ST. PETE – CLEARWATER INTERNATIONAL AIRPORT

Airport Master Plan

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Prepared for:

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TAMPA BAY THE EASY WAY

POSTSCRIPT

Impact of COVID-19

The 2020 outbreak of COVID-19 in the U.S. has caused significant business disruption to the aviation industry through travel restrictions, stay-at-home orders, quarantine requirements, and an increased reliance on teleconferencing. While the disruption may be short-term, there is considerable uncertainty around the duration and long-term impacts on the aviation industry. Similarly, while there has been a quantifiable effect on aircraft operations, the related financial impacts and duration cannot be reasonably estimated at this time.

While the activity forecasts included in Chapter 3 of this master plan were prepared and approved prior to the COVID-19 pandemic; they are still considered valid for the purposes of this study, especially since they were utilized to develop planning activity levels for key facility requirements. The Financial Feasibility Analysis in Chapter 8 relies on the achievement of the aircraft operations and passenger enplanement forecasts. If the actual aviation activity varies temporarily from the projected levels, the adverse impact on the capital program may not be significant. However, if decreased traffic levels occur and persist, implementation of all the proposed projects may not be financially feasible. It should also be noted that if the forecast activity levels are not met, then a number of the planned capital improvements may be canceled or deferred as necessary.

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CHAPTER 1

Background and Airport Setting

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Background and Airport Setting

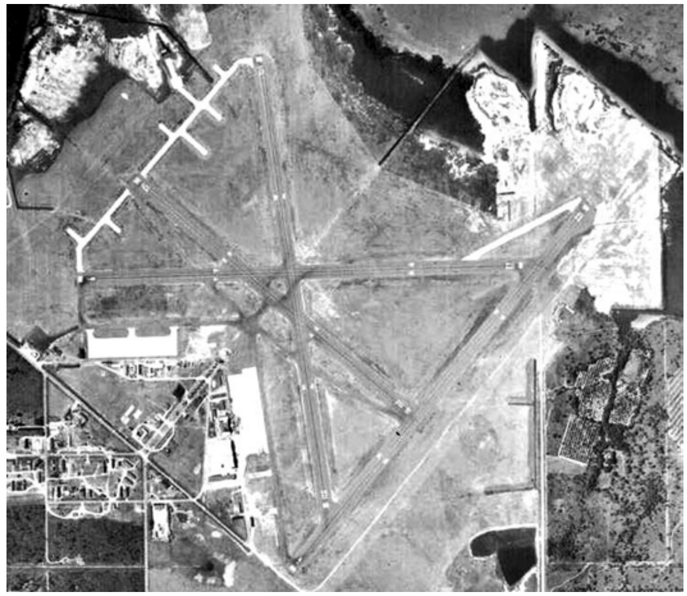
Airports receiving development grants from the Federal Aviation Administration (FAA) and Florida Department of Transportation (FDOT) are required to conduct periodic updates of their planning documents. In 2017, airport management and the Pinellas County Board of County Commissioners began the process of developing a new master plan for the St. Pete-Clearwater International Airport (PIE). The overall goal was to prepare a comprehensive planning document meeting the needs of airport management as well as the requirements of FAA and FDOT. As such, this study was conducted in accordance with FAA Advisory Circular (AC) 150/5070-6B, Change 2, *Airport Master Plans* and FDOT's *2019 Guidebook for Airport Master Planning*. It is also consistent with Chapter 14-60 of the Florida Administrative Code and other applicable FAA or FDOT guidance, including FAA AC 150/5300-13A, Change 1, *Airport Design*.

1.1 Need for a New Master Plan

The last airport master plan for PIE was completed in January 2004. By the end of that same year, the airport recorded its highest passenger levels since being converted from a military airfield in the late 1940s. The following year the airport lost its two biggest carriers when Southeast Airlines ceased operations at the airport and ATA Airlines moved to the Tampa International Airport (TPA) as part of their newly forged partnership with Southwest Airlines. Over the next two years, the airport lost over 70 percent of its passengers. Passenger levels did not begin their recovery until the end of 2006 when Allegiant Air inaugurated service with 12 non-stop destinations and Sunwing Airlines initiated non-stop international service. While Allegiant experienced rapid growth, nearly doubling their non-stop destinations by 2011, and Sun County Airlines began non-stop service in 2014, it was not until 2015 that the airport was able to surpass the total passengers record from 2004.

As evidenced by the most recent figures, PIE continues to provide an increasing level of commercial passenger service to the Tampa Bay community. In fact, 2017 saw a new all-time high for the airport and also represented the fifth consecutive year of double digit growth in the number of passengers served. With the record passenger levels, the terminal and landside facilities have struggled to keep pace. While the passenger levels have rebounded to record levels, overall aircraft operations (particularly general aviation) are less than half of what was projected in the previous study. From 2004 to the start of this study, the amount of air cargo handled each year has remained somewhat static and below the levels projected. This trend will likely change in the near term as a result of the October 2017 relocation of United Parcel Service (UPS) across the bay to TPA.

These fluctuations demonstrate the continuously dynamic landscape of the aviation industry. Since the nation's first commercial flight in 1914 from the St. Petersburg waterfront and initial construction of the airport at its current location in 1941, the aviation industry and airport have seen many changes. Such changes need to be understood to enable the airport to provide the proper aviation services and play an even greater role in the economic and business growth of the surrounding community. A new airport master plan will also enable the airport to ensure it remains proactive in its efforts to address newer airport design standards and airport land use guidance that have also occurred since 2004.



1941 aerial image of the Pinellas Army Airfield

1.2 Study Goals and Objectives

Airports face many challenges in their day to day operation. At a minimum they must maintain a safe facility, comply with a myriad of regulations, manage numerous leaseholds, preserve compatibility with the community, be good stewards of the environment, encourage economic growth, and compete for limited funds, all while providing essential community services with a positive public image. The master plan process serves as a tool for an airport to address these issues in an organized approach. The overall objective of a new master plan is to accurately assess existing airport conditions, project aviation activity, define future needs, develop cost effective options, and provide a realistic development program. In doing so, the 20-year plan also needs to be flexible by including appropriate activity triggers or benchmarks, as well as potential scenarios to respond to the ever changing aviation industry. Such flexibility provides options for airport management to react to fluctuating market conditions, shifts in development priorities, and/or take advantage of unforeseen opportunities.

In short, the master plan will serve as a guide to achieve realistic airport development in line with both airport and community objectives. Since the previous 2004 study is out of date and no longer reflects the current conditions at the airport, this master plan will be a "from scratch" effort as defined by FDOT in their guidance. The primary goal will be to create a 20-year development program to maintain a safe, efficient, economical, and environmentally acceptable airport facility for the Tampa Bay community. By achieving this goal, the document will provide the guidance to satisfy the aviation demand in a financially feasible and responsible manner, while at the same time addressing the aviation, environmental, and socioeconomic issues of the community. In support of this goal, the following objectives were established:

- Ensure orderly development: consider short-term needs and long-term plans;

- Maximize level of service to passengers while maintaining low operating costs;
- Serve increasing number of passengers in a phased and cost effective manner;
- Provide for the growth of air cargo and general aviation;
- Diversify airport revenue stream and increase regional economic impact;
- Ensure compliance with latest FAA design criteria, grant assurances, and policies;
- Refine land development strategy;
- Integrate sustainability and resiliency concepts to ensure long-term viability;
- Provide flexibility to allow the airport to respond to changes in the aviation industry;
- Meet FAA Airport Geographic Information System (AGIS) mandate;
- Create a new Airport Layout Plan (ALP) drawing set;
- Capitalize on airport branding; and
- Secure broad community buy-in for the future airport development program.

While some of these objectives fulfill the broader goals of a comprehensive planning document, some are much more unique to the airfield’s setting and surrounding environment. For example, it was critical to include a resiliency planning component as a subset of the sustainability elements given the airport’s location on Old Tampa Bay and the relatively low elevation of the airfield facilities. In fact, this became even more relevant given the events that occurred in Houston as a result of Hurricane Harvey at the start of this study. The impact and ensuing damage that resulted from Harvey’s flooding has drawn attention to the Tampa Bay area with regards to another major metropolitan area that is highly vulnerable to super storm impacts. Similarly, while the airport did not experience any significant flooding as a result of Hurricane Irma (a few weeks after Harvey), the effects of this storm on the entire Florida peninsula highlighted the need to incorporate resiliency elements into the future development program.

1.3 Planning Process

Airport Master Planning Process

This master plan ultimately provides a systematic outline of the actions required to maintain and further improve both airfield and landside facilities. This process provides those officials responsible for the scheduling, budgeting, and funding of improvement projects with an advance notice of the airport's needs. By phasing airport improvements, this development can be conducted in an orderly and timely fashion.

Throughout this process, reviews were conducted to ensure input was received from key stakeholders, including the Pinellas County Board of County Commissioners, Airport Noise Abatement Task Force, County staff, FAA, FDOT, air traffic control management, airport management, airport tenants, airport users, and the public. The individual steps in the master plan process build upon information and decisions made during previous steps. Taken as a whole they address the objectives identified above.

1.4 Airport Setting

The airport is located along the west coast of Florida in Pinellas County. Most of the county is surrounded either by the Gulf of Mexico or different portions of Tampa Bay. The airport is situated on the east side of the county with Old Tampa Bay forming much of the airfield's northern boundary. Overall, the airport property includes approximately 2,000 acres of relatively flat land with a published airfield elevation of 11 feet above mean sea level. Relative to its namesake cities, the airport is just over ten miles northwest of St. Petersburg and nearly nine miles southeast of Clearwater.

Figure 1.4-1 Pinellas County, Florida (highlighted in red)

Figure 1.4-2 Location of PIE within Pinellas County

1.4.1 History

Originally the Pinellas County Municipal Airport, the land was acquired by the U.S. Army Air Force and activated as the Pinellas Army Airfield in April 1942. At that time the airfield consisted of four paved runways and served as a secondary base to the Sarasota Army Airfield. The airfield trained fighter pilots and air crews mostly flying P-40 Warhawks and P-51 Mustangs. After the war effort, the airfield was deactivated on November 30, 1945. The airport property was later transferred back to Pinellas County to serve as a public use airport.

Pinellas County's Board of County Commissioners is the official owner responsible for the operation and maintenance of the facilities. They accomplish this through a department for the airport where an Airport Director has the direct responsibility for facility management.

1.4.2 System Planning Roles

Airport planning occurs at local, statewide, and national levels, each with its own particular emphasis. Airport master plans provide planning at the local level, while statewide matters are addressed by FDOT and national issues by the FAA.

Florida Aviation System Plan

The Florida Aviation System Plan (FASP) facilitates FDOT's strategic planning for the state's aviation system. This plan is updated on a regular basis through the Continuing Florida Aviation Systems Planning Process (CFASPP) and divides the state's public-use airports into nine regions. PIE is one of 11 public airports in the West Central Florida Metropolitan Area. As the most densely-populated CFASPP region, this area is home to some of the state's most popular attractions including world renowned beaches, three professional sports teams, museums, cruise ships, theme parks, three major league baseball spring training facilities, and other major area attractions. The region is also home to a number of universities, research centers, medical facilities, and military installations, not to mention every facet of business. The state system plan designates facilities as either commercial or general aviation airports and then subcategorizes them based on the role they serve. The FASP identifies PIE as one of Florida's 19 Commercial Service airports.

National Plan of Integrated Airport Systems

A National Plan of Integrated Airport Systems (NPIAS) is presented every two years to Congress by the Secretary of Transportation for the development of public-use airports which are significant to the national air transportation system. Specifically, this plan documents the federal aid required for infrastructure development at the nation's commercial service, reliever (high capacity general aviation airports), and other select general aviation airports. The categorization of these needs guides FAA management in their administration of the Airport Improvement Program.

The most recent NPIAS (2019-2023) groups airports into two major categories: primary and non-primary. Primary airports are then further grouped into the four subcategories of large, medium, small, and non-hub. These subcategories are based upon the amount of the nation's total passenger enplanements that are handled by the airport, which also determine the annual apportionment of federal entitlement funds. In the 2019-2023 NPIAS, PIE was designated as a primary small hub, facility with $38.0 million in eligible improvement requested for federal funding over the system's five-year planning period.

1.4.3 Climate and Weather Data

Pinellas County is located along the gulf coast of central Florida on Old Tampa Bay. As with much of central and southern Florida, the surrounding land is relatively flat and the airfield is located less than ten miles inland from the Gulf of Mexico. These characteristics, the maritime location, and prevailing sea breezes significantly influence the climate and prevailing winds for this region. Although the airport is located in the warmer southeastern portion of the nation, annual temperatures are considered moderate due to the influence of the sea breeze.

Temperatures during the summer months rarely reach 100 degrees Fahrenheit. Ten years of data show August as the hottest month with a mean daily maximum temperature of 91 degrees Fahrenheit. The mean daily minimum temperature is 53 degrees Fahrenheit in January. Rainfall in this area occurs during all seasons; however, it is more abundant during the summer when daily showers are common. Pinellas County averages approximately 55 inches of rainfall on an annual basis.

Historic wind and weather conditions are key considerations for an airport's runway system since aircraft takeoff and land into the wind. As recommended by FAA AC 150/5300-13A, Change 1, ten consecutive years of wind data was collected for PIE. This information will be analyzed and used to develop a number of airfield facility requirements in this study.

