US Census Bureau, (2017 TIGER/Line Shape files (machine-readable data files); Airports file, Federal Aviation Administration, 2018 Coded Instrument Flight Procedures (CIFP). Shaded Relief, 2018. ATAC Corporation, 2019, (2019 General Study Area boundary).

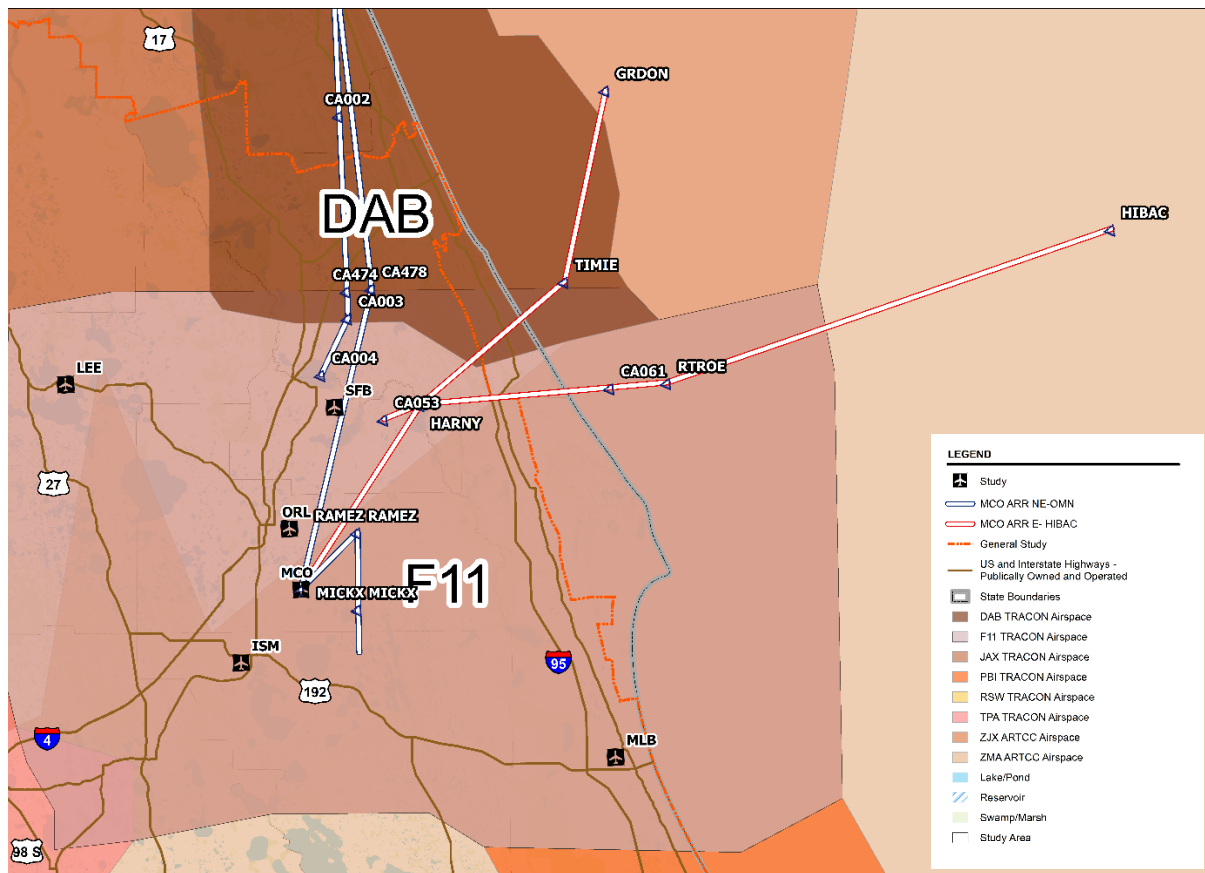
Prepared by: ATAC Corporation, March 2020

The Study Team made recommendations to address the issues identified with the CWRLD STAR. These recommendations were to:

- Relocate the OMN transition 8 miles west of its current location to segregate from the MIA/FLL/PBI flows.
- Create a separate STAR for the HIBAC (east) and GRDON (northeast) transitions to address the lack of a common route on the CWRLD STAR on both the north and south flow.

The Study Team notional design recommendations (MCO arrivals from the east via the HIBAC transition, and MCO arrivals from the northeast via the OMN transition) to address the issues identified with the CWRLD STAR are depicted in **Exhibit 3-5**.

Exhibit 3-5 Study Team Notional Design – MCO STARs



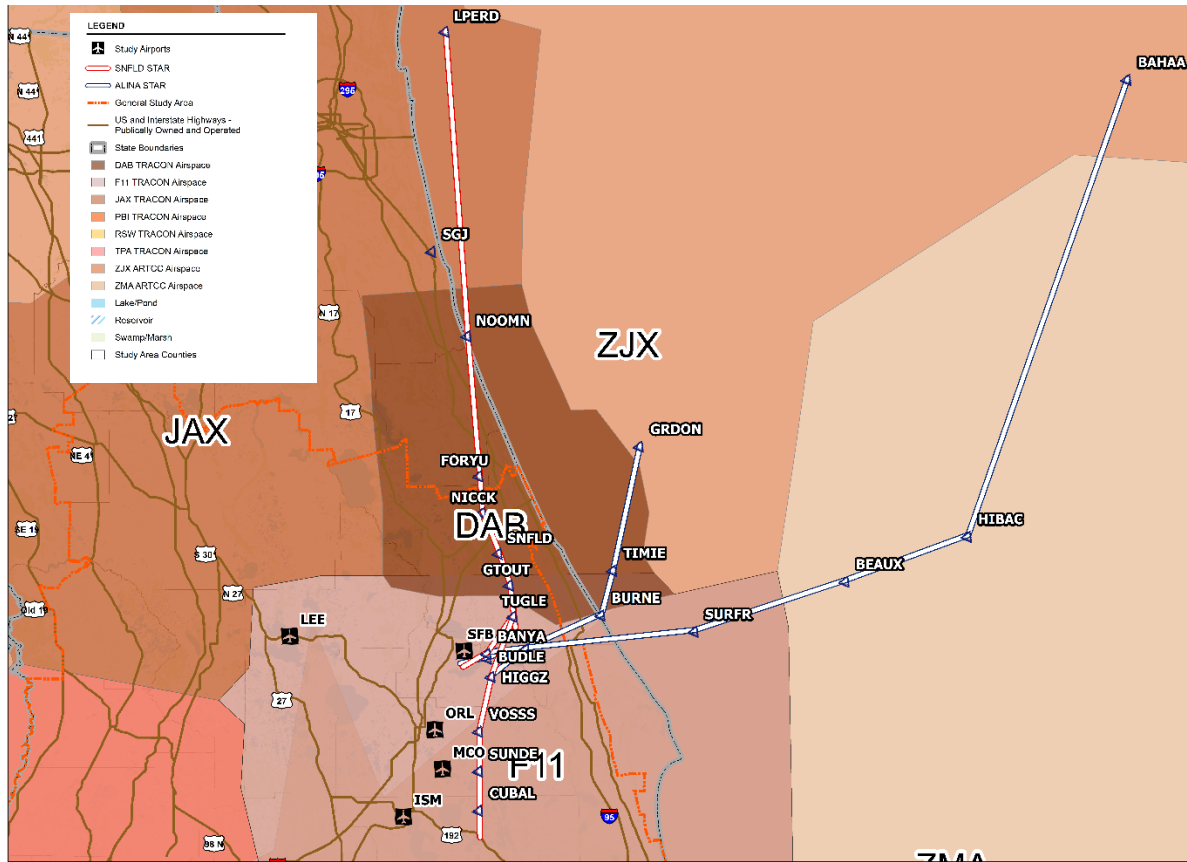
Source: South-Central Florida Metroplex Study Team Final Report, September 2012. Road Network File, U.S. Census Bureau, 2017 (2017 TIGER/Line Shape files (machine-readable data files), County Boundary File, US Census Bureau, (2017 TIGER/Line Shape files (machine-readable data files); Airports file, Federal Aviation Administration, 2018 Coded Instrument Flight Procedures (CIFP). Shaded Relief, 2018. ATAC Corporation, 2019, (2019 General Study Area boundary).

Prepared by: ATAC Corporation, March 2020.

Based on the Study Team recommendations, the D&I Team developed two new RNAV STARs named ALINA and SNFLD. The ALINA and SNFLD STARs have been designed to for availability to aircraft during all runway operating configurations.

In further refining the proposed final designs, the D&I Team extended the BAHA transition to connect into Atlantic routes given the volume of traffic served. The D&I Team also added an additional transition to serve ISM, ORL, and SFB and added waypoints to de-conflict traffic from adjacent procedures. Speed restrictions were added in response to stakeholder and HITL simulations while waypoints were adjusted to arrive at the proposed final designs. **Exhibit 3-6** depicts the proposed ALINA and SNFLD STARs serving MCO and replacing the existing CWRLD STAR.

Exhibit 3-6 Proposed Final Design – MCO ALINA and SNFLD STARS



Source: South-Central Florida Metroplex D&I Team TARGETS File, 2019; Road Network File, U.S. Census Bureau, 2017 (2017 TIGER/Line Shape files (machine-readable data files), County Boundary File, US Census Bureau, (2017 TIGER/Line Shape files (machine-readable data files); Airports file, Federal Aviation Administration, 2018 Coded Instrument Flight Procedures (CIFP). Shaded Relief, 2018. ATAC Corporation, 2019, (2019 General Study Area boundary).

Prepared by: ATAC Corporation, March 2020.

3.2 Alternatives Overview

The following sections discuss the No Action alternative and the Proposed Action, which are the two alternatives considered to determine what actions are carried forward for analysis in this EA.

3.2.1 No Action Alternative

Under the No Action alternative, the FAA would maintain existing arrival/departure procedures. The related routes and air traffic flow in use in the South-Central Florida Metroplex as of the period from June 1, 2017 to May 30, 2018 (representing existing conditions) would remain largely the same under the No Action alternative. Some procedure modifications and/or cancellations independent of those recommended as part of the South-Central Florida Metroplex Project are intended to be implemented prior to the Proposed Action to deal with specific issues separate from this Project. Existing procedures with expected modifications are listed on the FAA's Instrument Flight Procedure Gateway website.

Details related to changes to procedures were collected and defined for purposes of the No Action alternative.

In addition, work is underway on the FAA's Very High Frequency Omnidirectional Range (VOR) Minimum Operational Network (MON) program, which involves gradual reduction of the current VOR network to a minimum level necessary to provide a conventional navigation backup as the National Airspace System (NAS) transitions to performance-based navigation (PBN). The FAA plans to conduct the program in two phases. Phase 1 was completed at the end of September, 2020, and Phase 2 will be conducted between 2021 and 2025. The following VORs used by procedures at Study Airports are scheduled to be discontinued as of July 2019: AMG, CTY, CYY, GNV, LBV, PHK, TAY, and TRV.³⁷ To accommodate these discontinuances, a combination of radar-required, RNAV-only, and DME-required transitions will be implemented without changing the flight paths of aircraft.

The No Action alternative accounts for current airport runway and facility modifications under construction or those to be implemented during the planning horizon of the EA (2026). These changes are taken into account in the analyses of impacts associated with the No Action alternative (see **Chapter 5**).

3.2.1.1 No Action Alternative Procedures

The No Action alternative includes 85 procedures: 33 conventional procedures (procedures that use conventional NAVAIDs), and 52 RNAV procedures. Traffic managed by FAA ATC not using a specific procedure is depicted as "Preferred Route" in **Table 3-1**. The basis of design is not applicable, but the primary means of directing traffic is through ATC issued headings. **Table 3-1** lists the names of the No Action alternative procedures, the procedure type (i.e., SID or STAR), the basis of design, and the number of runway and en route transitions for each procedure.

Table 3-1 No Action SIDs and STARs

No Action Procedure	Procedure Type	Basis of Design	Transitions (en route/runway) ¹	Airports Served
ANNEY	STAR	Conventional	3/0	07FA, MIA, TMB
ARKES	SID	RNAV	0/4	FLL
BAHMA	SID	RNAV	0/2	FLL
BAIRN	STAR	RNAV	3/0	ISM, LEE, MCO, ORL, SFB
BAYPO	SID	RNAV	1/6	TPA
BEECH	SID	RNAV	0/2	FLL
BITHO	STAR	Conventional	1/0	ISM, MCO, MLB
BLOND	STAR	RNAV	1/2	LAL, PIE, SRQ, TPA
BLUFI	STAR	Conventional	1/0	07FA, FLL, FXE, MIA, OPF, TMB
BRDGE	STAR	Conventional	3/2	PIE, TPA
BRNGR	SID	RNAV	1/6	SUA
BSTER	SID	RNAV	4/4	MIA

37 U.S. Department of Transportation, Federal Aviation Administration.
[https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/techops/navservices/transition_programs/vormon/media/VOR%20Target%20Discontinuance%20List%2020190722.xlsx (Accessed April 29, 2020)].

Table 3-1 No Action SIDs and STARs

No Action Procedure	Procedure Type	Basis of Design	Transitions (en route/ runway) ¹	Airports Served
BUFIT	SID	RNAV	1/4	PBI
BUGGZ	STAR	RNAV	2/0	ISM, MCO, ORL
CAYSL	STAR	RNAV	3/2	BCT
CITRUS	SID	Conventional	0/0	MCO
CLAMP	STAR	Conventional	1/0	SRQ, VNC
CORLL	STAR	Conventional	1/0	ORL, SFB
COSTR	STAR	RNAV	5/0	ISM, LEE, MCO, MLB, ORL, SFB
CROWD	SID	RNAV	1/6	TPA
CURSO	STAR	RNAV	2/0	07FA, FLL, FXE, MIA, OPF, TMB
CWRLD	STAR	RNAV	3/0	ISM, LEE, MCO, ORL, SFB
CYPRESS	STAR	Conventional	3/0	07FA, MIA, OPF, TMB
DADES	STAR	RNAV	2/2	PIE, TPA
DARBS	STAR	Conventional	1/0	PIE, TPA
DEAKK	STAR	RNAV	3/2	PIE, TPA
DEEEP	SID	RNAV	3/4	MIA
DEKAL	STAR	Conventional	3/0	FLL, FXE, OPF
DVALL	STAR	Conventional	2/0	FLL, FXE, MIA, OPF, TMB
ENDED	SID	RNAV	0/6	TPA
EONNS	SID	RNAV	0/8	MIA
FISEL	STAR	RNAV	5/0	FLL, FXE, OPF
FLIPR	STAR	RNAV	2/0	07FA, MIA, TMB
FOOXX	STAR	RNAV	1/2	PIE, TPA
FORT LAUDERDALE	SID	Conventional	0/0	FLL, FXE
FORTL	STAR	Conventional	3/0	FLL, FXE, OPF
FOWEE	STAR	Conventional	4/0	07FA, MIA, TMB
FRWAY	STAR	RNAV	3/0	PBI
GANDY	SID	RNAV	1/6	TPA
GISSH	STAR	Conventional	4/0	FLL, FXE, OPF
GOOFY	STAR	Conventional	3/4	ISM, LEE, MCO, ORL, SFB
HEDLY	SID	RNAV	0/8	MIA
HILEY	STAR	RNAV	3/0	07FA, MIA, TMB
HITAG	SID	RNAV	4/4	MIA
JAGUAR	SID	Conventional	1/0	MCO
JINGL	STAR	RNAV	2/0	FLL, FXE, OPF
JONZI	SID	RNAV	3/4	MIA
LEESE	STAR	Conventional	4/0	ISM, MCO, ORL
LGTNG	SID	Conventional	0/6	TPA
LMORE	SID	RNAV	1/4	PBI

Table 3-1 No Action SIDs and STARs

No Action Procedure	Procedure Type	Basis of Design	Transitions (en route/ runway) ¹	Airports Served
LZARD	STAR	Conventional	2/2	PIE, TPA
MCCOY	SID	Conventional	0/0	MCO
MELBOURNE	SID	Conventional	0/0	MLB
MIAMI	SID	Conventional	0/0	MIA, OPF, TMB
MINEE	STAR	Conventional	4/0	ISM, LEE, MCO, ORL, SFB
MIXAE	SID	RNAV	1/4	PBI
MNATE	SID	RNAV	0/8	MIA
ORLANDO	SID	Conventional	0/0	MCO
PADUS	SID	RNAV	0/8	MIA
PALM BEACH	SID	Conventional	0/0	PBI
PIGLT	STAR	RNAV	2/0	ISM, MCO, ORL
POTTR	SID	Conventional	4/3	MIA
PREDA	SID	RNAV	0/4	FLL
PRRIE	STAR	RNAV	3/2	BCT
SANFORD	SID	Conventional	0/0	SFB
SARASOTA	SID	Conventional	0/0	SRQ
SKIPS	SID	RNAV	0/8	MIA
SLIDZ	SID	RNAV	1/4	PBI
SNDLR	SID	RNAV	1/6	SUA
SOUBY	SID	Conventional	3/3	MIA
SRKUS	SID	RNAV	3/3	SRQ, VNC
SSCOT	STAR	RNAV	2/0	07FA, MIA, OPF, TMB
ST PETE	SID	Conventional	0/0	PIE
SYKES	SID	RNAV	2/6	TPA
TAMPA	SID	Conventional	0/0	TPA
TBIRD	SID	RNAV	1/4	PBI
TEEGN	STAR	RNAV	1/2	SRQ, VNC
THNDR	SID	RNAV	0/4	FLL
TRAPR	STAR	RNAV	1/2	SRQ, VNC
TUXXI	STAR	Conventional	2/0	BCT, PBI
VALLY	SID	RNAV	0/8	MIA
WAVUN	STAR	RNAV	1/0	FLL, FXE, OPF

Table 3-1 No Action SIDs and STARs

No Action Procedure	Procedure Type	Basis of Design	Transitions (en route/runway) ¹	Airports Served
WINCO	SID	RNAV	0/8	MIA
WLACE	STAR	RNAV	3/0	PBI, SUA
ZAPPA	SID	RNAV	0/4	FLL

Notes:

¹ A runway transition is counted if there is at least one waypoint or fix beyond (or prior to) the common route to create a defined segment between the runway and common route (i.e. a defined route between two fixes or waypoints).

N/A = Not Applicable

STAR = Standard Terminal
Arrival

SID = Standard Instrument
Departure

RNAV = Area Navigation

Sources: National Flight Data Center National Airspace System Resources Database, Accessed December 2018; U.S. Department of Transportation, FAA Operational Procedure Files, December 2018. Federal Aviation Administration, Coded Instrument Flight Procedures (CIFP), Accessed March 2018.

Prepared by: ATAC Corporation, March 2020

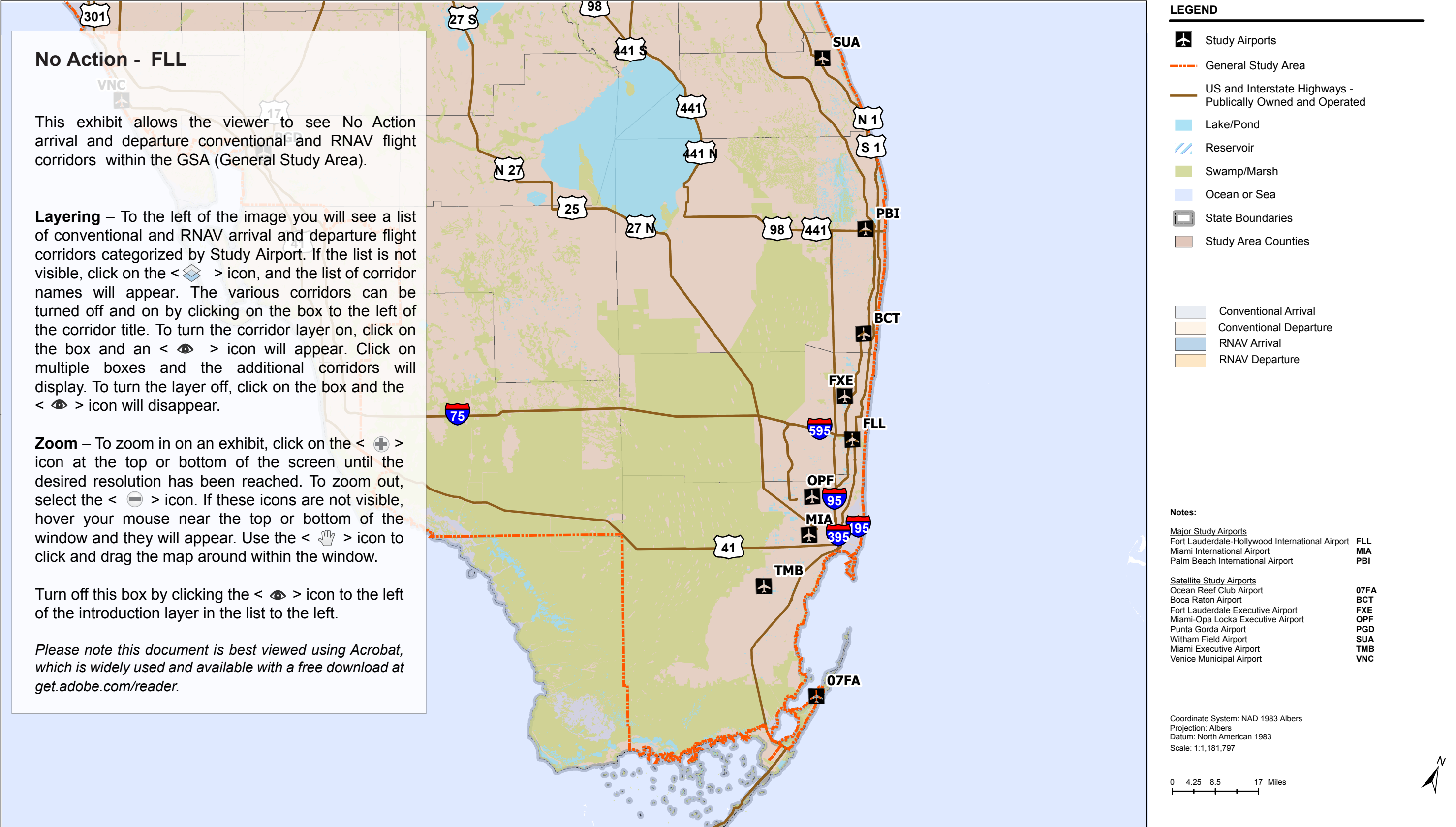
3.2.1.2 Airspace Control Structure under the No Action Alternative

When aircraft depart from or arrive to the South-Central Florida Metroplex on an assigned route or SID/STAR, transfer of control occurs between multiple air traffic facilities. Under the No Action alternative, the transfer areas would remain unchanged from existing conditions. For purposes of this EA, the areas where transfers occur are defined based on entry and exit gates/points. The gates/points are purposely located to segregate arrivals and departures where possible.

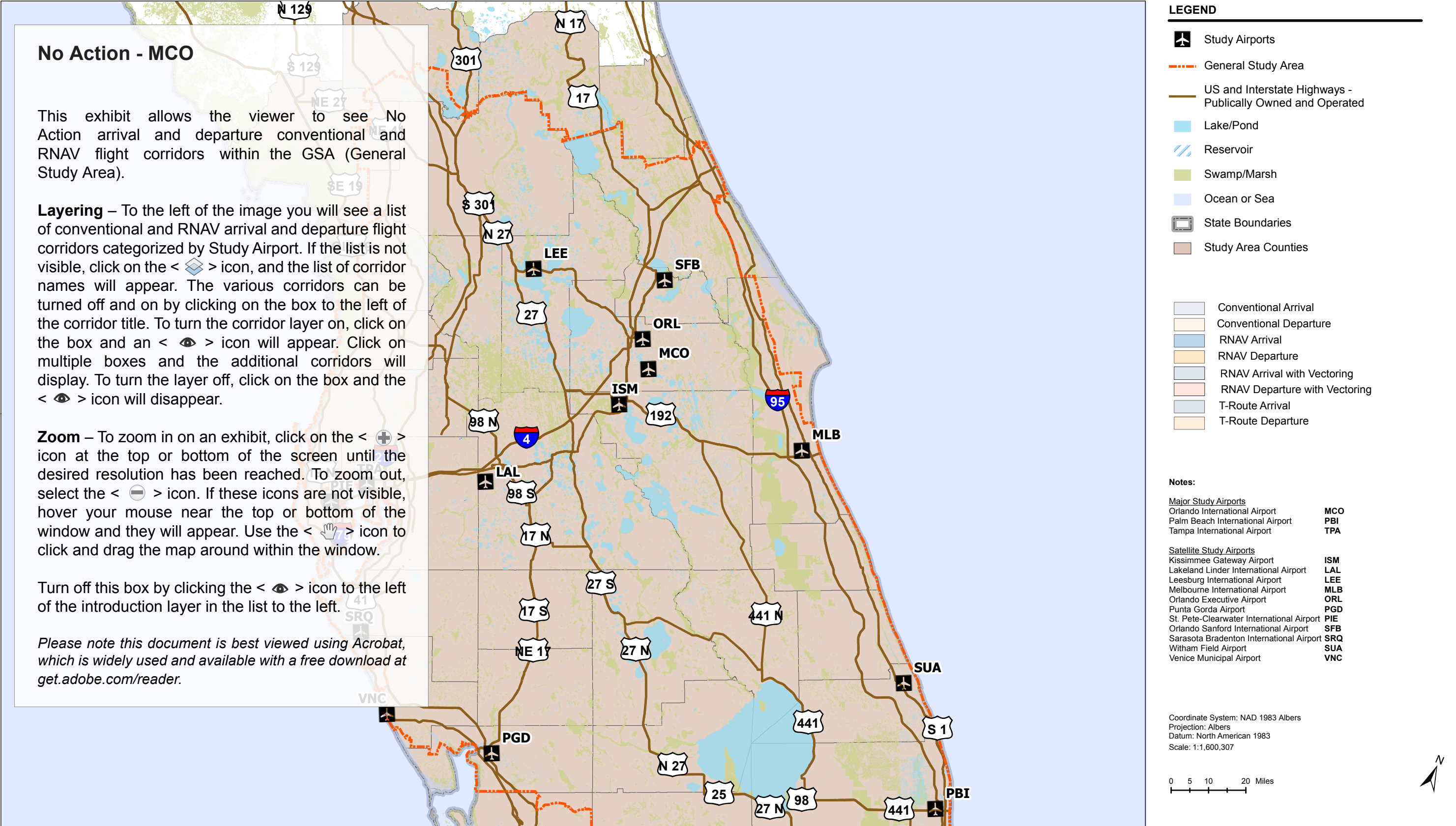
The South-Central Florida Metroplex Study Airports all have independent operating configurations that are based on weather and wind (refer to **Section 1.4.1**). Airport traffic flows can interact with other airport traffic flows in different runway operating configurations. Therefore, the D&I Team was required to consider all possible combinations of the various runway operating configurations.

Exhibits 3-7 through 3-13 show all arrival and departure flows to and from the Study Airports associated with the No Action alternative. Corridors are grouped by procedure type (conventional or RNAV), operation (arrival or departure), and major Study Airport or satellite Study Airports by geographic location (north satellites and south satellites). Depending on specific airport traffic flows, the interaction between specific flows changes.

If the reader is accessing the digital edition of this EA document using a recent Adobe® Reader® version that enables the visual access of layers, **Exhibits 3-7 through 3-20** allow the viewer to use the Adobe Layers function to view layers and show/hide their specific contents. Specifically, this Adobe document navigation pane feature enables a digital viewer to see No Action or Proposed Action arrival and departure conventional and RNAV flight corridors under defined air traffic flow conditions within the General Study Area (See **Section 4.1**). The various corridors can be turned off and on by clicking on the box to the left of the corridor title. Digital Exhibits can also use a zoom feature to gain a closer examination of the approximate corridor extents and the underlying geographic references.

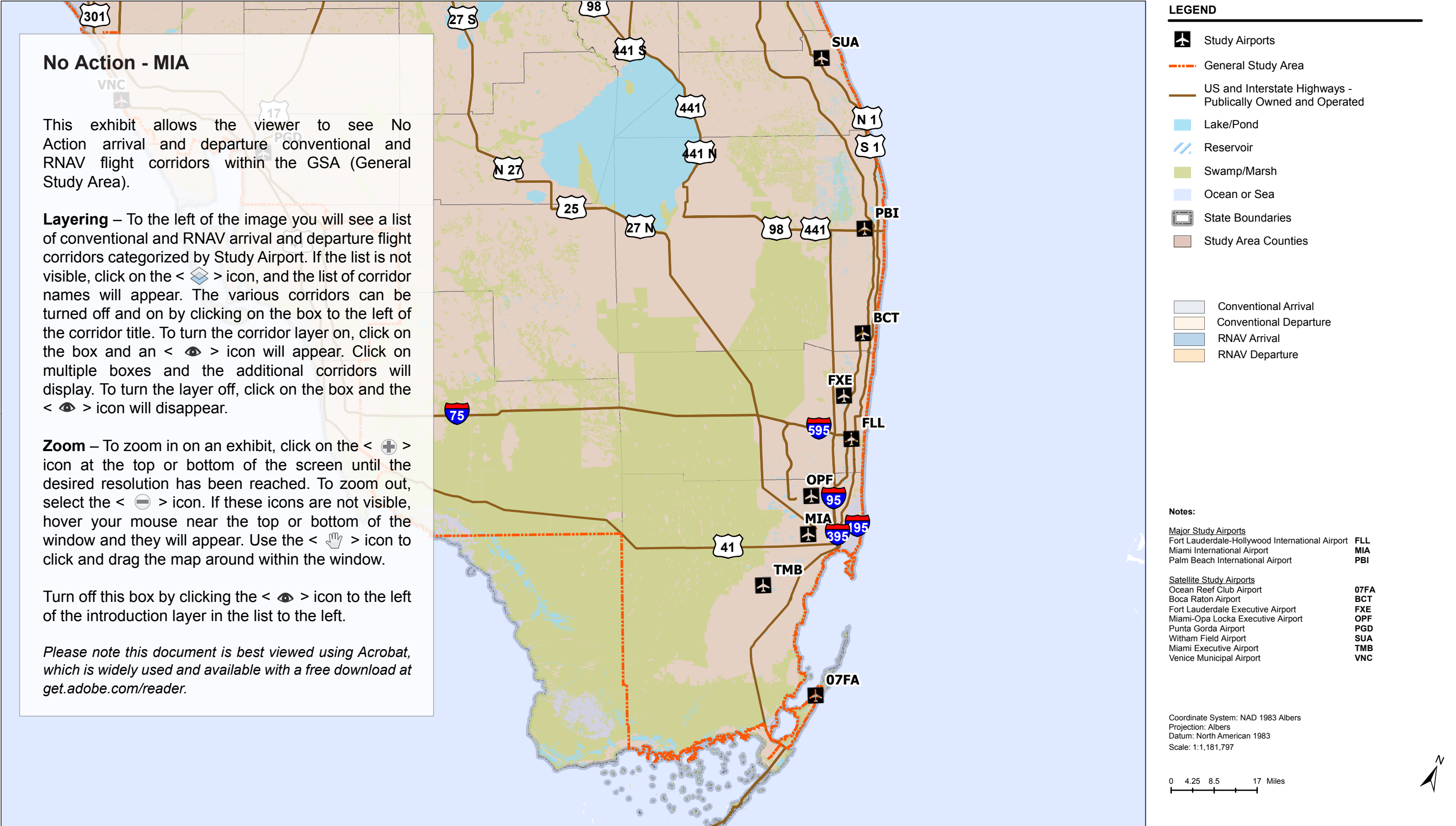


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Sources: U.S. Census Bureau, 2016 (2016 TIGER/Line Shapefiles (machine-readable data files), American Community Survey - 2010-2014 5-Year Estimates); ESRI, Inc., 2016 (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). ESRI World Water Bodies 2018 (Ocean and Sea). ATAC Corporation, 2020, (2020 General Study Area boundary). Prepared by: ATAC Corporation, October 2020.

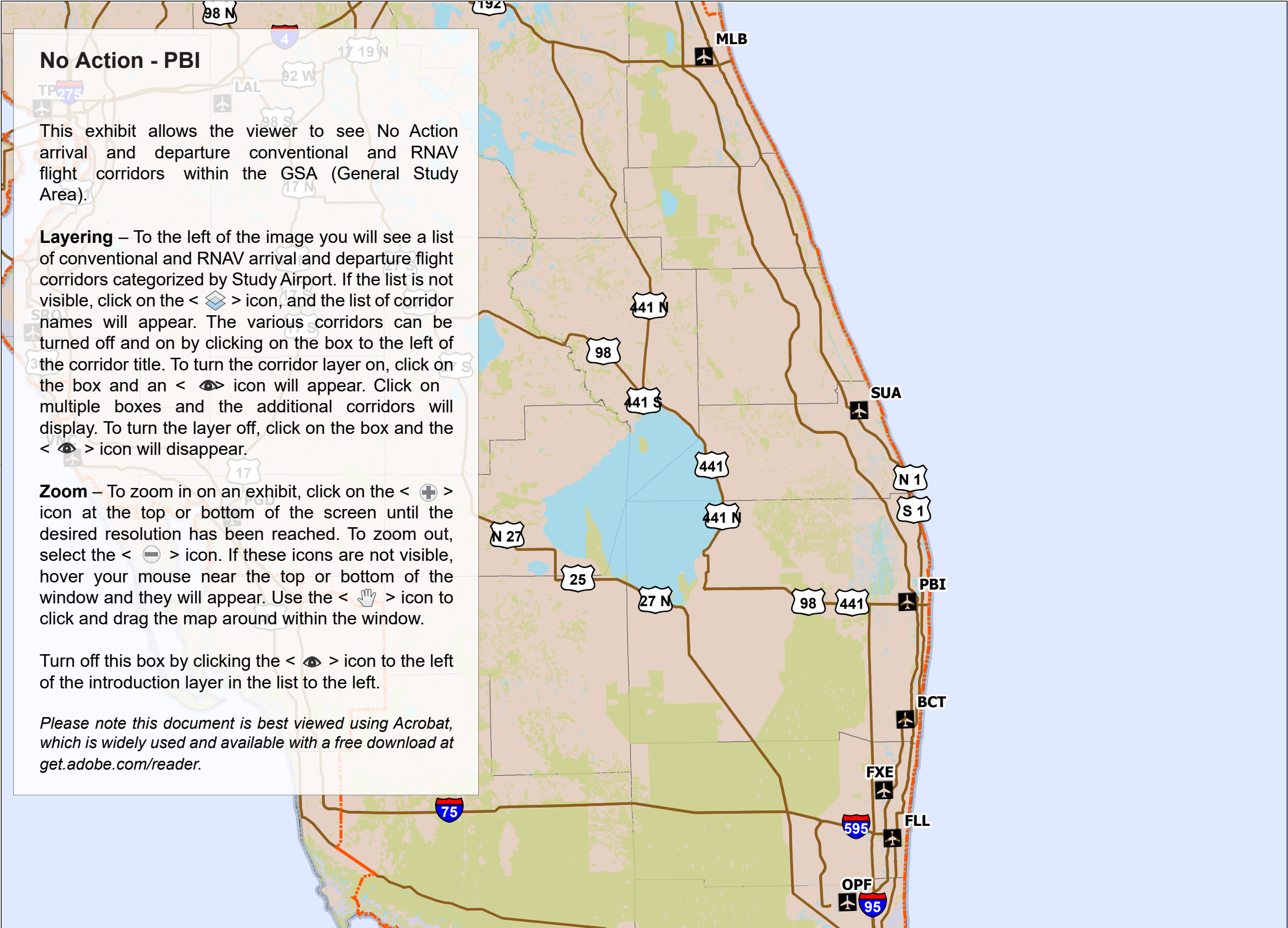
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Sources: U.S. Census Bureau, 2016 (2016 TIGER/Line Shapefiles (machine-readable data files), American Community Survey - 2010-2014 5-Year Estimates); ESRI, Inc., 2016 (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). ESRI World Water Bodies 2018 (Ocean and Sea). ATAC Corporation, 2020, (2020 General Study Area boundary).
Prepared by: ATAC Corporation, October 2020.