1.5 Economic Activity Analysis

In 2017, Volaire Aviation Consulting completed a comprehensive Economic Activity Analysis for the existing scheduled passenger service as well as the non-airline activity created by other aviation users at PIE. The study also evaluated the potential economic impacts of both new domestic and international passenger service scenarios. Overall, this study documented how the aviation activity alone was a significant economic engine for Pinellas County and the surrounding area. A summary of some of the key findings from the study include:

Overall Impacts

- Total estimated annual regional economic output of $1.04 billion dollars.
- About 81 percent of the annual output is the result of passenger airline service.
- There are 1,369 on-airport full-time employment (FTE) jobs with labor income of $81.275 million, a per FTE income of $59,355.
- If PIE was considered a single employer, it would be the 19th largest in the county.

Visitor Impacts

- An estimated 525,867 inbound visitors in 2016 used PIE as their gateway to the Suncoast.
- Those visitors, by conservative estimates, spent $226 million dollars.
- Visitor spending created 3,848 area FTE jobs by direct, indirect, and induced effect.
- Those jobs had labor income of $127.8 million dollars.
- Visitor spending resulted in $363.1 million dollars of annual regional economic output.

Airline Impacts

- Allegiant Air supports 446 local FTE jobs with average annual pay of $82,466.
- The carrier bases 12 Airbus aircraft at PIE and that fleet is expected to grow.
- PIE’s three airlines combined to offer non-stop service to approximately 60 U.S. and Canadian cities in 2017.
- Total airline traffic will exceed 2,000,000 passengers in 2017.
- Additional traffic and air service mean continued growth in economic impact.
- 309 FTE at-airport jobs support airline operations and passenger service.

Non-Airline Aviation

- There are ten non-airline businesses or government entities on the airfield.
- Overall PIE handled 113,096 flight operations in 2016.
- There were 271 aircraft based at PIE in 2016.
- Private sector and government/military non-airline aviation supports 629.5 FTE jobs.
- Those jobs have an annual labor income of $29.2 million dollars, or $46,408 annual per FTE.

According to the Volaire study, PIE generated just over $1 billion dollars in annual local and regional economic output in 2016. An estimated $847.8 million dollars, or 81 percent of the annual overall total is generated by airline service, airline employment, and the local and regional spending of out-of-state visitors brought to the region by air service.

Airport job creation provides an estimated 4,102.1 local FTEs created by direct effect, another 1,540.3 via indirect effect, and another 1,377.5 via induced effect. This means that overall the aviation related economic activities at PIE are responsible for an estimated 7,109.9 FTE jobs on airport and in the surrounding area. Local and regional annual labor income totals $310.1 million dollars. This translates to per FTE job annual labor income of $44,176. The $1.044 billion dollars in overall annual output generates $66.3 million dollars in annual state and local tax revenue and another $76.5 million dollars in annual federal tax revenue.

Economic impact analysis measures and projects numbers for jobs, labor income, and economic output. The Volaire study summarized some key benefits that cannot be quantified:

- PIE has the lowest facility costs for airlines and as such has recruited significant ultra low cost carrier (ULCC) passenger service from Allegiant Air. For the most part, Allegiant's service compliments the service provided by airlines out of the TPA. Airfares out of TPA are significantly higher than out of PIE, when measured side-by-side to the same metro area or regional destination. In this manner it can be argued that the weight of PIE's ULCC service holds down overall air fares for residents of the entire Tampa Bay region. This translates into an annual cost of travel savings for residents of the region in millions of dollars; dollars that often are redirected to other, local economic activities.
- The availability of non-stop ULCC service to nearly 60 domestic destinations enhances local quality of life, granting residents of the region low cost mobility for both leisure and business travel. It also improves the local real estate market by enabling U.S. and Canadian residents to more easily own second homes in the Tampa Bay area, with PIE's ample ULCC non-stop service enabling a larger pool of out-of-state or Canadian residents to rent or own local property.
- PIE supports important bases for the U.S. Coast Guard and U.S. Army Reserve. In addition to the significant economic impact of these bases, it is also a critical element in preservation of regional and national security.

- ✈ PIE provides a strategic location for the Pinellas County Sheriff's Flight Unit. The helicopters of this unit support the important day-to-day work of countywide law enforcement.

While these intangible attributes cannot be quantified, they do add to the already significant economic impact and economic value of the PIE. It should be noted that there is a significant portion of the airport property which supports a diverse mix of non-aeronautical businesses. These include both public and private entities west of Roosevelt Boulevard and parcels owned by the airport along the north side of Ulmerton Road. These have not been quantified in the economic activity estimates of Volaire's study since its focus was on those businesses directly on and around the airfield.

CHAPTER 2

Existing Conditions

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Information about the existing conditions of the St. Pete-Clearwater International Airport (PIE) is included to provide a foundation for subsequent analyses throughout the study. This includes an examination of the existing airfield, passenger terminal, general aviation, military, landside, and other airport support facilities.

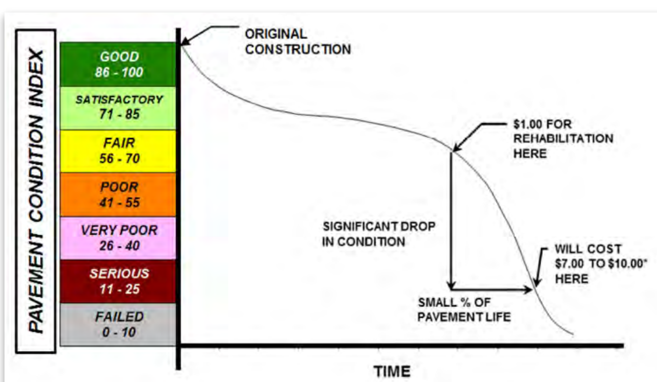
2.1 Airfield Environment

The following sections provide information regarding the facilities that exist to accommodate aircraft operations. In addition to the airport's runway and taxiway system, it also includes the associated air traffic control facilities, instrument approaches, airfield lighting, pavement markings, and takeoff/landing aids. The facilities described are identified on **Figure 2.1-1.**

2.1.1 Aircraft Operation Areas

The aircraft operation areas include the runways as well as any other paved or unpaved surfaces that enable aircraft to move between the runways and the different airport facilities. In addition to the physical characteristics of the runway and taxiway environment, there are other safety-related criteria. The specific criteria for the various protective surfaces will be addressed in the facility assessment and requirements chapter.

In June 2015, the Florida Department of Transportation (FDOT) published their most recent pavement report for PIE as part of the ongoing Statewide Airfield Pavement Management Program. This report provides an objective basis for determining maintenance and repair needs, as well as priorities, by assigning a Pavement Condition Index (PCI) value to each section of paved surface. The 2015 report indicated that the airport's airfield pavement facilities had an overall area weighted average PCI of 70, representing the top of range for the fair rating. This average accounted for an area weighted average PCI of 71 for runway surfaces, 73 for taxiway surfaces, and 63 for apron surfaces. As noted in the following sections, many of the paved surfaces, including all taxiways, have been rehabilitated since the 2015 report.



Pavement Life Cycle

SOURCE: FDOT Statewide Airfield Pavement Management Program, 2015.

Runway 18-36

As the primary runway, Runway 18-36 is 9,730 feet long and 150 feet wide. The Runway 36 landing threshold is displaced 930 feet. Constructed of asphalt, Runway 18-36 received a PCI of 68 (fair) in 2015. The runway is grooved and has paved shoulders on each side of the full strength pavement width. At the north end there is a 180 foot wide by 150 foot long paved blast pad prior to the Runway 18 landing threshold. At the south end there is a 220 foot wide by 400 foot long paved blast pad prior to the beginning of the displaced threshold pavement. There are plans to rehabilitate the pavement surface in the near future. **Table 2.1-1** provides technical data for both runways, including the current pavement strength based on the weight bearing capacities published for different aircraft landing gear configurations.

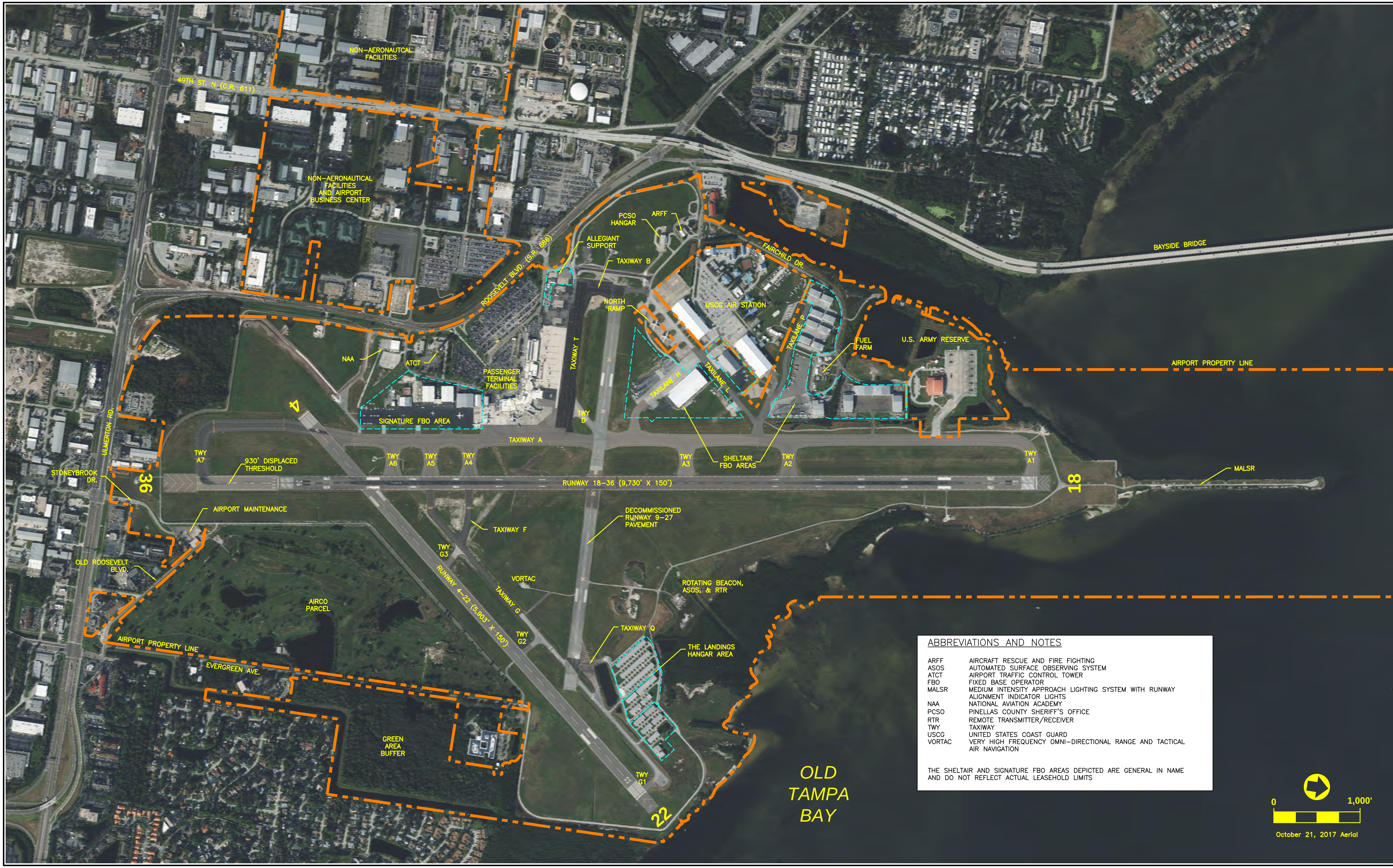
Runway 4-22

Runway 4-22 is the secondary runway with a published length of 5,903 feet and a width of 150 feet. The runway is asphalt and grooved. Runway 4-22 had recently been rehabilitated at the time of the 2015 pavement evaluation and received an overall area weighted PCI of 96 (good). At the northeast end of the runway there is a 150 foot wide by 222 foot long paved blast pad prior to the Runway 22 threshold. There is no paved blast pad on the southwest end of the runway. The airport is currently in the process of extending Runway 4-22 to 6,000 feet.

TABLE 2.1-1
RUNWAY CHARACTERISTICS

	Runway 18-36	Runway 4-22
Runway Length	9,730’	5,903’
Runway Width	150’	150’
Runway Markings	Precision	Non-Precision
Pavement Strength (pounds)		
Single (S)	75,000	80,000
Dual (D)	195,000	130,000
Two Single in Tandem (2S)	175,000	165,000
Two Dual in Tandem (2D)	320,000	235,000
Two Dual in Tandem / Two Dual in Double Tandem (2D/2D2)	700,000	n/a
Pavement Surface	Asphalt – Grooved	Asphalt - Grooved
Runway Lighting	High-Intensity	Medium-Intensity
Displaced Threshold	Runway 36 – 930’	None
Area Weighted PCI (2015)	68	96

SOURCE: 2018 FAA aeronautical publications and 2015 FDOT Airfield Pavement Management Program.



Source: ESA, 2018.

FIGURE 2.1-1

EXISTING AIRFIELD CONDITIONS

Taxiways and Taxilanes

Aircraft ground movements between runways, aprons, terminals, hangars, and other facilities is conducted via an airfield's taxiway and taxilane system. At PIE, this consists of a network of major taxiways, connector taxiways, apron edge taxiways/taxilanes, and hangar taxilanes. Taxilanes typically provide the final link access to aircraft hangars and parking positions, and in most cases are outside of the aircraft movement area managed by the airport traffic control tower (ATCT) staff.

Taxiway A

Taxiway A runs parallel to and along the west side of Runway 18-36. Beginning at the 18 end and moving south, there are seven connector taxiways which provide access to Runway 18-36. They are: Taxiways A1, A2, A3, A4, A5, A6, and A7. While the parallel taxiway width is 75 feet, the connectors provide approximately 90 feet each due to the pavement fillet standards. The taxiway maintains a centerline to centerline offset with Runway 18-36 of 500 feet except at the southernmost end. Between Taxiways A6 and A7 the centerline spacing increases to 670 feet. This enables the location where departing aircraft must hold for aircraft landing on Runway 36 to be much closer to the departure end of the runway. Taxiway A has recently undergone major rehabilitation, bringing the taxiway and its connectors up to the most current design standards and a PCI of 100 (good).

Taxiway B

Taxiway B is located at the western end of the decommissioned Runway 9-27. It connects Taxiway T to the North Ramp, adjacent to United States Coast Guard (USCG) Air Station facilities. Taxiway B was recently rehabilitated towards the end of 2017 and is therefore considered to have a PCI of 100 (good). To the north of the old runway alignment the taxiway was repaved to a width of 50 feet. On the south side, the recent taxiway improvement project included a re-alignment that eliminating the previous angled Taxiway C pavement. This southern half has a useable pavement width of 90 feet.

Taxiway D

Taxiway D is a short connector which runs from the northeast edge of the Passenger Terminal Apron to Taxiway A. This 75 foot wide taxiway crosses a portion of the decommissioned Runway 9-27 pavement where it intersects Taxiway A. The 2015 pavement study assigned an area weighted PCI of 49 (poor) to this taxiway.

Taxiway F

Taxiway F connects Taxiway G to Runway 18-36 at a point opposite of Taxiway A4. The current 50 foot wide Taxiway F alignment was constructed in 2017 and therefore is considered to have a PCI of 100 (good).

Taxiway G

Taxiway G is parallel to the northwest side of Runway 4-22. The taxiway runs from connector Taxiway G1 at the Runway 22 end and extends almost to the intersection of the two runways. At this point it turns west and connects to Runway 18-36, opposite of Taxiway A5. In addition to Taxiway G1, there are two other connectors with Runway 4-22. Taxiway G2 is at the approximate midpoint of Taxiway G, just south of the decommissioned Runway 9-27 alignment and Taxiway G3 lies roughly equidistant between Taxiway G2 and Runway 18-36; opposite of where Taxiway F ties into Taxiway G. The taxiway and connectors are all 50 feet wide, but the centerline to centerline offset with Runway 4-22 varies. Between Taxiway G1 and the decommissioned Runway 9-27 pavement, the offset is 335 feet while the remaining taxiway is at 350 feet. Taxiway G and the three connectors were repaved in 2017 and therefore are considered to have a PCI of 100 (good).

Taxilane H

Aligned between Taxiway A and Taxilane L, Taxilane H provides access to the south end of the Sheltair fixed base operator (FBO) leasehold. The current taxiway markings provide a minimum width of 60 feet. Since the taxilane has been realigned and repaved since the 2015 study, it is considered to be in good condition.

Taxilane L

Taxilane L runs between Taxiways A and B, bisecting facilities of the USCG Air Station and south end of the Sheltair FBO leasehold. The taxilane provides a minimum width of 50 feet and it has a PCI rating of 85 (satisfactory).

Taxilane P

Taxilane P provides access to the Sheltair FBO general aviation terminal as well as to the hangar facilities within the Sheltair FBO leasehold to the west. It ties into Taxiway A at the same point as Taxilane L. The current taxiway markings provide a minimum width of 50 feet. The area weighted PCI for Taxilane P was 100 (good) reflecting its recent repaving at the time of the FDOT pavement inspection.

Taxiway Q

Taxiway Q extends off the northwest side of Taxiway G to provide access to the Landings Hangar Area. While Taxiway Q is 25 feet wide, the various connectors to Taxiway G and T-hangar taxilanes in this area are 20 feet wide. Taxiway Q was repaved at the end of 2017 and is therefore considered to have a PCI of 100 (good).

Taxiway T

Taxiway T is an apron edge taxiway along the north side of the Passenger Terminal Apron. With a width of 75 feet, this taxiway provides access from the passenger terminal facilities to Taxiway A. It also serves a number of the facilities on the northwest side of the airfield, including the USCG North Ramp, via Taxiway B. Taxiway T was rehabilitated (milled and overlaid) towards the end of 2017 as part of the same project for Taxiway B. Therefore, the apron edge taxiway is considered to have a PCI of 100 (good).

2.1.2 Airspace and Airport Traffic Control

Controlled airspace is referred to as Class A, B, C, D, or E and uncontrolled airspace as Class G. Generally speaking, Class A airspace begins at 18,000 feet above mean sea level (AMSL), continues upward, and is used to manage en route aircraft traffic. Class B airspace surrounds the nation's busiest airports including Tampa International Airport (TPA). Class C surrounds airports with high traffic levels, but not as high as Class B airports. Both the Sarasota Bradenton and Southwest Florida International Airports have Class C airspace. Class D surrounds those airports with an ATCT not located in or designated as having Class B or C airspace. Class E airspace is any other controlled airspace where pilots are in radio contact with some portion of the FAA Air Traffic Control (ATC) network. This network primarily consists of ATCTs, Terminal Approach Control (TRACON) facilities, and Air Route Traffic Control Centers (ARTCC).


PIE Airport Traffic Control Tower

The Class B airspace associated with TPA overlaps PIE, but does not begin until 1,200 feet AMSL. As such, PIE has Class D airspace from the surface up to the overlapping Class B, which increases to 1,600 feet AMSL on the southwest side, where the floor of the TPA Class B is higher. The ATCT at PIE is a FAA facility operated daily from 6:00 a.m. to 11:00 p.m. local time. When the tower is closed, the airspace surrounding PIE, that is not within TPA's airspace, is designated as Class E. The tower is located to the southwest of the passenger terminal facilities (just east of Roosevelt Boulevard) with an overall height of 172 feet AMSL.

TRACON facilities have controllers whose primary function is to guide aircraft approaching and departing airports within a 30 to 50-mile radius and up to 10,000 feet AMSL. When an aircraft is within five miles of an airport (or below 2,500 feet AMSL), TRACON controllers hand off the aircraft to the ATCT. Alternatively, when departing aircraft leave the TRACON's range of control, TRACON controllers hand responsibility off to FAA Air Route Traffic Control Centers (ARTCC). For PIE, the approach and departure flow is managed by the Tampa TRACON facility at TPA.

Depending upon direction of travel, Tampa TRACON controllers will hand off or receive aircraft from ARTCCs in either Jacksonville or Miami.

Arrival Procedures

A Standard Terminal Arrival (STAR) is an ATC procedure published for arriving aircraft in order to transition from the en route phase of flight to the approach phase. STARs provide guidance to either a published instrument approach procedure or to a point from which ATC might provide the aircraft with radar vectors to their destination. There are eight STARs published for aircraft en route to PIE. These vary based on from where the arriving aircraft is coming, as well as the flow and active runway at the airport.

Instrument Approach Procedures

During times of inclement weather, and/or reduced visibility, instrument approaches enable pilots to safely descend into the airport environment for landing. There are a number of different instrument approaches that can be established, each with specific limitations. When the cloud ceiling is greater than 1,000 feet above ground level (AGL) and the visibility is greater than three statute miles, the conditions are considered visual and pilots can operate under visual flight rules (VFR). In VFR conditions, no published approaches are required for an aircraft to safely land at an airport. However, once the cloud ceiling is less than 1,000 feet AGL and/or the visibility is less than three statute miles, pilots must operate under instrument flight rules (IFR). Additional air traffic control services are provided to pilots during IFR conditions. During the arrival phase, instrument approaches are what allow a pilot to safely navigate to and land on a runway.

There are three categories for instrument approaches: precision approaches (PA), approach procedures with vertical guidance (APV), and non-precision approaches (NPA). All provide course guidance to the runway centerline they serve. The degree of horizontal guidance increases with the sophistication of the instrument approach established, which is reflected through the specific minimum operating parameters for each. The primary difference between the three is that non-precision approaches do not provide any vertical guidance to the runway end. For both PA and APV approaches, the vertical course allows an aircraft to descend safely on a fixed glideslope signal, even when the runway environment is not yet in sight.

All instrument approaches have heights published that dictate how low a pilot can descend without the runway environment in sight before having to abandon the approach and try again. For precision approaches this is either called the decision height (DH) which is indicated in feet above the ground level or the decision altitude (DA) in feet AMSL. For non-precision approaches, it is referred to as the minimum descent altitude (MDA) with heights published in the number of feet AMSL. In addition, every instrument approach has minimum visibility requirements, measured in feet or miles. If visual identification of the runway environment cannot be made before the published minimums, then the aircraft must execute a missed approach and either try again or go to an alternate airport.

Precision Approaches

Precision approaches are further defined as any approach that has visibility minimums lower than ¾ of a mile and the capability of safely guiding aircraft down to heights less than 250 feet above the threshold. Instrument Landing Systems (ILS) at PIE provide precision approaches to both ends of Runway 18-36. An ILS consists of four basic components: localizer antenna array, glideslope antenna array, marker beacons, and runway approach lighting system.

The localizer provides information with regard to the aircraft's position relative to the appropriate course to the runway threshold. The glideslope provides the vertical position relative to the landing threshold along the approach slope to the runway. Marker beacons or other navigational signals provide position information along the approach course while lighting systems provide a visual cue for the runway environment. The ILS equipment is runway specific and as such, each end of Runway 18-36 has its own system, both of which are owned and maintained by the FAA.

There are different classifications of ILS approaches depending on the components installed and special certifications. The Category I approach to Runway 18 provides visibility minimums of ½ mile and a DH of 200 feet. For aircraft and flight crews with the proper certification, even lower approaches are available to Runway 18. The lowest are those associated with the Category II approach with visibility lower than ¼ mile and a DH of 100 feet. For Runway 36, the Category I ILS provides visibility minimums of ¾ mile and a DH of 200 feet.

Additionally, precision area navigation (RNAV) procedures based on Global Positioning System (GPS) and the Wide Area Augmentation System (WAAS) have been established to Runways 18 and 36. The WAAS receivers improve the GPS capability to the point where approach minimums published are the same as the Category I ILS for the two runway ends. These are referred to as LPV approaches (localizer performance with vertical guidance).

Approach Procedures with Vertical Guidance

Approach procedures with vertical guidance are defined as any approach that has visibility minimums not lower than ¾ of a mile and the capability of safely guiding aircraft down to heights greater than or equal to 250 feet above the threshold. Currently, PIE has APVs published to each end of Runway 18-36. These are known as LNAV/VNAV approaches, which stands for lateral navigation/vertical navigation. For Runway 18 the LNAV/VNAV approach provides visibility minimums of ½ mile and a DA of 257 feet, while the one to Runway 36 provides one mile and a DA of 318 feet. There are no APVs established to Runway 4-22.

Non-Precision Approaches

All four runway ends have non-precision approaches established. For Runway 4 the lowest minimums are associated with the straight-in approach that utilizes the on-airfield VHF omnidirectional range (VOR). This approach provides visibility minimums of one mile and a MDA of 480 feet. The on-airfield VOR is actually a VORTAC system, which combines the civilian VOR with the military tactical air navigation (TACAN) system. The VORTAC projects straight line courses in all directions (radials) that pilots can use to navigate to and from the station. In addition to facilitating different NPAs at the airport, the VORTAC is also utilized for other phases of flight, including en route navigation. The VORTAC is owned and maintained by the FAA.


PIE VORTAC

For Runway 22, the RNAV(GPS)-A provides a NPA with circling approach minimums. Circling approaches allow an aircraft to approach and establish visual contact with the airport environment in less than VFR conditions. Once in the vicinity, the pilot can then maneuver the aircraft to set up a final approach to Runway 22 and land with visibility minimums of one mile and a MDA of 520 feet. It should be noted that the FAA classifies runways with only circling approach minimums as visual runways.

Departure Procedures

Departure procedures provide obstacle clearance as aircraft transition from takeoff to the en route phase of flight. Procedures designed for obstacle avoidance are referred to as obstacle departure procedures (ODP) and are described using text only. Other standard instrument departure procedures (SID) are named and published graphically to regulate traffic flows, ensure aircraft separation, enhance capacity, and reduce both pilot/controller workload. There is one departure procedure (ST PETE NINE) published for PIE which provide SIDs for aircraft departing from either end of Runway 18-36. There are also specific ODPs published for each of the four runway ends at PIE. These simply establish the preferred departure heading and minimum altitude before a turn can be made.

2.1.3 Airfield Lighting

Proper airfield lighting is required at all airports that are utilized for nighttime or IFR operations. With the exception of the airport rotating beacon, the lighting systems at the airport are supported by equipment in the airfield electrical vault, with primary control routed to the ATCT.

Identification Lighting

Rotating beacons universally indicate the location and presence of an airport at night or in adverse weather conditions. The rotating beacon is located on the airfield to the east of Runway 18-36 and north of Runway 4-22. It is equipped with an optical rotating system that projects two beams of light, one green and one white, 180 degrees apart. The beacon is continuously operated during nighttime hours or when the airfield is under instrument meteorological conditions.

Runway Lighting

Runway lights allow pilots to identify the edges of the runway and assist them in determining the length remaining during periods of darkness or restricted visibility. These lighting systems are classified according to their intensity or brightness. Runway 18-36 is equipped with high intensity runway lights (HIRL). This includes in-pavement centerline lighting and touchdown zone lighting for the Category II ILS approach to Runway 18. Runway 4-22 is equipped with medium intensity runway lights (MIRL). The HIRLs for Runway 18-36 and the MIRLs for Runway 4-22 both consist of base mounted LED light fixtures on cans with the cables in electrical conduit between each fixture.