Exhibit 3-9
No Action Flight Corridors
MIA

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No Action - PBI

This exhibit allows the viewer to see No Action arrival and departure conventional and RNAV flight corridors within the GSA (General Study Area).

Layering – To the left of the image you will see a list of conventional and RNAV arrival and departure flight corridors categorized by Study Airport. If the list is not visible, click on the < > icon, and the list of corridor names will appear. The various corridors can be turned off and on by clicking on the box to the left of the corridor title. To turn the corridor layer on, click on the box and an < > icon will appear. Click on multiple boxes and the additional corridors will display. To turn the layer off, click on the box and the < > icon will disappear.

Zoom – To zoom in on an exhibit, click on the < > icon at the top or bottom of the screen until the desired resolution has been reached. To zoom out, select the < > icon. If these icons are not visible, hover your mouse near the top or bottom of the window and they will appear. Use the < > icon to click and drag the map around within the window.

Turn off this box by clicking the < > icon to the left of the introduction layer in the list to the left.

Please note this document is best viewed using Acrobat, which is widely used and available with a free download at get.adobe.com/reader.

LEGEND

- Study Airports
- General Study Area
- US and Interstate Highways - Publically Owned and Operated
- Lake/Pond
- Reservoir
- Swamp/Marsh
- Ocean or Sea
- State Boundaries
- Study Area Counties
- Conventional Arrival
- Conventional Departure
- RNAV Arrival
- RNAV Departure
- RNAV Arrival with Vectoring
- RNAV Departure with V vectoring
- T-Route Arrival
- T-Route Departure

Notes:

<u>Major Study Airports</u>		
Fort Lauderdale-Hollywood International Airport	FLL	
Palm Beach International Airport	PBI	
Tampa International Airport	TPA	
<u>Satellite Study Airports</u>		
Boca Raton Airport	BCT	
Fort Lauderdale Executive Airport	FXE	
Lakeland Linder International Airport	LAL	
Miami-Opa Locka Executive Airport	OPF	
Punta Gorda Airport	PGD	
Sarasota Bradenton International Airport	SRQ	
Witham Field Airport	SUA	
Miami Executive Airport	TMB	
Venice Municipal Airport	VNC	

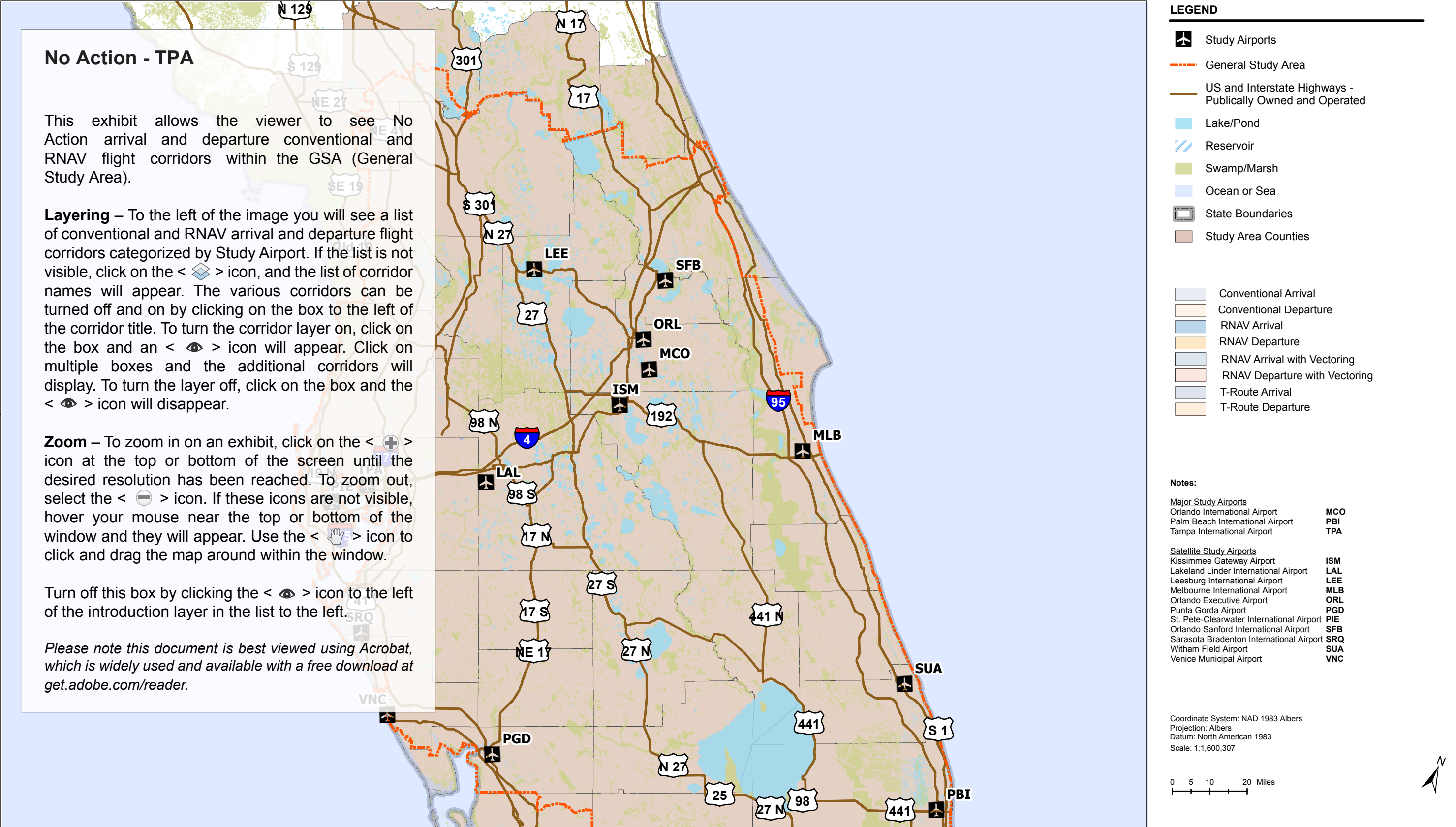
Coordinate System: NAD 1983 Albers
Projection: Albers
Datum: North American 1983
Scale: 1:1,181,797

0 4.25 8.5 17 Miles



Sources: U.S. Census Bureau, 2016 (2016 TIGER/Line Shapefiles (machine-readable data files), American Community Survey - 2010-2014 5-Year Estimates); ESRI, Inc., 2016 (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). ESRI World Water Bodies 2018 (Ocean and Sea). ATAC Corporation, 2020, (2020 General Study Area boundary). Prepared by: ATAC Corporation, October 2020.

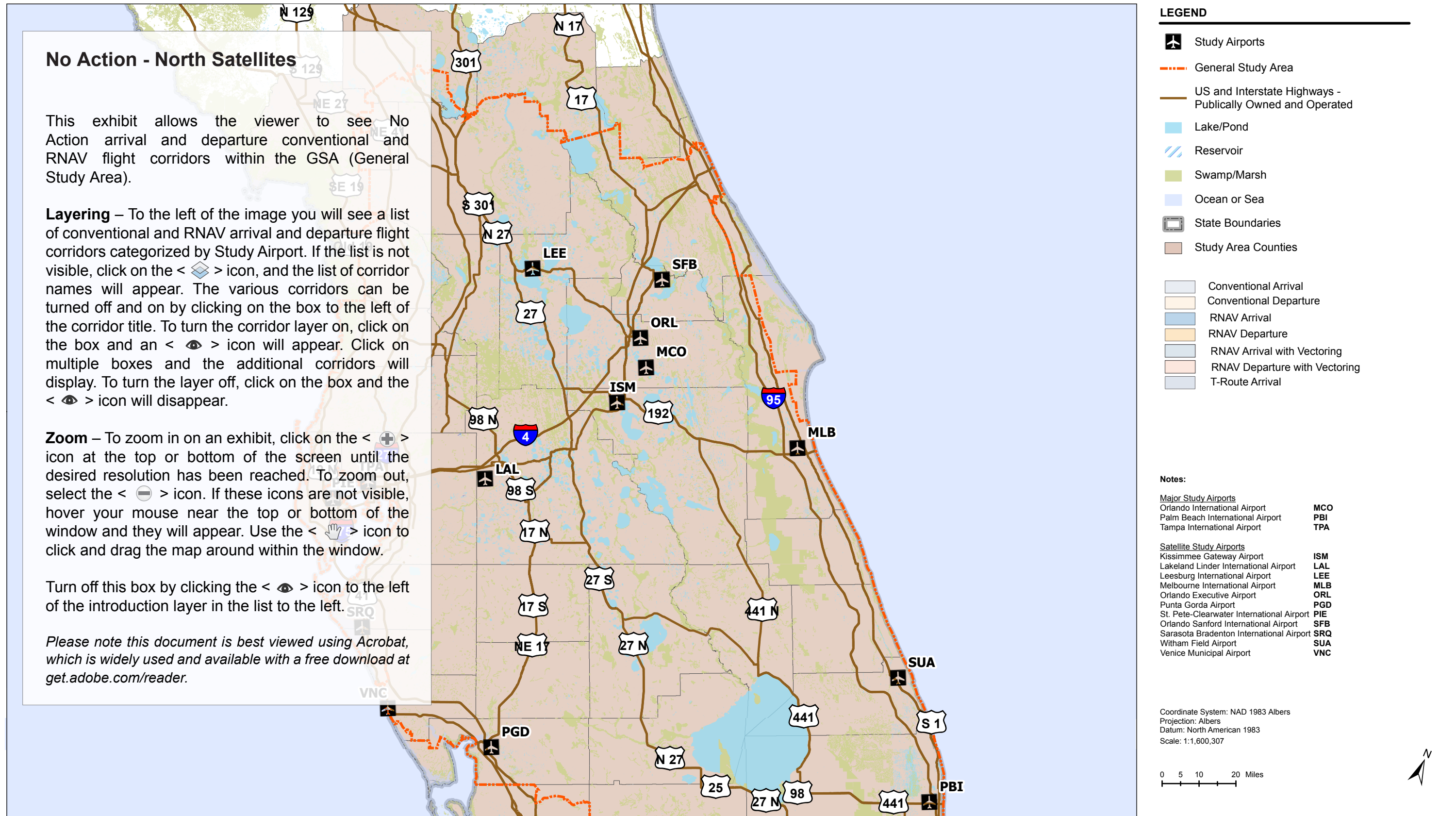
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Sources: U.S. Census Bureau, 2016 (2016 TIGER/Line Shapefiles (machine-readable data files), American Community Survey - 2010-2014 5-Year Estimates); ESRI, Inc., 2016 (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). ESRI World Water Bodies 2018 (Ocean and Sea). ATAC Corporation, 2020, (2020 General Study Area boundary). Prepared by: ATAC Corporation, October 2020.

Exhibit 3-11
No Action Flight Corridors
TPA

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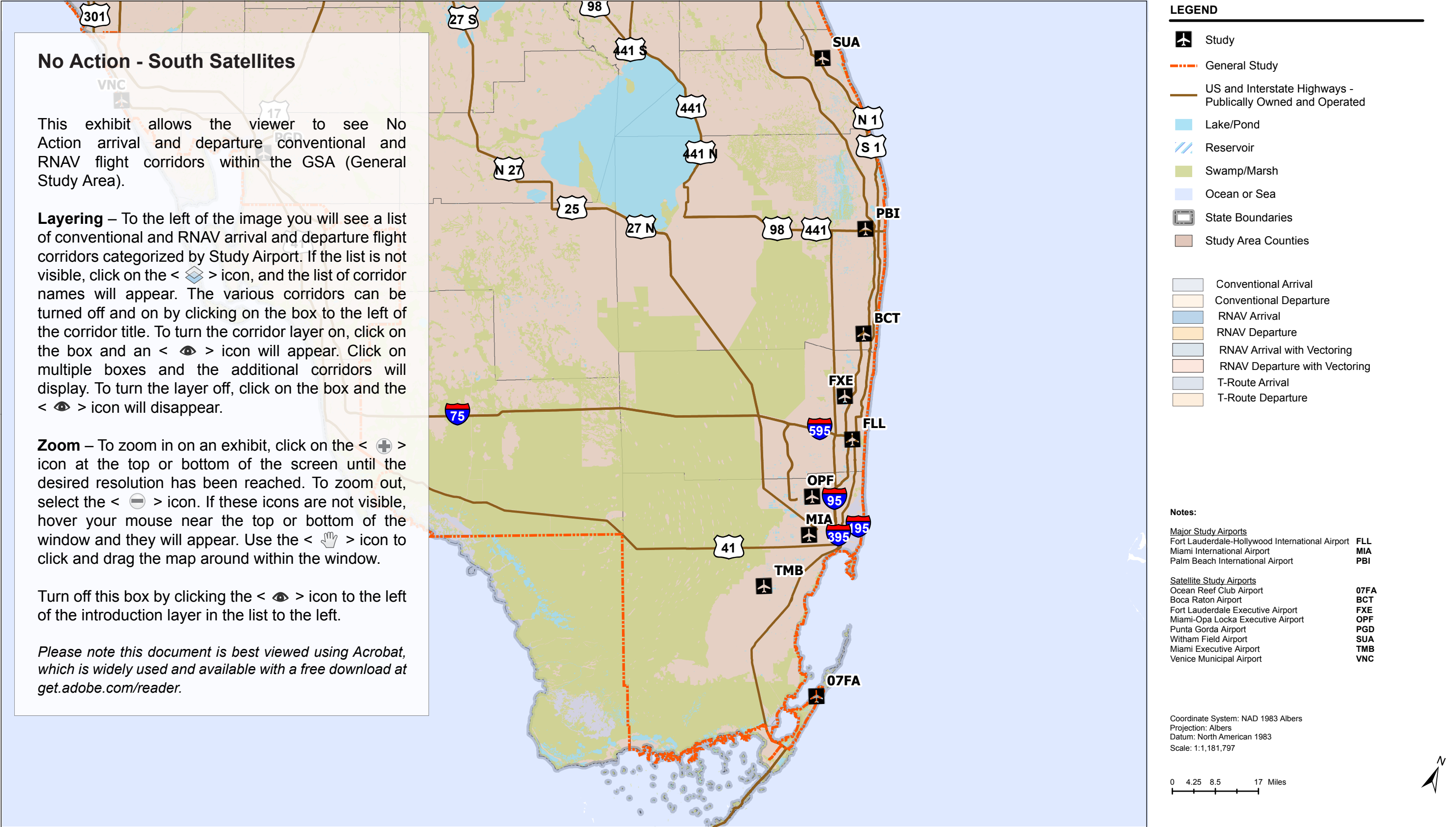


Sources: U.S. Census Bureau, 2016 (2016 TIGER/Line Shapefiles (machine-readable data files), American Community Survey - 2010-2014 5-Year Estimates); ESRI, Inc., 2016 (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies).
ESRI World Water Bodies 2018 (Ocean and Sea). ATAC Corporation, 2020, (2020 General Study Area boundary).
Prepared by: ATAC Corporation, October 2020.

Exhibit 3-12

No Action Flight Corridors North Satellites

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3.2.2 Proposed Action

As discussed in **Section 3.1**, the Proposed Action includes the Proposed Final Designs for all procedures the D&I Team developed plus existing procedures that would continue to be used. This alternative will increase efficiency in the South-Central Florida Metroplex airspace by improving flexibility in transitioning aircraft, segregating arrivals and departures, and improving the predictability of air traffic flows.

The Proposed Action includes 106 SIDs and STARs with 11 T-routes:³⁸

- 2 new conventional SIDs
- 11 new conventional STARs
- 37 new RNAV SIDs
- 33 new RNAV STARs
- 12 existing conventional SIDs
- 7 existing conventional STARs
- 4 existing RNAV SIDs
- 11 new RNAV T-Routes

The Proposed Action maintains 19 existing conventional procedures. In order to accommodate non-RNAV aircraft operations, the D&I Team proposed two new conventional SIDs and 11 new conventional STARs. The Proposed Action presents 67 new procedures, 17 procedures changed from the No Action to the Proposed Action, and 22 procedures staying the same from the No Action to the Proposed Action.

The Final EA also includes actions related to existing procedures with planned modifications that are carried forward as part of the Proposed Action, and any reasonably foreseeable projects that would alter/affect airspace procedures.

Table 3-2 lists the Proposed Action procedures, the No Action procedure that the Proposed Action alternative would replace (if applicable), the procedure type, and the basis of design. The table also shows the airports that the Proposed Action procedures serve, and the number of runway and en route transitions for each procedure. Finally, the table lists the objectives each procedure design achieves.

Table 3-2 Proposed Action SIDs, STARs, and T-Routes

Proposed Action Procedure	No Action Procedure	Procedure Type	Basis of Design	Airports Served	Transitions (enroute/runway)	Objectives
AARPS	N/A	SID	RNAV	07FA	1/22	Complexity/Flexibility/Predictability
	ARKES			FLL		
	BSTER, HEDLY, HITAG			MIA		
	N/A			OPF		
	N/A			TMB		

³⁸ T-routes are terminal airspace transition aircraft routes that use RNAV specifications and enable aircraft with RNAV capability to operate up to 18,000 feet MSL. [https://www.faa.gov/air_traffic/publications/atpubs/aip_html/part2_enr_section_3.3.html (Accessed May 1, 2020)].

Table 3-2 Proposed Action SIDs, STARs, and T-Routes

Proposed Action Procedure	No Action Procedure	Procedure Type	Basis of Design	Airports Served	Transitions (enroute/ runway)	Objectives
ALINA	CWRLD	STAR	RNAV	ISM, LEE, MCO, ORL, SFB	3/19	Complexity/ Predictability
BAHIA	CURSO	STAR	RNAV	FLL, FXE, OPF	5/10	Complexity/Flexibility/ Predictability
BAYPO	N/A BAYPO	SID	RNAV	PIE TPA	2/7	Complexity/ Predictability
BITHO	BITHO	STAR	Conventional	ISM, MCO, MLB	1/19	No Change
BLFRG	DEAKK	STAR	RNAV	PIE, TPA	3/10	Complexity/ Predictability
BNGOS	N/A THNDR N/A BSTER. HITAG, WINCO N/A N/A	SID	RNAV	07FA FLL FXE MIA OPF TMB	3/26	Complexity/Flexibility/ Predictability
BRDGE	BRDGE	STAR	Conventional	PIE, TPA	4/10	No Change
BRNGR	BRNGR	SID	RNAV	SUA	0/2	No Change
BUFIT	BUFIT	SID	RNAV	PBI	0/4	Complexity/ Predictability
CAPTN	CAYSL FISEL FRWAY	STAR	RNAV	BCT FXE PBI	2/11	Complexity/ Predictability
CITRUS	CITRUS	SID	Conventional	MCO	1/2	No Change
CLAMP	CLAMP	STAR	Conventional	SRQ, VNC	2/8	No Change
CLMNT	CAYSL FRWAY	STAR	RNAV	BCT PBI	1/7	Complexity/ Predictability
CSTAL	HILEY	STAR	RNAV	07FA, MIA, TMB	4/14	Complexity/ Predictability
CUUDA	FISEL	STAR	RNAV	FLL, OPF	7/10	Complexity/ Predictability
DADES	DADES	STAR	RNAV	PIE, TPA	5/9	Complexity/ Predictability
DARBS	DARBS	STAR	Conventional	PIE, TPA	2/9	No Change
DDANY	CITRUS, ORLANDO	SID	RNAV	MCO	4/8	Complexity/ Predictability
DEKAL	DEKAL	STAR	Conventional	FLL, FXE, OPF	3/13	Complexity/ Predictability
DORAL	HILEY	STAR	RNAV	MIA	8/7	Complexity/ Predictability
DVALL	DVALL	STAR	Conventional	FLL, FXE, MIA, OPF, TMB	3/25	No Change
ENDED	N/A ENDED	SID	RNAV	PIE TPA	0/4	Complexity/Flexibility/ Predictability
EPCOT	CITRUS, ORLANDO	SID	RNAV	MCO	1/8	Complexity/ Predictability
FATHE	MCCOY	SID	RNAV	MCO	1/6	Complexity/ Predictability

Table 3-2 Proposed Action SIDs, STARs, and T-Routes

Proposed Action Procedure	No Action Procedure	Procedure Type	Basis of Design	Airports Served	Transitions (enroute/runway)	Objectives
FEBAD	PRRIE	STAR	RNAV	BCT	1/6	Complexity/ Predictability
	WLACE			PBI		
	WLACE			SUA		
FEELX	PRED, ZAPPA	SID	RNAV	FLL	1/7	Complexity/ Predictability
	N/A			FXE		
FOLZZ	N/A	SID	RNAV	07FA	1/15	Complexity/Flexibility/ Predictability
	BSTER, HITAG, PADUS, VALLY			MIA		
	N/A			OPF		
	N/A			TMB		
FORT LAUDERDALE	FORT LAUDERDALE	SID	Conventional	FLL, FXE	7/8	Complexity/ Predictability
FORTL	FORTL	STAR	Conventional	FLL, FXE, OPF	2/14	Complexity/ Predictability
FOWEE	FOWEE	STAR	Conventional	07FA, MIA, TMB	3/15	Complexity/ Predictability
FSHUN	CITRUS, ORLANDO	SID	RNAV	MCO	1/8	Complexity/ Predictability
GABOW	N/A	SID	RNAV	FXE	2/4	Complexity/ Predictability
GANDY	GANDY	SID	RNAV	TPA	2/6	No Change
GLADZ	N/A	SID	RNAV	FLL, MIA, OPF	3/16	Complexity/ Predictability
GOOFY	GOOFY	STAR	Conventional	ISM, LEE, MCO, ORL, SFB	1/20	Complexity
GRNCH	BUGGZ	STAR	RNAV	ISM, MCO, ORL	3/14	Complexity/ Predictability
GWAVA	DEEEP, EONNS	SID	RNAV	MIA	1/6	Complexity/Flexibility/ Predictability
HERON	SSCOT	STAR	RNAV	07FA, MIA, OPF, TMB	5/18	Complexity/Flexibility/ Predictability
HUSIL	SKIPS	SID	RNAV	MIA	2/7	Complexity/ Predictability
	N/A			OPF		
JAFAR	PIGLT	STAR	RNAV	ISM, MCO, ORL	4/15	Complexity/ Predictability
JEEMY	JAGUAR	SID	RNAV	MCO	1/8	Complexity/ Predictability
JOKRS	COSTR	STAR	RNAV	ISM, LEE, MCO, MLB, ORL, SFB	4/18	Complexity/ Predictability
KLADA	DEEEP, JONZI, SKIPS	SID	RNAV	MIA	3/6	Complexity/ Predictability
KNOST	SYKES	SID	RNAV	TPA	2/2	Complexity/ Predictability
KYAKS	WAVUN	STAR	RNAV	FLL, FXE, OPF	3/9	Complexity/ Predictability
LARGO	CURSO	STAR	RNAV	07FA, MIA, TMB	5/10	Complexity/Flexibility/ Predictability
LEESE	LEESE	STAR	Conventional	ISM, MCO, ORL	3/14	Complexity

Table 3-2 Proposed Action SIDs, STARs, and T-Routes

Proposed Action Procedure	No Action Procedure	Procedure Type	Basis of Design	Airports Served	Transitions (enroute/ runway)	Objectives
LEWRD	CITRUS, ORLANDO	SID	RNAV	MCO	2/6	Complexity/ Predictability
LGTNG	LGTNG	SID	Conventional	TPA	1/6	No Change
LUBBR	N/A	STAR	RNAV	LAL	2/14	Complexity/ Predictability
	N/A			PGD		
	TRAPR			SRQ		
	TRAPR			VNC		
LUUCE	ANNEY, BLUFI	STAR	Conventional	07FA, FLL, MIA, OPF, TMB	1/16	Complexity
LZARD	LZARD	STAR	Conventional	PIE, TPA	3/10	No Change
MAATY	N/A	STAR	RNAV	LAL	3/8	Complexity/ Predictability
	FOOXX			TPA		
MAHHI	N/A	STAR	RNAV	BCT, PBI	1/6	Complexity/ Predictability
MCCOY	MCCOY	SID	Conventional	MCO	1/0	No Change
MELBOURNE	TUXXI	STAR	Conventional	BCT, PBI	1/4	Complexity
MELBOURNE	MELBOURNE	SID	Conventional	MLB	1/2	No Change
MHITO	N/A	SID	RNAV	07FA	3/21	Complexity/ Predictability
	N/A			FLL		
	N/A			FXE		
	DEEEP, MNATE			MIA		
	N/A			OPF		
	N/A			TMB		
MIAMI	MIAMI	SID	Conventional	MIA, OPF, TMB	9/25	Complexity
MINEE	MINEE	STAR	Conventional	ISM, LEE, MCO, ORL, SFB	5/27	No Change
MIXAE	MIXAE	SID	RNAV	PBI	1/3	Complexity/ Predictability
MYZNR	N/A	SID	RNAV	BCT	3/2	Complexity/ Predictability
MZULO	CITRUS, ORLANDO	SID	RNAV	MCO	2/6	Complexity/ Predictability
NNOCE	JONZI	SID	RNAV	MIA	2/4	Complexity/ Predictability
NYTES	N/A	SID	RNAV	ORL	0/1	Complexity/ Predictability
OLAHS	WAVUN	STAR	RNAV	FLL, FXE, OPF	5/11	Complexity/ Predictability
OLAKE	TBIRD	SID	RNAV	PBI	1/4	Complexity/Flexibility/ Predictability
OOYEE	ANNEY	STAR	Conventional	07FA, MIA, TMB	3/11	Complexity
ORLANDO	ORLANDO	SID	Conventional	MCO	1/8	No Change
PALM BEACH	PALM BEACH	SID	Conventional	PBI	1/6	No Change
PALMZ	CYPRESS	STAR	Conventional	07FA, MIA, OPF, TMB	3/20	Complexity
PIKKR	N/A	STAR	RNAV	PGD	2/2	Complexity/

Table 3-2 Proposed Action SIDs, STARs, and T-Routes

Proposed Action Procedure	No Action Procedure	Procedure Type	Basis of Design	Airports Served	Transitions (enroute/runway)	Objectives
						Predictability
POTTR	POTTR	SID	Conventional	MIA	5/2	No Change
PRICY	COSTR	STAR	RNAV	ISM, LEE, MCO, MLB, ORL, SFB	4/23	Complexity/Predictability
RASAE	CAYSL	STAR	RNAV	BCT	1/5	Complexity/Predictability
	FRWAY			PBI		
RAYZZ	BLOND	STAR	RNAV	LAL	2/14	Complexity/Predictability
	BLOND			PIE		
	BLOND			SRQ		
	BLOND			TPA		
	N/A			VNC		
REGAE	BAHMA, BEECH	SID	RNAV	FLL	1/4	Complexity/Predictability
RIDES	BAIRN	STAR	RNAV	ISM, LEE, MCO, ORL, SFB	7/20	Complexity/Predictability
SANFORD	SANFORD	SID	Conventional	SFB	1/8	No Change
SARASOTA	SARASOTA	SID	Conventional	SRQ	1/2	No Change
SDBAR	N/A	SID	RNAV	07FA, OPF, TMB	2/8	Complexity/Predictability
SHREK	N/A	STAR	RNAV	ISM, ORL, SFB	3/10	Complexity/Predictability
SHRVY	PRRIE	STAR	RNAV	BCT	3/13	Complexity/Flexibility/Predictability
	WLACE			PBI		
	WLACE			SUA		
SLIDZ	SLIDZ	SID	RNAV	PBI	1/4	Complexity/Predictability
SNAPR	BAHMA, BEECH	SID	RNAV	FLL	2/4	Complexity/Predictability
SNDLR	SNDLR	SID	RNAV	SUA	2/5	No Change
SNFLD	CWRLD	STAR	RNAV	ISM, MCO	1/12	Complexity/Predictability
SOUBY	SOUBY	SID	Conventional	MIA	4/2	No Change
SRKUS	SRKUS	SID	RNAV	SRQ, VNC	4/6	No Change
ST PETE	ST PETE	SID	Conventional	PIE	1/2	No Change
STOOP	TUXXI	STAR	Conventional	BCT, PBI	2/6	Complexity
SYKES	N/A	SID	RNAV	PIE	1/3	Complexity/Predictability
	SYKES			TPA		
TAMPA	TAMPA	SID	Conventional	TPA	1/6	No Change
TARPN	BLUFI	STAR	RNAV	07FA, FLL, MIA, OPF, TMB	2/17	Complexity/Predictability
TBIRD	TBIRD	SID	RNAV	PBI	3/4	Complexity/Flexibility/Predictability
TEEGN	FOOXX	STAR	RNAV	PIE	2/10	Complexity/Predictability
	TEEGN			SRQ		
	TEEGN			VNC		
TEEKY	JINGL	STAR	RNAV	FLL, FXE	5/7	Complexity/Flexibility/Predictability

Table 3-2 Proposed Action SIDs, STARs, and T-Routes

Proposed Action Procedure	No Action Procedure	Procedure Type	Basis of Design	Airports Served	Transitions (enroute/runway)	Objectives
TOLLZ	N/A	SID	RNAV	ORL	0/1	Complexity/ Predictability
TTHOR	N/A	STAR	RNAV	LEE	2/14	Complexity/ Predictability
	CORLL			ORL		
	CORLL			SFB		
TTYLR	N/A	STAR	Conventional	BCT, PBI, SUA	2/11	Complexity
TURPS	N/A	SID	RNAV	BCT	2/2	Complexity/ Predictability
TWZTR	N/A	SID	RNAV	07FA	2/21	Complexity/Flexibility/ Predictability
	THNDR			FLL		
	N/A			FXE		
	BSTER, HITAG, WINCO			MIA		
	N/A			OPF		
	N/A			TMB		
	N/A					
VACAY	N/A	SID	RNAV	07FA	2/27	Complexity/Flexibility/ Predictability
	ARKES			FLL		
	N/A			FXE		
	BSTER, HEDLY, HITAG			MIA		
	N/A			OPF		
	N/A			TMB		
	N/A					
VIICE	FLIPR	STAR	RNAV	07FA, MIA, TMB	6/14	Complexity/Flexibility/ Predictability
WELLY	LMORE	SID	RNAV	PBI	0/4	Complexity/ Predictability
T-208	N/A	T-route	RNAV	All	N/A	Complexity
T-210	N/A	T-route	RNAV	All	N/A	Complexity
T-336	N/A	T-route	RNAV	All	N/A	Complexity
T-337	N/A	T-route	RNAV	All	N/A	Complexity
T-339	N/A	T-route	RNAV	All	N/A	Complexity
T-341	N/A	T-route	RNAV	All	N/A	Complexity
T-343	N/A	T-route	RNAV	All	N/A	Complexity

Table 3-2 Proposed Action SIDs, STARs, and T-Routes

Proposed Action Procedure	No Action Procedure	Procedure Type	Basis of Design	Airports Served	Transitions (enroute/runway)	Objectives
T-345	N/A	T-route	RNAV	All	N/A	Complexity
T-347	N/A	T-route	RNAV	All	N/A	Complexity
T-349	N/A	T-route	RNAV	All	N/A	Complexity
T-353	N/A	T-route	RNAV	All	N/A	Complexity

Notes:

1) A runway transition is counted if there is at least one waypoint or fix beyond (or prior to) the common route to create a defined segment between the runway and common route (i.e. a defined route between two fixes or waypoints).

N/A = Not Applicable

STAR = Standard Terminal
Arrival

SID = Standard Instrument
Departure

RNAV = Area Navigation

T-XXX = T Route

Sources: South-Central Florida Metroplex D&I Team Proposed Final Design TARGETS Files 2019/2020.
National Flight Data Center National Airspace System Resources Database, Accessed December 2018; U.S. Department of Transportation, FAA Operational Procedure Files, December 2018.

Prepared by: ATAC Corporation, October 2020

In response to public comment on the Draft EA, the Design Team modified a number of the Proposed Action procedures. A specific example includes the DREDS waypoint on the FEELX, AARPS, VACAY, SNAPR, REGAE SIDs. The FAA evaluated the modifications and determined the changes did not affect the conclusion of Final EA with respect to any environmental category.

In addition to SIDs, STARs, and T-routes, the South-Central Florida Metroplex incorporates 42 new and existing satellite-based RNAV or ground-based Instrument Landing System (ILS)-derived final approach procedures. These procedures are used by landing aircraft to line up with the designated runway and descend at a steady, stabilized rate during the final phase of flight prior to touchdown. **Table 3-3** lists the new or revised approaches, as well as the type of procedure and the airport served.