The runway lighting systems are also configured with caution zone lights in support of the instrument approach procedures to Runways 18, 36, and 4. The caution zone is created by changing the white lens on the fixtures within the last 2,000 feet of the runway ends. The lights in this range are replaced with split lens so that they emit yellow light along the last 2,000 feet of usable pavement for the landing rollout. The other half is still white for the approach or takeoff end of the runway.

As part of the runway lighting systems, the identification of the runway ends and thresholds are critical to a pilot during landing and takeoff. Therefore, the runway ends are equipped with special lighting configurations to aid in their identification. Each runway end is designated with eight inboard threshold lights (four on each side). For Runway 18 and both ends of Runway 4-22, these threshold lights have a two color (red/green) split lens, placed inward from the runway edge. When landing, the green half of the lens faces the approaching aircraft, indicating the beginning of usable runway. The red half of the lens faces the aircraft on takeoff, indicating the end of usable runway. For the end of Runway 36 all eight of the inboard threshold lights are red due to the displaced threshold. At the displaced threshold, there are a second set of threshold lights on each side of the runway. All of these threshold lights are green towards the aircraft approaching or landing on Runway 36 and have an outboard configuration due to the displaced threshold. From the opposite direction, only the ones in line with the runway edge lighting appear yellow (as part of the caution zone). The outside three on each side are shielded from emitting any light from that side. The runway lighting, as well as the taxiway lighting described in the following section, can be activated by pilots through the common traffic advisory frequency (CTAF) when the ATCT is closed.

Taxiway Lighting

All of the taxiways have medium intensity taxiway lights (MITL) along their alignment. The MITLs have been installed using base mounted light fixtures on cans with conduit. Each taxiway circuit has LED light fixtures which are considered to be in good condition. and many were installed as part of the taxiway improvements completed in 2017.

LED Taxiway Edge Light along Taxiway A

Airfield Signage

Taxiway A1 signage at Runway 36 intersection

As part of the airfield lighting system, the airport has a number of internally illuminated airfield signs. These include mandatory instruction, location, direction, and destination signs. The mandatory signs include the holding position signs which delineate to a pilot the limits of the runway environment. These critical signs are typically located on the left side of each connector taxiway, adjacent to the different runway holding position markers. The current airfield signage primarily consists of LED fixtures and is considered to be in good condition since many were replaced as part of the recent taxiway system improvements.

2.1.4 Pavement Markings

Pavement markings delineate the various movement areas of the airfield. The following sections describe those markings used at PIE which establish the various boundaries and paths along the paved surfaces.

Runway Markings

Runway 18-36 is marked with landing designators, centerline striping, edge, threshold, aiming point, and touchdown zone markings. The Runway 36 end also has the appropriate arrows and arrowheads to denote the 930 foot displaced threshold.

Runway 4-22 is marked with landing designators, centerline striping, edge, threshold, and aiming point markings. The Runway 4-22 markings are interrupted at the intersection with Runway 18-36, due to the order of precedence for runway marking schemes. This runway intersection also requires that the aiming point markings for Runway 4 be located slightly past the standard 1,000 foot distance from the threshold.

There are Land and Hold Short Operation (LAHSO) holding position markings for Runways 18 and 22. LAHSO is an air traffic control procedure which permits the issuance of landing clearances to aircraft to land and hold short of an intersecting runway. These procedures help improve capacity and to more efficiently move aircraft around the airfield. For Runway 18 the markings are just north of the runway intersection and provide a published landing distance of 7,557 feet when used. For Runway 22 the markings are just east of the runway intersection and provide a published landing distance of 4,514 feet when used.

Each runway end also has chevrons to indicated the edge of runway pavement. In addition to the threshold markings on each runway, threshold bars have been added to clearly indicate the beginning of the landing area for each runway end. With the exception of the LAHSO holding position lines, all of the markings on the useable runway are painted white and in good condition. The chevrons, as well as the LAHSO markings, are painted yellow and also considered to be in good condition.

Taxiway Markings

All of the taxiways have centerline stripes with enhanced taxiway centerline markings prior to the holding position markings at each intersection with a runway. Enhanced taxiway centerline markings consist of parallel yellow dashes on either side of the normal taxiway centerline extending up to 150 feet from the holdline. These markings ensure that taxiing aircraft have the proper wingtip clearance and indicate the areas protected for runway operations. Each of the T-hangar taxilanes and entrances to the aircraft parking areas also have visible centerline stripes. Taxiway edge markings have also been added in a number of locations to delineate the taxiway in areas where there is a large amount of pavement. Examples of this include where Taxiways A, B, D, and G traverse the large areas of decommissioned Runway 9-27 pavement. Taxiways A, D, and G have recently undergone rehabilitation and as such are the most recently repainted. All of the taxiway and holding position markings are painted yellow with a black background and considered to be in good condition.

2.1.5 Takeoff and Landing Aids

A number of different systems on the airfield facilitate the arrival and departure of aircraft. The primary ones are described in the following sections.

Runway End Identifier Lights

Runway end identification lights (REIL) consist of a pair of synchronized white flashing lights which are situated on each side of and abeam the runway end threshold lights. They provide pilots with a rapid and positive visual identification of the approach end of the runway during night, instrument, and marginal weather conditions. REILs also aid in identification of the runway end in areas having a high concentration of lighting or areas that lack contrast with the surrounding terrain. Both ends of Runway 4-22 are equipped with REILs. There are no REILs for the approach to Runway 36 due to the displaced threshold lighting and Runway 18 has a full approach lighting system described in the following section.

Approach Lighting

As part of the Runway 18 ILS, a Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) has been installed. The MALSR is comprised of a combination of threshold lights, light bars, and sequenced flashing lights that provide pilots runway alignment, height, roll, and horizontal references. The Runway 18 MALSR, which is owned and maintained by the FAA, extends out into Old Tampa Bay on a narrow man-made peninsula.

Visual Glide Slope Indicators

Visual glide slope indicators are systems installed to provide an indication of the aircraft's relation to the proper glideslope. Precision Approach Path Indicator (PAPI) systems have been installed on all four runway ends. These consist of a 4-light unit system for each end, located on the left side of the runway (PAPI-4L). The lights of a PAPI system provide pilots with visual descent information during an approach to a runway. These lights are typically visible from five miles during the day and up to 20 miles or more at night. PAPIs use a light bar unit that is installed in a single row perpendicular to the runway edge. The lights project a beam of white light in the upper segment and red light in the lower segment. Depending on the aircraft's angle in relation to these lights, the pilot will receive a combination that indicates his position relative to the desired glideslope. All of the PAPI-4L systems are considered to be in good condition; however, only the ones on Runway 4-22 are owned and maintained by the airport. The units on Runway 18-36 are ILS equipment, the RVR units are owned and maintained by the FAA.

PAPI-4L Systems for Runway 18 (red lights) and Runway 4 (lights not visible)

Runway Distance Remaining Signs

Runway distance remaining signs are located along the left side of Runway 18 to provide pilots with a quick reference on the length available (in 1,000 foot increments) for takeoff or landing operations. While preferred on the left side of the runway, the most economical option is to utilize double-faced signs on one side of the runway. This is the case at PIE, with the panels facing and on the right side of Runway 36 providing information to pilots on the distance remaining for operations on that runway.

Runway Visual Range Equipment

Runway Visual Range (RVR) equipment measures the specific visibility at different locations along a runway. Information from these instruments provides the actual conditions to support the ILS approach minimums and facilitate the landing capacity of the runway. Two of the RVR sensor units are collocated with the ILS glideslope antennas at each end of Runway 18-36. The third is located east of the approximate midpoint of Runway 18-36. As with other ILS equipment, the RVR units are owned and maintained by the FAA.

Automated Surface Observing System

The airport has two Automated Surface Observing Systems (ASOS) located in midfield area to the northeast of the runway intersection and near the rotating beacon. Each ASOS is a combination of instruments which observe, report, and record the airfield altimeter setting, wind data, temperature, precipitation, dew point, visibility, and cloud/ceiling data. The ASOS equipment south of the airport perimeter road is the official ASOS for the airport which is owned and maintained by the FAA. Pilots can receive this information via the Automatic Terminal Information Service (ATIS), the Hazardous Inflight Weather Advisory Service, or through a dedicated telephone number. The ASOS equipment north of the perimeter road is owned and maintained by the National Weather Service.

Remote Transmitter/Receiver

A remote transmitter/receiver (RTR) facility is located in the midfield area to the northeast of the runway intersection (near the rotating beacon and ASOS). Three antenna towers with an equipment shelter make up the RTR facility and extend the communication range of air traffic services. The RTR provides ground-to-ground communications between air traffic controllers and pilots for delivering en route clearances, issuing departure authorizations, and acknowledging instrument flight rules cancellations or departure/landing times. As a secondary function, they are also used for advisory purposes whenever the aircraft is below the coverage of the primary air/ground frequency. The RTR facility is owned and maintained by the FAA.

Wind Indicators

Perhaps the most basic takeoff and landing aid is the windsock, which indicates wind direction and speed. There are a number of lighted windsocks on the airfield. One is located to the left of the Runway 18 threshold, one to the right of the Runway 36 threshold, and one to the left of Runway 22 threshold. There is also a supplemental lighted windsock on the Pinellas County Sheriff's Department hangar to facilitate the helicopter operations on that side of the airfield.

Lighted windsock adjacent to Runway 22

VOR Receiver Checkpoint

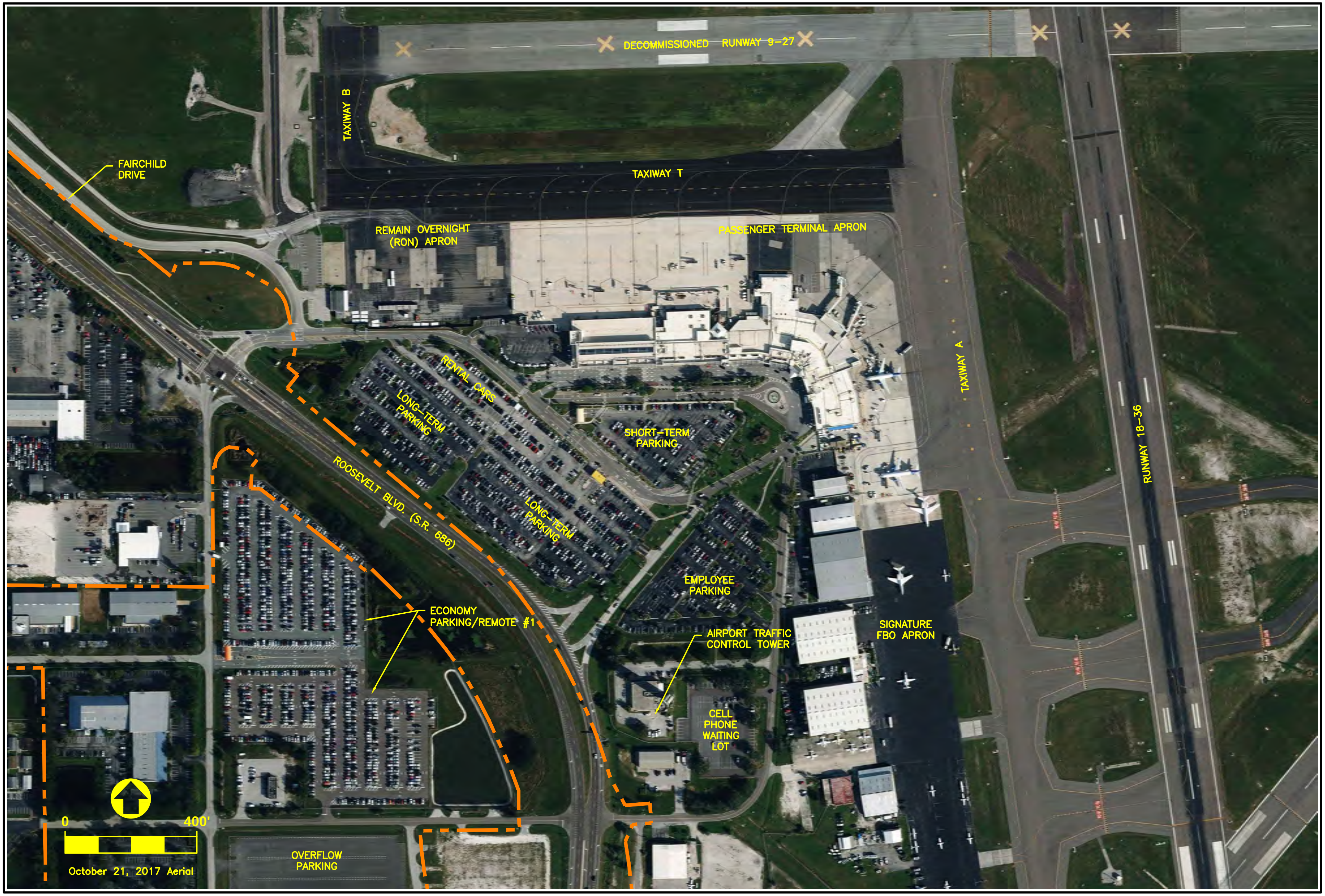
A VOR receiver checkpoint is located where Taxiway G turns into Taxiway G1 at the approach end of Runway 22. This pavement marking consists of a painted circle with an arrow in the middle that is aligned in the direction of the checkpoint azimuth. This marking, which was repainted at the beginning of 2018 when the taxiway repaving was complete, allows pilots to check their aircraft instruments with the on-airfield VORTAC signals.

2.2 Passenger Terminal Facilities

The passenger terminal facilities are located on the southwest side of the airfield, off Roosevelt Boulevard (SR 686). The terminal has a linear J shaped configuration. Taxiway A and Taxiway T provide airside access to the terminal from the runway system. On the landside of the terminal facilities there are various surface lots for public, rental car, and employee parking. To the south are multiple general aviation facilities within the Signature FBO leasehold and the FAA ATCT. The area previously utilized for air cargo is located to the west of the terminal. **Figure 2.2-1** depicts the existing terminal area.

Ticketing A and Curbside Roadway

Additional information on the existing passenger terminal building systems has been included in a high-level building conditions assessment. Airport records, drawings, and reports on key site utilities, architectural elements, and structural elements, as well as the various mechanical, electrical, and plumbing systems have been reviewed and documented. The resulting comprehensive *Terminal Building Conditions Assessment*, included in **Appendix C**, provides the basis for determining capacity and projecting future needs of the passenger terminal facilities.



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C:\Users\ddicarlo\Documents\PIE\Drawings\Figures\PIE MP Figure 2.2-1.dwg

Source: C&S Companies Inc., 2018

FIGURE 2.2-1
EXISTING PASSENGER TERMINAL FACILITIES

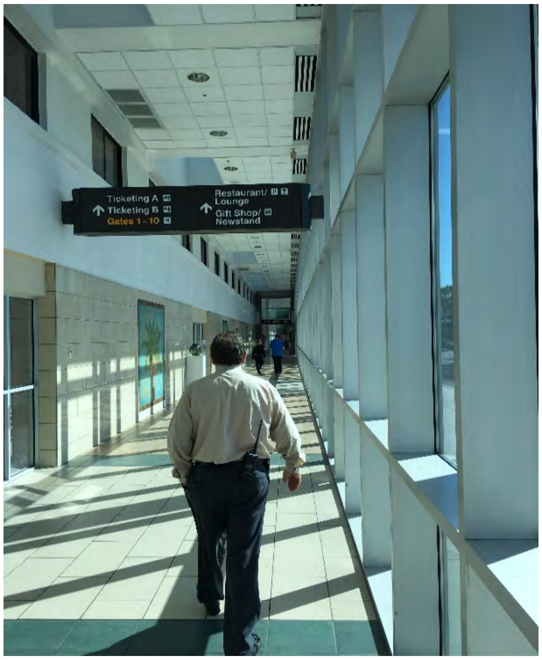
2.2.1 First Floor Functional Areas

The 2 story terminal building serves most passenger functions on the main level (first floor). The first floor has an approximate total floor area of 130,000 square feet (SF). **Table 2.2-1** at the end of this section summarizes the functional areas and features of the first floor, which are illustrated in **Figure 2.2-2**.

Circulation Areas

Public circulation is located throughout the first floor on both the non-secure and secure sides of the terminal building. There is a main circulation aisle that runs along the entire length of the terminal building facade connecting Ticketing A to the baggage claim area. Elevators and stairs provide vertical access to the second floor. Circulation on the secure side is via a wide aisle connecting the holdrooms, concessions, and restrooms.

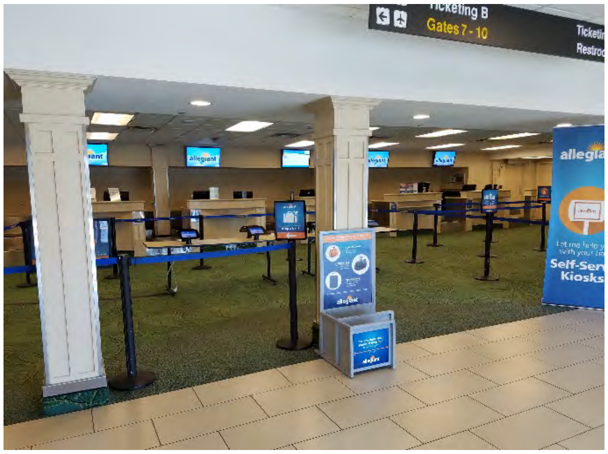
Non-public circulation areas are accessible only by airport, airline, or other people under an escort with security clearance. These areas are considered "back of house" areas and include circulation within the TSA screening and outbound baggage makeup areas; airport or tenant offices areas; and the FIS facility.



Curbside circulation corridor

Passenger Check-In/Bag Drop

Departing passengers obtain boarding passes or check baggage at one of two check-in areas; Ticketing A or Ticketing B. Ticketing A is located at the southeast end of the building, the first drop off location for departing passengers, and Ticketing B is located to the west. Allegiant Air occupies all of Ticketing B and half of Ticketing A. The remainder of Ticketing A is utilized by Sun Country and Sunwing Airlines.



Ticketing B

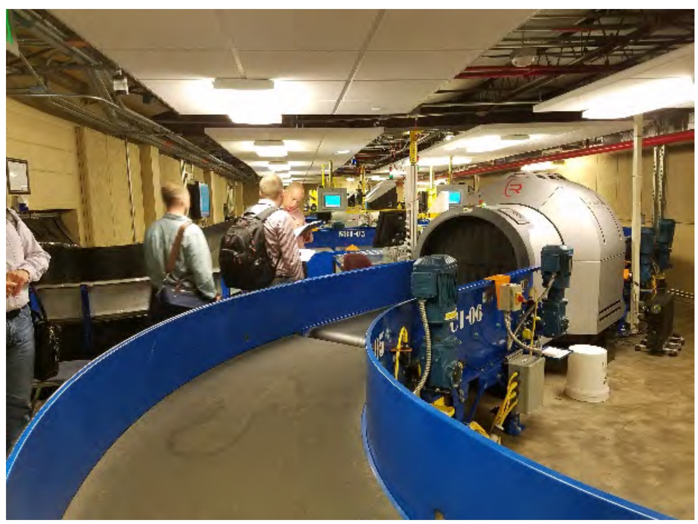
Airline Offices

Airline offices traditionally include space to support day-to-day activities and transactions specific to airline operations. Most of these areas are used today for storage or break areas for airline employees, with computers and workstations utilized by station managers. At Ticketing A, the airline offices are directly behind the check-in counters and many are vacant. As a part of the Ticketing A reconfiguration project in 2018, some of the vacant office space will be redeveloped as outbound baggage belt right-of-ways while others will remain as office space. At Ticketing B, there is limited airline office space, which is located to the right of the check-in queue, adjacent to the Federal Inspection Services (FIS) facility.

Explosives Detection System Baggage Screening

There are two Transportation Security Administration (TSA) baggage screening areas; one serving each of the check-in areas. Ticketing A is currently a manual system where bags are transferred to the screening area via multiple baggage belts and are then manually carried to the TSA explosive detection system (EDS) machines. Once screened, bags are manually moved to the baggage make up belts. A construction project to redevelop this area is set to begin in 2018. This project, which will create a full inline system (eliminating manual carrying of bags) will be used as the baseline for this study's analyses.

The EDS screening area for Ticketing B is configured as a full-inline system. Bags from the check-in areas go behind the public wall to the screening area. Bags are then screened and proceed to secondary screening or the outbound baggage makeup area. The system provides a good level of service for passengers and airlines by automating the screening process. These areas are secured by TSA, requiring special access for airport or airline employees.



EDS System for Ticketing B

Outbound Baggage

The outbound baggage makeup area is where airline personnel organize, separate, and load passenger baggage onto carts for departing flights. Once a bag exits the TSA screening area it travels on a belt to the outbound baggage makeup. There are two baggage make up areas, one serving each of the check-in/TSA screening areas. The project set to begin in 2018 will also expand the outbound baggage make up area and will be used as the baseline for this study's analyses. Ticketing B has a dedicated outbound baggage makeup area directly behind the screening area. This area is very small and only utilized by Allegiant.

Ticketing B Outbound Baggage Makeup

Passenger Security Screening

TSA is responsible for ensuring the security of the nation's transportation systems and provides mandatory passenger and baggage screening services at airports. There are two TSA checkpoints for security screening: one located at the entrance to the Gates 2-6 holdrooms (adjacent to Ticketing A) and the other located at the entrance to the Gates 7-11 holdrooms (adjacent to Ticketing B). Departing passengers access either security checkpoint from the main circulation aisle. Both security checkpoints have three screening lanes, including one TSA Pre-Check lane. Arriving passengers circulate past the checkpoints in a narrow back-flow prevention corridor.

TSA Security Checkpoint B

Holdrooms and Boarding Gates

Holdrooms are where departing passengers enplane and arriving passengers deplane. A seating area for waiting and podiums for airline assistance are included in each holdroom. Holdrooms are located in two areas, for Gates 2-6 and Gates 7-11. The holdroom for Gates 2-6 is a common use, open area for seating and boarding, with some concessions and restrooms. Gates 4 and 5 have passenger boarding bridges which are accessed by interior ramps. All other gates are ground loaded positions, meaning passengers exit the building at the apron level, and use exterior ramps or stairs to access aircraft. In 2018 the holdroom for Gates 7-11 was under construction to meet growing demand and improve the passenger experience. When construction is complete, the Gates 7-11 holdroom will be a connected, open area for seating and boarding, with a larger concessions area and restrooms. Gates 7-11 will also be ground loaded positions with arriving passengers exiting directly into the baggage claim area. Gates 1 and 1A are only used for arriving passengers since there is not security screening or holdroom space for these gates.

Holdrooms for Gates 2-6

Concessions

Airport terminal concessions typically include food, beverage, retail items, news/gifts, specialty services, and (international) duty-free shops. PIE has most of these offerings, in four public concession areas; three of which are on the first floor. There is a small retail and news/gift shop on the non-secure side near the security checkpoint entrance for Gates 2-6. This retail area is only open during peak departure and arrival periods. Post-security, within the Gates 2-6 holdroom area, is a small, duty free concession at one end, and a quick-serve restaurant and bar at the other end. Within the Gates 7-11 holdroom area there will be multiple food and beverage areas including a vending area, quick-serve kiosk, and a large sit down restaurant and bar.

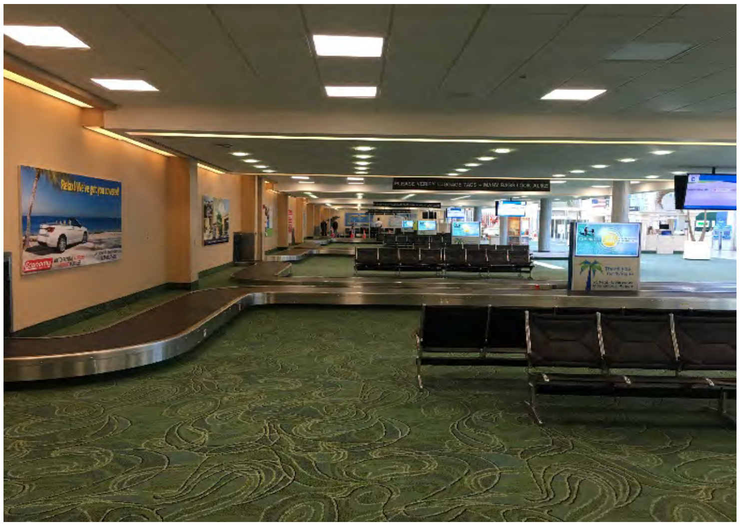
Concessions area within holdroom for Gates 2-6

Inbound Baggage

The inbound baggage system is used by airline personnel to transfer passenger baggage from arriving aircraft to individual flat-plate baggage claim units. The baggage transfer occurs manually in the non-public area of the first floor behind the baggage claim hall. Baggage is placed on the rotating inbound baggage units which tie into the baggage claim carousels on the public side. There is one domestic inbound baggage makeup in the back of the baggage claim hall and one international inbound baggage makeup in the FIS facility.

Baggage Claim

The baggage claim area is located on the western end of the first floor. Arriving passengers access the baggage claim area via the circulation aisle that stretches the length of the terminal building or via secure one-way doors from Gates 7-11. There are four flat-plate carousels for arriving passengers to retrieve their bags. There is circulation around the carousels and between the baggage claim area and rental car counters. Once passengers claim their bags, they exit to the curbside through three exit vestibules near the rental car counters, or the vestibule to the west, which leads to the ground transportation area and rental car parking lot. Adjacent to the carousels are Allegiant's airline baggage service office and restrooms.



Baggage Claim Area

Rental Car Counters

The rental car counters are located adjacent to the baggage claim area. The area includes counters for customer processing, a small queueing area, and a small back room used for storage and break room. Additional details on the rental car facilities are included as part of the terminal landside facilities.

Federal Inspection Services

Federal Inspection Services (FIS) for arriving international passengers are located next to Gate 6. At the beginning of this study, this area was under final design to bring the facility up the current U.S. Customs and Border Protection (CBP) standards. The final reconfigured area will serve as the baseline for this study's analyses. This area consists of immigration and passport control (primary inspection) services and one baggage claim unit.