Table 3-3 Proposed Action Final Approach Procedures

Proposed Action Procedure	Procedure Type	Design	Airport Served
ILS or LOC Rwy 10L	ILS or LOC	ILS	FLL
ILS or LOC Rwy 10R	ILS or LOC	ILS	FLL
ILS or LOC Rwy 28L	ILS or LOC	ILS	FLL
ILS or LOC Rwy 28R	ILS or LOC	ILS	FLL
RNAV (GPS) Rwy 10R	GPS	RNAV	FLL
RNAV (GPS) Rwy 28L	GPS	RNAV	FLL
RNAV (GPS) Y Rwy 28R	GPS	RNAV	FLL
RNAV (GPS) Z Rwy 10L	GPS	RNAV	FLL
RNAV (RNP) Z Rwy 28R	RNP	RNAV	FLL
ILS Rwy 17L CAT II	ILS	ILS	MCO
ILS Rwy 17L SA CAT I	ILS	ILS	MCO
ILS Rwy 17L CAT III	ILS	ILS	MCO
ILS or LOC Rwy 17L	ILS or LOC	ILS	MCO

Table 3-3 Proposed Action Final Approach Procedures

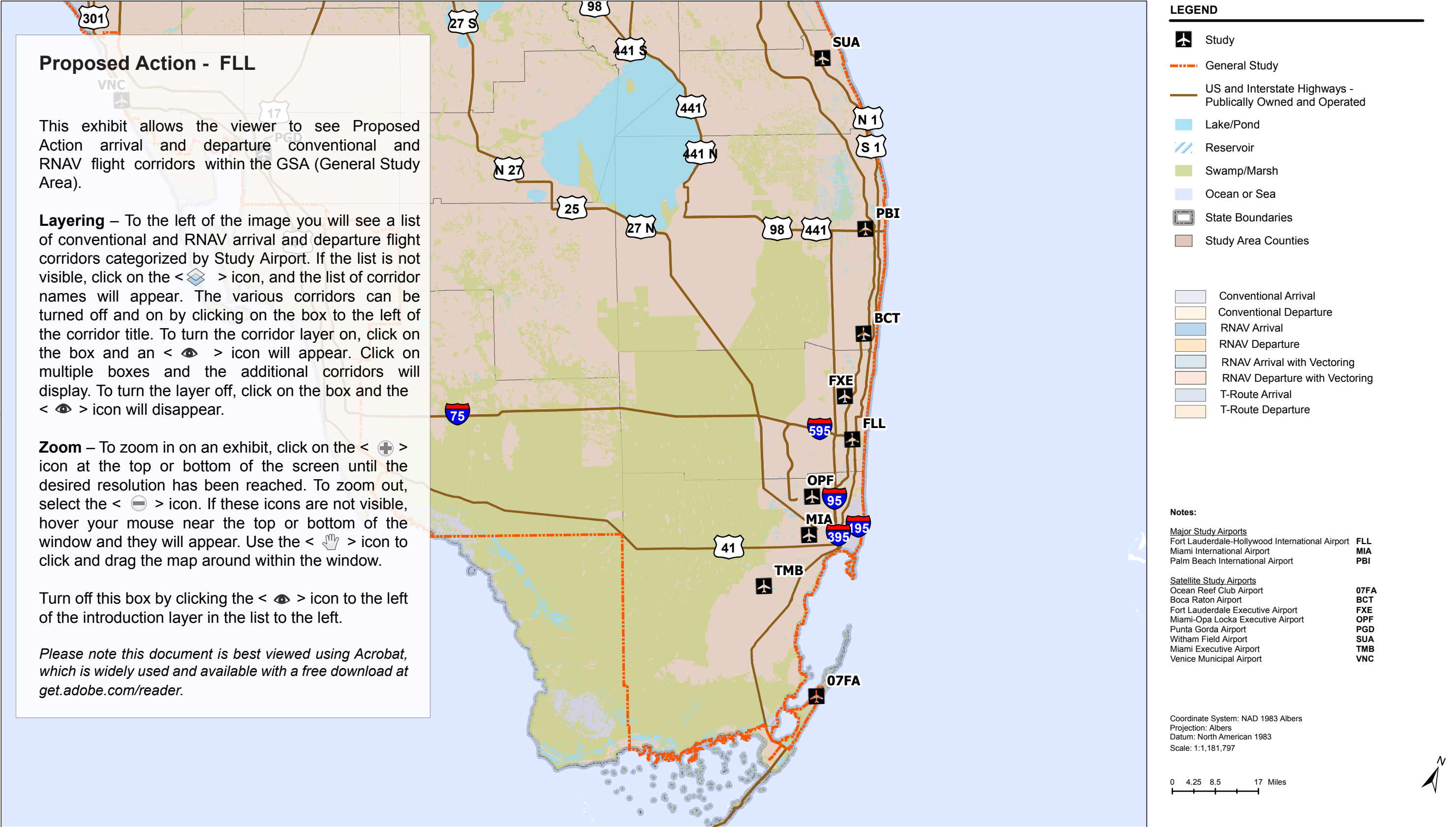
Proposed Action Procedure	Procedure Type	Design	Airport Served
ILS or LOC Rwy 18R	ILS or LOC	ILS	MCO
ILS or LOC Rwy 35R	ILS or LOC	ILS	MCO
ILS Rwy 35R Cat III	ILS	ILS	MCO
ILS Rwy 35R CAT II	ILS	ILS	MCO
ILS Rwy 35R SA CAT I	ILS	ILS	MCO
RNAV (GPS) Rwy 17L	GPS	RNAV	MCO
RNAV (GPS) Rwy 18R	GPS	RNAV	MCO
RNAV (GPS) Rwy 35R	GPS	RNAV	MCO
RNAV (GPS) Rwy 36L	GPS	RNAV	MCO
ILS or LOC Rwy 26L	ILS or LOC	ILS	MIA
ILS or LOC Rwy 27	ILS or LOC	ILS	MIA
LOC/DME Rwy 26R	LOC	LOC	MIA
RNAV (GPS) Rwy 26L	GPS	RNAV	MIA
RNAV (GPS) Rwy 26R	GPS	RNAV	MIA
RNAV (GPS) Rwy 27	GPS	RNAV	MIA
RNAV (RNP) Rwy 26L	RNP	RNAV	MIA
RNAV (RNP) Rwy 27	RNP	RNAV	MIA
ILS or LOC Rwy 10L	ILS or LOC	ILS	PBI
ILS or LOC Rwy 28R	ILS or LOC	ILS	PBI
RNAV (GPS) X Rwy 28R	GPS	RNAV	PBI
RNAV (GPS) Y Rwy 10L	GPS	RNAV	PBI
RNAV (GPS) Y Rwy 14	GPS	RNAV	PBI
RNAV (GPS) Y Rwy 28R	GPS	RNAV	PBI
RNAV (GPS) Y Rwy 32	GPS	RNAV	PBI
RNAV (RNP) W Rwy 28R	RNP	RNAV	PBI
RNAV (RNP) Z Rwy 10L	RNP	RNAV	PBI
RNAV (RNP) Z Rwy 14	RNP	RNAV	PBI
RNAV (RNP) Z Rwy 28R	RNP	RNAV	PBI
RNAV (RNP) Z Rwy 32	RNP	RNAV	PBI

Sources: South-Central Florida Metroplex D&I Team Proposed Final Design TARGETS Files 2019/2020.
National Flight Data Center National Airspace System Resources Database, Accessed December 2018; U.S. Department of Transportation, FAA Operational Procedure Files, December 2018.

Prepared by: ATAC Corporation, May 2020




As described for the major Study Airports in **Section 1.4.1**, independent operating configurations are dependent upon many factors. Airport traffic flows can interact with other airport traffic flows in different runway operating configurations. Therefore, the D&I Team took into consideration all possible runway operating configurations or combinations thereof. The predominant configurations for each of the major Study Airports were incorporated in **Exhibits 3-14 through 3-20** and show arrival and departure flows to the Study Airports associated with the Proposed Action. Corridors are grouped by procedure type (conventional




or RNAV), operation (arrival or departure), and major Study Airport or satellite Study Airports by geographic location (north satellites and south satellites).



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This exhibit allows the viewer to see Proposed Action arrival and departure conventional and RNAV flight corridors within the GSA (General Study Area).









Layering – To the left of the image you will see a list of conventional and RNAV arrival and departure flight corridors categorized by Study Airport. If the list is not visible, click on the  icon, and the list of corridor names will appear. The various corridors can be turned off and on by clicking on the box to the left of the corridor title. To turn the corridor layer on, click on the box and an  icon will appear. Click on multiple boxes and the additional corridors will display. To turn the layer off, click on the box and the  icon will disappear.

Zoom – To zoom in on an exhibit, click on the <  > icon at the top or bottom of the screen until the desired resolution has been reached. To zoom out, select the <  > icon. If these icons are not visible, hover your mouse near the top or bottom of the window and they will appear. Use the <  > icon to click and drag the map around within the window.

Turn off this box by clicking the < > icon to the left of the introduction layer in the list to the left.

Please note this document is best viewed using Acrobat, which is widely used and available with a free download at get.adobe.com/reader.

- ## LEGEND
-  Study Airports
 -  General Study Area
 -  US and Interstate Highways - Publically Owned and Operated
 -  Lake/Pond
 -  Reservoir
 -  Swamp/Marsh
 -  Ocean or Sea
 -  State Boundaries
 -  Study Area Counties

- | | |
|---|-------------------------------|
|  | Conventional Arrival |
|  | Conventional Departure |
|  | RNAV Arrival |
|  | RNAV Departure |
|  | RNAV Arrival with Vectoring |
|  | RNAV Departure with Vectoring |
|  | T-Route Arrival |
|  | T-Route Departure |

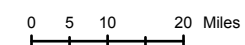
Notes:

<u>Major Study Airports</u>	
Orlando International Airport	MCO
Palm Beach International Airport	PBI
Tampa International Airport	TPA

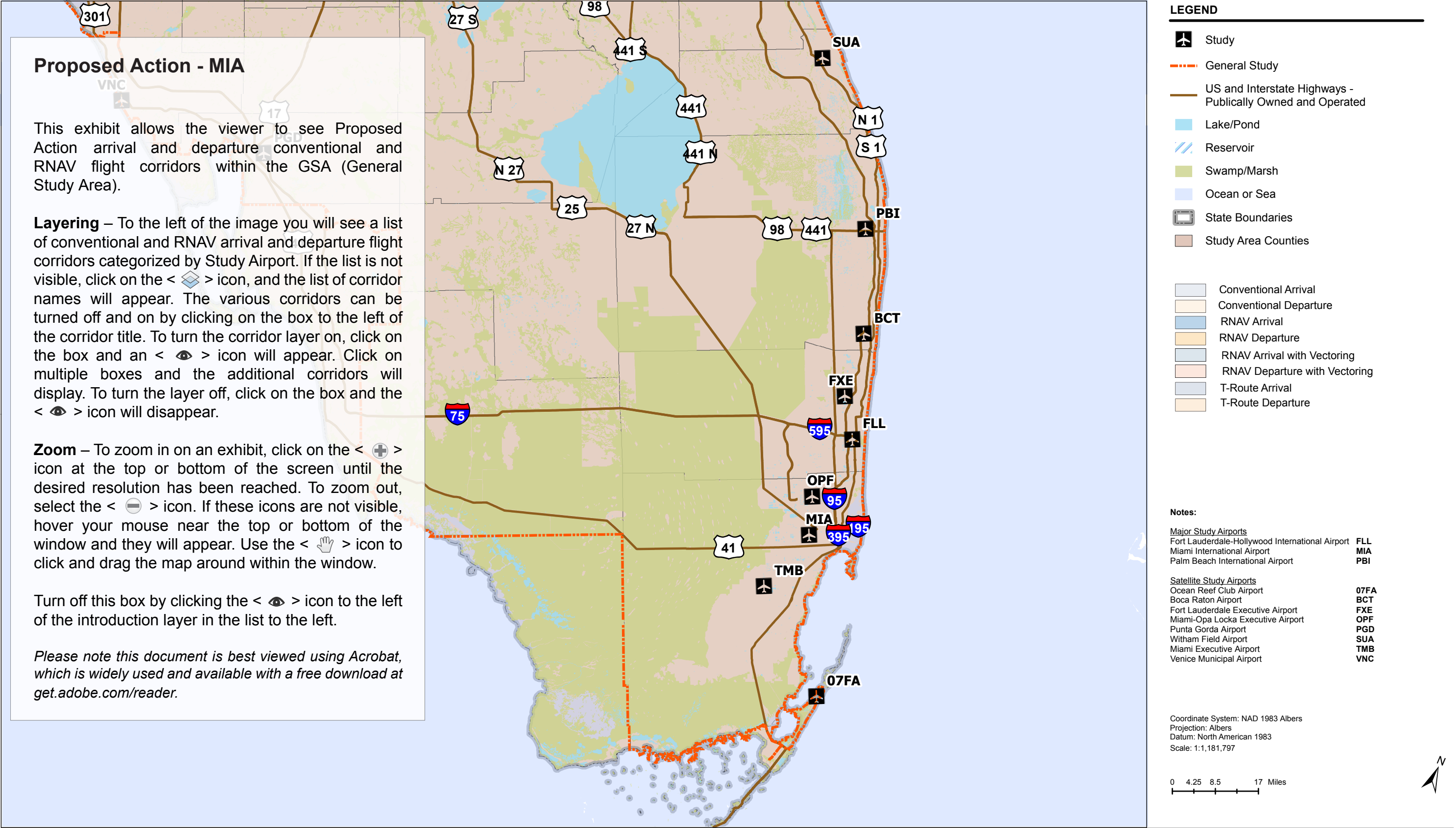
Satellite Study Airports

Kissimmee Gateway Airport	ISM
Lakeland Linder International Airport	LAL
Leesburg International Airport	LEE
Melbourne International Airport	MLB
Orlando Executive Airport	ORL
Punta Gorda Airport	PGD
St. Pete-Clearwater International Airport	PIE
Orlando Sanford International Airport	SFB
Sarasota Bradenton International Airport	SRQ
Witham Field Airport	SUA
Venice Municipal Airport	VNC

Coordinate System: NAD 1983 Albers
Projection: Albers
Datum: North American 1983
Scale: 1:1,600,307

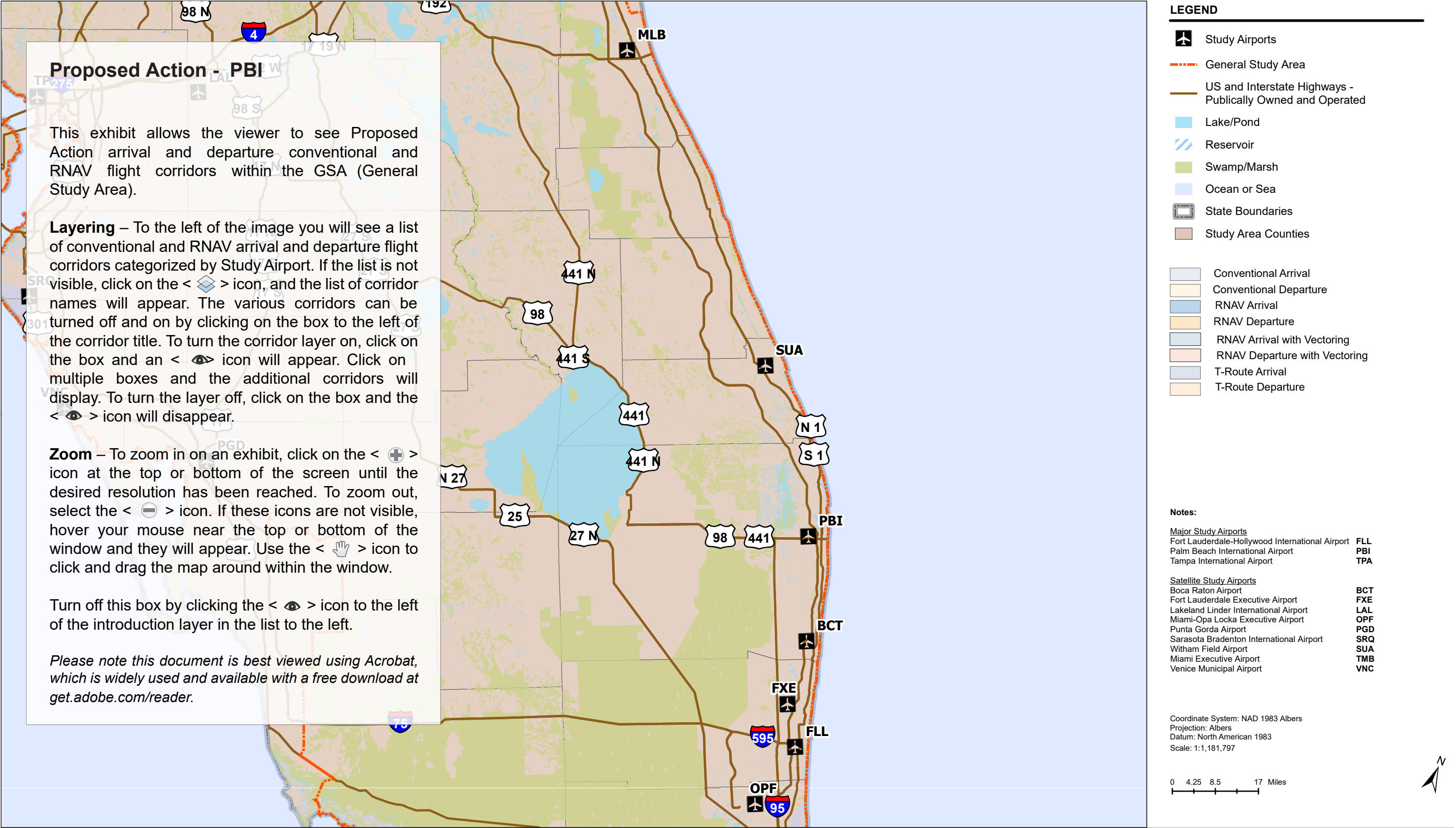


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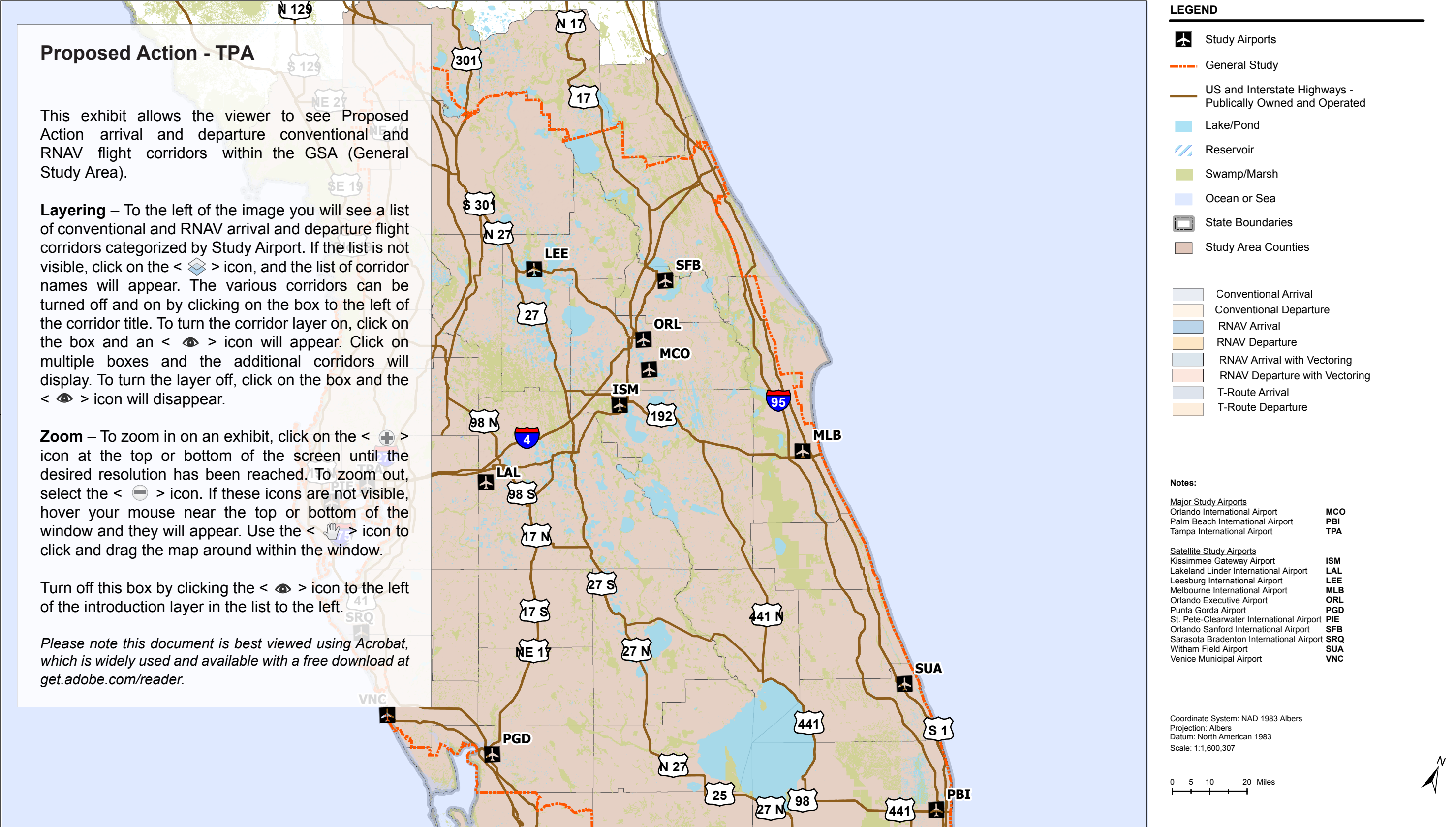


Sources: U.S. Census Bureau, 2016 (2016 TIGER/Line Shapefiles (machine-readable data files), American Community Survey - 2010-2014 5-Year Estimates); ESRI, Inc., 2016 (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). ESRI World Water Bodies 2018 (Ocean and Sea). ATAC Corporation, 2020, (2020 General Study Area boundary). Prepared by: ATAC Corporation, October 2020.

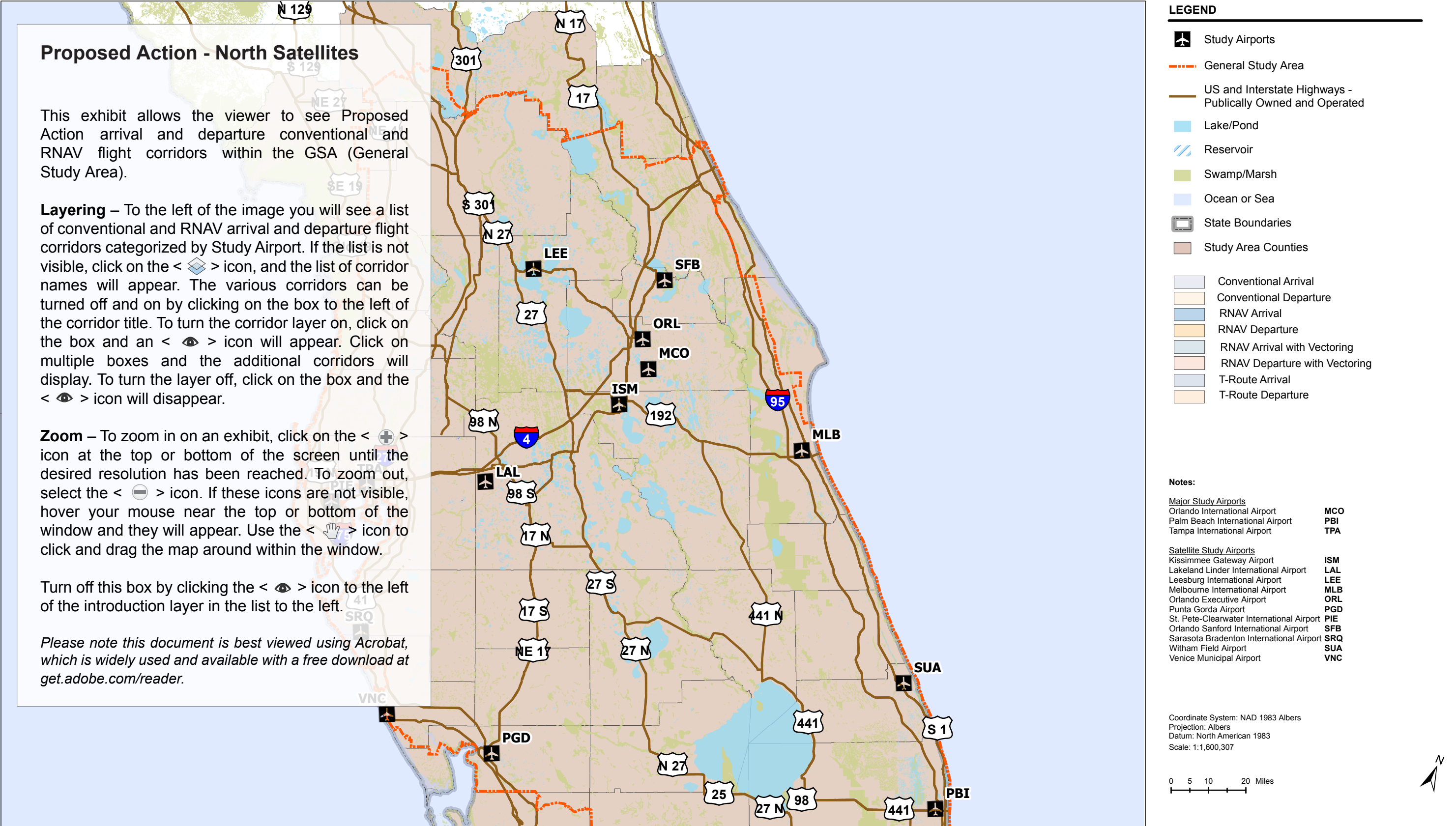
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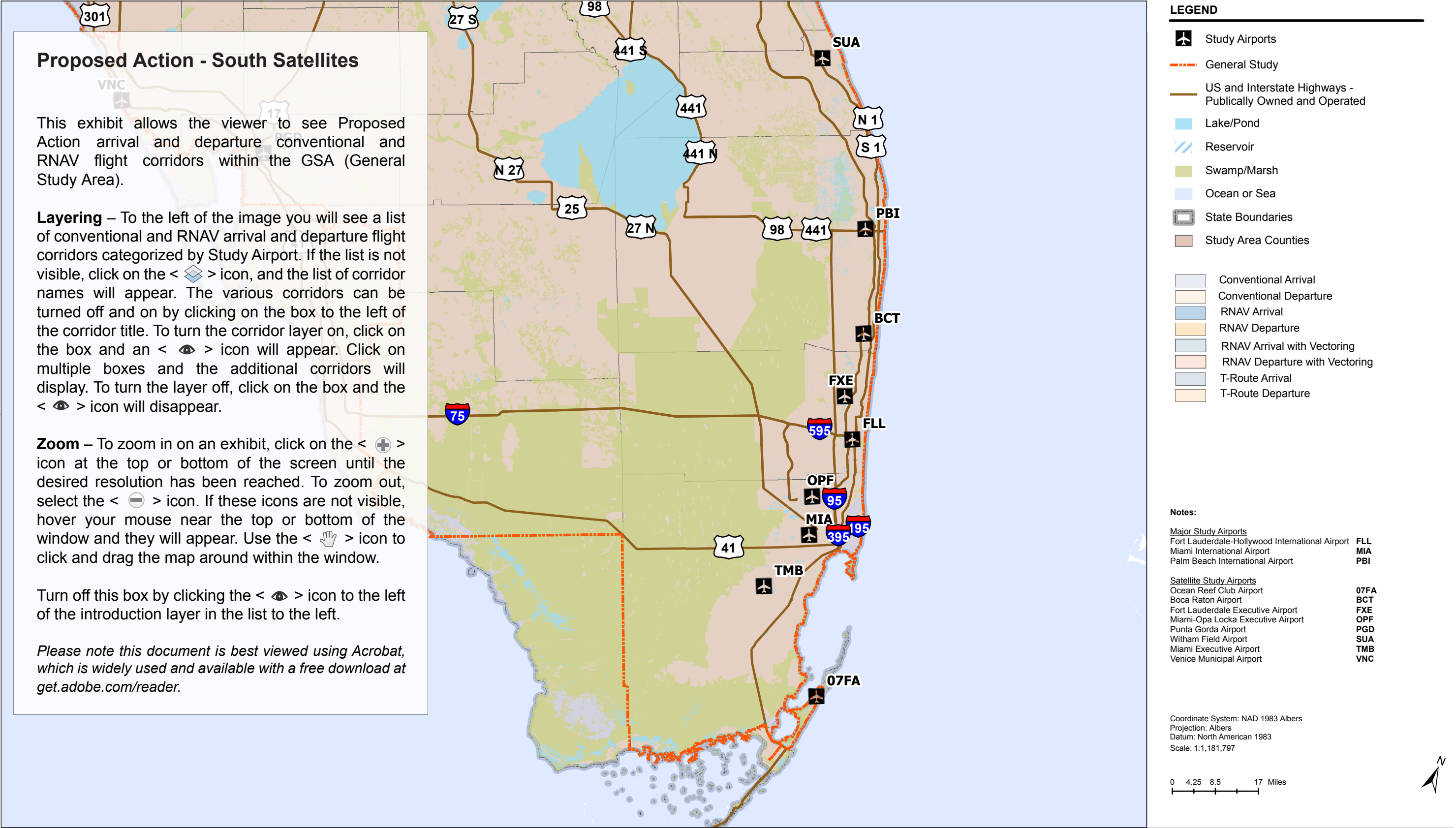
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Sources: U.S. Census Bureau, 2016 (2016 TIGER/Line Shapefiles (machine-readable data files), American Community Survey - 2010-2014 5-Year Estimates); ESRI, Inc., 2016 (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). ESRI World Water Bodies 2018 (Ocean and Sea). ATAC Corporation, 2020, (2020 General Study Area boundary). Prepared by: ATAC Corporation, October 2020.

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3.3 Summary Comparison of the Proposed Action and No Action Alternatives

This section provides a comparative summary between the Proposed Action and No Action alternatives based on the objectives defined in **Section 2.2**:

- Improve the flexibility in transitioning traffic between en route and terminal area airspace and between terminal area airspace and the runways
- Improve the segregation of arrivals and departures in terminal area and en route airspace
- Improve the predictability in transitioning traffic between en route and terminal area airspace and between terminal area airspace area and the runways

3.3.1 Improve the Flexibility in Transitioning Aircraft

Section 2.2.1 includes two criteria established to measure the objective to increase the flexibility in transitioning aircraft between the terminal and en route airspace:

- Where possible, increase the number of available transitions compared with the No Action alternative (measured by number of exit/entry points)
- Where possible, increase the number of RNAV STARs and SIDs compared with the No Action alternative (measured by total count of RNAV STARs and RNAV SIDs for each of the Study Airports)

Table 3-4 provides a summary comparison of the Proposed Action and No Action alternatives based on the criteria defined above.

Under the No Action alternative, there are 135 en route transitions and 193 runway transitions. Under the Proposed Action the number of en route transitions increases to 245, and the number of runway transitions increases to 455. The additional en route transitions result from more procedures being designed to tie into both existing and proposed entry and exit points, allowing for more flexibility within the airspace. The additional runway transitions allow controllers to assign aircraft to routes that were not available previously.

Table 3-4 Alternatives Evaluation: Improve Flexibility in Transitioning Aircraft

Criteria	Alternative	
	No Action	Proposed Action
Total En Route Transitions	135	245
Total Runway Transitions	193	455

Sources: National Flight Data Center National Airspace System Resources Database, Accessed December 2018; U.S. Department of Transportation, FAA Operational Procedure Files, December 2018. South-Central Florida Metroplex D&I Team Proposed Final Design TARGETS Files 2019/2020.

Prepared by: ATAC Corporation, October 2020

3.3.2 Segregate Arrival and Departure Flows

Section 2.2.2 includes one criterion to measure the objective to increase flexibility in transitioning aircraft between the terminal and en route airspace:

- Segregate arrival and departure traffic (measured by number of RNAV STARs and/or SIDs that can be used independently to/from Study Airports). Note that a single procedure may serve more than one airport.

Table 3-5 provides a summary comparison of the Proposed Action and No Action alternatives based on the criteria defined above. Under the No Action, there are 81 RNAV procedures. The Proposed Action has 180 RNAV procedures. The greater number of RNAV routes and better usability allow for greater segregation of arrival and departure flows.

Table 3-5 Alternatives Evaluation: Segregate Arrival and Departure Flows

Airport	Alternative	
	No Action	Proposed Action
Criterion: Number of Independent RNAV Procedures		
07FA	4	12
BCT	1	8
FLL	10	15
FXE	4	11
ISM	3	8
LAL	1	3
LEE	1	5
MCO	3	14
MIA	13	17
MLB	0	2
OPF	5	15
ORL	3	10
PBI	7	12
PGD	0	2
PIE	4	7
SFB	1	6
SRQ	3	4
SUA	3	4
TMB	4	12
TPA	9	9
VNC	2	4
Total	81	180

Sources: National Flight Data Center National Airspace System Resources Database, Accessed December 2018; U.S. Department of Transportation, FAA Operational Procedure Files, Accessed December 2018. South-Central Florida Metroplex D&I Team Proposed Final Design TARGETS Files 2019/2020.

Prepared by: ATAC Corporation, October 2020

3.3.3 Improve Predictability of Air Traffic Flow

Section 2.2.3 includes two criteria to measure the objective to increase flexibility in transitioning aircraft between the terminal and enroute airspace:

- RNAV procedures with altitude controls intended to optimize descent or climb patterns (measured by count of procedures with altitude controls)
- Ensure that the majority of STARs and SIDs to and from the Study Airports are based on RNAV technology (measured by count of RNAV STARs and SIDs for an individual Study Airport)

Under the No Action alternative, 30 procedures include altitude controls. In comparison, the Proposed Action includes 161 procedures with altitude controls. **Table 3-6** provides a summary comparison of the Proposed Action and No Action based on the criteria defined

above. The total number of RNAV procedures increases from 52 under the No Action alternative to 74 under the Proposed Action. The No Action alternative has 33 published conventional/radar vector procedures, and the Proposed Action has 32 conventional procedures. These are retained for non-RNAV equipped aircraft and adjusted to more closely align with the proposed new RNAV procedures. Other non-RNAV equipped aircraft would be assigned preferred/direct routing.

Table 3-6 Alternatives Evaluation: Improve Predictability of Air Traffic Flow

Airport	Alternative	
	No Action	Proposed Action
07FA	0	11
BCT	0	7
FLL	6	13
FXE	0	10
ISM	0	7
LAL	0	3
LEE	0	5
MCO	0	14
MIA	11	13
MLB	0	1
OPF	0	13
ORL	0	9
PBI	5	11
PGD	0	1
PIE	0	7
SFB	0	4
SRQ	1	3
SUA	2	4
TMB	0	11
TPA	5	11
VNC	1	3
Total	30	161

Source: U.S. Department of Transportation, Federal Aviation Administration, South-Central Florida Metroplex D&I Team Proposed Final Design TARGETS Files 2019/2020.

Prepared by: ATAC Corporation, October 2020

3.4 Proposed Action Determination

Of the two alternatives carried forward for analysis, only the Proposed Action would meet the Purpose and Need for the South-Central Florida Metroplex Project based on the criteria discussed above. Therefore, the Proposed Action is carried forward for analysis in this EA. Although it would not meet the Purpose and Need, the No Action alternative was carried forward, as required by Council on Environmental Quality (CEQ) regulations, to establish a norm against which decision makers can measure the environmental effects of undertaking the Proposed Action.

3.5 Listing of Federal Laws and Regulations Considered

Table 3-7 lists the relevant federal laws and statutes, Executive Orders, and regulations applicable to the Proposed Action and the No Action alternative and considered in preparation of this EA.

Table 3-7 List of Federal Laws and Regulations Considered

Federal Laws and Statutes	Citation
National Environmental Policy Act of 1969	42 U.S.C. § 4321 <i>et seq.</i>
Clean Air Act of 1970, as amended	42 U.S.C. § 7401 <i>et seq.</i>
American Indian Religious Freedom Act of 1978	42 U.S.C. § 1996
Department of Transportation Act of 1966, Section 4(f)	49 U.S.C. § 303(c)
Aviation Safety and Noise Abatement Act of 1979	49 U.S.C. § 47501 <i>et seq.</i>
Federal Aviation Act of 1958, as amended	49 U.S.C. § 40101 <i>et seq.</i>
Endangered Species Act of 1973	16 U.S.C. § 1531 <i>et seq.</i>
Fish and Wildlife Coordination Act of 1958	16 U.S.C. § 661 <i>et seq.</i>
The Bald and Golden Eagle Protection Act of 1940	16 U.S.C. § 668 <i>et seq.</i>
Lacey Act of 1900	16 U.S.C. § 3371 <i>et seq.</i>
Migratory Bird Treaty Act of 1918	16 U.S.C. § 703 <i>et seq.</i>
National Historic Preservation Act of 1966, as amended	16 U.S.C. § 470
The Wilderness Act of 1964	16 U.S.C. § 1131-1136
Archaeological and Historic Preservation Act of 1974, as amended	16 U.S.C. § 469 <i>et seq.</i>
Executive Orders	Citation
11593, Protection and Enhancement of the Cultural Environment	36 Federal Register (FR) 8921
12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations	59 FR 7629
13045, Protection of Children from Environmental Health Risks and Safety Risks	62 FR 19885
13423, Strengthening Federal Environmental, Energy, and Transportation Management	72 FR 3919
Federal Regulations	Citation
Council for Environmental Quality Regulations	40 C.F.R. Part 1500 to Part 1508
General Conformity Regulations	40 C.F.R. Part 93 Subpart B
Protection of Historic Properties Regulations	36 C.F.R. 800
Airport Noise Compatibility Planning Regulations	14 C.F.R. Part 150
Federal Aviation Regulations (FAR) Part 71: Designation of Class A, Class B, Class C, Class D, and Class E Airspace Areas; Airways; Routes; and Reporting Points, December 17, 1991.	14 C.F.R. Part 71
FAA/U.S. Department of Transportation Orders	
U.S. DOT Order 5610.2a: <i>Final Order to Address Environmental Justice in Low-Income and Minority Populations</i> , May 2, 2012.	
FAA Order 8260.58B, <i>The United States Standard Performance Based Navigation (PBN) Instrument Procedure Design</i> , August 24, 2020.	
FAA Order 8260.43C, <i>Flight Procedures Management Program</i> , April 9, 2019.	
FAA Joint Order 7110.65Y, <i>Air Traffic Control</i> (with Change 1 and Change 2), August 15, 2019.	
FAA Order 1050.1F: <i>Environmental Impacts: Policies and Procedures</i> , July 16, 2015.	
FAA Order 1050.1F: <i>1050.1F Desk Reference Version 2</i> , February 2020.	
FAA Order 7100.41A, <i>Performance Based Navigation Implementation Process</i> , April 29, 2016.	
FAA Order JO 7400.2M, <i>Procedures for Handling Airspace Matters</i> (with Change 1 and Change 2), February 28, 2019.	
FAA Order 8260.3D, <i>United States Standard for Terminal Instrument Procedures (TERPS)</i> , February 16, 2018.	
FAA Order 8040.4B, <i>Safety Risk Management Policy</i> , May 02, 2017.	
FAA Joint Order 1000.37B, <i>Air Traffic Organization Safety Management System</i> , October 31, 2018.	
FAA Order 8260.19I, <i>Flight Procedures and Airspace</i> , June 29, 2020.	
FAA Order 8260.46G, <i>Departure Procedure (DP) Program</i> , November 9, 2018.	
FAA Advisory Circulars	
FAA Advisory Circular 150/5020-1: <i>Noise Control and Compatibility Planning for Airports</i> , August 5, 1983.	
FAA Advisory Circular 150/5200-33C: <i>Hazardous Wildlife Attractants on or near Airports</i> , February 21, 2020.	
FAA Advisory Circular 36-3H: <i>Estimated Airplane Noise Levels in A-Weighted Decibels</i> , (with Change 1) May 25, 2012.	
Source:	ATAC Corporation, October 2020
Prepared by:	ATAC Corporation, October 2020

4 Affected Environment

This chapter describes the human, physical, and natural environmental conditions that could be affected by the Proposed Action. Specifically, this Environmental Assessment (EA) considers effects on the environmental resource categories identified in Federal Aviation Administration (FAA) Order 1050.1F, *Environmental Impacts: Policies and Procedures* (FAA Order 1050.1F) and 1050.1F *Desk Reference*. The potential environmental impacts of the Proposed Action and No Action alternatives are discussed in **Chapter 5, Environmental Consequences**.