FIS primary inspection area (not operational)

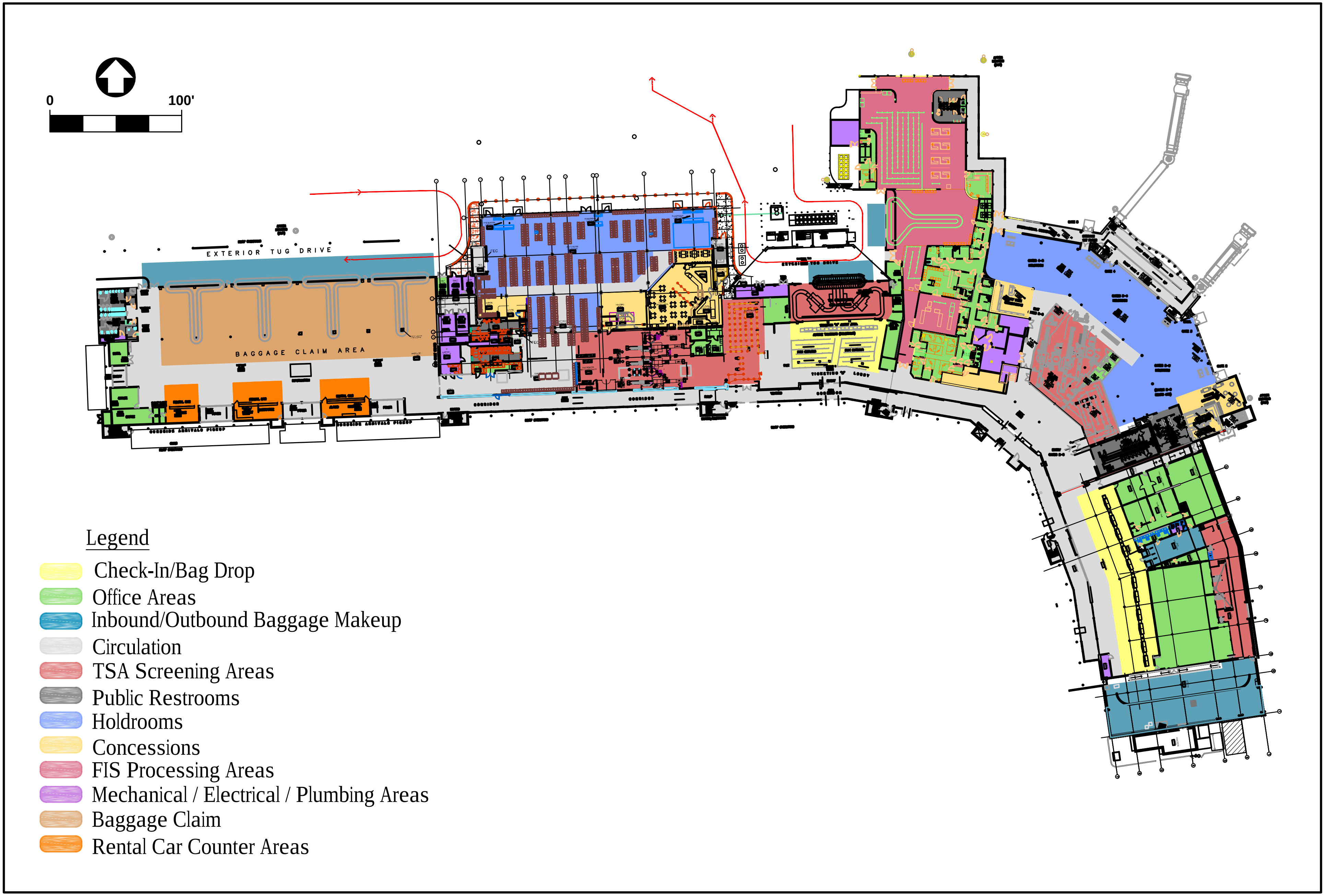
After primary screening, passengers claim their baggage and proceed to the customs and agricultural inspection areas (secondary inspection). After clearing primary and secondary screening procedures, passengers exit the facility via a corridor and enter the non-secure area adjacent to Ticketing B.

Next to the passenger processing area is a significant amount of CBP office space. The space includes the command and control areas, interrogation rooms, break rooms, and employee work stations. These areas are not open to the passengers, but are connected to the passenger areas for quick access for CBP officers.

TABLE 2.2-1
FIRST FLOOR FUNCTIONAL FEATURES AND AREAS

Functional Element	Items	Area (SF)
Circulation Areas		
Non-Secure	-	24,700
Secure	-	10,320
Check-In/Bag Drop		
Terminal A	22 positions	4,260
Terminal B	12 positions	2,530
Airline Offices		8,990
EDS Baggage Screening	4 machines	4,440
Outbound Baggage	160 linear feet	3,360
Passenger Security Screening	6 lanes	10,325
Holdrooms and Boarding Gates	-	19,375
Concessions		
Non-Secure	-	575
Secure	-	6,570
Inbound Baggage		
Domestic	200 linear feet	3,950
International	40 linear feet	415
Baggage Claim	480 linear feet	12,320
Rental Car Counters	-	2,800
FIS Facilities	8 primary booths	5,375
CBP Facilities	3 stations, 120 linear feet	4,945
CBP Offices		5,130
	Total Area	**130,380**

SOURCE: Passenger terminal drawings from airport records.



Source: C&S Companies Inc., 2018

FIGURE 2.2-2

PASSENGER TERMINAL - FIRST FLOOR PLAN

2.2.2 Second Floor Functional Areas

The second floor has two main areas: the public concessions area which includes a small sit down restaurant, a small bar, and an open seating/viewing area; and the airport administration and tenant office areas. With approximately 21,000 SF, the second floor functional areas are summarized in **Table 2.2-2** and illustrated in **Figure 2.2-3**.

Circulation

The second floor circulation consists of two areas; internal circulation within the airport administration office area, and the emergency egress from the administration office area. There are five stairwells, four of which are rated egress stairwells, and the other is the main circulation to the administrative office entrance and concessions area. There are also two public elevators located near the entrance to the office and concession areas that provide access between the first and second floors.

Concessions

The concessions area on the second floor include a sit down restaurant with a kitchen and bar/lounge. There is also a large dining room area with open seating that is not served by the restaurant, but used for some passengers, employees, or others as a waiting area or for taking breaks. This restaurant and bar area provides the only place with food and beverage service on the non-secure side of the terminal.

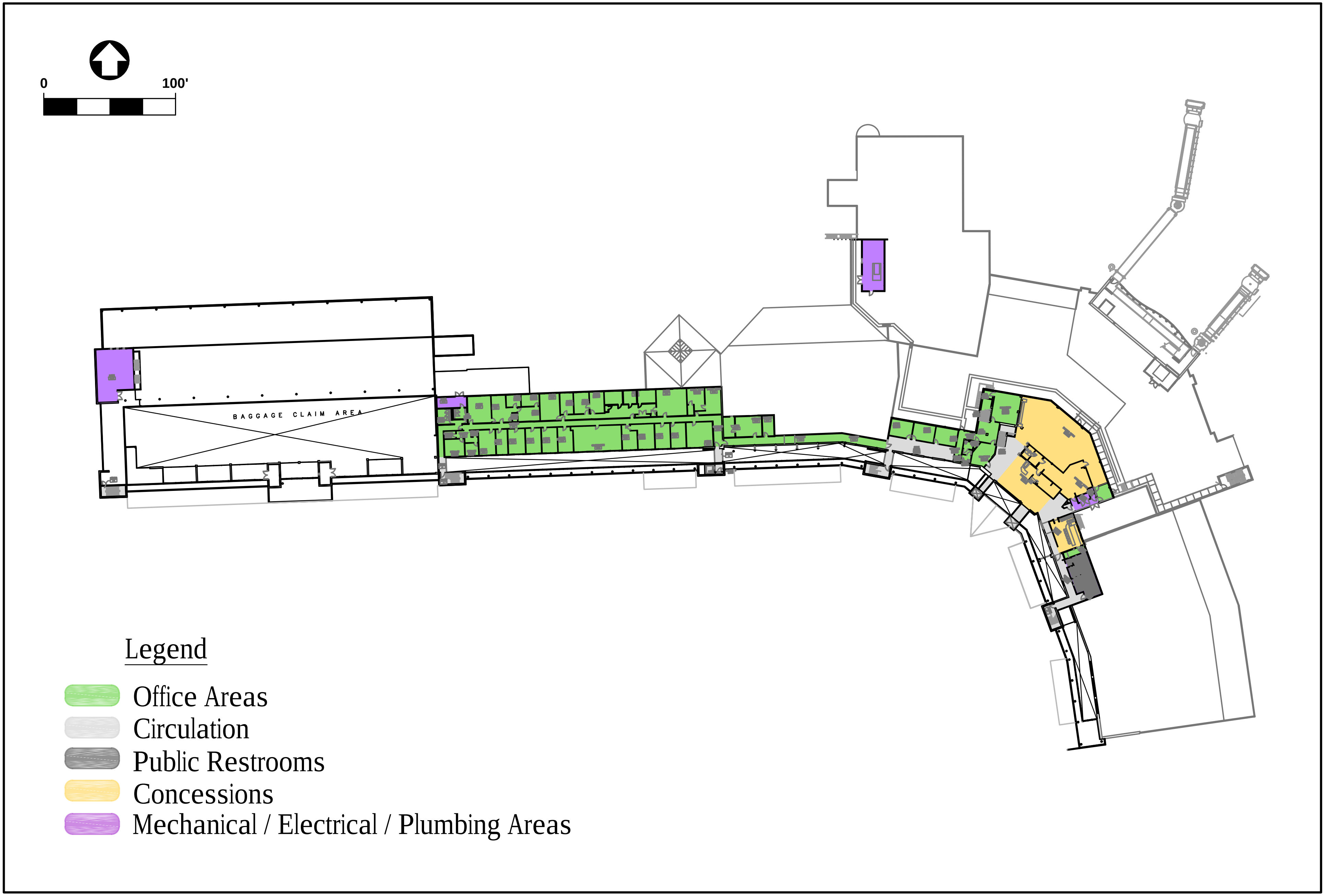
Airport Administration

The primary airport administration space is in the center of the second floor adjacent to the concessions area. From this point to the west end of the second floor are additional administrative offices, storage areas, a conference room, a break room, and other tenant offices.

TABLE 2.2-2
SECOND FLOOR FUNCTIONAL FEATURES AND AREAS

Functional Element	Area (SF)
Circulation	3,180
Concessions	
Non-Secure	4,760
Secure	0
Airport Administration	13,260
Total	**21,200**

SOURCE: Passenger terminal drawings from airport records.



Oct 22, 2018 – 10:37am C:\Users\lholiday\Documents\Aviation Planning\Airports\KPIE – St. Pete-Clearwater International Airport\Airport Master Plan\05 Graphics-GIS-Modeling\Drawings\Figures\PIE MP Figure 2.2-3.dwg

Source: C&S Companies Inc., 2018

FIGURE 2.2-3

PASSENGER TERMINAL - SECOND FLOOR PLAN

2.2.3 Passenger Terminal Apron

Aprons or ramps are paved areas designated for aircraft parking, the loading/unloading of passengers, loading/unloading of air cargo, maintenance, and aircraft storage. They are also used to store ground service equipment and vehicles. Apron areas are non-movement areas, meaning that they do not have to be free of obstructions at all times and design criteria and safety area specifications are limited.

Gate 5 Passenger Boarding Bridge

The Passenger Terminal Apron is within a non-movement area whose limits include the apron edge Taxiway T on the north and Taxiway A to the east. Aircraft ingress/egress to the aircraft parking positions is from both taxiways. The 45,000 square yards (SY) concrete apron, largely reconstructed in 2017, is considered to be in excellent condition. There is a designated vehicle service road adjacent to the apron that runs the entire length of the terminal building. The service road allows for vehicles such as baggage tugs, aircraft catering, fuel trucks, and others to move safely on the apron. **Figure 2.2-4** depicts the 15 aircraft parking positions around the passenger terminal building.

Aircraft Parking Positions

The linear terminal building and concourse is approximately 1,200 feet long with a total of 12 aircraft parking positions and three remain overnight (RON) positions. The eastern part of the concourse has six aircraft parking positions, two of which are served by passenger loading bridges (Gates 4 and 5). The western part of the concourse also has six aircraft parking positions, of which all are ground-loading positions. The majority of gate areas are used by Allegiant; however, Sun Country has priority use for the passenger boarding bridges at Gates 4 and 5. Gates 1 and 1A are primarily used by charters throughout the year. Gate 6 is the closest gate to the FIS. As such, it is the most accessible for international arrivals and not used for domestic flights. However, since

West end of Passenger Terminal Apron

most parking positions are currently ground loaded and deplaned, other positions are also available for international arrivals. Aircraft fueling is provided by truck at each aircraft parking position.