The technical terms and concepts discussed in this chapter are explained in **Chapter 1, Background**.

4.1 General Study Area

To describe existing conditions in the South-Central Florida Metroplex, the FAA developed a General Study Area. The General Study Area is used to evaluate the potential for environmental impacts under the Proposed Action. Two overall objectives guided the development of the General Study Area:

1. The General Study Area captures June 1, 2017 – May 30, 2018 radar data flight tracks where 95 percent of departing aircraft leaving the major Study Airports (FLL, MCO, MIA, PBI, TPA) are below 10,000 feet Above Ground Level (AGL) and 95 percent of arriving aircraft to the major Study Airports are below 7,000 feet AGL. The FAA requires consideration of impacts of airspace actions from the surface to 10,000 feet AGL if the study area is larger than the immediate area around an airport or involves more than one airport or up to 18,000 feet AGL if the proposed action or alternative(s) are over a national park or wildlife refuge³⁹ where other noise is very low and a quiet setting is a generally recognized purpose and attribute.^{40,41} Furthermore, policy guidance issued by the FAA Program Director for Air Traffic Airspace Management states that for air traffic project environmental analyses, noise impacts should be evaluated for proposed changes in arrival procedures between 3,000 feet AGL and 7,000 feet AGL and departure procedures between 3,000 feet AGL and 10,000 feet AGL for large civil jet aircraft weighing over 75,000 pounds.⁴²
2. The lateral boundary of the General Study Area is defined by U.S. Census tract boundaries where aircraft cross at or below the 10,000/7,000 feet AGL thresholds. This extent is concisely defined to focus on areas of air traffic flow.

Exhibits 4-1 and 4-2 depict the General Study Area. **Table 4-1** lists the 36 counties all or partially included in the General Study Area.

39 U.S. Department of Transportation, Federal Aviation Administration. *Order 1050.1F Desk Reference (Version 2)* Section 11.2 *Affected Environment*. Also see this EA, Section 4.1.1 *Department of Transportation Act, Section 4(f)* for a more detailed discussion of the type of properties related to 4(f) resources.

40 U.S. Department of Transportation, Federal Aviation Administration, FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, Appendix B. *Federal Aviation Administration Requirements for Assessing Impacts Related to Noise and Noise-Compatible Land Use and Section 4(f) of the Department of Transportation Act (49 U.S.C. § 303)*, Para. B-1.3, *Affected Environment*. July 16, 2015.

41 U.S. Department of Transportation, Federal Aviation Administration, *1050.1F Desk Reference (Version 2)*, Ch. 11, *Noise and Noise-Compatible Land Use*, Section 11.2, *Affected Environment*, February 2020.

42 U.S. Department of Transportation, Federal Aviation Administration, *Memorandum Regarding Altitude Cut-Off for National Airspace Redesign (NAR) Environmental Analyses*, September 15, 2003.

Table 4-1 Counties within General Study Area

Florida Counties		
Alachua County	Highlands County	Orange County
Brevard County	Hillsborough County	Osceola County
Broward County	Indian River County	Palm Beach County
Charlotte County	Lake County	Pasco County
Citrus County	Lee County	Pinellas County
Collier County	Levy County	Polk County
DeSoto County	Manatee County	Putnam County
Flagler County	Marion County	Sarasota County
Glades County	Martin County	Seminole County
Hardee County	Miami-Dade County	St. Lucie County
Hendry County	Monroe County	Sumter County
Hernando County	Okeechobee County	Volusia County

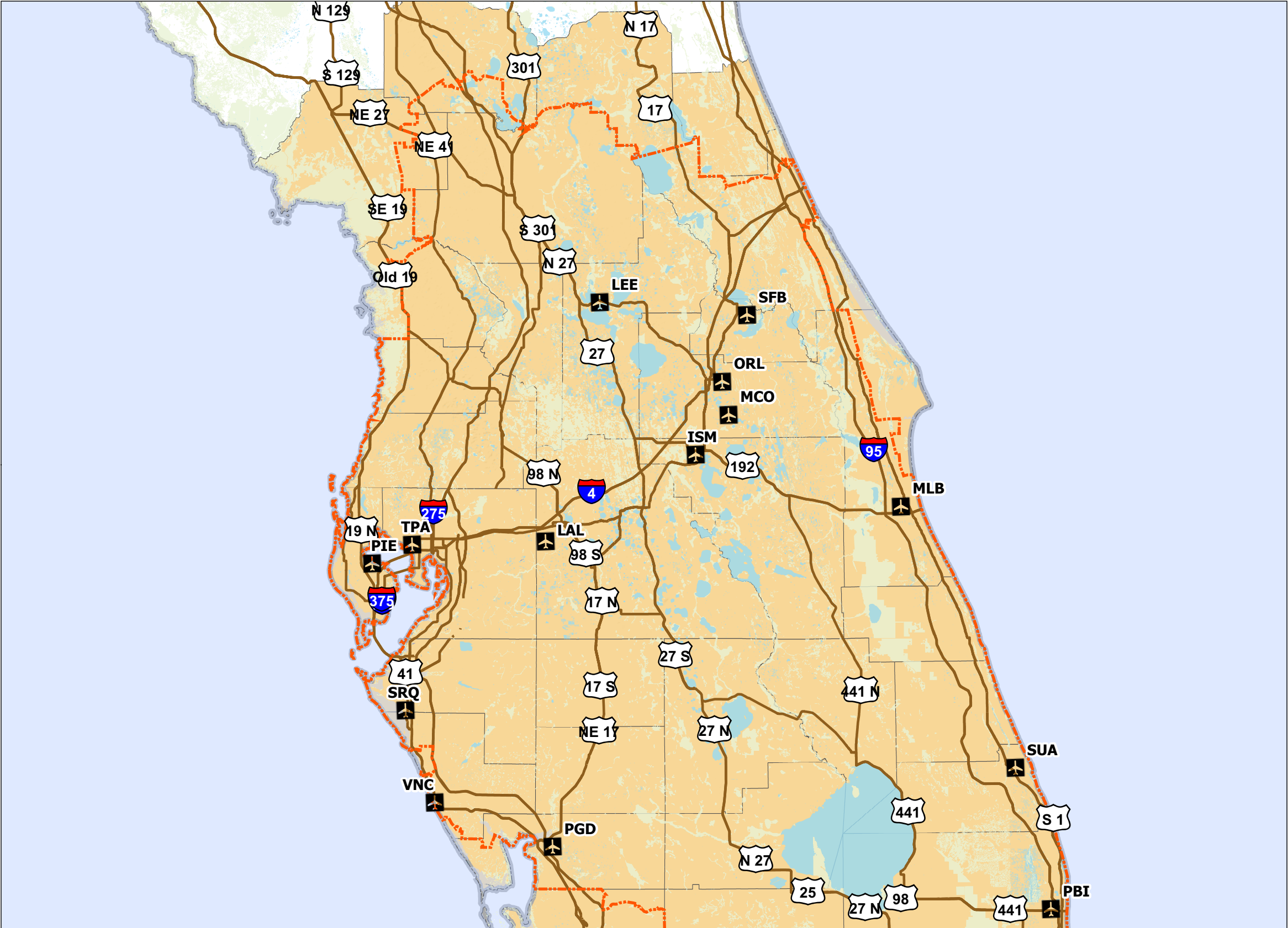
Sources: ESRI, U.S. Census Bureau, 2019
Prepared by: ATAC Corporation, February 2020.

4.1.1 Supplemental Study Area

In accordance with FAA Order 1050.1F that specifies a Study Area may be "...up to 18,000 feet AGL if the proposed action or alternative(s) are over a national park or wildlife refuge where other noise is very low and a quiet setting is a generally recognized purpose and attribute,"⁴³ this analysis extends the analysis to a Supplemental Study Area. The height of the Supplemental Study Area is at an altitude consistent with the 18,000 feet AGL guidance, and the lateral boundaries are derived from the location where aircraft arriving to or departing from a Study Airport achieve 18,000 feet AGL.

The noise values for the General Study Area are comprehensively calculated from the surface to 18,000 AGL vertically, while the noise is reported consistent with the General Study Area methodology and identified reporting points.

43 U.S. Department of Transportation, Federal Aviation Administration, FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, Appendix B. *Federal Aviation Administration Requirements for Assessing Impacts Related to Noise and Noise-Compatible Land Use*, Para. B-1.3, *Affected Environment*. July 16, 2015.

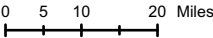


LEGEND

- Study Airports
- General Study Area
- US and Interstate Highways - Publically Owned and Operated
- Lake/Pond
- Reservoir
- Swamp/Marsh
- Ocean or Sea
- State Boundaries
- Study Area Counties

- Notes:**
- Major Study Airports
- | | |
|----------------------------------|-----|
| Orlando International Airport | MCO |
| Palm Beach International Airport | PBI |
| Tampa International Airport | TPA |
- Satellite Study Airports
- | | |
|---|-----|
| Kissimmee Gateway Airport | ISM |
| Lakeland Linder International Airport | LAL |
| Leesburg International Airport | LEE |
| Melbourne International Airport | MLB |
| Orlando Executive Airport | ORL |
| Punta Gorda Airport | PGD |
| St. Pete-Clearwater International Airport | PIE |
| Orlando Sanford International Airport | SFB |
| Sarasota Bradenton International Airport | SRQ |
| Witham Field Airport | SUA |
| Venice Municipal Airport | VNC |

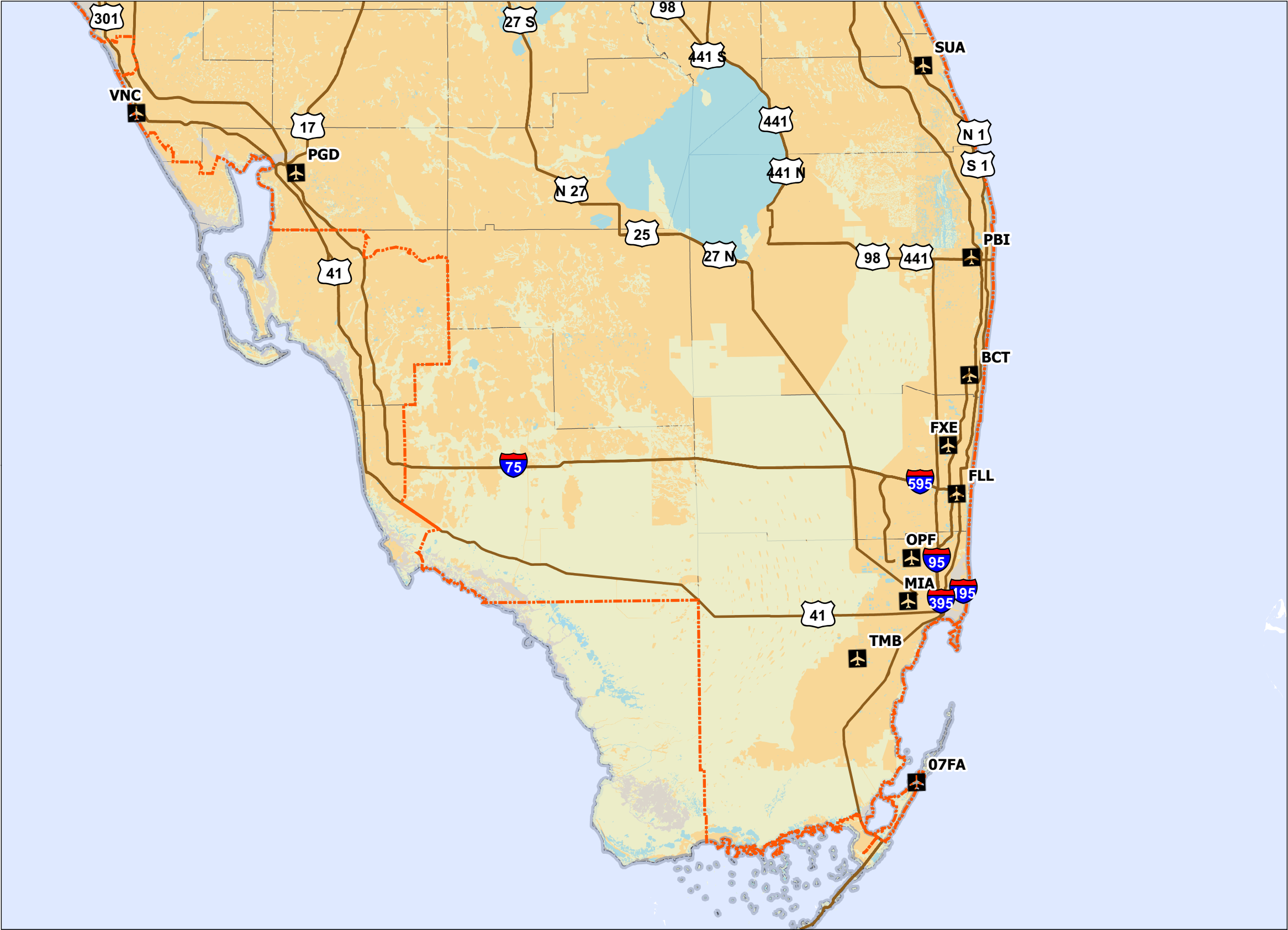
Coordinate System: NAD 1983 Albers
Projection: Albers
Datum: North American 1983
Scale: 1:1,601,151



Sources: U.S. Census Bureau, 2016 (2016 TIGER/Line Shapefiles (machine-readable data files), American Community Survey - 2010-2014 5-Year Estimates); ESRI, Inc., 2016 (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies).
ESRI World Water Bodies 2018 (Ocean and Sea). ATAC Corporation, 2020, (2020 General Study Area boundary).
Prepared by: ATAC Corporation, August 2020.

Exhibit 4-1
General Study Area - North

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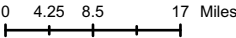


LEGEND

- Study Airports
- General Study Area
- US and Interstate Highways - Publically Owned and Operated
- Lake/Pond
- Reservoir
- Swamp/Marsh
- Ocean or Sea
- State Boundaries
- Study Area Counties

- Notes:**
- Major Study Airports
- | | |
|---|-----|
| Fort Lauderdale-Hollywood International Airport | FLL |
| Miami International Airport | MIA |
| Palm Beach International Airport | PBI |
- Satellite Study Airports
- | | |
|-----------------------------------|------|
| Ocean Reef Club Airport | 07FA |
| Boca Raton Airport | BCT |
| Fort Lauderdale Executive Airport | FXE |
| Miami-Opa Locka Executive Airport | OPF |
| Punta Gorda Airport | PGD |
| Witham Field Airport | SUA |
| Miami Executive Airport | TMB |
| Venice Municipal Airport | VNC |

Coordinate System: NAD 1983 Albers
Projection: Albers
Datum: North American 1983
Scale: 1:1,181,797



Sources: U.S. Census Bureau, 2016 (2016 TIGER/Line Shapefiles (machine-readable data files), American Community Survey - 2010-2014 5-Year Estimates); ESRI, Inc., 2016 (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). ESRI World Water Bodies 2018 (Ocean and Sea). ATAC Corporation, 2020, (2020 General Study Area boundary). Prepared by: ATAC Corporation, August 2020.

Exhibit 4-2
General Study Area - South

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4.2 Resource Categories or Sub-Categories Not Affected

This section discusses the environmental resource categories or sub-categories that would remain unaffected by the Proposed Action. These resource categories would remain unaffected because the resource either does not exist within the General Study Area or the types of activities associated with the Proposed Action would not affect them. The resource categories or sub-categories are:

- **Biological Resources (including fish and plants only):** Air traffic airspace and procedure changes do not involve ground-disturbing activities. They will not destroy or modify critical habitat for any species. The Proposed Action would not affect habitat for non-avian fish or plants, and thus no further analysis is required.
- **Coastal Resources:** The Proposed Action would not involve any actions (physical changes or development of facilities) that would be inconsistent with management plans for designated Coastal Barrier Resource System (CBRS) areas found in the General Study Area. The Proposed Action would not directly affect any shorelines or change the use of shoreline zones and be inconsistent with any NOAA-approved state Coastal Zone Management Plan (CZMP).
- **Farmlands:** The Proposed Action would not involve the development of any land regardless of use, nor does it have the potential to convert any farmland to non-agricultural uses.
- **Hazardous Materials, Solid Waste, and Pollution Prevention:** The Proposed Action would not result in any construction or development or any physical disturbances of the ground. Therefore, the potential for impact in relation to hazardous materials, pollution prevention, and solid waste is not anticipated, and no further analysis is required.
- **Historical, Architectural, Archeological, and Cultural Resources – Archeological and Architectural sub-category only:** The Proposed Action would not involve excavation of archaeological resources on Federal or Indian lands or disposition of cultural items. It would not affect the access to or the physical integrity of American Indian sacred sites. The Proposed Action would not result in any construction, development, or physical disturbances of the ground. Therefore, the potential for impact in relation to architectural compatibility with the character of a surrounding historic district or property is not anticipated, and therefore, no further analysis is required.
- **Land Use:** The Proposed Action would not involve any changes to existing, planned, or future land uses within the General Study Area. Therefore, no further analysis is required.
- **Natural Resources and Energy Supply – Natural Resources sub-category only (aircraft fuel only):** The Proposed Action would not require the need for unusual natural resources and materials, or those in short supply. Therefore, no further analysis is required.

- **Socioeconomic Impacts, Environmental Justice, and Children's Environmental Health and Safety Risks**
 - **Socioeconomic Impacts sub-category:** The Proposed Action would not involve acquisition of real estate, relocation of residents or community businesses, disruption of local traffic patterns, loss in community tax base, or changes to the fabric of the community.
 - **Children's Environmental Health and Safety Risks sub-categories:** The Proposed Action would not affect products or substances that a child would be likely to come into contact with, ingest, use, or be exposed to, and would not result in environmental health and safety risks that could disproportionately affect children.
- **Visual Effects – Light Emissions only:** The Proposed Action will not change aviation lighting; therefore, no further analysis is required.
- **Water Resources (including Wetlands, Floodplains, Surface Waters, Groundwater, and Wild and Scenic Rivers)**
 - **Wetlands:** The Proposed Action would not result in the construction of facilities and would therefore not encroach upon areas designated navigable waters. Therefore, no further analysis is required.
 - **Floodplains:** The Proposed Action would not result in the construction of facilities. Therefore, it would not encroach upon areas designated as a 100-year flood event area as described by the Federal Emergency Management Agency (FEMA), and no further analysis is required.
 - **Surface Waters:** The Proposed Action would not result in any changes to existing discharges to water bodies, create a new discharge that would result in impacts to surface waters, or modify a water body. The Proposed Action would, therefore, not result in any direct or indirect impacts on surface waters, and no further analysis is required.
 - **Groundwater:** The Proposed Action does not involve land acquisition or ground-disturbing activities that would withdraw groundwater from underground aquifers or reduce infiltration or recharge to ground water resources through the introduction of new impervious surfaces, and thus, no further analysis is required.
 - **Wild and Scenic Rivers:** The Wekiva River,⁴⁴ which covers 41.6 total miles; and the Loxahatchee River,⁴⁵ which covers 7.6 total miles are the only designated wild and scenic rivers located within the General Study Area. Florida has approximately 25,949 miles of river, of which 49.2 miles

44 The Wekiva River has 31.4 miles designated "Wild"; 2.1 miles designated "Scenic"; 8.1 miles designated "Recreational"; and a total length of 41.6 miles. The River is located in the north central portion of the General Study Area and is generally 9 miles west of SFB [<https://nps.maps.arcgis.com/apps/MapJournal/index.html?appid=ba6debd907c7431ea765071e9502d5ac#>] (Accessed March 9, 2020)].

45 The Loxahatchee River has 1.3 miles designated "Wild", 5.8 miles designated "Scenic"; 0.5 miles designated Recreational; and a total length of 7.6 miles. The River is located in the southeast portion of the General Study Area and is generally 26 miles north of PBI [<https://nps.maps.arcgis.com/apps/MapJournal/index.html?appid=ba6debd907c7431ea765071e9502d5ac#>] (Accessed March 9, 2020)].

are designated as wild & scenic, thus comprising 0.19% of total river miles.⁴⁶ The Proposed Action would not foreclose or downgrade Wild, Scenic, or Recreational river status of a river or river segment included in the Wild and Scenic River System, and, therefore, no further analysis is required.

4.3 Potentially Affected Resource Categories or Sub-Categories

This section provides information on the current conditions within the General Study Area for environmental resource categories or components that the Proposed Action could potentially affect. These environmental resource categories or sub-categories include:

- **Section 4.3.1 Air Quality**
- **Section 4.3.2 Biological Resources – Wildlife (Avian and Bat Species) and Migratory Birds Sub-Categories only**
- **Section 4.3.3 Climate**
- **Section 4.3.4 Department of Transportation Act, Section 4(f)**
- **Section 4.3.5 Historic, Architectural, Archeological, and Cultural Resources – Historic and Cultural Resources Sub-Categories only**
- **Section 4.3.6 Natural Resources and Energy Supply – Energy Supply sub-category only (aircraft fuel only)**
- **Section 4.3.7 Noise and Noise – Compatible Land Use**
- **Section 4.3.8 Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks – Environmental Justice sub-category only**
- **Section 4.3.9 Visual Effects (Visual Resources / Visual Character Only)**

The following sections discuss each of the above listed environmental resource categories in detail.

4.3.1 Air Quality

This section describes air quality conditions within the General Study Area. In the United States, air quality is generally monitored and managed at the county or regional level. The U.S. EPA, pursuant to mandates of the federal Clean Air Act, (42 U.S.C. § 7401 et seq. (1970)), has established the National Ambient Air Quality Standards (NAAQS) to protect public health, the environment, and quality of life from the detrimental effects of air pollution. Standards have been established for the following criteria pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), ozone (O₃), particulate matter (PM), and sulfur dioxide (SO₂). PM standards have been established for inhalable coarse particles ranging in diameter from 2.5 to 10 micrometers (µm) (PM₁₀) and fine particles less than 2.5 µm (PM_{2.5}) in diameter.

⁴⁶ U.S. Fish and Wildlife Service, National Wild and Scenic Rivers System [<https://www.rivers.gov/florida.php> (Accessed March 9, 2020)].

In accordance with the Clean Air Act Amendments (CAAA) of 1997, (91 Stat. 685, P.L. 95-95), the U.S. EPA uses air monitoring data it compiles, as well as data collected by local air quality agencies, to classify counties and some sub-county geographical areas by their compliance with the NAAQS. An area with air quality at or below the NAAQS is designated as an attainment area. An area with air quality that exceeds the NAAQS is designated as a nonattainment area. Nonattainment areas are further classified as extreme, severe, serious, moderate, and marginal by the extent the NAAQS are exceeded. Areas that have been reclassified from nonattainment to attainment are identified as maintenance areas. An area may be designated as unclassifiable when there is a temporary lack of data on which to base its attainment status. **Table 4-2** identifies those areas that fall within the General Study Area that are in nonattainment or maintenance status for the identified pollutants.

Table 4-2 NAAQS Nonattainment and Maintenance Areas in the General Study Area

Pollutant	Status	County
Sulfur Dioxide (2010)	Maintenance (Partial County)	Hillsborough County, FL; Nassau County, FL, Polk County, FL
Lead (2008)	Maintenance (Partial County)	Hillsborough County, FL

Source: U.S. Environmental Protection Agency Green Book [<https://www.epa.gov/green-book> (Accessed October 2, 2020)].

Prepared by: ATAC Corporation, October 2020.

Both the EPA and the FAA have determined that aircraft operations at or above a mixing height of 3,000 feet AGL have a very small effect on pollutant concentrations at ground level.^{47,48,49} The mixing height represents the height of the completely mixed portion of the atmosphere that begins at the earth's surface and extends to a few thousand feet overhead where the atmosphere becomes fairly stable.⁵⁰ Mixing heights will vary based on a variety of factors including topography, time of day, temperature, wind, and season. A mixing height of 3,000 feet AGL represents the annual national average mixing height. While 3,000 feet AGL is the threshold established by the EPA and the FAA, FAA research on mixing heights indicates that changes in air traffic procedures above 1,500 ft. AGL and below the mixing height would have little if any effect on emissions and ground concentrations.⁵¹

4.3.2 Biological Resources – Wildlife (Avian and Bat Species) and Migratory Birds Sub-Categories Only

This section discusses the existing wildlife resources within the General Study Area. The Proposed Action involves redesigning standard instrument arrival and departure procedures and the supporting airspace management structure serving the Study Airports. Accordingly, the discussion is limited to avian and bat species that may be present within the General Study Area.

47 Wayson, Roger, and Fleming, Gregg, "Consideration of Air Quality Impacts by Airplane Operations at or Above 3000 feet AGL," Volpe National Transportation Systems Center and FAA Office of Environment & Energy, FAA-AEE-00-01-DTS-34, September 2000. [http://www.faa.gov/regulations_policies/policy_guidance/envir_policy/ (Accessed March 2020)].

48 40 C.F.R. § 93.150(c)(2) (xxii).

49 72 Fed. Reg. 6641 (February 12, 2007).

50 U.S. Department of Transportation, Federal Aviation Administration, *Aviation Emissions and Air Quality Handbook Version 3, Update 1*, January 2015 [https://www.faa.gov/regulations_policies/policy_guidance/envir_policy/airquality_handbook/ (Accessed March 2020)].

51 Report on "Consideration of Air Quality Impacts by Airplane Operations At or Above 3,000 feet AGL, FAA-AEE-00-01, September 2000, p. 5. [https://www.faa.gov/regulations_policies/policy_guidance/envir_policy/media/catex.pdf (Accessed March 2020)].

4.3.2.1 Threatened and Endangered Species (Avian and Bat Species)

The Endangered Species Act (ESA) of 1973, (16 U.S.C. § 1531 et seq. (1973)), requires the evaluation of all federal actions to determine whether a Proposed Action is likely to jeopardize any proposed or listed threatened or endangered species or proposed or designated critical habitat. A federal action is one conducted, funded, or permitted by a federal agency. Section 7 of the ESA requires the lead federal agency (in this case the FAA) to consult with the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) Fisheries to determine whether the proposed federal action would jeopardize the continued existence of any species listed or proposed for listing as threatened or endangered or result in the destruction or adverse modification of designated or proposed critical habitat. Critical habitat includes areas that will contribute to the recovery or survival of a listed species. Federal agencies are responsible for determining if an action “may affect” listed species. If so, the federal agency is required to prepare a Biological Assessment (BA) to determine if the action is “likely to adversely affect the species.” The potential for federal- and state-listed avian and bat species was assessed based on agency lists and reports. Data from the USFWS was used to identify potential federally-listed species.

4.3.2.2 Migratory Birds

The Migratory Bird Treaty Act of 1918 (MBTA) (16 U.S.C. §§ 703-712) prohibits the taking of any migratory bird and any part, nest, or egg of any such bird, without a permit issued by the USFWS. “Take” under the MBTA is defined as the action or attempt to “pursue, hunt, shoot, capture, collect, or kill.” Migratory birds listed under the ESA are managed by the agency staff members who handle compliance with Section 7 of the ESA; management of all other migratory birds is overseen by the Migratory Bird Division of the ESA. Several migratory bird species occur in or migrate through the General Study Area.

Birds migrate along four main routes or flyways in North America: the Atlantic, the Central, the Mississippi, and the Pacific flyways, which are loosely delineated in these geographic regions. The General Study Area is located within the Atlantic flyway. These flyways are not specific lines the birds follow but broad areas through which the birds migrate.

Migration routes may be defined as the various lanes birds travel from their breeding ground to their winter quarters. The actual routes followed by a given bird species differ by distance traveled, starting time, flight speed, and geographic position and latitude of the breeding and wintering grounds. Hundreds of bird species make the round-trip each year along the Atlantic Flyway from their breeding grounds in Greenland and northern United States to wintering grounds found throughout the Caribbean and South America.

Table 4-3 identifies the federally-listed bat and bird species of concern that are potentially found within the General Study Area by county where they occur. **Table 4-4** identifies the state listed bat and bird species of concern potentially found within the General Study Area.

Table 4-3 Federally-Listed Bird & Bat Species Potentially Found in the General Study Area

Status	Species	Type	County of Occurrence within the General Study Area
Threatened	Audubon's crested caracara (<i>Polyborus plancus audubonii</i>)	Bird	Brevard, Broward, Charlotte, Collier, DeSoto, Glades, Hardee, Hendry, Highlands, Hillsborough, Indian River, Lake, Lee, Manatee, Martin, Miami-Dade, Monroe, Okeechobee, Orange, Osceola, Palm Beach, Pasco, Polk, Sarasota, Seminole, St. Lucie, Sumter, Volusia
Endangered	Bachman's warbler (<i>Vermivora bachmanii</i>)	Bird	Miami-Dade, Monroe
Endangered	Cape Sable seaside sparrow (<i>Ammodramus maritimus mirabilis</i>)	Bird	Collier, Miami-Dade, Monroe
Endangered	Everglade snail kite (<i>Rostrhamus sociabilis plumbeus</i>)	Bird	Brevard, Broward, Charlotte, Collier, DeSoto, Glades, Hendry, Highlands, Indian River, Lee, Martin, Miami-Dade, Monroe, Okeechobee, Orange, Osceola, Palm Beach, Polk, Sarasota, St. Lucie, Volusia
Endangered	Florida bonneted bat (<i>Eumops floridanus</i>)	Bat	Broward, Charlotte, Collier, DeSoto, Glades, Hardee, Hendry, Highlands, Indian River, Lee, Martin, Miami-Dade, Monroe, Okeechobee, Osceola, Palm Beach, Polk, Sarasota
Endangered	Florida grasshopper sparrow (<i>Ammodramus savannarum floridanus</i>)	Bird	Collier, DeSoto, Glades, Hendry, Highlands, Miami-Dade, Okeechobee, Osceola, Polk
Threatened	Florida scrub-jay (<i>Aphelocoma coerulescens</i>)	Bird	Alachua, Brevard, Broward, Charlotte, Citrus, Collier, DeSoto, Flagler, Glades, Hardee, Hendry, Hernando, Highlands, Hillsborough, Indian River, Lake, Lee, Levy, Manatee, Marion, Martin, Okeechobee, Orange, Osceola, Palm Beach, Pasco, Pinellas, Polk, Putnam, Sarasota, Seminole, St. Lucie, Sumter, Volusia
Threatened	Piping Plover (<i>Charadrius melodus</i>)	Bird	Brevard, Broward, Charlotte, Collier, Hillsborough, Indian River, Lee, Manatee, Martin, Miami-Dade, Monroe, Palm Beach, Pasco, Pinellas, Sarasota, St. Lucie, Volusia
Threatened	Red knot (<i>Calidris canutus rufa</i>)	Bird	Broward, Charlotte, Collier, Flagler, Hernando, Hillsborough, Indian River, Lake, Lee, Levy, Manatee, Marion, Martin, Miami-Dade, Monroe, Orange, Palm Beach, Pasco, Pinellas, Putnam, Seminole, St. Lucie, Sumter, Volusia

Table 4-3 Federally-Listed Bird & Bat Species Potentially Found in the General Study Area

Status	Species	Type	County of Occurrence within the General Study Area
Endangered	Red-cockaded woodpecker (<i>Picoides borealis</i>)	Bird	Alachua, Brevard, Broward, Charlotte, Citrus, Collier, Flagler, Glades, Hendry, Hernando, Highlands, Hillsborough, Indian River, Lake, Lee, Levy, Manatee, Marion, Martin, Miami-Dade, Okeechobee, Orange, Osceola, Palm Beach, Pasco, Pinellas, Polk, Putnam, Seminole, St. Lucie, Sumter, Volusia
Threatened	Roseate tern (<i>Sterna dougallii dougallii</i>)	Bird	Monroe
Threatened	Wood stork (<i>Mycteria americana</i>)	Bird	Alachua, Brevard, Broward, Charlotte, Citrus, Collier, DeSoto, Flagler, Glades, Hardee, Hendry, Hernando, Highlands, Hillsborough, Indian River, Lake, Lee, Levy, Manatee, Marion, Martin, Miami-Dade, Monroe, Okeechobee, Orange, Osceola, Palm Beach, Pasco, Pinellas, Polk, Putnam, Sarasota, Seminole, St. Lucie, Sumter, Volusia

Source: US Fish and Wildlife Service. [<https://ecos.fws.gov/ecp0/reports/species-listed-by-state-report?stateAbbrev=FL&stateName=Florida&statusCategory=Listed&status=listed> (accessed Feb 25, 2020)].

Prepared by: ATAC Corporation, May 2020.