Ground Service Equipment Circulation and Storage

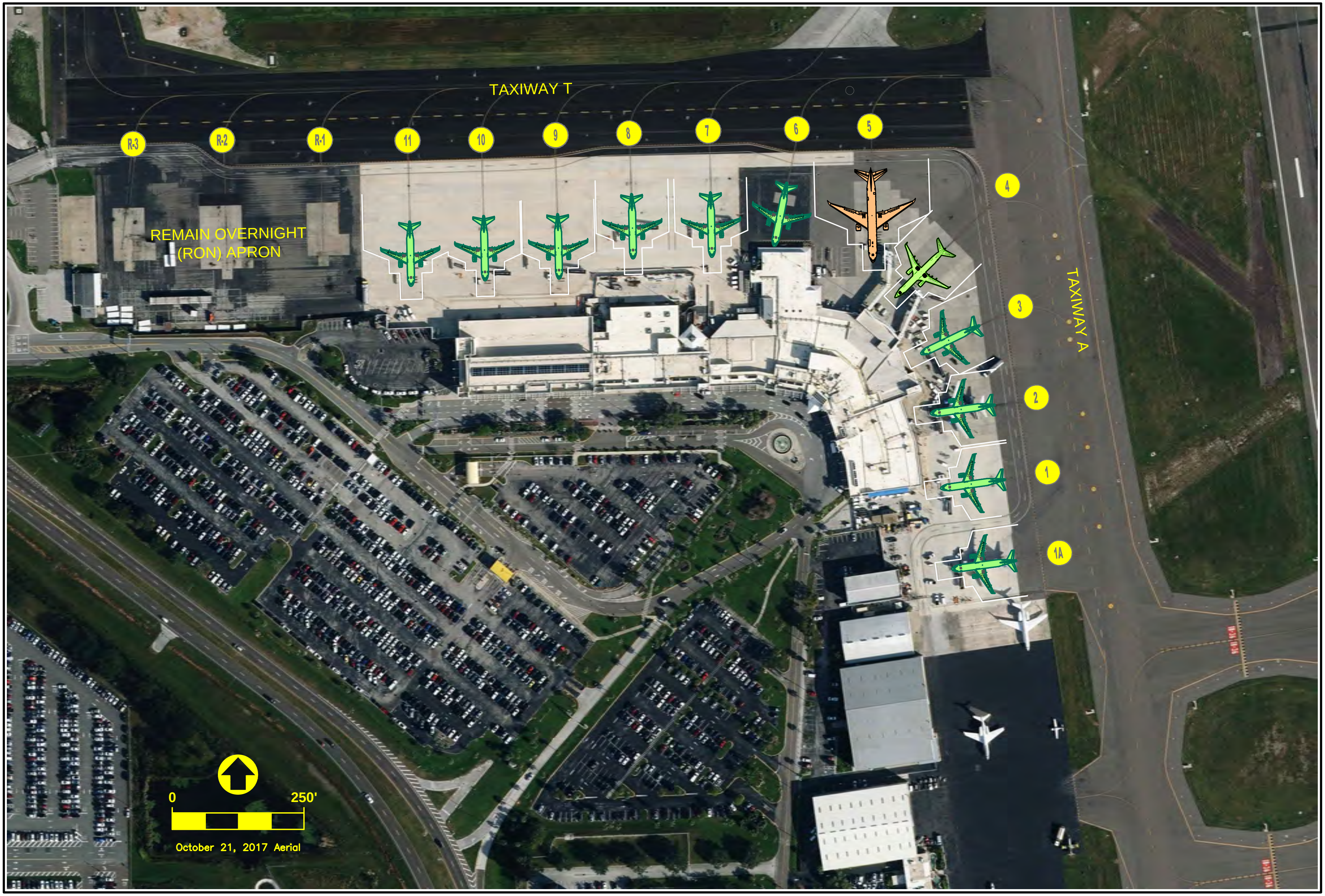
Ground service equipment (GSE) is comprised of various vehicles and other equipment on the apron that support flight operations. Examples include fuel trucks, baggage tugs, airline catering trucks, airline maintenance trucks, airport operations vehicles, and others. The vehicle service road described previously runs the entire length of the terminal building, providing the GSE operators with a safe and efficient way to get to and from the aircraft they are servicing. The western portion of the Passenger Terminal Apron has ample depth allowing for GSE circulation and storage adjacent to the aircraft parking positions. The eastern portion of the apron has more restrictive depth, resulting in less area available for circulation and storage. While there are some enclosed or covered GSE storage areas along the airside face of the terminal building, much of the equipment is stored outside on the apron.

GSE storage on the Passenger Terminal Apron

Remain Overnight Parking

Remain overnight (RON) aircraft parking occurs after the last flight of the day has been completed. Because of the flight schedule operated by Allegiant, a large number of their aircraft remain overnight, and in some cases, for an entire day or two before their next departure. Almost all RON parking is provided at the designated aircraft parking gate positions, where aircraft can be efficiently prepared, boarded, and released for the first flight on the following day.

When demand for RON parking exceeds the number of available aircraft parking positions at the terminal, other areas must be used. Demand for RON parking does not typically exceed the available terminal aircraft parking positions. When it does, the apron area to the west (previously for air cargo) provides three additional large aircraft parking positions. This portion of the apron provides approximately 16,000 SY of space and is constructed of both concrete and asphalt. In the 2015 FDOT pavement report, the three concrete aircraft hardstands were assigned a PCI of 51 (poor) and the surrounding asphalt a PCI of 55 (poor).



Source: C&S Companies Inc., 2018

FIGURE 2.2-4
AIRCRAFT PARKING POSITIONS

2.3 Passenger Terminal Landside Facilities

Passenger terminal landside facilities provide surface transportation access and serve as the interface between arriving or departing passengers and the terminal facilities. The following sections document the terminal access roadways, curbfront areas, parking lots, and rental car facilities. These facilities general lie within the shown in **Figure 2.3-1**.

Figure 2.3-1: Passenger Terminal Landside Facilities

SOURCE: www.fly2pie.com "Airport Parking Map," 2018.

2.3.1 Landside Facilities

Regional Roadways

The main regional roadway feeding the terminal facilities is State Road 686 (SR 686). As shown in **Figure 2.3-2**, Interstate 275 (I-275) and County Road 611 (49^{th} Street North) connect SR 686 north and south of the airport.

Figure 2.3-2: Regional Roadway Network

SOURCE: Google Earth; Kimley-Horn and Associates, Inc., 2017.

SR 686 is a four-lane divided arterial that runs in a southeast-northwest orientation along the southern and western edges of the airport. Along the western edge of the airport, SR 686 is Roosevelt Boulevard with a posted speed limit is 50 miles per hour (mph) in both directions. SR 686 provides three access points to PIE (see **Figure 2.3-3**).

Airport Roadways

The airport roadways serve as the landside interface between the regional roadway system and the passenger terminal facilities. These are categorized as either: airport access roadway, terminal area roadway, or terminal curbfront. Access to the terminal curbfront is provided by Airport Parkway Drive and Terminal Boulevard as shown in **Figure 2.3-3**. Airport Parkway Drive consists of two separate roadways, each originating from different access points off SR 686 and terminating at the terminal curbfront. Terminal Boulevard provides access to the curbfront via a northbound only access off SR 686. The characteristics of each of the airport roadways are summarized in **Table 2.2-3**.

Airport Parkway Drive North

Airport Parkway Drive North is a two-lane circulator road connecting SR 686 (Roosevelt Boulevard) to the north end of the passenger terminal area. It provides full access to the Rental Car, Long-Term, and Short-Term parking lots, as well as the ground transportation area. East of its access to the Long-Term parking lot, Airport Parkway Drive North converts to one-way road before merging with Terminal Boulevard. All exiting traffic from curbside accesses SR 686 via Airport Parkway Drive North. A speed limit of 25 mph was assumed, as no speed limit is posted.

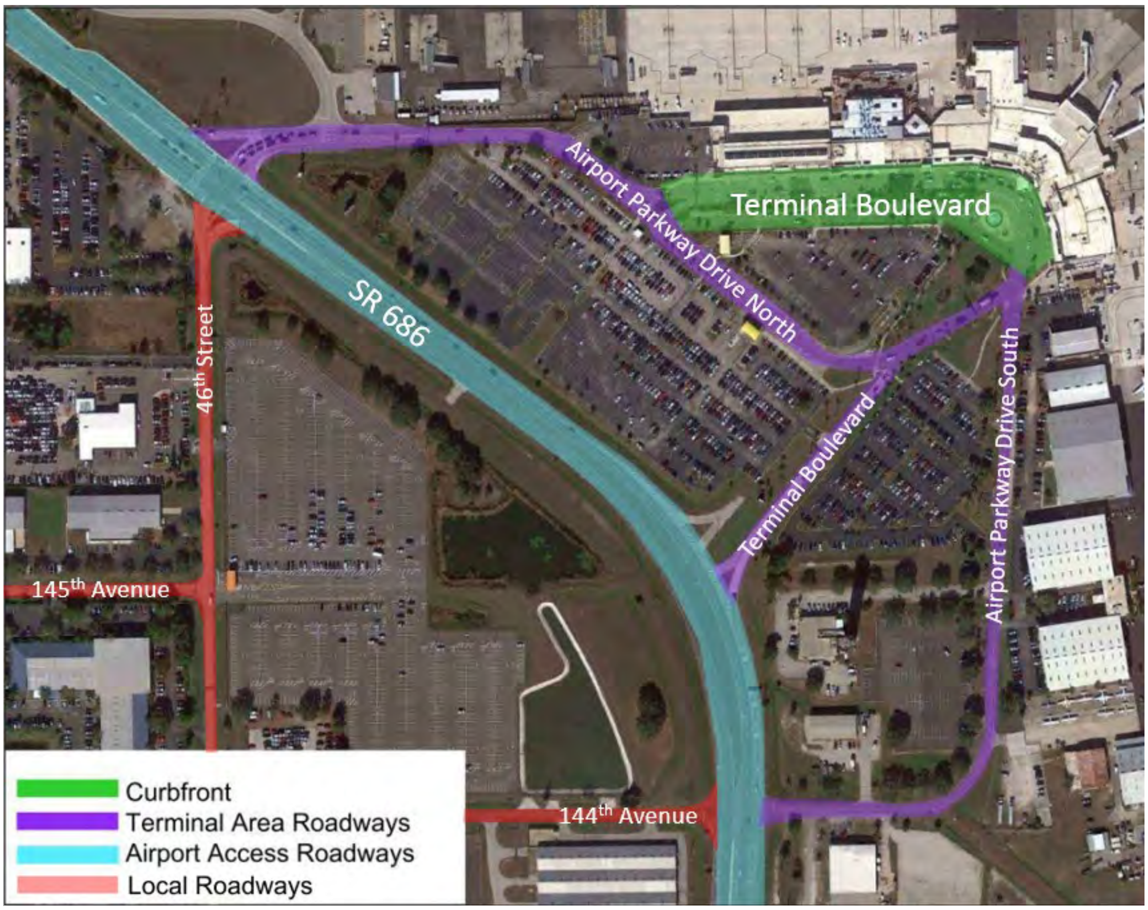


Figure 2.3-3: Terminal Access Roadways

SOURCE: Google Earth; Kimley-Horn and Associates, Inc., 2017.

Airport Parkway Drive South

Airport Parkway Drive South is a two-lane circulator road connecting SR 686 to the south end of the passenger terminal area. It is accessible only by northbound traffic, as southbound left-turns from SR 686 are prohibited at the intersection. Airport Parkway Drive South provides access to both the Cell Phone and Employee Lots before terminating at Terminal Boulevard. A speed limit of 25 mph was assumed, as no speed limit is posted.

Terminal Boulevard

Terminal Boulevard is a one to two lane, one-way connector road providing access to the passenger terminal curbfront from SR 686 for northbound traffic. Terminal Boulevard does not provide access to any parking facilities at PIE. Airport Parkway Drive North merges with Terminal Boulevard and adds a second lane. Downstream of this juncture, Airport Parkway Drive South also merges. A speed limit of 25 mph was assumed on the non-curbside portions of Terminal Boulevard, as no speed limit is posted. A posted speed limit of 15 mph applies to all curbfront portions of Terminal Boulevard.

TABLE 2.3-1
AIRPORT ROADWAY OVERVIEW

Roadway	Lanes	Speed Limit	Roadway Type
SR 686 (Roosevelt Boulevard)	4	50 mph	Airport Access Roadway
Airport Parkway Drive North	2	25 mph	Terminal Area Roadway
Airport Parkway Drive South	2	25 mph	Terminal Area Roadway
Terminal Boulevard	1 - 2	25 mph	Terminal Area Roadway
Terminal Boulevard	2 - 4	15 mph	Terminal Curbfront

SOURCE: Kimley-Horn and Associates, Inc., 2017.

Gateway Express Project

Landside access to PIE and its internal roadway network will be significantly altered after completion of the FDOT Gateway Expressway Project (Gateway Project) in 2021. As a part of the Tampa Bay NEXT transportation modernization program, the Gateway Project will construct roadway infrastructure improvements in the St. Petersburg and Clearwater areas. A component of these improvements includes the construction of an elevated, tolled expressway over SR 686 and improvements to the existing roadway network to the airport off SR 686. In conjunction with this project, reconfiguration of the existing curbfront area, onsite parking, and onsite roadway network will occur. **Figure 2.3-4** depicts the proposed airport landside improvements that began in 2018 in conjunction with the Gateway Project.

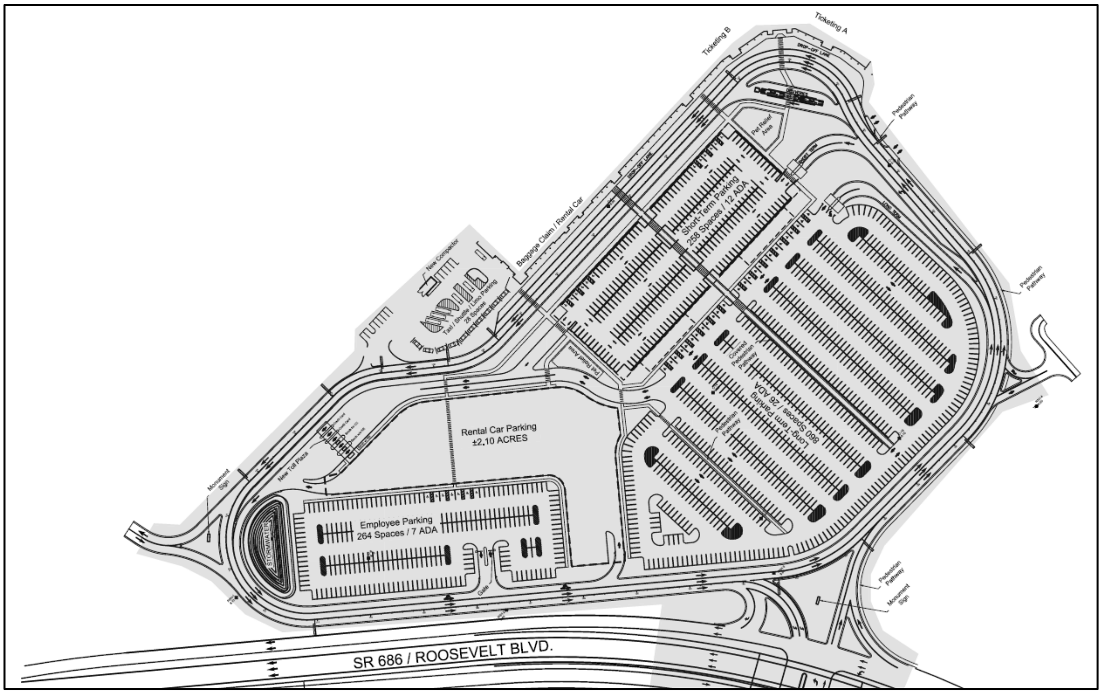


Figure 2.3-4: Airport Landside Improvements with Gateway Project

SOURCE: FDOT Gateway Expressway Reverse Access Road Drawing and Kimley-Horn and Associates, Inc., 2017.