Table 4-4 State Listed Bird & Bat Species Potentially Found in the General Study Area

Common Name	Species	Type	Status
American oystercatcher	<i>Haematopus palliatus</i>	Bird	State Designated Threatened
Audubon's crested caracara	<i>Polyborus plancus audubonii</i>	Bird	Federally Designated Threatened
Bachman's wood warbler	<i>Vermivora bachmanii</i>	Bird	Federally Designated Endangered
Black skimmer	<i>Rynchops niger</i>	Bird	State Designated Threatened
Cape Sable seaside sparrow	<i>Ammodramus maritimus mirabilis</i>	Bird	Federally Designated Endangered
Eskimo curlew	<i>Numenius borealis</i>	Bird	Federally Designated Endangered
Everglade snail kite	<i>Rostrhamus sociabilis plumbeus</i>	Bird	Federally Designated Endangered
Florida burrowing owl	<i>Athene cunicularia floridana</i>	Bird	State Designated Threatened
Florida grasshopper sparrow	<i>Ammodramus savannarum floridanus</i>	Bird	Federally Designated Endangered
Florida sandhill crane	<i>Antigone canadensis pratensis</i>	Bird	State Designated Threatened
Florida bonneted bat	<i>Eumops floridanus</i>	Bat	Federally Designated Endangered
Florida scrub-jay	<i>Aphelocoma coerulescens</i>	Bird	Federally Designated Threatened
Gray bat	<i>Myotis grisescens</i>	Bat	Federally Designated Endangered
Indiana bat	<i>Myotis sodalis</i>	Bat	Federally Designated Endangered

Table 4-4 State Listed Bird & Bat Species Potentially Found in the General Study Area

Common Name	Species	Type	Status
Ivory-billed woodpecker	<i>Campephilus principalis</i>	Bird	Federally Designated Endangered
Kirtland's warbler (Kirtland's wood warbler)	<i>Setophaga kirtlandii</i> (<i>Dendroica kirtlandii</i>)	Bird	Federally Designated Endangered
Least tern	<i>Sternula antillarum</i>	Bird	State Designated Threatened
Little blue heron	<i>Egretta caerulea</i>	Bird	State Designated Threatened
Marian's marsh wren	<i>Cistothorus palustris marianae</i>	Bird	State Designated Threatened
Piping plover	<i>Charadrius melodus</i>	Bird	Federally Designated Threatened
Red-cockaded woodpecker	<i>Picoides borealis</i>	Bird	Federally Designated Endangered
Reddish egret	<i>Egretta rufescens</i>	Bird	State Designated Threatened
Roseate spoonbill	<i>Platalea ajaja</i>	Bird	State Designated Threatened
Roseate tern	<i>Sterna dougallii dougallii</i>	Bird	Federally Designated Threatened
Rufa red knot	<i>Calidris canutus rufa</i>	Bird	Federally Designated Threatened
Scott's seaside sparrow	<i>Ammodramus maritimus peninsulae</i>	Bird	State Designated Threatened
Snowy plover	<i>Charadrius nivosus</i>	Bird	State Designated Threatened
Southeastern American kestrel	<i>Falco sparverius paulus</i>	Bird	State Designated Threatened
Tricolored heron	<i>Egretta tricolor</i>	Bird	State Designated Threatened
Wakulla seaside sparrow	<i>Ammodramus maritimus juncicola</i>	Bird	State Designated Threatened
White-crowned pigeon	<i>Patagioenas leucocephala</i>	Bird	State Designated Threatened
Whooping crane	<i>Grus americana</i>	Bird	Federal Non-Essential Experimental Population
Worthington's marsh wren	<i>Cistothorus palustris griseus</i>	Bird	State Designated Threatened
Wood stork	<i>Mycteria americana</i>	Bird	Federally Designated Threatened

Note: The Florida Fish and Wildlife Conservation Commission does not identify a geographic area of concern for listed species. For that reason, it is assumed all listed species may be present even if the federal designation has specifically identified a geographic area of concern outside of the General Study Area.

Sources: Florida Fish and Wildlife Conservation Commission, *Florida's Imperiled Species Management Plan 2016-2026 (2018 Amendment)*. 2018. Florida Fish and Wildlife Conservation Commission, *Florida's Endangered and Threatened Species*, December 2018.

Prepared by: ATAC Corporation, May 2020.

4.3.3 Climate

Greenhouse gases (GHGs) are naturally occurring and man-made gases that trap heat in the earth's atmosphere. These gases include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). According to the EPA, domestic aviation contributed approximately three percent of total national CO₂ emissions.⁵²

In December 2014, the CEQ issued revised draft NEPA guidance for considering effects of climate change and GHG emissions. The guidance recommended consideration of potential effects of a proposed action or its alternatives on climate change as indicated by GHG

52 U.S. Environmental Protection Agency [<https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-greenhouse-gas-emissions-aircraft>] (Accessed April 2019)].

emissions, and the implications of climate change for the environmental effects of a proposed action or its alternatives.

This Final EA calculated total MT of CO₂, reported as MT CO₂e, using AEDT 2d estimates of the amount of fuel burned by IFR aircraft arriving and departing from the Study Airports in the General Study Area for the No Action alternative and applying accepted Environmental Protection Agency factors to calculate CO₂e. Fuel burn calculations are discussed in **Section 4.3.6, Energy Supply**.

4.3.4 Department of Transportation Act, Section 4(f)

Section 4(f) of the DOT Act (codified at 49 U.S.C. § 303(c)), states that, subject to exceptions for *de minimis* impacts:

“...the Secretary may approve a transportation program or project (other than any project for a park road or parkway under section 204 of title 23) requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance, or land of an historic site of national, State, or local significance (as determined by the Federal, State, or local officials having jurisdiction over the park, area, refuge, or site) only if –

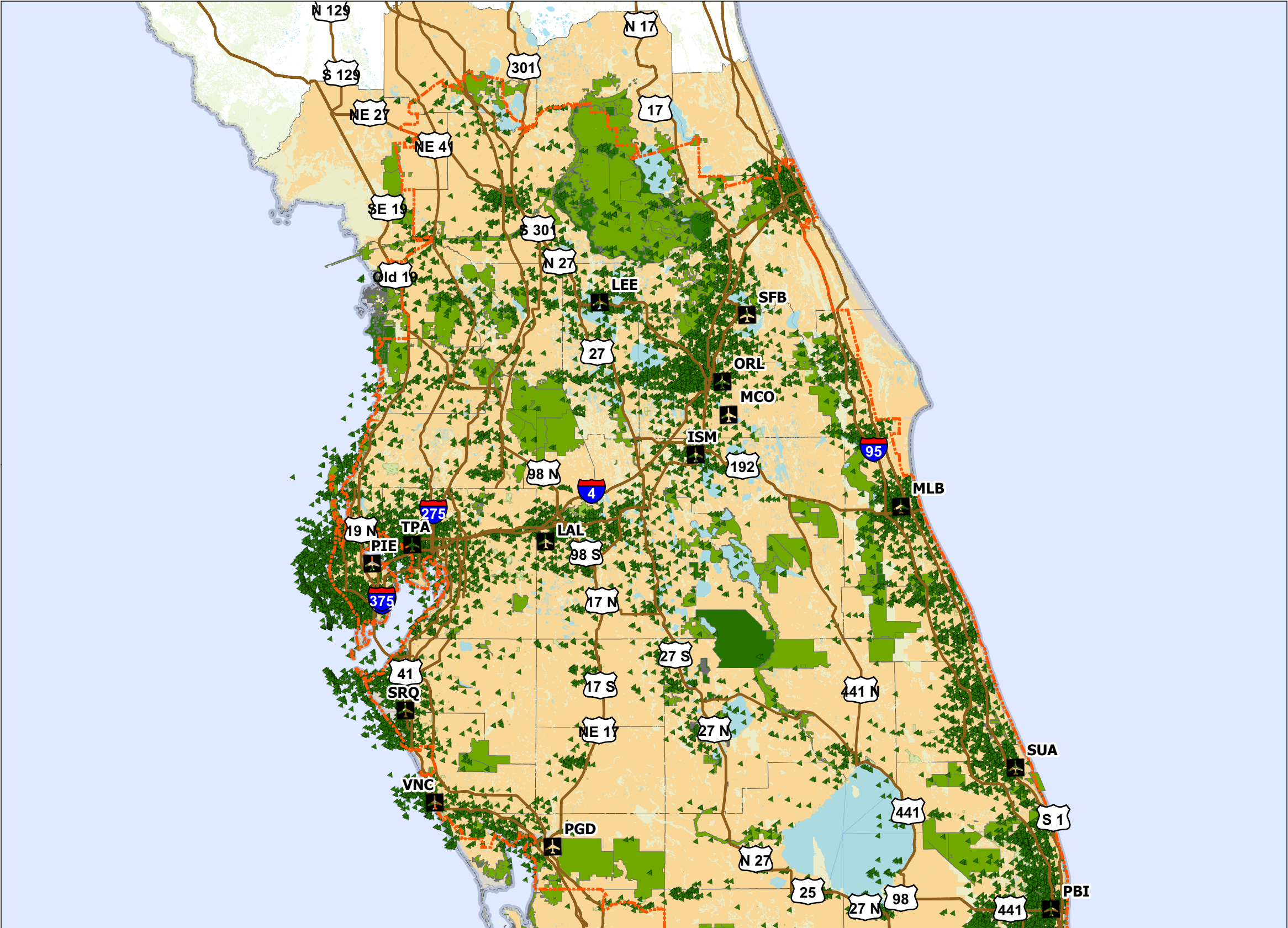
- (1) there is no prudent and feasible alternative to using that land; and
- (2) the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use.”

The term “use” includes both physical and indirect or “constructive” impacts to Section 4(f) resources. Direct use is the physical occupation or alteration of a Section 4(f) property or any portion of a Section 4(f) property. A “constructive” use does not require direct physical impacts or occupation of a Section 4(f) resource. A constructive use would occur when a proposed action would result in substantial impairment of a resource to the degree that the activities, features, or attributes of the resource that contribute to its significance or enjoyment are substantially diminished. The determination of use must consider the entire property and not simply the portion of the property used for a proposed project.

Parks and natural areas where a quiet setting is a generally recognized purpose and attribute receive special consideration. In these areas, the FAA “...must consult all appropriate Federal, State, and local officials having jurisdiction over the affected Section 4(f) resources when determining whether project-related noise impacts would substantially impair the resource.” Privately-owned parks, recreation areas, and wildlife refuges are not subject to the Section 4(f) provisions.

4.3.4.1 Section 4(f) Resources

The FAA used data from federal and state sources to identify 94,486 Section 4(f) resource points within the General Study Area and Supplemental Study Area. **Exhibits 4-3 and 4-4** depicts the locations of Section 4(f) resources, other than those listed or eligible for listing in the National Register of Historic Places (NRHP). The locations of Section 4(f) resources that are listed or eligible for listing in the NRHP are discussed in **Section 4.3.3** and depicted in **Exhibits 4-5 and 4-6**. A list of the Section 4(f) resources identified in the General Study Area, the type of resource (i.e., federal, state, or local), the county in which they are located, site acreage, and DNL calculated for each resource under existing conditions is included in **Appendix I**.

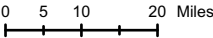


LEGEND

- Study
- General Study Area
- US and Interstate Highways - Publically Owned and Operated
- Parks/Trails
- National Park or Forest
- State Park or Forest
- County Park
- Wildlife Area
- Historic Place
- Local park
- Lake/Pond
- Reservoir
- Swamp/Marsh
- Ocean or Sea
- State Boundaries
- Study Area Counties

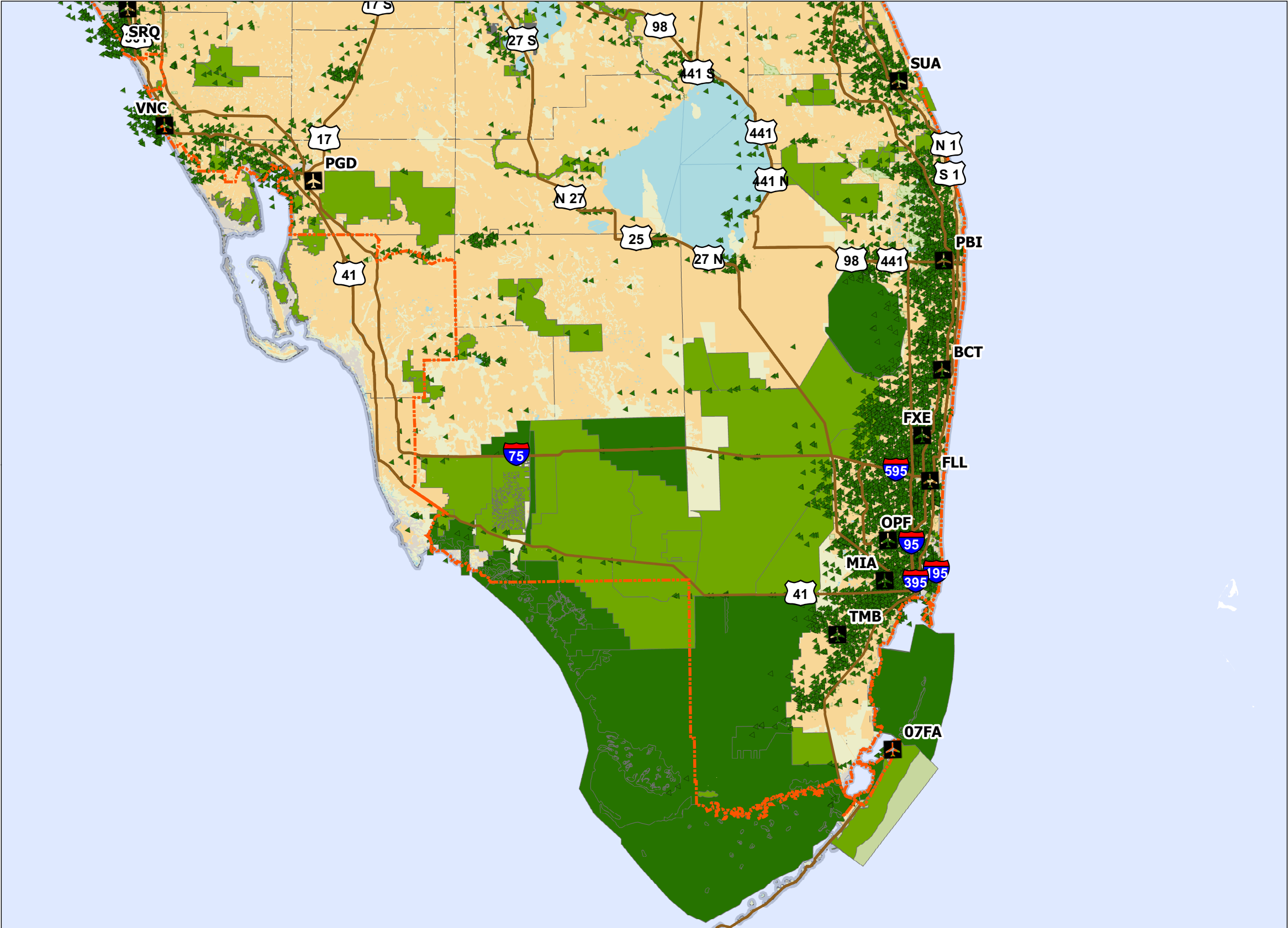
- Notes:**
- Major Study Airports
- | | |
|----------------------------------|-----|
| Orlando International Airport | MCO |
| Palm Beach International Airport | PBI |
| Tampa International Airport | TPA |
- Satellite Study Airports
- | | |
|---|-----|
| Kissimmee Gateway Airport | ISM |
| Lakeland Linder International Airport | LAL |
| Leesburg International Airport | LEE |
| Melbourne International Airport | MLB |
| Orlando Executive Airport | ORL |
| Punta Gorda Airport | PGD |
| St. Pete-Clearwater International Airport | PIE |
| Orlando Sanford International Airport | SFB |
| Sarasota Bradenton International Airport | SRQ |
| Witham Field Airport | SUA |
| Venice Municipal Airport | VNC |

Coordinate System: NAD 1983 Albers
Projection: Albers
Datum: North American 1983
Scale: 1:1,601,151



Sources: U.S. Census Bureau, 2016 (2016 TIGER/Line Shapefiles (machine-readable data files), American Community Survey - 2010-2014 5-Year Estimates); ESRI, Inc., 2016 (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). ESRI World Water Bodies 2018 (Ocean and Sea). Data.gov, National Park Services, Florida Department of Environmental Protection, ESRI, TomTom North America Inc., Florida Natural Areas Inventory (Administrative boundaries, parks, historic properties, wildlife and recreational areas). ATAC Corporation, 2020 (2020 General Study Area boundary). Prepared by: ATAC Corporation, August 2020.

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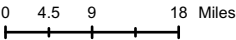


LEGEND

- Study Airports
- General Study Area
- US and Interstate Highways - Publically Owned and Operated
- Parks/Trails
- National Park or Forest
- State Park or Forest
- County Park
- Wildlife Area
- Historic Place
- Local park
- Lake/Pond
- Reservoir
- Swamp/Marsh
- Ocean or Sea
- State Boundaries
- Study Area Counties

- Notes:**
- Major Study Airports
- | | |
|---|-----|
| Fort Lauderdale-Hollywood International Airport | FLL |
| Miami International Airport | MIA |
| Palm Beach International Airport | PBI |
- Satellite Study Airports
- | | |
|-----------------------------------|------|
| Ocean Reef Club Airport | 07FA |
| Boca Raton Airport | BCT |
| Fort Lauderdale Executive Airport | FXE |
| Miami-Opa Locka Executive Airport | OPF |
| Punta Gorda Airport | PGD |
| Witham Field Airport | SUA |
| Miami Executive Airport | TMB |
| Venice Municipal Airport | VNC |

Coordinate System: NAD 1983 Albers
Projection: Albers
Datum: North American 1983
Scale: 1:1,264,155



Sources: U.S. Census Bureau, 2016 (2016 TIGER/Line Shapefiles (machine-readable data files), American Community Survey - 2010-2014 5-Year Estimates); ESRI, Inc., 2016 (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). ESRI World Water Bodies 2018 (Ocean and Sea). Data.gov, National Park Services, Florida Department of Environmental Protection, ESRI, TomTom North America Inc., Florida Natural Areas Inventory (Administrative boundaries, parks, historic properties, wildlife and recreational areas). ATAC Corporation, 2020 (2020 General Study Area boundary). Prepared by: ATAC Corporation, August 2020.

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4.3.5 Historic, Architectural, Archeological, and Cultural Resources – Historic Properties and Cultural Resources Sub-Categories

Section 106 of the National Historic Preservation Act (NHPA) of 1966 (16 U.S.C. §470 et seq., as amended) requires federal agencies to consider the effects of their undertakings on properties listed or eligible for listing in the NRHP. Compliance requires agencies to consider the effects of such undertakings on properties listed, or eligible for listing, in the National Register of Historic Places (NRHP). Regulations implementing Section 106 of the NHPA are located in Title 36 CFR Part 800, *Protection of Historic Properties*. In accordance with Executive Order 13175 Consultation and Coordination with Indian and Tribal Governments and FAA Order 1210.20 American Indian and Alaska Native Tribal Consultation Policy and Procedures, the FAA invited identified tribal government-to-government consultations regarding any concerns that uniquely or significantly affect a Tribe related to the proposed project.

Consistent with Section 106, this EA defines “historic property” as “...any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the NRHP criteria.”⁵³ It is possible that changes in aircraft flight routes associated with the Proposed Action could introduce or increase aircraft routing over historic properties and result in potential adverse noise impacts. As noted in **Section 4.2**, the Proposed Action does not involve ground disturbance that could physically impact archaeological or architectural resources. The Proposed Action is located above the ground and does not involve the construction, disturbance, or alteration of any physical structure on, in, or emanating from the ground. Thus, the EA does not further discuss these resources.

4.3.5.1 Historic and Cultural Resources in the General Study Area and Supplemental Study Area

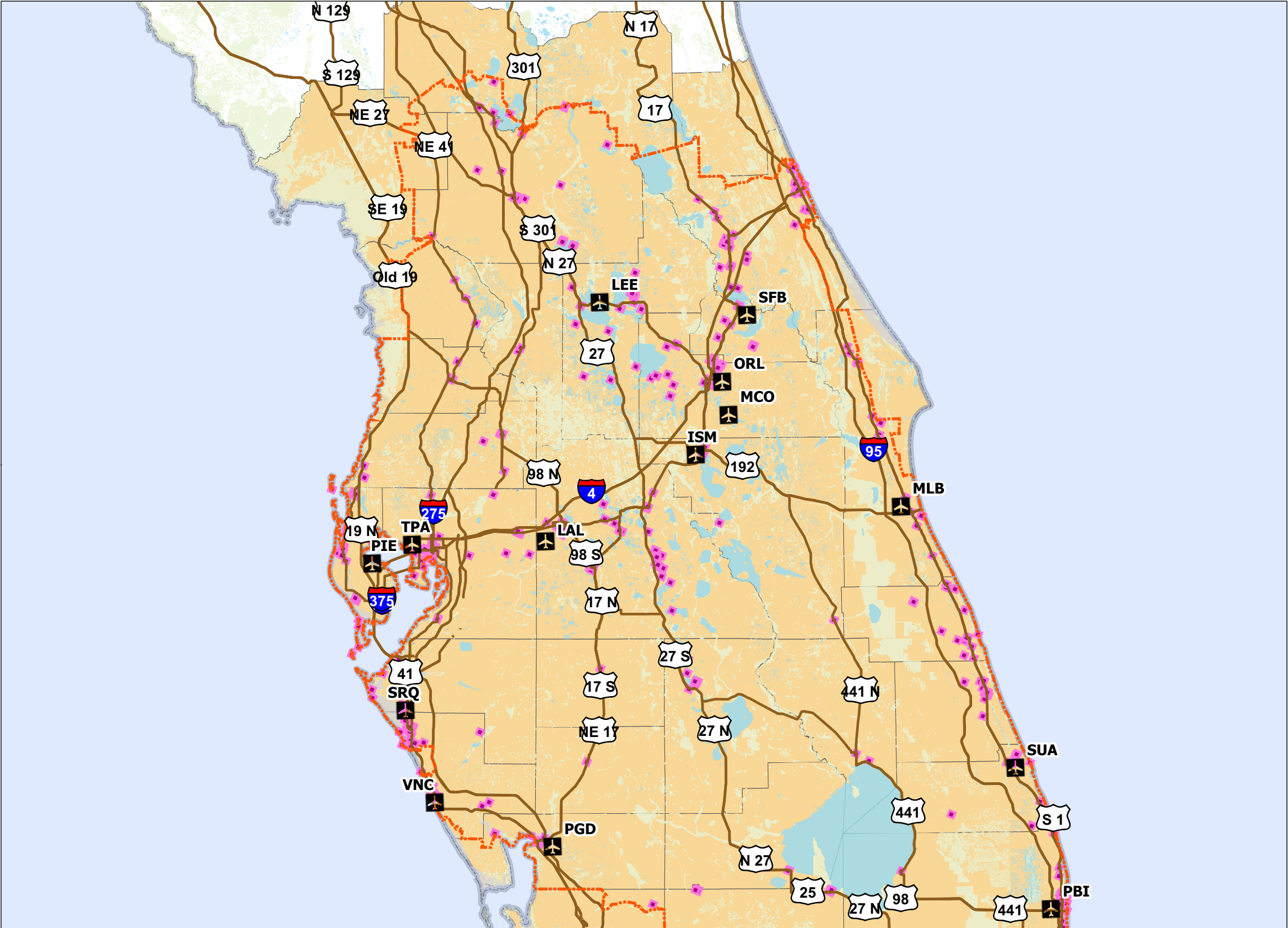
Exhibits 4-5 and 4-6 shows the location of historic properties and cultural resources identified in the General Study Area and Supplemental Study Area. A total of 873 NRHP listed properties represented by 880 unique reporting points were identified, and consultations were concluded to identify other listed or eligible resources. A list of the historic and cultural resources identified in the General Study Area, the county in which they are located, and DNL calculated for each resource under existing conditions is included in **Appendix I**.

Federal regulations require the FAA to define an area of potential effect (APE) as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.⁵⁴ The FAA has defined the APE as coterminous with the General Study Area boundary.

⁵³ Title 36 CFR Part 800.16(l)(1)

⁵⁴ Title 36 CFR Part 800.16(d).

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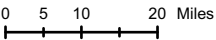


LEGEND

- Study Airports
- General Study Area
- US and Interstate Highways - Publically Owned and Operated
- Historic_Places
- Lake/Pond
- Reservoir
- Swamp/Marsh
- Ocean or Sea
- State Boundaries
- Study Area Counties

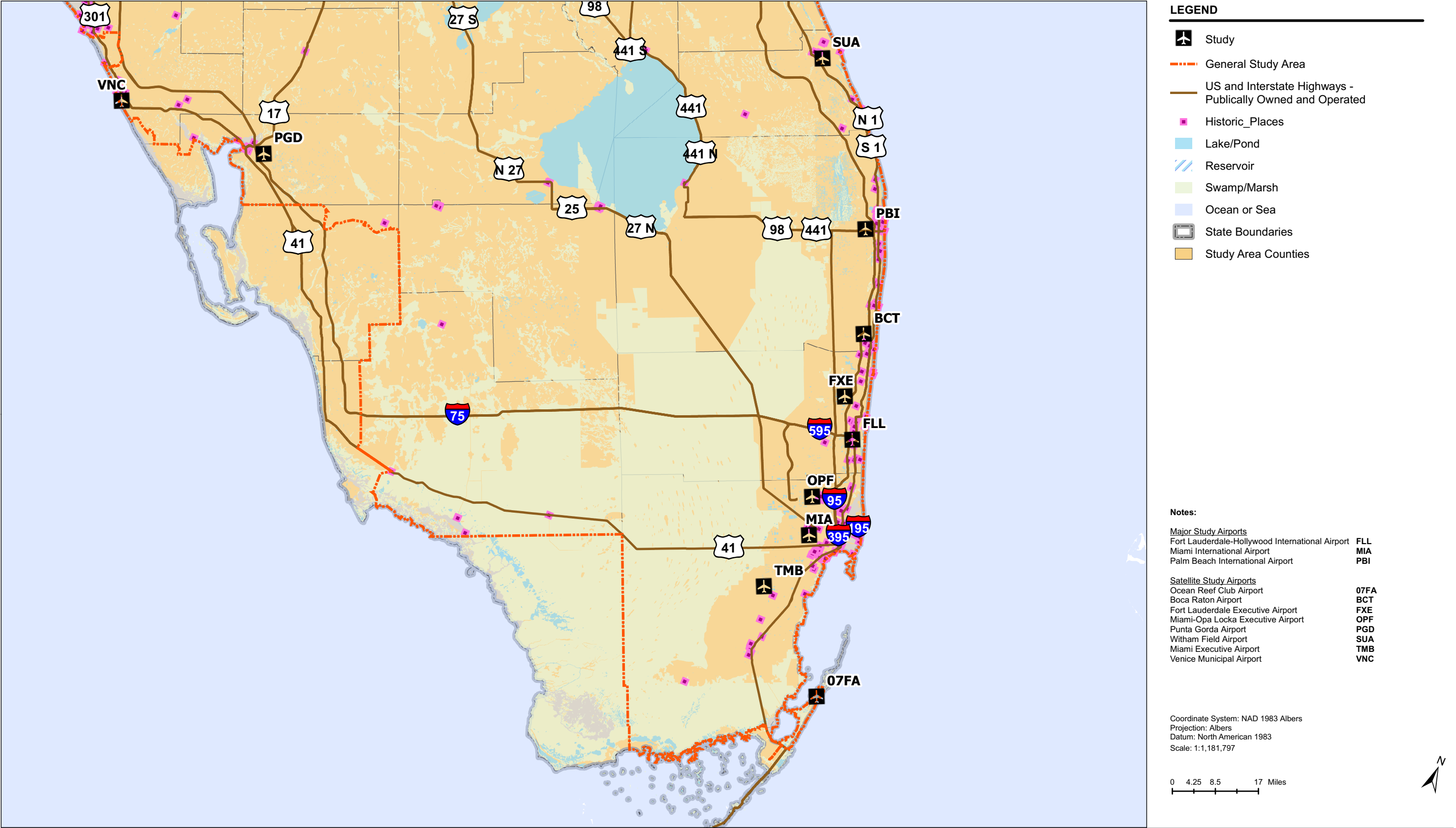
- Notes:**
- Major Study Airports
- | | |
|----------------------------------|-----|
| Orlando International Airport | MCO |
| Palm Beach International Airport | PBI |
| Tampa International Airport | TPA |
- Satellite Study Airports
- | | |
|---|-----|
| Kissimmee Gateway Airport | ISM |
| Lakeland Linder International Airport | LAL |
| Leesburg International Airport | LEE |
| Melbourne International Airport | MLB |
| Orlando Executive Airport | ORL |
| Punta Gorda Airport | PGD |
| St. Pete-Clearwater International Airport | PIE |
| Orlando Sanford International Airport | SFB |
| Sarasota Bradenton International Airport | SRQ |
| Witham Field Airport | SUA |
| Venice Municipal Airport | VNC |

Coordinate System: NAD 1983 Albers
Projection: Albers
Datum: North American 1983
Scale: 1:1,601,151



Sources: U.S. Census Bureau, 2016 (2016 TIGER/Line Shapefiles (machine-readable data files), American Community Survey - 2010-2014 5-Year Estimates); ESRI, Inc., 2016 (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies).
ESRI World Water Bodies 2018 (Ocean and Sea). ATAC Corporation, 2020 (2020 General Study Area boundary).
Prepared by: ATAC Corporation, August 2020.

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Sources: U.S. Census Bureau, 2016 (2016 TIGER/Line Shapefiles (machine-readable data files), American Community Survey - 2010-2014 5-Year Estimates); ESRI, Inc., 2016 (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies).
ESRI World Water Bodies 2018 (Ocean and Sea). ATAC Corporation, 2020 (2020 General Study Area boundary).
Prepared by: ATAC Corporation, August 2020.

Exhibit 4-6

Historic and Cultural Resources in the General Study Area

South

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4.3.6 Natural Resources Energy Supply (Aircraft Fuel)

This section describes fuel consumption by IFR aircraft arriving at and departing from the Study Airports. Using AEDT version 2d, the FAA calculated aircraft fuel burn to estimate fuel consumption associated with air traffic flows in the 2021 and 2026 Proposed Action and No Action alternatives. AEDT calculates fuel burn using the same input used for calculating noise (See **Section 4.3.7.1** for a discussion of AEDT model inputs). Based on the AEDT calculations, IFR aircraft arriving at and departing from the Study Airports burn approximately 1,245,092 gallons of fuel⁵⁵ on a 2021 No Action annual average day while the 2021 Proposed Action burns approximately 1,250,807 gallons of fuel. IFR aircraft arriving at and departing from the Study Airports in the 2026 No Action alternative burn approximately 1,387,339 gallons of fuel on an annual average day while the 2026 Proposed Action burns approximately 1,393,344 gallons of fuel.

4.3.7 Noise and Noise-Compatible Land Use

Aircraft noise is often the most noticeable environmental effect associated with any air traffic project. This section discusses FAA guidance on conducting noise analyses, noise model input development, and existing aircraft noise conditions. **Appendix E** provides background information on the physics of sound, the effects of noise on people, and noise metrics. Detailed results of the noise analysis are included in **Appendix I**.

4.3.7.1 Noise Modeling Methodology

To comply with NEPA requirements, the FAA has issued policies and procedures for assessing aircraft noise in FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*. That Order requires that aircraft noise analysis use the yearly Day-Night Average Sound Level (DNL) metric. The DNL metric is a single value representing the aircraft sound level over a 24-hour period and includes all of the sound energy generated within that period. The DNL metric includes a 10-decibel (dB) weighting for noise events occurring between 10:00 p.m. and 7:00 a.m. (nighttime). This weighting helps account for the greater level of annoyance caused by nighttime noise events. Accordingly, the metric essentially equates one nighttime flight to 10 daytime flights. The DNL metric is further discussed in **Appendix E**.

FAA Order 1050.1F also requires the FAA to evaluate aircraft noise using the current FAA-approved computer model at the beginning of the environmental analysis process. In accordance with this requirement, the FAA is using the Aviation Environmental Design Tool (AEDT) Version 2d, to analyze noise associated with the Proposed Action and No Action alternatives.

Although the noise environment around major airports comes almost entirely from jet aircraft operations, the DNL calculations reflect noise from many types of jet and propeller aircraft on IFR flight plans that could be affected by the Proposed Action.

When operating outside certain categories of controlled airspace, aircraft operating under Visual Flight Rules (VFR) are not required to be in contact with ATC. Because these aircraft operate at the pilot's discretion and are often not required to file flight plans, the FAA has very

⁵⁵ For fuel burn purposes, jet fuel ("Jet-A-1," available only in the US) is calculated at 6.6671 pounds per gallon at 59 degrees Fahrenheit. Approximately 8,301,157 pounds of jet fuel are burned by IFR aircraft arriving and departing the Study Airports on an annual average day in the 2021 No Action and 8,339,255 pounds of jet fuel in the 2021 Proposed Action. The 2026 No Action amount is approximately 9,249,529 pounds of jet fuel and the 2026 Proposed Action is 9,289,569 pounds of jet fuel.

limited information about these operations. Consequently, there is no known source for comprehensive route, altitude, aircraft type, and frequency information for VFR operations in the General Study Area. However, even if complete information were available for VFR operations, the Proposed Action would not require any changes to routing or altitudes to accommodate these operations. If they could be modeled, they would use the same flight routes and altitudes under the Proposed Action and No Action scenarios. Their operations would not be affected by the forecast conditions in 2021 (the proposed first year of implementation) and 2026 (five years after implementation) for either the Proposed Action or the No Action alternative. Therefore, VFR aircraft were not included in the analysis.

AEDT 2d requires a variety of inputs, including local environmental data, temperature and humidity, runway layout, number and type of aircraft operations, runway use, and flight tracks. Accordingly, the FAA assembled detailed information on aircraft operations for the Study Airports for input into AEDT 2d. This includes specific aircraft fleet mix information such as aircraft type, arrival and departure times, and origin/destination airport.

Radar data obtained from the FAA's Performance Data Analysis and Reporting System (PDARS) identified 1,741,841 flights to and from the Study Airports between June 1, 2017 and May 30, 2018. The 365 days of usable data span all seasons and runway usage configurations for the Study Airports. The FAA used this data to develop the average annual day (AAD) fleet mix, time of day and night, and runway use input for AEDT 2d. More detailed information about the AEDT 2d input for Existing Conditions can be found in **Appendix I**.

The PDARS data provided tracks for each flight that occurred during from June 1, 2017 through May 30, 2018. The FAA used the data to define the Average Annual Day (AAD) track locations and use as representing a typical flow of traffic, as well as the typical climb and descent patterns that occur along each flow. The FAA analyzed the tracks using proprietary software. All the trajectories were "bundled" into a set of tracks representing a flow. The flows comprise all the typical flight routings within the General Study Area for an AAD.⁵⁶ AEDT 2d tracks are then developed based on the group of radar tracks representing each flow.

The AEDT 2d model was used to calculate noise levels for the following specific locations on the ground:

Census Block Population Centroids: The AEDT 2d model was used to calculate DNL at the geographic centers (centroids) of census blocks to estimate the population exposed to varying levels of aircraft noise. This EA analyzed population within the General Study Area using 2010 U.S. Census block geometry.⁵⁷ A census block is the smallest geographical unit that the United States Census uses to collect data. The census block population centroid DNL represents the DNL for the total maximum potential population within that census block. Because noise levels are analyzed only at the centroid point and applied to the entire census block area population, and because the area represented by each centroid varies depending on the density of population, the actual noise exposure level for individuals will vary from the reported level based on their proximity to the geographic centroid.

Grid Points: The AEDT 2d model calculated noise exposure at evenly spaced grid points. This EA covered the General Study Area with a grid of noise receptor points spaced evenly at 0.5 NM intervals. Noise at regular intervals was calculated for these grid points throughout

⁵⁶ Appendix H *South-Central Florida Metroplex Flight Schedules Technical Report*, May 2020.

⁵⁷ The Decennial Census data is the most accurate data source for population data for general analysis. It serves as the benchmark for interim year projections and estimates until the next Decennial Census data is released. Estimated and/or more recent Census data may be used should the analysis necessitate a geographically focused investigation involving census data.

the General Study Area. In addition, these grid points were evaluated for noise at any Section 4(f) resource or historic property not captured using unique points as described below.

Unique Points – Section 4(f) and Historical and Cultural Resources: The AEDT 2d model analyzed noise levels at sites of interest that are too small to be captured in the 0.5 NM grid. These sites include individual Section 4(f) resources that are less than one square NM in area (such as significant public parks or trails), and specific historic sites listed on the National Register of Historic Places (such as individual buildings).⁵⁸ See **Section 4.3.2** for a discussion of what constitutes a Section 4(f) resource and **Section 4.3.3** for a discussion of historic properties in the General Study Area.

Unique Points – Noise Sensitive Areas and Uses: In addition to the unique points identified for individual Section 4(f) resources and specific listed historic sites, the AEDT 2d model was used to analyze noise at noise sensitive areas and uses generally exposed to existing noise of DNL 65 dB and above. These locations are further discussed in **Section 4.3.1.3** and disclosed in **Table 4-3**.

In total, noise exposure levels were calculated at 210,582 census block population centroids representing 14,246,039 persons, 117,424 grid points, and 95,366 unique points throughout the General Study Area.

4.3.7.2 Existing Aircraft Noise Exposure

Table 4-5 identifies the total population exposed to aircraft noise between DNL 45 dB and 60 dB, DNL 60 dB and 65 dB, and DNL 65 dB and higher. This data establishes a baseline for existing aircraft noise exposure. **Exhibits 4-7 to 4-13** provides a graphical representation, by DNL 5 dB bands, of existing noise exposure based on radar data collected for June 1, 2017 through May 30, 2018 within the General Study Area. Each point on the exhibit represents a Census block population centroid. As shown in **Exhibit 4-7 to 4-13**, areas exposed to higher DNL are generally aligned with Study Airport runways and areas with existing aircraft traffic.

Table 4-5 2018 Population Exposed to Aircraft Noise (DNL) within the General Study Area

DNL Range (dB)	Population
DNL 45 dB to DNL 60 dB	3,356,316
DNL 60 dB to less than DNL 65 dB	115,910
DNL 65 dB and higher	16,561
Total above DNL 45 dB	3,488,787

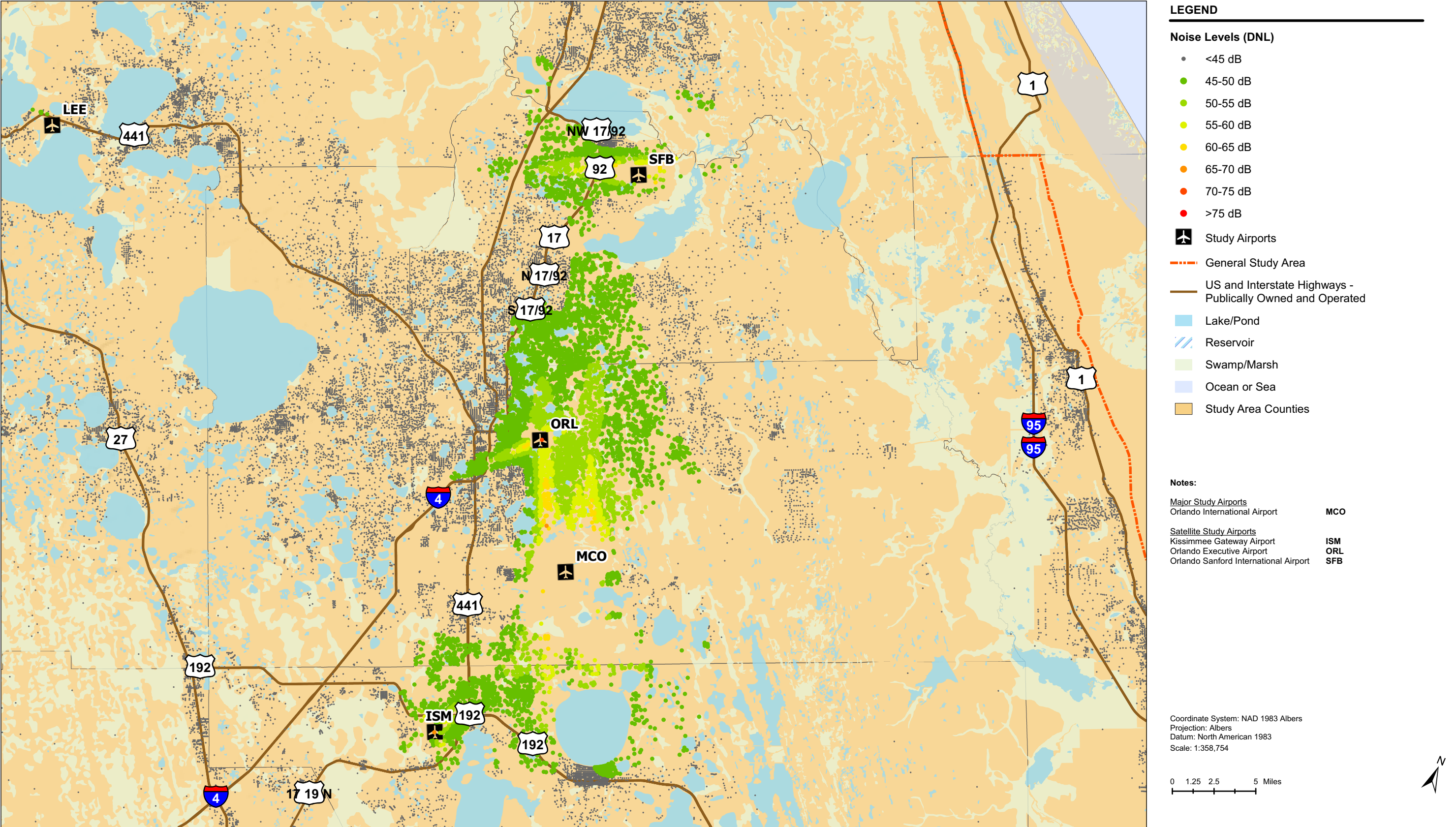
Sources: AEDT version 2d; US Census Bureau, 2010 Centroid Data, 2018.
Prepared by: ATAC Corporation, May 2020.

⁵⁸ Appendix I: South-Central Florida Metroplex Noise Technical Report, May 2020

A horizontal number line representing distance in miles. It has tick marks at 0, 0.75, 1.5, and 3. The segment from 0 to 0.75 is shaded gray.

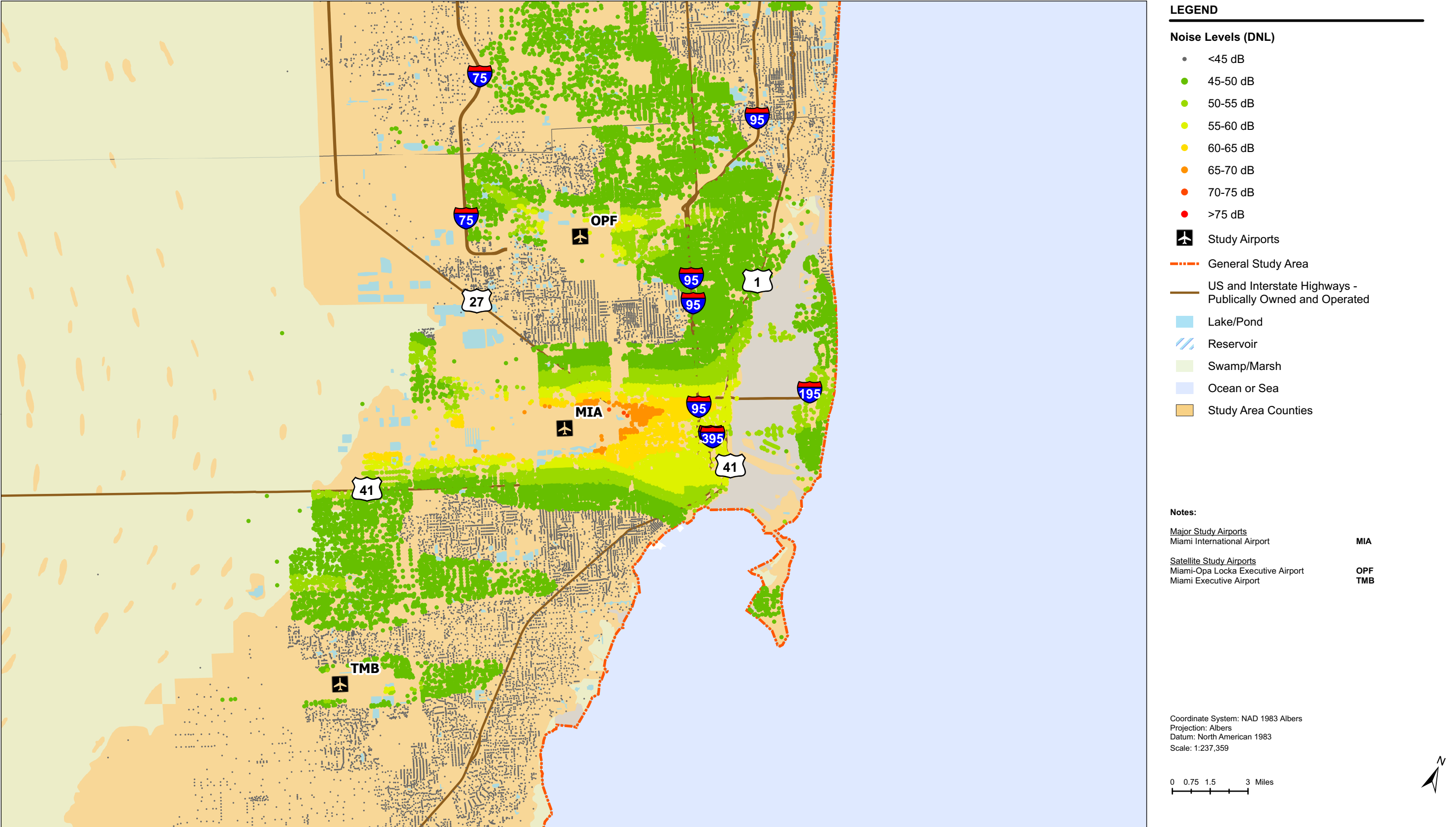


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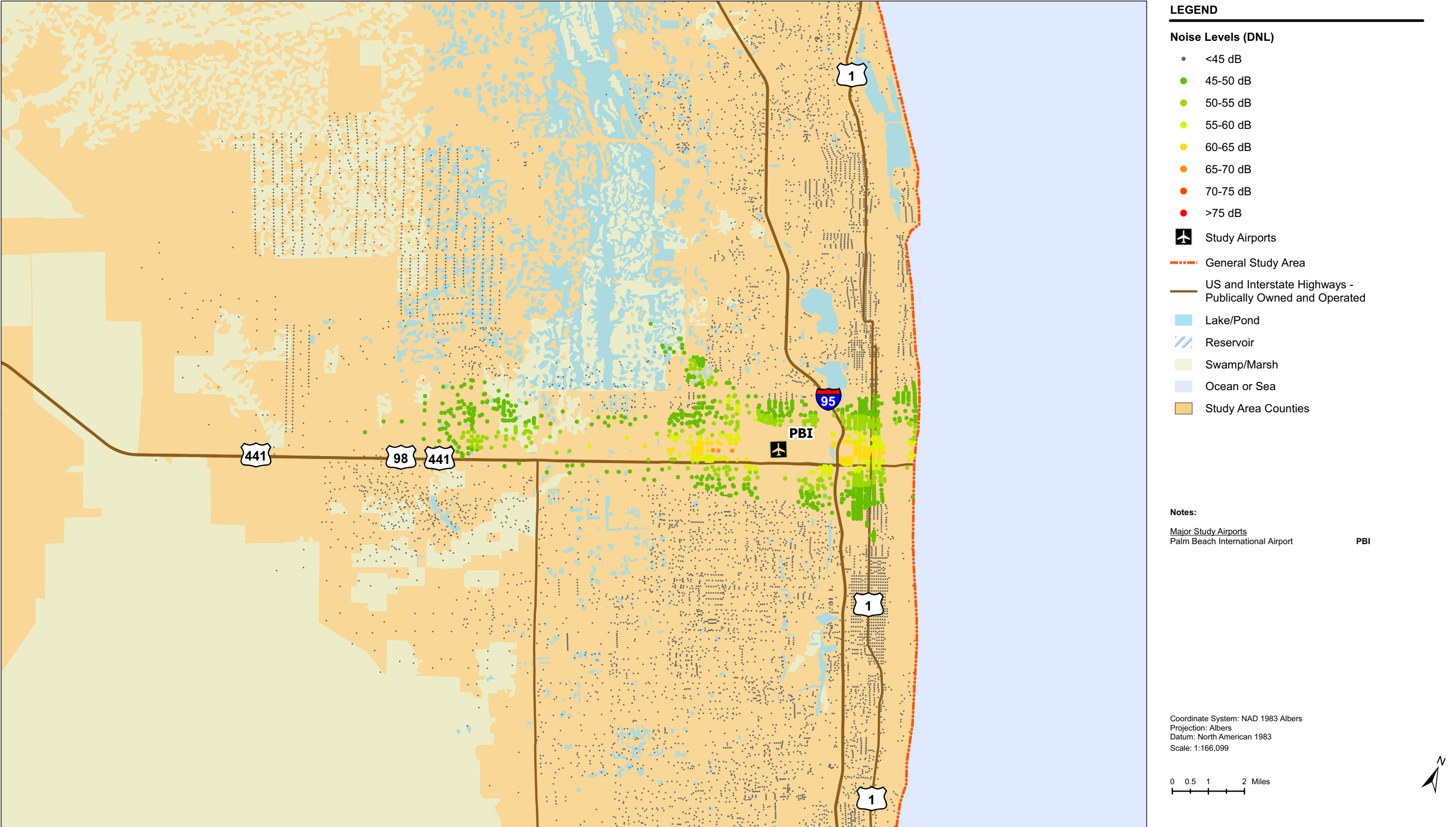
Sources: U.S. Census Bureau, 2016 (2016 TIGER/Line Shapefiles (machine-readable data files), American Community Survey - 2010-2014 5-Year Estimates); ESRI, Inc., 2016 (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies).
ESRI World Water Bodies 2018 (Ocean and Sea). ATAC Corporation, 2020 (2020 General Study Area boundary) (2020 Baseline DNL Noise Exposure).
Prepared by: ATAC Corporation, August 2020.

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Sources: U.S. Census Bureau, 2016 (2016 TIGER/Line Shapefiles (machine-readable data files), American Community Survey - 2010-2014 5-Year Estimates); ESRI, Inc., 2016 (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies).
ESRI World Water Bodies 2018 (Ocean and Sea). ATAC Corporation, 2020 (2020 General Study Area boundary) (2020 Baseline DNL Noise Exposure).
Prepared by: ATAC Corporation, August 2020.

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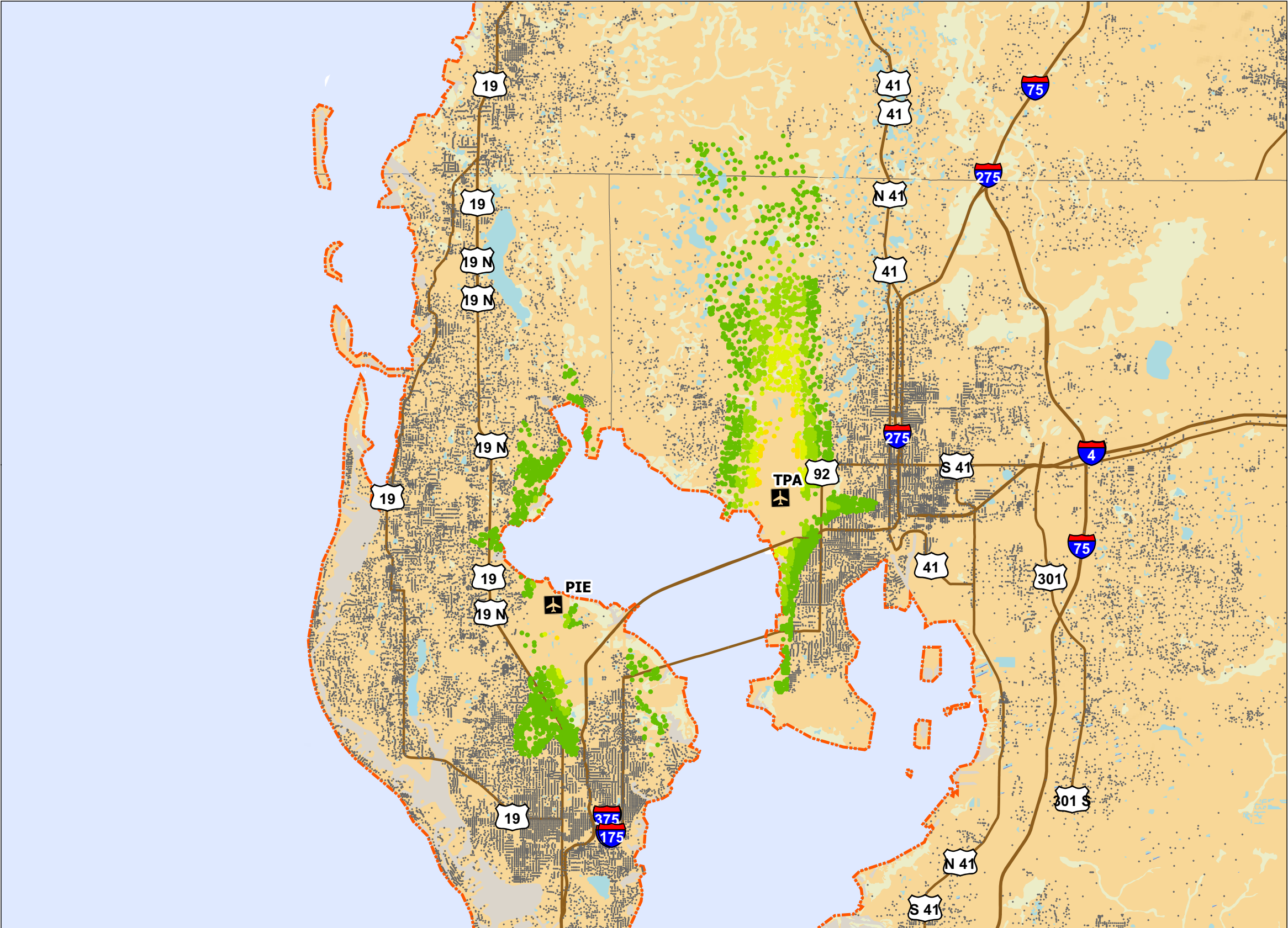


Sources: U.S. Census Bureau, 2016 (2016 TIGER/Line Shapefiles (machine-readable data files), American Community Survey - 2010-2014 5-Year Estimates); ESRI, Inc., 2016 (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies).
ESRI World Water Bodies 2018 (Ocean and Sea). ATAC Corporation, 2020 (2020 General Study Area boundary) (2020 Baseline DNL Noise Exposure).
Prepared by: ATAC Corporation, August 2020.

Exhibit 4-10

2020 Baseline DNL Noise Exposure by Census Block PBI

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LEGEND

Noise Levels (DNL)

- <45 dB
- 45-50 dB
- 50-55 dB
- 55-60 dB
- 60-65 dB
- 65-70 dB
- 70-75 dB
- >75 dB

Study Airports

General Study Area

US and Interstate Highways - Publically Owned and Operated

Lake/Pond

Reservoir

Swamp/Marsh

Ocean or Sea

Study Area Counties

Notes:

Major Study Airports
Tampa International Airport TPA

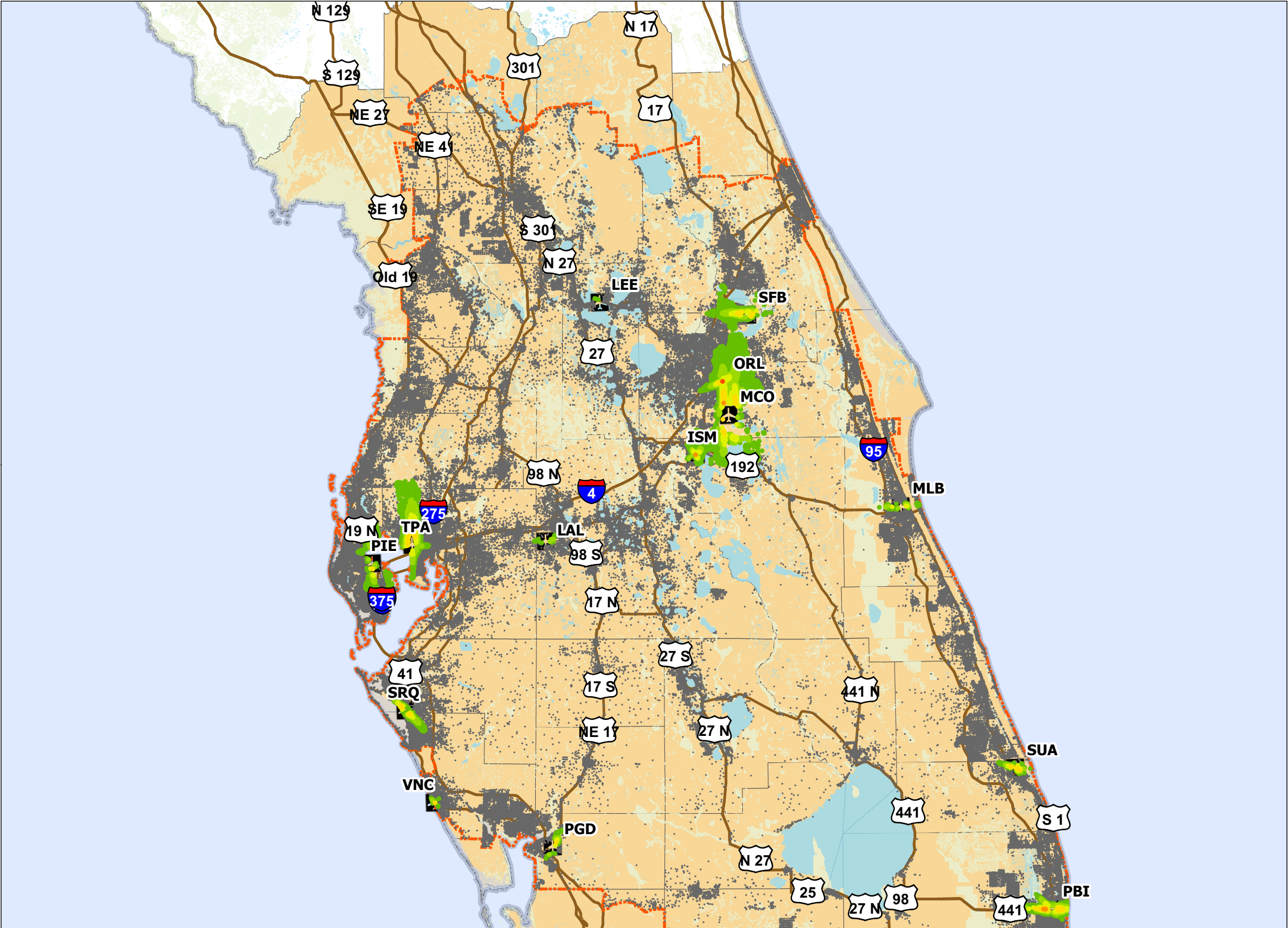
Satellite Study Airports
St. Pete-Clearwater International Airport PIE

Coordinate System: NAD 1983 Albers
Projection: Albers
Datum: North American 1983
Scale: 1:281,300

Sources: U.S. Census Bureau, 2016 (2016 TIGER/Line Shapefiles (machine-readable data files), American Community Survey - 2010-2014 5-Year Estimates); ESRI, Inc., 2016 (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies).
ESRI World Water Bodies 2018 (Ocean and Sea). ATAC Corporation, 2020 (2020 General Study Area boundary) (2020 Baseline DNL Noise Exposure).
Prepared by: ATAC Corporation, August 2020.

Exhibit 4-11
2020 Baseline DNL Noise Exposure by Census Block
TPA

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LEGEND

Noise Levels (DNL)

- <45 dB
- 45-50 dB
- 50-55 dB
- 55-60 dB
- 60-65 dB
- 65-70 dB
- 70-75 dB
- >75 dB

Study Airports

General Study Area

US and Interstate Highways - Publically Owned and Operated

Lake/Pond

Reservoir

Swamp/Marsh

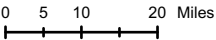
Ocean or Sea

State Boundaries

Study Area Counties

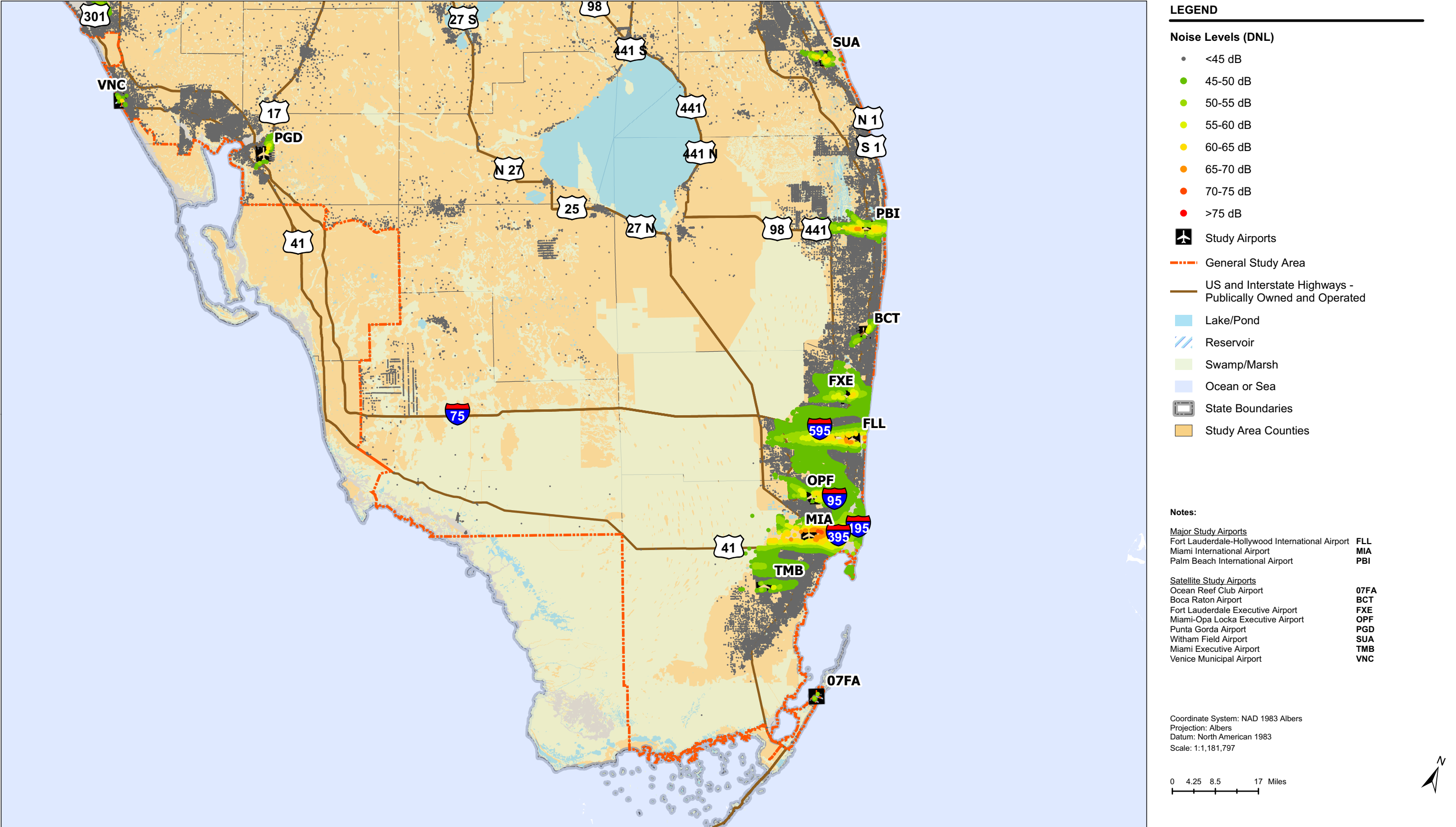
- Notes:**
- Major Study Airports
- | | |
|----------------------------------|-----|
| Orlando International Airport | MCO |
| Palm Beach International Airport | PBI |
| Tampa International Airport | TPA |
- Satellite Study Airports
- | | |
|---|-----|
| Kissimmee Gateway Airport | ISM |
| Lakeland Linder International Airport | LAL |
| Leesburg International Airport | LEE |
| Melbourne International Airport | MLB |
| Orlando Executive Airport | ORL |
| Punta Gorda Airport | PGD |
| St. Pete-Clearwater International Airport | PIE |
| Orlando Sanford International Airport | SFB |
| Sarasota Bradenton International Airport | SRQ |
| Witham Field Airport | SUA |
| Venice Municipal Airport | VNC |

Coordinate System: NAD 1983 Albers
Projection: Albers
Datum: North American 1983
Scale: 1:1,601,151



Sources: U.S. Census Bureau, 2016 (2016 TIGER/Line Shapefiles (machine-readable data files), American Community Survey - 2010-2014 5-Year Estimates); ESRI, Inc., 2016 (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies).
ESRI World Water Bodies 2018 (Ocean and Sea). ATAC Corporation, 2020 (2020 General Study Area boundary) (2020 Baseline DNL Noise Exposure).
Prepared by: ATAC Corporation, August 2020.

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Sources: U.S. Census Bureau, 2016 (2016 TIGER/Line Shapefiles (machine-readable data files), American Community Survey - 2010-2014 5-Year Estimates); ESRI, Inc., 2016 (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies).
ESRI World Water Bodies 2018 (Ocean and Sea). ATAC Corporation, 2020 (2020 General Study Area boundary) (2020 Baseline DNL Noise Exposure).
Prepared by: ATAC Corporation, August 2020.

Exhibit 4-13

2020 Baseline DNL Noise Exposure by Census Block

South Satellites

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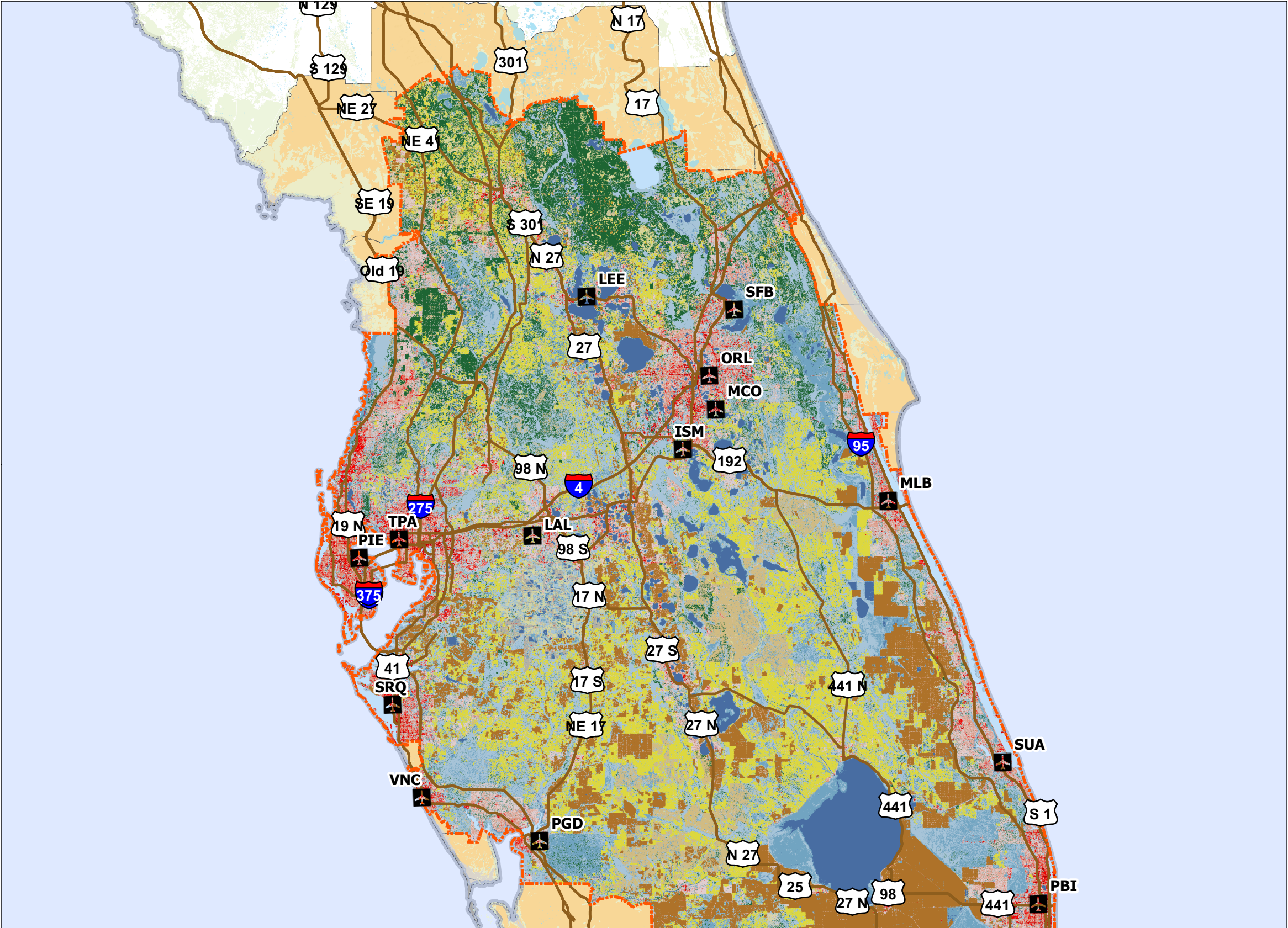
4.3.7.3 Noise Sensitive Areas and Uses

Appendix B to FAA Order 1050.1F, paragraph B-1.3, *Affected Environment*, requires the FAA to identify the location and number of noise sensitive uses in addition to residences (e.g., schools, hospitals, parks, recreation areas) that could be significantly impacted by noise. As defined in Paragraph 11-5.b(10) of FAA Order 1050.1F, a noise sensitive area is “[a]n area where noise interferes with normal activities associated with its use. Normally, noise sensitive areas include residential, educational, health, and religious structures and sites, and parks, recreational areas, areas with wilderness characteristics, wildlife refuges, and cultural and historical sites.” Potential impacts to residential population are considered using US Census block population centroids as described in **Section 4.3.1.2**. Parks, recreational areas, areas with wilderness characteristics, wildlife refuges, and cultural and historical sites are further discussed in **Sections 4.3.2 and 4.3.3**, below. **Appendix I, Table A8.1** lists those locations identified as noise sensitive in the General Study Area and reports the noise values associated with each location.

4.3.7.4 Compatible Land Use

The noise compatibility of land use is determined by comparing the aircraft DNL values at a site to the values of the FAA’s land use compatibility guidelines in Title 14, Code of Federal Regulations, Part 150, Appendix A, Table 1.

Existing land use in the General Study Area is depicted in **Exhibits 4-14 and 4-15**. It is characterized using generalized land coverage data from the USGS National Land Cover Database 2011 (NLCD 2011). As depicted in **Exhibits 4-14 and 4-15**, the majority of the General Study Area is dominated by shrub/scrub, while portions of the northeastern area are dominated by deciduous forest. Open water is found in the northeast and eastern portions of the General Study Area. The majority of urban development lies in along the coastal regions of the General Study Area, predominantly characterized by areas of low-, medium-, and high-density urban development around the Gulf Coast-Tampa Bay area, inland Orlando region, and coastal areas from Palm Beach to Miami. Agricultural area extends through the middle of the General Study Area with the highest concentration bordering Lake Okeechobee on the south. Forested and pasture areas primarily exist in the inland areas northeast of Tampa Bay and to the north and east of the Orlando area. The majority of the south General Study Area is dominated by woody and emergent herbaceous wetlands. The General Study Area also includes numerous water bodies, swampland, large parks, recreational areas, wilderness areas, and other types of resources managed by local, state, and federal agencies. These resources are further discussed in **Section 4.3.2**.



LEGEND

- ✈ Study Airports
- General Study Area
- US and Interstate Highways - Publically Owned and Operated
- Lake/Pond
- Reservoir
- Swamp/Marsh
- Ocean or Sea
- State Boundaries
- Study Area Counties

National Land Cover Data

- Ocean water
- Open water
- Developed, open space
- Developed, low intensity
- Developed, medium intensity
- Developed, high intensity
- Barren land
- Deciduous forest
- Evergreen forest
- Mixed forest
- Shrub / scrub
- Grassland / herbaceous
- Pasture hay
- Cultivated crops
- Woody wetlands
- Emergent herbaceous wetlands

Notes:

Major Study Airports

Orlando International Airport	MCO
Palm Beach International Airport	PBI
Tampa International Airport	TPA

Satellite Study Airports

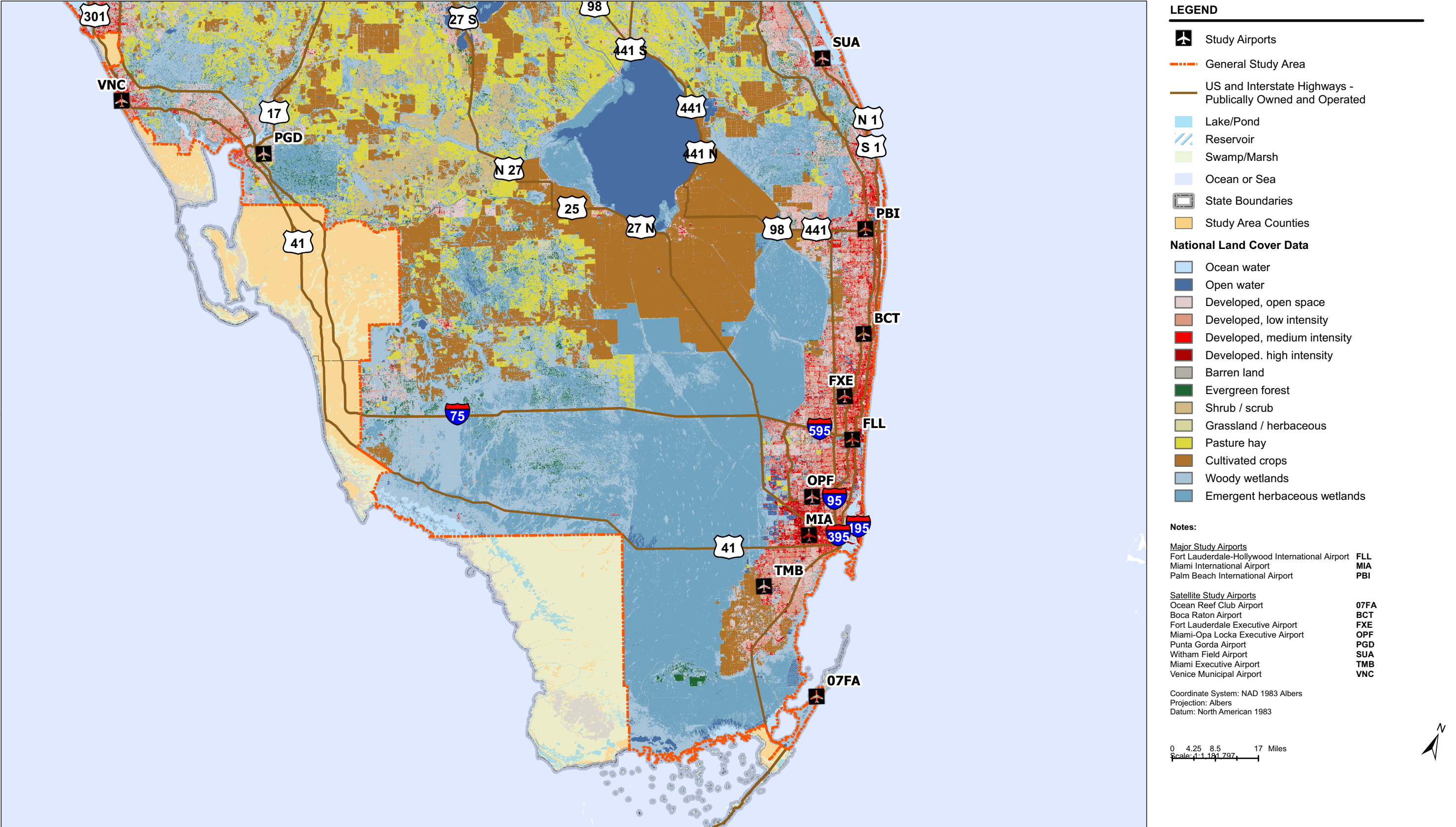
Kissimmee Gateway Airport	ISM
Lakeland Linder International Airport	LAL
Leesburg International Airport	LEE
Melbourne International Airport	MLB
Orlando Executive Airport	ORL
Punta Gorda Airport	PGD
St. Pete-Clearwater International Airport	PIE
Orlando Sanford International Airport	SFB
Sarasota Bradenton International Airport	SRQ
Witham Field Airport	SUA
Venice Municipal Airport	VNC

Coordinate System: NAD 1983 Albers
 Projection: Albers
 Datum: North American 1983

0 5 10 20 Miles
 Scale: 1:1,600,307

Sources: U.S. Census Bureau, 2016 (2016 TIGER/Line Shapefiles (machine-readable data files), American Community Survey - 2010-2014 5-Year Estimates); ESRI, Inc., 2016 (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). ESRI World Water Bodies 2018 (Ocean and Sea). The National Geospatial Program, The National Map (2015 Land Cover). ATAC Corporation, 2020 (2020 General Study Area boundary). Prepared by: ATAC Corporation, August 2020.

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Sources: U.S. Census Bureau, 2016 (2016 TIGER/Line Shapefiles (machine-readable data files), American Community Survey - 2010-2014 5-Year Estimates); ESRI, Inc., 2016 (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). ESRI World Water Bodies 2018 (Ocean and Sea).The National Geospatial Program, The National Map (2015 Land Cover). ATAC Corporation, 2020 (2020 General Study Area boundary). Prepared by: ATAC Corporation, August 2020.

Exhibit 4-15
Land Coverage in the General Study Area South

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4.3.8 Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks – Environmental Justice Sub-Category

This section is limited to a discussion of Environmental Justice as it pertains to potential aircraft noise impacts in the General Study Area. An environmental justice analysis considers the potential of the proposed project alternatives to cause disproportionate and adverse effects on low-income or minority populations. In the event that adverse effects are determined, applicable mitigation ensures that no low-income or minority population bears a disproportionate burden of effects.

The FAA's 1050.1F *Desk Reference* notes that Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* and the accompanying Presidential Memorandum, as well as DOT Order 5610.2a, *Final Order to Address Environmental Justice in Low-Income and Minority Populations*, require the FAA to provide for meaningful public involvement by minority and low-income populations. These documents encourage considering environmental justice impacts in EAs to determine whether a disproportionately high and adverse impact may occur.

The socioeconomic and racial characteristics of the population within the General Study Area are based on data from the U.S. Census, 2010-2014 American Community Survey (ACS) 5-Year Data Release. Minority and low-income populations for each census block group within the General Study are identified using the AEDT 2d environmental justice module and depicted in **Exhibits 4-16 and 4-17** using geographical information systems (GIS).⁵⁹ This analysis defines and identifies minority population and low-income population as follows:

- A **minority census block group** is a census block group with a minority population percentage greater than the average minority population percentage of the overall General Study Area. Based on U.S. Census data, the average percentage of minority population residing in the General Study Area was 43.87 percent. Therefore, every census block group with a percentage of minority population greater than 43.87 percent is designated a census block group of environmental justice concern.
- A **low-income population census block group** is a census block group with a greater percentage of low-income population than the average percentage of low-income population in the overall General Study Area. The average percentage of low-income population residing in the overall General Study Area was 17.32 percent. Therefore, every census block group with a low-income population greater than 17.32 percent is designated a census block group of environmental justice concern.

Exhibits 4-16 and 4-17 depicts areas of environmental justice concern in the General Study Area. **Table 4-6** presents minority and low-income populations by county within the General Study Area. Those counties exceeding the minority population and/or low-income population average percentages are highlighted for clarity.

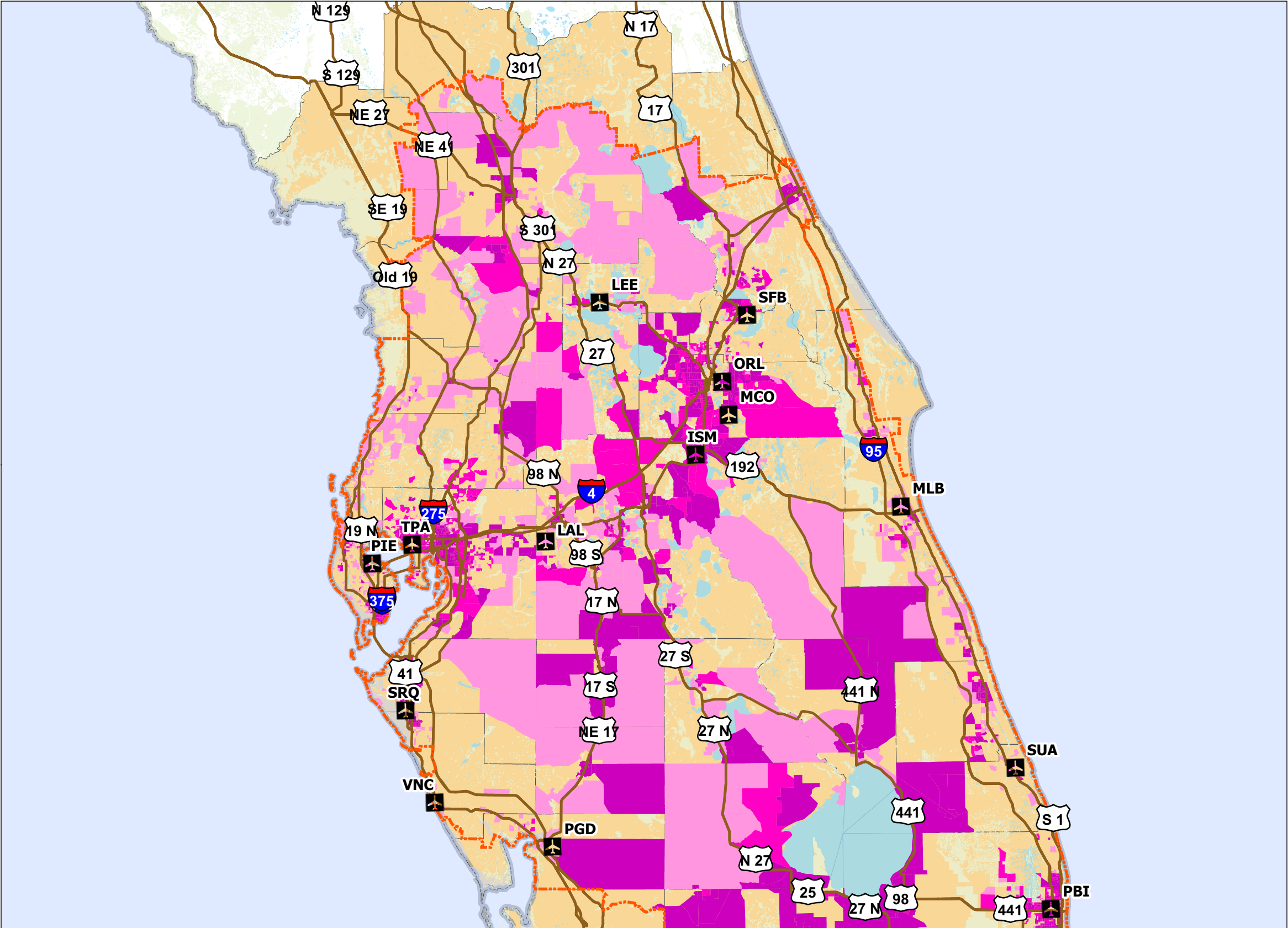
⁵⁹ All GIS work was conducted using ESRI ArcGIS version 10.8, Manifold Release 9.0, and prior release versions where applicable.

Table 4-6 Low-Income and Minority Populations by County in General Study Area

County	Population	Minority	% of Total	Low Income	% of Total
Alachua County	29,273	10,097	34.49%	5,306	18.13%
Brevard County	533,103	127,523	23.92%	74,027	13.89%
Broward County	1,815,269	1,064,534	58.64%	263,443	14.51%
Charlotte County	144,652	23,237	16.06%	18,390	12.71%
Citrus County	135,892	15,031	11.06%	23,044	16.96%
Collier County	120,668	56,085	46.48%	20,800	17.24%
DeSoto County	34,785	15,482	44.51%	9,968	28.66%
Flagler County	4,922	856	17.39%	1,080	21.94%
Glades County	13,190	5,149	39.04%	2,885	21.87%
Hardee County	27,549	14,418	52.34%	7,910	28.71%
Hendry County	38,360	25,251	65.83%	9,761	25.45%
Hernando County	173,792	32,920	18.94%	27,409	15.77%
Highlands County	98,261	29,873	30.40%	18,617	18.95%
Hillsborough County	1,279,668	609,669	47.64%	216,127	16.89%
Indian River County	140,918	32,802	23.28%	21,438	15.21%
Lake County	305,010	82,730	27.12%	43,155	14.15%
Lee County	31,285	4,506	14.40%	3,153	10.08%
Levy County	22,692	5,386	23.74%	5,338	23.52%
Manatee County	335,840	92,073	27.42%	49,357	14.70%
Marion County	334,771	90,878	27.15%	59,591	17.80%
Martin County	149,658	30,506	20.38%	17,674	11.81%
Miami-Dade County	2,600,861	2,201,466	84.64%	524,382	20.16%
Monroe County	3,739	1,057	28.27%	674	18.03%
Okeechobee County	39,398	14,038	35.63%	10,161	25.79%
Orange County	1,200,241	668,534	55.70%	207,658	17.30%
Osceola County	289,449	180,191	62.25%	52,506	18.14%
Palm Beach County	1,359,074	565,733	41.63%	195,174	14.36%
Pasco County	472,745	101,759	21.53%	66,435	14.05%
Pinellas County	925,030	222,672	24.07%	130,580	14.12%
Polk County	617,323	227,191	36.80%	111,170	18.01%
Putnam County	10,740	2,753	25.63%	2,758	25.68%
Sarasota County	371,764	60,859	16.37%	43,492	11.70%
Seminole County	432,135	152,125	35.20%	49,768	11.52%
St. Lucie County	283,988	113,187	39.86%	51,590	18.17%
Sumter County	103,708	16,841	16.24%	10,324	9.95%
Volusia County	432,250	122,436	28.33%	77,436	17.91%

Source: FAA AEDT v2d Environmental Justice module dataset derived from US Census Bureau, 2010-2014 American Community Survey (ACS) 5-Year Estimate.

Prepared by: ATAC Corporation, February 2020.

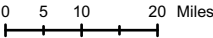


LEGEND

- Study Airports
- General Study Area
- US and Interstate Highways - Publically Owned and Operated
- Lake/Pond
- Reservoir
- Swamp/Marsh
- Ocean or Sea
- State Boundaries
- Study Area Counties
- Low Income Population
- Minority Population
- Low Income/Minority Population

- Notes:**
- Major Study Airports
- | | |
|----------------------------------|-----|
| Orlando International Airport | MCO |
| Palm Beach International Airport | PBI |
| Tampa International Airport | TPA |
- Satellite Study Airports
- | | |
|---|-----|
| Kissimmee Gateway Airport | ISM |
| Lakeland Linder International Airport | LAL |
| Leesburg International Airport | LEE |
| Melbourne International Airport | MLB |
| Orlando Executive Airport | ORL |
| Punta Gorda Airport | PGD |
| St. Pete-Clearwater International Airport | PIE |
| Orlando Sanford International Airport | SFB |
| Sarasota Bradenton International Airport | SRQ |
| Witham Field Airport | SUA |
| Venice Municipal Airport | VNC |

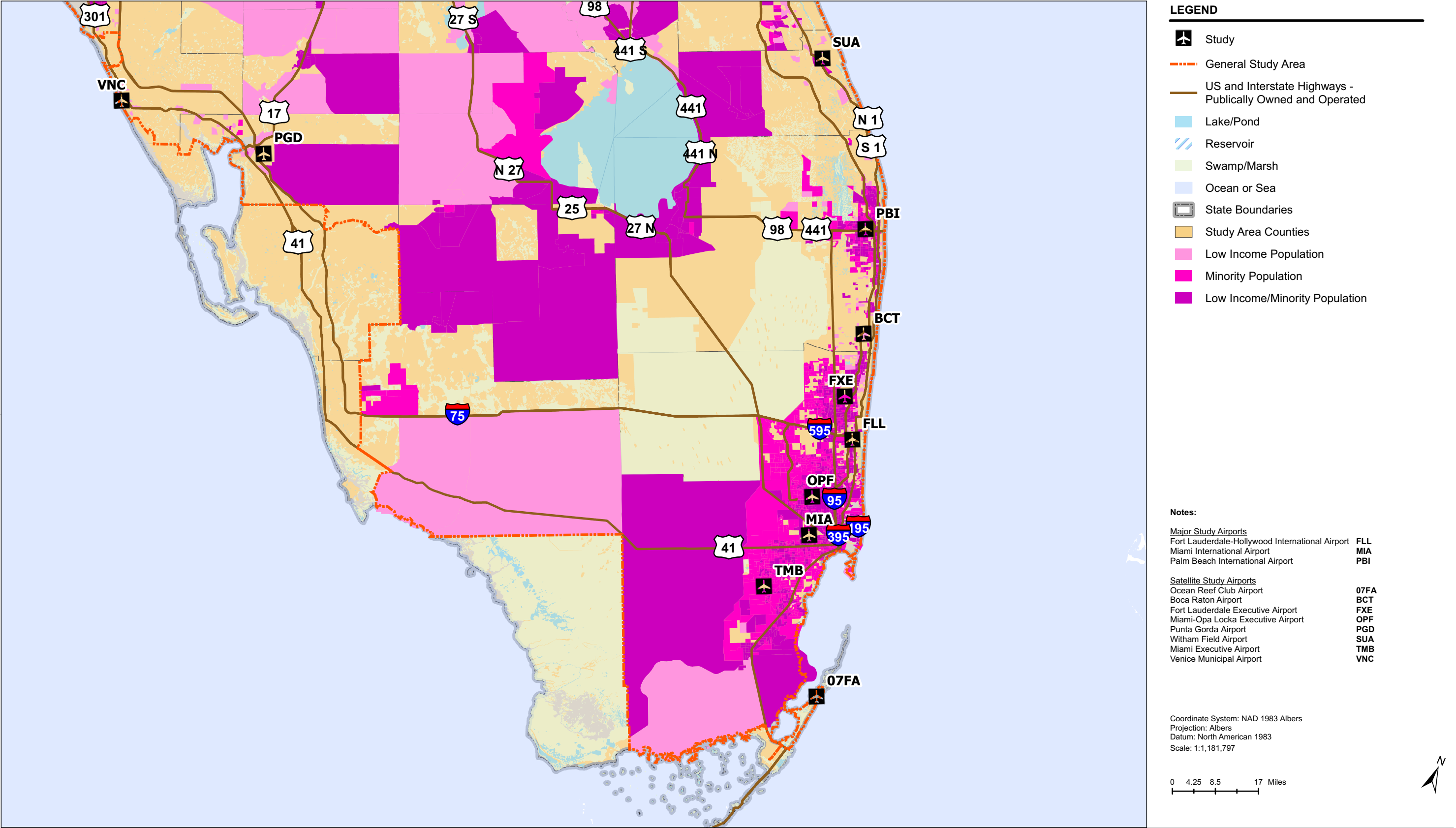
Coordinate System: NAD 1983 Albers
Projection: Albers
Datum: North American 1983
Scale: 1:1,600,307



Sources: U.S. Census Bureau, 2016 (2016 TIGER/Line Shapefiles (machine-readable data files), American Community Survey - 2010-2014 5-Year Estimates); ESRI, Inc., 2016 (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies).
ESRI World Water Bodies 2018 (Ocean and Sea). ATAC Corporation, 2020 (2020 General Study Area boundary).
Prepared by: ATAC Corporation, August 2020.

Exhibit 4-16
Environmental Justice Communities in the General Study Area North

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Sources: U.S. Census Bureau, 2016 (2016 TIGER/Line Shapefiles (machine-readable data files), American Community Survey - 2010-2014 5-Year Estimates); ESRI, Inc., 2016 (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies).
ESRI World Water Bodies 2018 (Ocean and Sea). ATAC Corporation, 2020 (2020 General Study Area boundary).
Prepared by: ATAC Corporation, August 2020.

Exhibit 4-17
Environmental Justice Communities in the General Study Area
South

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4.3.9 Visual Effects (Visual Resources / Visual Character Only)

Visual Effects deal with the extent to which a Proposed Action would result in visual impacts within the General Study Area. The Proposed Action includes changes that would generally occur at altitudes at or above 3,000 feet AGL (with any changes at and below that altitude occurring within the footprint of existing procedures). Currently, portions of the General Study Area are exposed to the sight of aircraft arriving and departing from the Study Airports. Any potential visual impacts would only arise from changes in the visibility of aircraft within the General Study Area as perceived from the ground.

5 Environmental Consequences

This chapter discusses the potential environmental impacts that could result from implementing the Proposed Action and the No Action alternatives. Specifically, this EA considers effects on the environmental resource categories identified in FAA Order 1050.1F. Both the Proposed Action and the No Action alternatives were evaluated under forecasted 2021 conditions, which is the first year the Proposed Action could potentially be implemented, and under forecasted 2026 conditions. This evaluation considers the direct, indirect, and cumulative effects associated with the Proposed Action and No Action alternatives, as required under FAA Order 1050.1F.

Potential environmental impacts are identified for the environmental resource categories described in **Section 4.3**. Neither the Proposed Action nor the No Action alternative would involve land acquisition; physical changes to the environment resulting from ground-disturbing or construction activities; changes in patterns of population movement or growth, increases in public service demands or business and economic activity; or generation, disturbance, transportation, or treatment of hazardous materials. Therefore, neither alternative is expected to result in impacts to certain environmental resource categories (please see **Section 4.2** for a list of excluded categories). The excluded environmental resource categories are not further discussed in this chapter.

Table 5-1 identifies the environmental impact categories that the Proposed Action could potentially affect, the thresholds of significance used to determine the potential for impacts, and a side-by-side comparative summary of the potential for environmental impacts resulting from implementing the Proposed Action under 2021 and 2026 forecast conditions.

Table 5-1 Summary of Potential Environmental Impacts

Environmental Impact Category	Threshold of Significance/Factors to Consider	Significant Impact?	
		2021	2026
Noise and Noise-Compatible Land Use	A significant noise impact would occur if the Proposed Action would increase noise by DNL 1.5 dB or more for a noise sensitive area that is exposed to noise at or above the DNL 65 dB noise exposure level, or that will be exposed at or above the DNL 65dB level due to a DNL 1.5dB or greater increase, when compared to the No Action Alternative for the same timeframe.	No	No
Air Quality	A significant impact would occur if the Proposed Action would cause pollutant concentrations to exceed one or more of the National Ambient Air Quality Standards (NAAQS), as established by the Environmental Protection Agency under the Clean Air Act, for any of the time periods analyzed, or to increase the frequency or severity of any such existing violations.	No	No

Table 5-1 Summary of Potential Environmental Impacts

Environmental Impact Category	Threshold of Significance/Factors to Consider	Significant Impact?	
		2021	2026
Wildlife (Avian Species)	A significant impact to federally-listed threatened and endangered species would occur when the United States Fish and Wildlife Service (FWS) or National Marine Fisheries Service (NMFS) determines that the Proposed Action would be likely to jeopardize the continued existence of the species in question, or would result in the destruction or adverse modification of federally-designated critical habitat. Lesser impacts including impacts on non-listed species could also constitute a significant impact based on consideration factors such as long-term or permanent loss of unlisted wildlife species and adverse impacts to special status species or their habitats. The FAA has not established a significance threshold for non-listed species.	No	No
Climate	The FAA has not established a significance threshold for climate and has not identified specific factors to consider in making a significance determination.	No	No
Department of Transportation Act, Section 4(f) Resources	A significant impact would occur if the proposed action involves more than a minimal physical use of a Section 4(f) resource or constitutes a “constructive use” based on an FAA determination that the aviation project would substantially impair the Section 4(f) resource. Resources that are protected by Section 4(f) are publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance; and publicly or privately-owned land from an historic site of national, state, or local significance. Substantial impairment occurs when the activities, features, or attributes of the resource that contribute to its significance or enjoyment are substantially diminished. Substantial impairment occurs when the activities, features, or attributes of the Section 4(f) resource that contribute to its significance or enjoyment are substantially diminished.	No	No
Historic Properties and Cultural Resources	The FAA has not established a significance threshold for historical and cultural resources.	No	No
Energy Supply (Aircraft Fuel)	The FAA has not established a significance threshold for energy supply. However, a significant factor to consider is if the action would have the potential to cause demand to exceed available or future (project year) supplies of these resources.	No	No

Table 5-1 Summary of Potential Environmental Impacts

Environmental Impact Category	Threshold of Significance/Factors to Consider	Significant Impact?	
		2021	2026
Environmental Justice	The FAA has not established a significance threshold for environmental justice. However, significant factors to consider to determine potential significant impact are if the action would have the potential to lead to a disproportionately high and adverse impact to an environmental justice population, i.e., a low-income or minority population, due to significant impacts in other environmental impact categories, and/or causes impacts on the physical or natural environment that affect an environmental justice population in a way that the FAA determines are unique to the environmental justice population and significant to that population	No	No
Visual Effects	The FAA has not established a significance threshold for visual resources / visual character. Significant factors to consider include potential effect an action has on the nature of the visual character of the area, potential to contrast with the visual resources and/or visual character in the study area, and/or potential to block or obstruct the views of visual resources	No	No

Source: FAA Order 1050.1F, Exhibit 4-1, July 2015.
Prepared By: ATAC Corporation, October 2020.

The following sections describe the impact findings for each environmental resource category, followed by a discussion of potential cumulative impacts. In summary, no significant impacts to any environmental resource category have been identified.

5.1 Noise and Noise-Compatible Land Use

This section discusses the analysis of aircraft noise exposure under the Proposed Action and the No Action alternatives, under both 2021 and 2026 forecast conditions. This discussion includes identifying the differences in noise exposure between the Proposed Action and the No Action alternatives. This comparison is used to determine if implementing the Proposed Action would result in significant noise impacts. Additional information on noise metrics and the basics of noise can be found in **Appendix E**. Detailed information on the noise analysis prepared for the South-Central Florida Metroplex Project is included in **Appendix I**.

5.1.1 Summary of Impacts

Aircraft noise exposure was modeled for both the Proposed Action and the No Action alternatives under 2021 and 2026 forecast conditions. The noise analysis demonstrates that implementing the Proposed Action would not result in a day-night average sound level (DNL) increase of 1.5 dBA or higher in noise-sensitive areas exposed to DNL 65 dB or higher. Therefore, neither the Proposed Action nor the No Action alternative would result in a significant noise impact.

5.1.2 Methodology

The noise analysis evaluated noise exposure to communities within the General Study Area from aircraft forecasted to be operating under Instrument Flight Rules (IFR)-filed flight plans, at altitudes between ground level up to 18,000 feet above ground level (AGL) due to the presence of one or more national parks.⁶⁰ IFR-filed aircraft activity was forecasted for the years 2021 and 2026 and used to model conditions under both the Proposed Action and the No Action alternatives. Noise modeling was conducted using Aviation Environmental Design Tool (AEDT) 2d, the FAA-required noise model for aviation projects, including air traffic changes over large areas and altitudes over 3,000 feet AGL.⁶¹ While this is the policy delineating under what circumstances the AEDT model is to be used, this policy does not delineate the methodology applied in modelling noise. All noise modelling for this analysis was conducted from the ground elevation up to 18,000 feet AGL. All noise results are reported at the ground level elevation of that point based on the AEDT 2d terrain model.

If the FAA approves the Proposed Action, the agency expects to begin implementation in 2021. Therefore, aircraft noise modeling was conducted for 2021 and five years later (2026), as required by FAA Order 1050.1F. Future year noise exposure levels modeled for the Proposed Action and the No Action alternatives were compared to determine whether there is a potential for noise impacts. While the overall number and type of aircraft operations will increase between 2021 and 2026, the number and type of aircraft operations are the same under both the Proposed Action and No Action alternatives in 2021 and 2026. The Proposed Action does not include developing or constructing facilities, such as runways or terminal expansions, that would be necessary to accommodate an increase in aviation activity; therefore, no additional growth in operations associated with the Proposed Action is anticipated. The noise analysis reflects the change in noise exposure at the ground elevation at that point resulting from the proposed changes in aircraft routes (i.e., flight tracks) under the Proposed Action compared to the No Action alternatives.

Detailed information on IFR-filed aircraft operations within the General Study Area was assembled for input into AEDT, including the following data:

Average Annual Day IFR-Filed Aircraft Flight Schedules: The IFR-filed aircraft flight schedules identify arrival and departure times, aircraft types, and origin/destination information for an average annual day (AAD) in 2021 and in 2026. The AAD represents all the aircraft operations for every day in a study year divided by 365, the number of days in a year. The AAD does not reflect a particular day, but is meant to represent a typical day over a period of a year. The forecast was based on the FAA's 2019 Terminal Area Forecast (TAF),⁶² modified for 2021 and 2026 with additional details using previously identified arrival/departure times, aircraft types, and origin/destination information. More detail related to the development of the forecasts is provided in **Appendix H**.

Weather: The AEDT model includes data for multiple meteorological parameters, including temperature, pressure, and humidity. Weather conditions for all Study Airports were defined and used in the noise study. Further discussion on the weather data employed in the AEDT model can be found in **Appendix I**.

60 FAA Order 1050.1F Desk Reference (Version 2), Section 11.2 Noise and Noise-Compatible Land Use, February 2020.

61 FAA Order 1050.1F Desk Reference (Version 2), Section 11.3 Noise and Noise-Compatible Land Use, February 2020.

62 U.S. Department of Transportation, Federal Aviation Administration, *Terminal Area Forecast*, 2019 [<https://aspm.faa.gov/main/taf.asp> (Accessed October 2019)].

Flight Tracks: The flight tracks used in noise modeling were based on radar data collected for the Existing Conditions (June 1, 2017 to May 30, 2018) noise analysis and information provided by FAA Air Traffic Control (ATC) personnel. The proposed final designs from the D&I Team were extensively reviewed over three non-consecutive weeks in June, August, and September of 2019 with applicable air traffic subject matter experts to obtain anticipated aircraft routings; anticipated procedure usage; anticipated typical operation; anticipated instances of aircraft altitude, location, and timing; and other operational influences for inclusion to the detailed AEDT modeling process. Aircraft routings under both the No Action alternative and Proposed Action are depicted in **Exhibit 3-7 through 3-20** in **Chapter 3, Alternatives**. For the Proposed Action, flight tracks were developed from the aircraft ATC procedures created by the FL Metroplex Design & Implementation (D&I) Team using the Terminal Area Route Generation, Evaluation, Traffic and Simulation (TARGETS) program. The majority of the No Action modeled flight tracks are based on the Existing Conditions noise analysis. The remaining No Action flight tracks for amended or new ATC procedures were modeled based on input from the air traffic control experts who developed the ATC procedures. Illustrations depicting Existing Conditions radar tracks and Proposed Action ATC procedure designs were developed and shared with the D&I Team as part of the consultation process. The consultations were conducted to seek out key model input assumptions such as frequency of Proposed Action ATC procedure usage and air traffic control techniques, such as vectoring. The assumptions were then used for refining model track locations, altitude profiles, and utilization.

TARGETS flyability lines, or the lines indicating the actual 3D path of different categories of aircraft ideally flying the ATC procedure for the Proposed Action ATC procedures served as the center of the 1 NM and 0.3 NM containment area for RNAVs and RNP, respectively. The containment area is generally where dispersed tracks are contained, but during the D&I consultation process, air traffic control experts could indicate the need for vectors off of the RNAV with a rejoin of the RNAV at a later point. For those identified cases NIRS model tracks were developed to account for that type of dispersion.

Runway Use: Runway use percentages were identified for all runways at the Study Airports. Forecasted aircraft operations were assigned to particular runways representing operating conditions at the Study Airports under Proposed Action and No Action conditions. Runway use patterns did not change under the Proposed Action at the Study Airports compared to the No Action alternative.

More detail related to the development of the AEDT model input files is provided in **Appendix I**.

As discussed in **Section 4.3.7.1**, the AEDT model was used to compute DNL values for 2021 and 2026 Proposed Action and No Action conditions at multiple sets of data points throughout the General Study Area:

- 210,582 2010 Census block centroids containing reported population;
- 117,424 uniform grid points at 0.5 NM intervals on a uniform grid covering the General Study Area,
- 95,366 points used to calculate DNL values at potential Department of Transportation Act (DOT), Section 4(f) resources, including 873 (represented by 880 total points) National Register listed historic sites; and 7,231 unique points representing other Section 4(f) resources.

As discussed in **Section 4.3.7.1**, DNL is the FAA's primary noise metric. **Table 5-2** provides the criteria used to assess the changes in aircraft noise exposure attributable to the Proposed Action compared with the No Action alternative. FAA Order 1050.1F defines a significant impact as an increase of DNL 1.5 dB at noise-sensitive land use locations (e.g., residences, schools, etc.) exposed to aircraft noise of DNL 65 dB or higher under the Proposed Action. For example, an increase from 63.5 dB to 65 dB is considered a significant impact.

FAA Order 1050.1F also recommends that when there are DNL increases of 1.5 dB or more at noise-sensitive locations in areas exposed to aircraft noise of DNL 65 dB and higher, DNL increases of 3 dB or more in areas exposed to aircraft noise between DNL 60 dB and 65 dB should also be evaluated and disclosed. It is important to note that DNL increases of 3 dB in areas exposed to aircraft noise below DNL 65 dB are not considered "significant impacts," but are to be considered in the environmental evaluation of a proposed project.

FAA Order 1050.1F also stipulates that changes in exposure of DNL 5 dB or greater in areas exposed to aircraft noise between DNL 45 dB and 60 dB should be considered for airspace actions, such as changes to air traffic routes. This threshold was established in 1990, following issuance of an FAA noise screening ATC procedure to evaluate whether certain airspace actions above 3,000 feet AGL might increase DNL levels by 5 dB or more. The FAA established this noise-screening ATC procedure because experience indicated that DNL increases 5 dB or more at cumulative levels well below DNL 65 dB could be disturbing to people and become a source of public concern. As shown in **Table 5-2**, a 3 dB increase in areas exposed to DNL 60 to 65 dB and a 5 dB increase in areas exposed to DNL 45 to 60 dB are considered reportable noise increases.

Table 5-2 Criteria for Determining Impact of Changes in Aircraft Noise

DNL Noise Exposure Level	Increase in DNL with Proposed Action	Aircraft Noise Exposure Change Consideration
DNL 65 and higher	DNL 1.5 dB or more ^{1/}	Exceeds Threshold of Significance
DNL 60 to 65	DNL 3.0 dB or more ^{2/}	Reportable Noise Increase (Considered When Evaluating Air Traffic Actions)
DNL 45 to 60	DNL 5.0 dB or more ^{3/}	Reportable Noise Increase (Information Disclosed When Evaluating Air Traffic Actions)

Notes:

1/ Source FAA Order 1050.1F Desk Reference, Pg. 11-9; Title 14 C.F.R. Part 150.21 (2) (d), July 15, 2015; and Federal Interagency Committee on Noise, Federal Agency Review of Selected Airport Noise Issues, August 1992.

2/ Source FAA Order 1050.1F Desk Reference, Pg. 11-9; and Federal Interagency Committee on Noise, Federal Agency Review of Selected Airport Noise Issues, August 1992.

3/ Source FAA, Order 1050.1F Desk Reference, Pg. 11-9.

Source: FAA Order 1050.1F Desk Reference (Version 2), Ch. 11, *Noise and Noise-Compatible Land Use*, February 2020.

Prepared by: ATAC Corporation, October 2020

5.1.3 Potential Impacts – 2021 and 2026

Table 5-3 summarizes the results of the noise analysis for 2021 and 2026 conditions. The results for both years indicate that, when compared to the No Action Alternative, the Proposed Action would not result in a DNL 1.5 dB or higher increase in noise-sensitive areas exposed to DNL 65 dB or higher. Furthermore, no population would experience a reportable noise increase in areas exposed to DNL between 60 dB and 65 dB or between 45 dB and 60 dB.

These results indicate that Proposed Action would not result in a significant noise exposure impact on population exposed to DNL 65 dB or higher levels under the Proposed Action or produce reportable noise increases in areas exposed to DNL 45 dB to 65 dB.

Table 5-3 Change in Potential Population Exposed to Aircraft Noise – 2026

DNL Noise Exposure Level Under the Proposed Action	Increase in DNL with the Proposed Action	Population Exposed to Noise that Exceeds the Threshold	
		2021	2026
DNL 65 and higher	DNL 1.5 dB or greater	0	0
DNL 60 to 65	DNL 3.0 dB or greater	0	0
DNL 45 to 60	DNL 5.0 dB or greater	0	0

Sources: U.S. Census Bureau, 2010 Census (population centroid data), Accessed October 2019; ATAC Corporation, May 2020 (AEDT modeling results).

Prepared by: ATAC Corporation, October 2020.

5.1.4 Noise Sensitive Uses and Areas

In addition to disclosing potential noise impacts to residential population, FAA Order 1050.1F requires the FAA to identify and describe noise sensitive uses and areas in the General Study Area. As defined in Paragraph 11-5b(8) of Order 1050.1F, a noise sensitive area is “(a)n area where noise interferes with normal activities associated with its use. Normally, noise sensitive areas include residential, educational, health, and religious structures and sites, and parks, recreational areas, areas with wilderness characteristics, wildlife refuges, and cultural and historical sites.” Potential impacts to residential population are discussed in **Section 5.1.3**. Potential impacts to recreational areas, areas with wilderness characteristics, wildlife refuges, and cultural and historical sites are discussed in **Sections 5.5 and 5.6**. A table of all grid point and, where applicable, unique point noise results for the Marjory Stoneman Douglas Wilderness at Everglades National Park can be found in **Table A9 of Appendix I**. The noise analysis results indicate that the Proposed Action when compared to the No Action alternative would not result in a DNL 1.5 dBA or higher increase to noise sensitive uses or noise sensitive areas in locations exposed to DNL 65 dB or higher. In addition, these resources would not experience reportable noise increases between DNL 60 dB and 65 dB and DNL 45 and 60 dB.

5.1.5 Noise-Compatible Land Use

FAA Order 1050.1F requires that EA documents discuss possible conflicts between the proposed action and the objectives of federal, regional, state, local, and tribal land use plans, policies, and controls for the area concerned. The analysis of potential impacts to noise-compatible land use was focused on changes in aircraft noise exposure resulting from implementing the Proposed Action. FAA Order 1050.1F states, “The compatibility of existing and planned land uses in the vicinity of an airport is usually associated with the extent of the airport’s noise impact. If the noise analysis concludes that there is no significant impact, a similar conclusion usually may be drawn with respect to compatible land use.” Air traffic actions such as the South-Central Florida Metroplex Project do not result in direct impacts to land usage due to a lack of ground disturbance. Accordingly, the compatible land use analysis relies on changes in aircraft noise exposure between the Proposed Action and the No Action alternative (discussed in **Section 5.1**) as the basis for determining compatible land use impacts within the General Study Area.

5.1.5.1 Potential Impacts – 2021 and 2026

As stated in **Section 5.1**, the Proposed Action, when compared with the No Action alternative, would not result in changes in aircraft noise exposure in 2021 or 2026 that would exceed the FAA's significance threshold. Likewise, there are no conflicts with federal, regional, state, or local land use plans, policies, or controls. Therefore, the Proposed Action would not result in significant compatible land use impacts.

Under the No Action alternative, there would be no changes to air traffic routing in the General Study Area and no changes in aircraft noise exposure expected to occur in either 2021 or 2026. Therefore, the No Action alternative would not result in significant compatible land use impacts

5.2 Air Quality

This section discusses the analysis of air quality impacts under the Proposed Action and the No Action alternative.

5.2.1 Summary of Impacts

The Proposed Action would result in a slight increase in emissions when compared to the No Action alternative. However, operational changes likely to result in a change in emissions under the Proposed Action would occur at or above 3,000 feet AGL and are therefore presumed to conform to the applicable state implementation plans (SIPs). For any changes to flight paths below that mixing height, they are also presumed to conform to the SIPs because they are modifications to air-traffic procedures that are designed to enhance operational airspace efficiency.⁶³ The slight increase in emissions is expected to have little or no effect on emissions or ground concentrations. Therefore, no significant impacts to air quality would be anticipated.

The No Action alternative would not result in a change in the number of aircraft operations or air traffic routes; therefore, no impacts to air quality would be anticipated.

5.2.2 Methodology

Air quality modelling for this analysis was conducted from the ground elevation up to where IFR aircraft operate at or below 18,000 feet AGL. Typically, significant air quality impacts would be identified if an action would result in the exceedance of one or more of the NAAQS for any time period analyzed.⁶⁴ Section 176(c) of the *Clean Air Act* requires that federal actions conform to the appropriate SIP in order to attain the air quality goals identified in the CAA. However, a conformity determination is not required if the emissions caused by a federal action would be less than the *de minimis* levels established in regulations issued by EPA.⁶⁵ FAA Order 1050.1F provides that further analysis for NEPA purposes is normally not required where emissions do not exceed the EPA's *de minimis* thresholds.⁶⁶ The EPA regulations identify certain actions that would not exceed these thresholds, including ATC

63 Federal Presumed to Conform Actions under General Conformity, 72 Fed. Reg. 41565 (July 30, 2007).

64 FAA Order 1050.1F Desk Reference (Version 2), Section 1 Air Quality, February 2020.

65 40 C.F.R. § 93.153(b).

66 FAA Order 1050.1F Desk Reference (Version 2), Section 1 Air Quality, February 2020.

activities and adoption of approach, departure, and en route ATC procedures for aircraft operations above the mixing height specified in the applicable SIP (or 3,000 feet AGL in places without an established mixing height). In addition, the EPA regulations allow federal agencies to identify specific actions as “presumed to conform” (PTC) to the applicable SIP.⁶⁷ In a notice published in the Federal Register, the FAA has identified several actions that “will not exceed the applicable *de minimis* emissions levels” and, therefore, are presumed to conform, including ATC activities and adoption of approach, departure, and en route ATC procedures for air operations.⁶⁸ The FAA’s PTC notice explains that aircraft emissions above the mixing height do not have an effect on pollution concentrations at ground level. The notice also specifically notes that changes in air traffic ATC procedures above 1,500 feet AGL and below the mixing height “would have little if any effect on emissions and ground concentrations.”⁶⁹ Furthermore, “air traffic actions below the mixing height are also presumed to conform when modifications to routes and ATC procedures are designed to enhance operational efficiency (i.e., to reduce delay).”⁷⁰

5.2.3 Potential Impacts – 2021 and 2026

Under the Proposed Action there would be a slight increase in fuel burn (0.46 percent in 2021 and 0.43 percent in 2026) when compared to the No Action alternative. While increased fuel burn corresponds with an increase in emissions, operational changes likely to result in a change in emissions would occur at or above 3,000 feet AGL and are presumed to conform to the applicable state implementation plan (SIP). For any changes to flight paths below that mixing height, they are also presumed to conform to the SIP because they are modifications to air-traffic procedures that are designed to enhance operational airspace efficiency. Thus, no further air quality analysis is necessary, a conformity determination is not required, and the Proposed Action would not result in a significant impact to air quality. The No Action alternative would not result in a change in the number of aircraft operations or air traffic routes; therefore, no impacts to air quality would be anticipated.

5.3 Wildlife (Avian and Bat Species) and Migratory Birds

This section discusses the analysis of potential impacts to avian and bat species under the Proposed Action and the No Action alternative.

5.3.1 Summary of Impacts

The greatest potential for impacts to wildlife species would result from strikes on avian and bat species at altitudes below 3,000 feet AGL. Changes to flight paths under the Proposed Action would primarily occur at or above 3,000 feet AGL. Therefore, the Proposed Action would not result in significant impacts to avian and bat species when compared with the No Action alternative.

⁶⁷ *Id.* at 93.153(f).

⁶⁸ Federal Presumed to Conform Actions under General Conformity, 72 Fed. Reg. 41565 (July 30, 2007).

⁶⁹ *Id.*

⁷⁰ *Id.*

The No Action alternative would not involve changes to air traffic flows, land acquisition, construction, or other ground-disturbing activities. Therefore, the No Action alternative would not result in significant impacts to avian or bat species.

5.3.2 Methodology

The FAA's *Wildlife Strike Database*⁷¹ and an accompanying annual wildlife strike compendium⁷² is the best information available for assessing potential impacts of aircraft on wildlife. Strike reports over the period 1990-2018 are aggregated nationally as well as for individual airports are available from the database and compendium to understand existing conditions. Strike reports are comparable to known information on the presence of specific species of concern to corroborate the reports.

This analysis involved a review of wildlife strike reports⁷³ for the Study Airports under both the Proposed Action and the No Action alternatives, and an evaluation of the potential for the presence of federal- and state-listed threatened and endangered species (i.e., special-status species) within the General Study Area. The FAA compared modifications in flight ATC procedures to the occurrence of special-status species to qualitatively assess the likelihood of whether wildlife strikes might change under the Proposed Action.

5.3.3 Potential Impacts – 2021 and 2026

A significant impact would likely occur if the Proposed Action were to jeopardize the existence of special-status species or result in destroying or adversely modifying critical habitat in the General Study Area. Changes to flight paths under the Proposed Action would primarily occur at or above 3,000 feet AGL, thus there is no potential for these effects in the General Study Area. Accordingly, the analysis is focused on the potential for significant impacts to species resulting from increased wildlife strikes with aircraft.

Since 1990, the FAA has compiled pilot and airport reports of wildlife strikes with aircraft. Within the most recent comprehensive reporting period of 1990 through 2018, 209,950 wildlife strikes were reported nationally, and in 2018, birds were involved in 94.7 percent of the reported strikes, while bats were involved in 3.2 percent.⁷⁴ From 1990 through 2018, about 41 percent of bird strikes with commercial aircraft occurred when the aircraft was at ground level, 71 percent occurred at less than 500 feet AGL, and 92 percent occurred at or below 3,500 feet AGL.⁷⁵ About one percent of bird strikes occurred above 9,500 feet AGL. Above 500 feet AGL, the number of reported strikes declined consistently by 34 percent for each 1,000-foot gain in height. The Wildlife Strike Database reports that of identified species, waterfowl, gulls, and raptors are the species groups of birds with the most damaging strikes.⁷⁶

71 U.S. Department of Transportation, Federal Aviation Administration, *FAA Wildlife Strike Database* [<https://wildlife.faa.gov/search>] (Accessed March 2020).

72 U.S. Department of Transportation, Federal Aviation Administration, and U.S. Department of Agriculture Wildlife Services. *Wildlife Strikes to Civil Aircraft in the United States 1990-2018*. July 2019.

73 U.S. Department of Transportation, Federal Aviation Administration, *FAA Wildlife Strike Database* [<https://wildlife.faa.gov/search>] (Accessed March 2020).

74 U.S. Department of Transportation, Federal Aviation Administration, and U.S. Department of Agriculture Wildlife Services. *Wildlife Strikes to Civil Aircraft in the United States 1990-2018*. July 2019.

75 *Id.*

76 *Id.*

Table 5-3 (Identified Species) and **Table 5-4** (Unknown Species) provides a summary of wildlife strikes reported for the Study Airports between January 1, 1990 and March 1, 2020. In total, 9,415 reported strikes (96.33 percent of all strike records) occurred at altitudes below 3,000 feet AGL, which is slightly higher than the US average 1990-2020.

The *Migratory Bird Treaty Act (MBTA) of 1918* (16 U.S.C. §§ 703–712) protects all the bird species identified in these reports. Furthermore, federal and state laws protect listed endangered and threatened species. In **Chapter 4**, **Table 4-3** identifies the federally-listed bird or bat species and **Table 4-4** identifies state listed bird or bat species believed to occur or known to occur in counties in the General Study Area.

The number of aircraft operations under the Proposed Action and No Action alternatives would be the same. Therefore, the assessment of the potential impacts focuses on changes to flight paths and the potential for impact due to wildlife strikes. Combining **Table 5-3** and **Table 5-4** results, 3.67 percent of bird/bat strikes occurred at altitudes above 3,000 feet AGL. The substantial decline in the number of strikes reported above 3,000 feet AGL indicates that there is less likelihood of bird/bat strikes at these altitudes. Under the Proposed Action, changes to proposed flight paths would primarily occur at or above 3,000 feet AGL and no significant changes to arrival and departure corridors below 3,000 feet AGL would be expected. Therefore, no significant impacts to bird or bat species would be anticipated.

The No Action alternative would not involve changes to air traffic flows, land acquisition, construction, or other ground-disturbing activities. Therefore, no impacts to avian or bat species would occur.

Table 5-3 Identified Bird/Bat Species Strikes by Altitude (1990 – 2020)

Type of Strike	Airport	≤3,000 ft.	>3,000 ft. AGL to ≤ 10,000 ft.	>10,000 ft. AGL	Total
		AGL	AGL		
Identified Bird or Bat Species	FLL	1050	4	0	1,054
	MCO	1,396	8	0	1,404
	MIA	418	4	3	425
	PBI	170	0	2	172
	TPA	619	6	0	625
	07FA	1	0	0	1
	BCT	17	0	0	17
	FXE	120	0	0	120
	ISM	41	0	0	41
	LAL	70	0	0	70
	LEE	3	0	0	3
	MLB	103	0	0	103
	OPF	30	0	0	30
	ORL	102	0	0	102
	PGD	132	0	0	132
	PIE	234	1	0	235
	SFB	427	1	0	428
	SRQ	577	0	0	577
	SUA	8	0	0	8
	TMB	19	0	0	19
	VNC	9	0	0	9
	Identified Total	5,546	24	5	5,575
	Identified Percentage	99.48%	0.43%	0.09%	100%

NOTES: Unknown altitudes (left blank in database) were assumed at or below 3,000 feet AGL except where relevant data indicated otherwise. Terrestrial mammals and reptiles were excluded from the above counts where reported.

Source: U.S. Department of Transportation, Federal Aviation Administration, *FAA Wildlife Strike Database* [<https://wildlife.faa.gov/search> (Accessed March 2020)].

Prepared by: ATAC Corporation, March 2020.

Table 5-4 Unknown Bird/Bat Species Strikes by Altitude (1990 – 2020)

Type of Strike	Airport	>3,000 ft. AGL to			Total
		≤3,000 ft. AGL	≤ 10,000 ft. AGL	>10,000 ft. AGL	
Unknown Bird Or Bat Species	FLL	482	53	8	543
	MCO	1,199	70	14	1,283
	MIA	641	78	22	741
	PBI	224	7	5	236
	TPA	460	41	7	508
	07FA	3	0	0	3
	BCT	4	2	0	6
	FXE	68	1	0	69
	ISM	13	1	0	14
	LAL	12	1	0	13
	LEE	7	0	0	7
	MLB	72	3	2	77
	OPF	38	0	0	38
	ORL	72	0	1	73
	PGD	48	0	1	49
	PIE	165	3	0	168
	SFB	232	7	0	239
	SRQ	82	0	2	84
	SUA	9	1	0	10
	TMB	36	0	0	36
	VNC	2	0	0	2
Unknown Total		3,869	268	62	4,199
Unknown Percentage		92.14%	6.38%	1.48%	100%

NOTES: Unknown altitudes (left blank in database) were assumed at or below 3,000 feet AGL except where relevant data indicated otherwise. Terrestrial mammals and reptiles, where reported, were excluded from the above counts.

Source: U.S. Department of Transportation, Federal Aviation Administration, *FAA Wildlife Strike Database* [https://wildlife.faa.gov/search (Accessed March 2020)].

Prepared by: ATAC Corporation, March 2020.

5.4 Climate

This section discusses greenhouse gas (GHG) emissions and effects to the climate as they relate to the Proposed Action and the No Action alternative.

5.4.1 Summary of Impacts

Although fuel burn would increase slightly under the Proposed Action as compared to the No Action alternative, no significant impacts to the climate would be anticipated.

The No Action alternative would not result in a change in the number of aircraft operations or air traffic routes; therefore, no impacts to climate would be anticipated.

5.4.2 Methodology

In accordance with FAA guidance, estimated CO₂ emissions were calculated from the amount of fuel burned under the No Action alternative and the Proposed Action in 2021 and 2026 (see **Section 5.7**). The resulting CO₂ emissions were then reported as CO₂e.

5.4.3 Potential Impacts – 2021 and 2026

Table 5-5 shows project-related CO₂e emissions that would comprise an increase of less than .000000009983 percent of U.S.-based greenhouse gas emissions as reported for 2017 when compared to the Proposed Action.⁷⁷

Table 5-5 CO₂e Emissions – 2021 and 2026

	2021		2026	
	No Action	Proposed Action	No Action	Proposed Action
CO ₂ e Emissions (MT)	11,879.65	11,934.17	13,236.85	13,294.15
Volume Change (MT)		54.52		57.30
(Proposed Action – No Action)		0.46%		0.43%

Note: CO₂e = Carbon Dioxide Equivalent

Source: ATAC Corporation, May 2020 (AEDT modeling results).

Prepared by: ATAC Corporation, May 2020.

5.5 Department of Transportation Act, Section 4(f) Resources

This section discusses potential impacts to Department of Transportation (DOT) Act, Section 4(f) Resources. **Exhibits 4-3 and 4-4** depicts Section 4(f) resources within the General Study Area as described in **Section 4.3.4**.

5.5.1 Summary of Impacts

Evaluating potential impacts to Section 4(f) resources focuses on changes in aircraft noise exposure resulting from implementing the Proposed Action. The FAA's aircraft noise exposure analysis indicates that the Proposed Action would not substantially change the noise environment at any Section 4(f) resource identified within the General Study Area when compared with the No Action alternative. Furthermore, any changes in aircraft traffic patterns would occur at altitudes and distances from viewers that would not substantially impair the view or setting of Section 4(f) resources. Therefore, no constructive use of a Section 4(f) resource associated with the Proposed Action would occur, and no impacts would be anticipated.

Under the No Action alternative, no changes in air traffic routes in the General Study Area would occur. Therefore, no changes to aircraft noise exposure or aircraft overflight patterns would occur over Section 4(f) resources, and no impacts would be anticipated.

5.5.2 Methodology

The FAA evaluates potential effects on Section 4(f) resources in terms of both direct impacts (i.e., physical use) and indirect impacts (i.e., constructive use). A direct impact would occur as a result of land acquisition, construction, or other ground-disturbing activities that would result in physical use of all or a portion of a Section 4(f) property. As land acquisition, construction, or other ground-disturbing activities would not occur under either the Proposed Action or the No Action alternative, neither alternative would have the potential to cause a direct impact to a Section 4(f) resource. Therefore, analysis of potential impacts to Section 4(f) resources is limited to identifying indirect impacts resulting from constructive use. A

⁷⁷ U.S. Environmental Protection Agency (EPA), *Fast Facts 1990-2017 National Level U.S. Greenhouse Gas Inventory*. April 2019. 5,742.6 million Metric Tons of CO₂e are reported for all sources and sinks.

constructive use of a Section 4(f) resource would occur if there were a substantial impairment of the resource to the degree that the activities, features, or attributes of the site that contribute to its significance or enjoyment are substantially diminished. This could occur as a result of both visual and noise impacts. Concerning aircraft noise, a constructive use would occur if noise levels substantially impair the resource. Refer to **Section 5.9, Visual Impacts**, regarding potential visual impacts within the General Study Area.

Noise exposure levels were calculated for grid points placed at Section 4(f) properties. A list of the resources evaluated is provided in **Appendix I**. The analysis of potential impacts to Section 4(f) resources considered whether these properties would experience a significant noise increase, when comparing the Proposed Action with the No Action alternative, using the applicable thresholds shown in **Table 5-2**.

FAA Order 1050.1F identifies additional factors in deciding whether to apply the thresholds listed above to determine the significance of noise impacts on Section 4(f) resources. If a reportable noise increase were to occur, the Section 4(f) properties would be evaluated further to determine if the project-related effects would constitute a constructive use. Further evaluation can include identifying the specific attributes for which the property is managed (e.g., for traditional recreational uses or where other noise is very low and a quiet setting is a generally recognized purpose and attribute).

In cases where Land and Water Conservation Fund Act (LWCF)⁷⁸ resources are “used” by a transportation project, FAA Order 1050.1F stipulates that replacement satisfactory to the Secretary of the Interior is required for recreation lands aided by the Department of Interior’s LWCF. Therefore, these resources are considered as part of the Section 4(f) impact analysis process.

5.5.3 Potential Impacts – 2021 and 2026

As stated in **Section 5.1**, the Proposed Action, when compared with the No Action alternative, would not result in changes in aircraft noise exposure in 2021 or 2026 that would exceed the FAA’s significance threshold. Noise analysis results for Section 4(f) properties located within the General Study Area can be found in **Appendix I**. As stated in **Section 5.9**, the Proposed Action, when compared with the No Action alternative, would not cause a significant visual impact in 2021 or 2026. Any changes in aircraft traffic patterns would occur at altitudes and distances from viewers that would not substantially impair the view or setting of the Section 4(f) resources. Therefore, the Proposed Action would not result in potential impacts to Section 4(f) resources from a visual impact perspective.

For the 4(f), Historic, and Cultural Resource areas, including but not limited to National Park Service units such as the Marjory Stoneman Douglas Wilderness at Everglades National Park, in 2021 or 2026 the Proposed Action would not result in a DNL 1.5 dB increase or decrease in areas exposed to DNL of 65 dB and higher, nor would it result in a reportable noise increase or decrease of DNL 3.0 dB in areas exposed to DNL 60 dB to 65 dB compared with the 2021 or 2026 No Action alternative. Additionally, the Proposed Action would not result in a DNL 5 dB increase or decrease in areas exposed to DNL between 45 dB and 60 dB compared with the 2021 or 2026 No Action alternative. Therefore, the No Action alternative would not result in potential impacts to Section 4(f) resources.

7816 U.S.C. §§ 460l-4, et seq.

5.6 Historic and Cultural Resources

This section discusses the analysis of impacts to historic properties under the Proposed Action and No Action alternatives. **Section 4.3.5** provides information on historic properties within the General Study Area. The FAA initiated consultation with the State Historic Preservation Officer (SHPO) for the State of Florida in May 2020, in accordance with Section 106 of the *National Historic Preservation Act of 1966* (16 U.S.C. § 470 *et seq.*) and the implementing regulations at 36 C.F.R. Part 800. This effort concluded on September 18, 2020 with a determination of no adverse effects by the Florida SHPO for the proposed undertaking. There are recognized on-tribal or off-tribal⁷⁹ lands located within the General Study Area based on readily available data. Tribal Historic Preservation Officers (THPOs) were contacted as part of the Section 106 process as a means of initiating government-to-government consultation regarding any concerns related to the South-Central Florida Metroplex Project that uniquely or significantly affect Tribal interests. Tribal Historic Preservation Officers did not request further consultation. Further documentation of government-to-government communication is available in **Appendix A**.

5.6.1 Summary of Impacts

The aircraft noise exposure analysis indicates that there would be no significant noise impact to the environment at any historic properties under the Proposed Action compared with the No Action alternative. The Proposed Action would not directly or indirectly change the characteristics qualifying or potentially qualifying a historic resource for inclusion in or its eligibility for the NRHP. Therefore, no adverse effect on historic properties under the Proposed Action would be anticipated for 2021 or 2026, nor would there be any visual impacts at historic properties under the Proposed Action.

Under the No Action alternative, no changes to air traffic routes in the South-Central Florida Metroplex would occur in either 2021 or 2026 and no reportable or significant changes to aircraft noise exposure or changes in aircraft overflight or flight patterns over historic properties would be anticipated. Therefore, no adverse effect on historic properties under the No Action alternative would be anticipated for 2021 or 2026, nor would there be any visual impacts at historic properties under the No Action alternative.

5.6.2 Methodology

The *National Historic Preservation Act of 1966* requires the FAA to consider the effects of its undertakings on properties listed or eligible for listing in the National Register of Historic Places (i.e., National Register). In assessing whether an undertaking, such as the Proposed Action, affects a property listed or eligible for listing on the National Register, the FAA must consider both direct and indirect effects. An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

⁷⁹ "Off-Tribal" lands may include Protected Tribal Resources or Native American sacred sites. Areas related to the Brighton, Miccosukee, Immokalee, Big Cypress, Hollywood (Dania), Seminole, Tampa, and Fort Pierce areas are areas identified by the Bureau of Indian Affairs [<https://biamaps.doi.gov/indianlands/> (Accessed March 10, 2020)].

Federal regulations define an area of potential effect (APE) as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.⁸⁰ Direct effects generally occur at the time and place of the proposed action. An APE has been defined for the South-Central Florida Metroplex Project to assess the potential direct and indirect effects of the Proposed Action on historic properties.

For purposes of this analysis, the APE is the same geographic area and boundary as the General Study Area. **Exhibits 4-5 and 4-6** in **Section 4.3.4** shows analysis points for cultural and historic properties listed and eligible for listing on the National Register that are found within the General Study Area. These analysis points are combined with the 4(f) resource points in **Exhibits 4-5 and 4-6**.

All historic and cultural resources identified within the APE require further evaluation by the FAA to determine if the property may experience a potential adverse effect. Therefore, noise exposure levels at points representing historic properties listed on the National Register were calculated for purposes of determining potential adverse effects. In addition, noise exposure results for the uniform grid points (located at 0.5 NM intervals throughout the General Study Area) were evaluated for purposes of identifying potential adverse effects to historic properties that are eligible but may not be listed on the National Register. In the event that a significant or reportable noise increase was identified at one of these grid points, the surrounding area would be examined for the presence of eligible-to-be-listed historic properties.

The analysis of potential impacts to historic and cultural resources considers whether these properties would experience a significant noise increase, when comparing the Proposed Action with the No Action alternative, using the applicable thresholds shown in **Table 5-2**. Properties exposed to DNL 65 dB or higher under the Proposed Action and an increase of DNL 1.5 dB or higher may be considered to be potentially adversely affected by the project. Formal consultation with the appropriate SHPO/THPO would be conducted to confirm this determination. If reportable increases in noise are detected for properties exposed to DNL between DNL 45 dB and lower than 65 dB, the FAA would consider further whether the increase would result in an adverse effect on historic properties. If the noise analysis indicates a reportable change for the resources, further research and/or survey on the subject property may be conducted to determine if the reportable increase would diminish the integrity of a property's setting for which the setting contributes to historical or cultural significance.

5.6.3 Potential Impacts – 2021 and 2026

As stated in **Section 5.1**, when compared with the No Action alternative, the Proposed Action would not result in changes in aircraft noise exposure in 2021 or 2026 that would exceed FAA's significance threshold for noise. Therefore, the Proposed Action would not result in an adverse effect to historic properties or cultural resources. Noise analysis results for historic properties or cultural resources located within the General Study Area can be found in the **Appendix I**. A table of all grid point and, where applicable, unique point noise results for the Marjory Stoneman Douglas Wilderness at Everglades National Park can be found in **Table A9 to Appendix I**.

80 36 CFR 800.16(d)

Under the No Action alternative no changes to air traffic routes in the South-Central Florida Metroplex would occur in either 2021 or 2026, and no adverse effects related to changes in aircraft noise exposure would be anticipated. Therefore, the No Action alternative would not result in impacts to historic or cultural resources.

5.7 Energy Supply (Aircraft Fuel)

This section discusses whether changes in the movement of aircraft would result in measurable effects on local energy supplies under the Proposed Action and the No Action alternative.

5.7.1 Summary of Impacts

In comparison to the No Action alternative, the Proposed Action would result in a relatively small increase in aircraft fuel burned: 0.46 percent increase in 2021 and 0.43 percent increase in 2026. These increases would not be expected to affect local aircraft fuel supplies. Therefore, no significant impacts to energy supply would be anticipated.

The No Action alternative would not involve changes to air traffic flows, construction, or other ground-disturbing activities. Therefore, the No Action alternative would not result in the depletion of local energy supply.

5.7.2 Methodology

The Proposed Action would not change the number of aircraft operations relative to the No Action alternative, but it would involve changes to air traffic flows during the departure, descent, and approach phases of flight. These changes affect both the route an aircraft may follow as well as its climb-out and descent profiles. This in turn may directly affect aircraft fuel burn. Aircraft fuel burn is considered a proxy for determining whether the Proposed Action would have a measurable effect on local energy supplies when compared with the No Action alternative.

In addition to calculating aircraft noise exposure, the FAA's AEDT model calculates aircraft-related fuel burn (e.g., AAD flight schedules, flight tracks, and runway use). See **Section 5.1.2** for further discussion on AEDT input data. Determining the difference in fuel burn between alternatives can be used as an indicator of changes in fuel consumption resulting from implementation of the Proposed Action when compared with the No Action alternative.

5.7.3 Potential Impacts – 2021 and 2026

Table 5-6 presents the results of the fuel burn analysis for the Proposed Action and No Action alternatives. In comparison to the No Action alternative, the Proposed Action would result in approximately 17.28 metric tons (MT) more fuel burned in 2021 (0.46% percent increase) and approximately 18.16 MT more fuel burned in 2026 (0.43% percent increase). Given these relatively small increases, the FAA expects that when compared with the No Action alternative, the Proposed Action would not adversely affect local fuel supplies. Therefore, no significant impacts to energy supply would be anticipated.

Table 5-6 Energy Consumption Comparison

	2021		2026	
	No Action	Proposed Action	No Action	Proposed Action
Fuel Burn (MT)	3,765.34	3,782.62	4,195.52	4,213.68
Volume Change (MT) (Proposed Action – No Action)		17.28		18.16
Percent Change from No Action		0.46%		0.43%

Note: MT = Metric Ton

Source: ATAC Corporation, May 2020 (AEDT modeling results).

Prepared by: ATAC Corporation, May 2020.

5.8 Environmental Justice

This section presents a summary of the analysis of environmental justice impacts under the Proposed Action and the No Action alternative.

5.8.1 Summary of Impacts

Neither the Proposed Action nor the No Action alternative would displace people or businesses; therefore, implementing the Proposed Action or No Action alternative would not result in direct impacts in this category. No areas within the General Study Area would experience significant impacts to air quality or noise. Therefore, no disproportionately high and adverse effects to minority populations or low-income populations would occur under either the Proposed Action or the No Action alternative.

5.8.2 Methodology

Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, requires that federal agencies include environmental justice as part of their mission by identifying and addressing as appropriate, the potential for disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations. Environmental justice applies to all environmental resources. Therefore, a disproportionately high and adverse human health or environmental effect on minority and low-income populations may represent a significant impact.

5.8.3 Potential Impacts – 2021 and 2026

Under the Proposed Action, neither people nor businesses would be displaced. As discussed in **Section 5.1**, under the Proposed Action, no census block centroids in the General Study Area would experience a change in noise exposure in 2021 or 2026 that exceeds any of the FAA's significance thresholds for noise impacts on people. Therefore, no adverse direct or indirect effects would occur to any environmental justice populations within the General Study Area under the Proposed Action for 2021 and 2026.

Under the No Action alternative, neither people nor businesses would be displaced. Furthermore, air traffic routes would not change and there would be no change in aircraft noise exposure in 2016 or 2021 that could result in an indirect impact. Therefore, the No Action alternative would not result in disproportionately high and adverse human health or environmental effects on minority and low-income populations.

5.9 Visual Effects (Visual Resources / Visual Character Only)

This section discusses the analysis of visual impacts under the Proposed Action and the No Action alternative.

5.9.1 Summary of Impacts

As stated in **Section 5.1**, implementation of the Proposed Action would not increase the number of aircraft operations at the Study Airports compared with the No Action alternative. Changes in aircraft traffic patterns under the Proposed Action are expected to be at altitudes and distances sufficiently removed from viewers that visual impacts would not be anticipated.

Under the No Action alternative, no changes in air traffic routes would occur and no changes in aircraft overflight patterns would be expected. Therefore, the No Action alternative would not result in visual effects to visual resources or visual character of any resource.

5.9.2 Methodology

As discussed in FAA Order 1050.1F, visual, or aesthetic, impacts are difficult to define and evaluate because of the subjectivity involved. Aesthetic impacts deal more broadly with the extent that the project contrasts with the existing environment and whether the difference is considered objectionable by the agency responsible for the location in which the project is set. Visual impacts are normally related to the disturbance of the aesthetic integrity of an area caused by development, construction, or demolition, and thus, do not typically apply to airspace changes.

To evaluate the potential for indirect impacts resulting from changes in aircraft routings and visual intrusion, the general altitudes at which aircraft route changes occur beyond the immediate airport environs, which experience overflights on a routine basis, are considered to evaluate the potential for visual impacts.

5.9.3 Potential Impacts – 2021 and 2026

According to FAA Order 1050.1F, the visual sight of aircraft, aircraft contrails, or aircraft lights at night, particularly at a distance that is not normally intrusive, should not be assumed to constitute an adverse impact. Changes in aircraft routes associated with the Proposed Action would generally occur at altitudes above 3,000 feet AGL; therefore, the visual sight of aircraft and aircraft lights would not be considered intrusive. Consequently, the Proposed Action would not result in significant visual impacts. Accordingly, significant visual impacts resulting from the Proposed Action or the No Action alternative would not be anticipated.

5.10 Cumulative Impacts

Consideration of cumulative impacts applies to the impacts resulting from the implementation of the Proposed Action with other actions. CEQ regulations define a cumulative impact as “an impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions.”⁸¹ The regulations

⁸¹ 40 C.F.R. § 1508.7

also state that cumulative impacts can result from individually minor, but collectively significant actions that take place over a period of time.

5.10.1 Summary of Impacts

The implementation of the Proposed Action when considered with other past, present, and reasonably foreseeable future actions would not be expected to result in significant cumulative impacts.

The No Action alternative would not result in a change in the number of aircraft operations or air traffic routes; therefore, no cumulative impacts would be anticipated.

5.10.2 Methodology

Due to the nature of the Proposed Action and its potential impacts (as described in **Sections 5.1 through 5.9**), the only potentially-relevant past, present, and reasonably foreseeable future actions for cumulative impact analysis are those that would have direct or indirect effects on aircraft flight patterns within the General Study Area. Research was conducted to identify any present or reasonably foreseeable airport improvement projects at the Study Airports or FAA actions relating to airspace, flight procedures, or air traffic routes that would have the potential for such effects. (Past actions are reflected in the environmental baselines described in **Chapter 4**.) This included reviewing capital improvement program (CIP) projects at the Study Airports that directly affect or involve runway surfaces having the potential to affect local or regional flight patterns. For these projects, five years corresponds to the typical CIP planning horizon and was therefore applied as the timeline for including projects to be reviewed. “Reasonably foreseeable future actions” refers to projects that would likely be completed by 2026.

The FAA evaluated the potential for cumulative impacts in those environmental resource categories listed in **Section 4.3**, *Potentially Affected Resource Categories or Sub-Categories*.

5.10.3 Potential Impacts – 2021 and 2026

As stated in **Section 5.10.2**, research was conducted to identify relevant airport improvement capital projects and airspace actions. The FAA is aware that Runway 04/22 at Punta Gorda Airport (PGD) will be temporarily closed due to construction to rehabilitate the airport, and that during this closure Runway 15/33 will be used. Due to the distance from the airport, altitude, and nature of the Proposed Action procedure changes, the forecast environmental impacts for 2021 and 2026 are not expected to change. The FAA is aware of a need for potential operational changes to departures at MIA, but at the time of the Final EA, the timing and frequency of these changes remains unknown. This research did not reveal any other present or reasonably foreseeable actions with the potential for direct or indirect effects on aircraft flight patterns within the General Study Area. Therefore, no cumulative impacts would be anticipated for the Proposed Action when compared to the No Action alternative for either 2021 or 2026.

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