2.3.2 Terminal Curbfront

The terminal has two curbfront roadways providing access to the ticketing/check-in (departures) area and the baggage claim (arrivals) area as detailed in **Figure 2.3-5**.

Figure 2.3-5: Passenger Terminal Curbfront

SOURCE: Google Earth; Kimley-Horn and Associates, Inc., 2017.

The primary curbfront closest to the terminal building is intended for use by private vehicles, transportation network company vehicles (TNCs), hotel shuttles, and other passenger vehicles. A secondary curbfront is also provided south of the primary curbfront, intended for use by airport vehicles, law enforcement, deliveries, and parking lot shuttles. A landscaped median separates the curbfronts. **Table 2.3-2** provides a general description of each terminal curbfront configuration. Additional detail on the terminal curbfront and pedestrian areas is provided in **Appendix D**.

TABLE 2.3-2
PASSENGER TERMINAL CURBFRONT OVERVIEW LOCATIONS

Location	Length	Description of Activity	Number of Lanes	
			Curbfront	Travel
Ticketing A				
Primary	130’	Passenger Drop-off (Sunwing, Sun Country)	2	1
Secondary	n/a	Delivery / Airport Vehicles	-	2
Ticketing B				
Primary	250’	Passenger Drop-off (Allegiant)	2	1
Secondary	200’	Delivery / Airport Vehicles	1	2
Unassigned				
Primary	130’	Passenger Pick-up	2	2
Secondary	n/a	Delivery / Airport Vehicles	1	1
Baggage Claim				
Primary	280’	Passenger Pick-up	2	2
Secondary	250’	Delivery / Airport Vehicles	1	1

SOURCE: Kimley-Horn and Associates, Inc., 2017.

The completion of the Gateway Project is expected to alter curbfront behavior in that the secondary curbfront will be replaced by additional Short-Term parking (as depicted in **Figure 2.3-4**). Primary curbfront behavior is expected to perform similar to the existing condition.

Ground Transportation Area

A ground transportation area (GTA) is located at the west end of the passenger terminal building, adjacent to the baggage claim area. This area is utilized by a variety of vehicles including taxis, shuttles, commercial vehicles, luxury limousine service, and personal employee vehicles. **Figure 2.3-6** details the layout of the GTA and **Table 2.3-3** summarizes the available spaces.

Figure 2.3-6: Ground Transportation Area Layout

SOURCE: Google Earth; Kimley-Horn and Associates, Inc., 2017.

TABLE 2.3-3
GROUND TRANSPORTATION AREA OVERVIEW

Designation	Spaces or Length
Taxi Queueing Area	6
Shuttle / Delivery Parking	10
Rental Parking	6
Employee Parking	7
Curbfront Area	75'

SOURCE: Kimley-Horn and Associates, Inc., 2017.

The GTA is accessible via Airport Parkway Drive North through a gated access point. While installation of transponders for the gate is planned, current access is via a code. After completion of the Gateway Project, it is anticipated that the GTA will function largely like the existing condition with the exception of a revised access point.

2.3.3 Automobile Parking

PIE currently provides 2,651 public and 220 employee parking spaces distributed among six surface parking lots. In addition, the airport has a Cell Phone Lot with 130 spaces for vehicles awaiting arriving passengers. Existing public and employee parking areas are listed in **Table 2.3-4** and illustrated in **Figure 2.3-7**.

The airport landside improvements that began in 2018 to accompany the Gateway Project will change the configuration and number of spaces in the Short-Term, Long-Term, and Employee Lots. Operations in both remote lots are expected to remain similar to existing conditions. The layout of the parking improvements was provided previously in **Figure 2.3-4**. The automobile parking spaces after the completion of these projects is also included in the table below.

TABLE 2.3-4
AUTOMOBILE PARKING SPACE OVERVIEW

	Short-Term	Long-Term	Employee	Economy/ Remote #1	Overflow	Economy/ Remote #2	Total
Existing	184	651	220	1,054	480	282	**2,871**
After Improvements	270	886	271	1,054	480	282	**3,243**

SOURCE: FDOT Gateway Expressway Reverse Access Road Drawing and Kimley-Horn and Associates, Inc., 2017.

Figure 2.3-7: Passenger Terminal Automobile Parking

SOURCE: NearMap; Kimley-Horn and Associates, Inc., 2017.

Short-Term Lot

The Short-Term Lot is located directly south of the curbside area with at-grade walking access to the passenger terminal. Vehicle access to the existing lot is provided from Airport Parkway Drive North through two entry lanes, each equipped with ticket dispensers. Vehicles exit the existing lot through a two lane exit plaza egressing to Airport Parkway Drive North. One exit lane is credit card only while the other is staffed to accept cash or credit card. The vehicle access to the lot following the completion of the Gateway Project is from the realigned Terminal Boulevard through a two-lane entry plaza. The improved vehicle exit will be via a new five-lane exit plaza serving both Short- and Long-Term Lots.

Long-Term Lot

The Long-Term Lot is located across Airport Parkway Drive North, directly south of Short-Term parking with at-grade walking access to the terminal. Vehicle access to the existing lot is provided from Airport Parkway Drive North through two entry lanes, each equipped with ticket dispensers. Vehicles exit the existing lot through a two lane exit plaza egressing to Airport Parkway Drive North. One exit lane is credit card only while the other is staffed to accept cash or credit card. The vehicle access improvements to the lot will be from the realigned Terminal Boulevard through a two-lane entry plaza. The future exit will be via a new five-lane exit plaza serving both Short- and Long-Term Lots.

Economy/Remote #1 Lot

The Economy/Remote #1 Lot is located south of Roosevelt Boulevard. Airport shuttles operate on a continuous loop between the remote lot, the terminal curbside, and the GTA to serve customers. Vehicle access is at the intersection of 145th Avenue and 46th Street, south of the 46th Street intersection with Roosevelt Boulevard. The access provides two entry lanes, each equipped with a ticket dispenser. Vehicles exit the existing lot through a two lane exit plaza adjacent to the entry point. One exit lane is credit card only while the other is staffed to accept cash or credit card.

Overflow Lot

The Overflow Lot is located south of the Economy/Remote #1 Lot across 144th Avenue. This lot is only used when both the Long-Term and Economy/Remote #1 Lots are at capacity. When in use, the Overflow Lot is serviced by the same airport shuttles for the Economy/Remote #1 Lot. A single entrance and exit lane is provided. The access is gated and uses a mobile collection booth.

Economy/Remote #2 Lot

The Economy/Remote #2 Parking Lot is a surface lot located on Fairchild Drive northwest of the terminal and adjacent to the USCG Air Station. This lot is only used when both the Economy/Remote #1 and Overflow Lots are at capacity. When in use, Economy/Remote #2 Lot is serviced by the same airport shuttles as for the Economy/Remote #1 Lot. Three access egress points are provided at the lot. Fairchild Drive approaching the lot is gated. There is a ticketing system, but it is no longer in use. The lot is now served with a mobile collection booth.

Cell Phone Lot

A cell phone lot for waiting customers is located at the southern end of the passenger terminal area. The lot is accessible off Roosevelt Boulevard via Terminal Boulevard and Airport Parkway Drive South. As noted previously, the lot provides 130 spaces for vehicles waiting for passengers to arrive.

Employee Lot

The Employee Lot for the passenger terminal is located between Terminal Boulevard and Airport Parkway Drive South with at-grade walking access to the terminal. Vehicle access to and egress from the lot is provided from Airport Parkway Drive South. There are two card access controlled gated entrance lanes and two card access controlled gated exit lanes. Changes to the Employee Lot as a result of the current improvements and Gateway Project will follow the realignment of Terminal Boulevard. Future vehicle access to and egress from the lot will be from the south via the relocated Airport Parkway Drive South. There is one entry and one exit lane in the future, each of which is assumed to include card access controlled gates.

2.3.4 Rental Car Facilities

Rental car brand families Avis (Avis and Budget), Enterprise (Enterprise, Alamo, and National), and Hertz operate rental car service on airport property. Rental customer service counters are available in the terminal, adjacent to baggage claim. The existing rental car ready and return lot, where customers pick-up and drop-off vehicles, is currently located south of Airport Parkway Drive North (Figure 2.3-7) with at-grade walking access to the passenger terminal. The current landside improvements show that the rental car ready and return lot will be in a similar position (Figure 2.3-4). The existing space layout for each rental car brand family is depicted in Table 2.3-5. Information on the proposed layout for the rental car brand families is not available at this time.

TABLE 2.3-5
RENTAL CAR FACILITIES

Time	Counter Positions	Ready and Return Spaces
Avis (Avis, Budget)	3	31
Enterprise (Enterprise, Alamo, National)	11	120
Hertz	3	15
Total	**17**	**166**

SOURCE: Kimley-Horn and Associates, Inc., 2017.

The rental car service areas are located off-airport property, west of the airport, as shown in **Figure 2.3-8**. The returned vehicles are shuttled to the remote service areas to be refueled, washed, and returned to the rental car ready and return lot as needed.

Figure 2.3-8: Rental Car Facilities

SOURCE: Google Earth; Kimley-Horn and Associates, Inc., 2017.

2.4 Airport Facilities

The airport facilities described in this section include the general aviation, military, and support facilities. While most of these are located on the west side of Runway 18-36 (see **Figure 2.1-1**) there are a few on the east side.

2.4.1 General Aviation Facilities

The various general aviation facilities at the airport support nearly every type of aircraft activity that is conducted at PIE, including the passenger air carrier operations. The primary exception being the USCG Air Station, which as described in the military facility section, is a fairly autonomous installation.

Fixed Base Operators

Fixed base operators (FBOs) provide terminal facilities for general aviation passengers and pilots; aircraft parking, fueling, maintenance, and storage; and other support services such as aircraft ground handling, ground transportation, or catering. In addition, full service FBOs typically support a number of other aeronautical businesses to provide flight training, aircraft charter, aircraft rental, pilot supplies, etc. Nearly all of the general aviation facilities at PIE lie within the leasehold limits of the two full service FBOs: Sheltair Aviation and Signature Flight Support.

Sheltair Aviation

On the north side of the airfield, the Sheltair FBO encompasses a number of general aviation businesses and facilities within their lease area (see **Figure 2.1-1**). Their primary general aviation terminal, hangar, and aircraft parking apron are situated just west of Taxiway A and north of Taxilane P. The aircraft parking apron is approximately 24,000 SY and while it was not included as part of the 2015 FDOT pavement report, is considered to be in fair condition based upon visual inspection. The terminal and hangar are a single building which provides reception and office space for the FBO and other businesses operating out of the facility. Approximately 30,000 SF of space is split almost equally between the terminal/office and hangar portion of the facility. Sheltair also operates a fleet of different trucks to deliver fuel to their customers, tenants, and Allegiant Airlines.

At the west end of Taxilane P there are eight clearspan hangars. Referred to as the Pirates Cove area of the airfield, each hangar provides 9,600 SF of space. To the north of the main FBO facility and just west of Taxiway A are four much larger clearspan hangars centered on an apron area. The two hangars on the north and south side of the small apron provide 19,700 SF each, while the two to the west of the apron provide 19,900 SF each. All of these facilities within the north part of the Sheltair FBO area have landside access via Fairchild Drive and automobile parking adjacent to the buildings.

Sheltair FBO General Aviation Terminal

To the south of Taxilane P is the other half of the Sheltair FBO area which consists of two large clearspan hangar facilities and their associated apron areas. The hangar to the northeast of Taxilane L is approximately 38,000 SF while the one to the southeast of Taxilane L provides approximately 100,000 SF of space. The areas for both hangars include office space for the different businesses that operate out of the facilities. Overall, there were 80 aircraft based at the facilities within the Sheltair FBO area at the end of 2017. Landside access to the facilities on the south half of the is less than ideal as automobiles must utilize Spadco Drive which first crosses Taxiway B and the USCG North Ramp. Then vehicles must cross Taxilane H and Taxilane L to get to the parking areas for the hangars.

Signature Flight Support

On the south side of the airfield, the Signature FBO encompasses a number of general aviation businesses and facilities within their lease area (see **Figure 2.1-1**). Their primary FBO terminal, hangars, and aircraft parking apron are located just west of Taxiway A, south of the passenger terminal facilities, and north of the approach end of Runway 4. Signature's aircraft parking apron is approximately 40,000 SY and considered to be in satisfactory condition. While the apron was evaluated in 2015 FDOT pavement report, it has since had a number of improvements to repair cracks and seal coat the surface. Signature has four main FBO hangars, two of which are attached to either side of their general aviation terminal and office space. The terminal and office building provides approximately 8,750 SF of space on two floors. The matching hangars to the north and south of the terminal (Hangars 1 and 2) each provide approximately 25,000 SF. To the north of these are Hangars 3 and 4 which provide approximately 30,000 SF and 10,000 SF, respectively.

Immediately to the south of Signature's main FBO hangar complex there are two other clearspan hangars and two smaller storage buildings. The clearspan hangar right off the aircraft parking apron is approximately 15,000 SF while the one behind and to the west is approximately 7,000 SF. Both facilities provide office and shop space which support different aviation businesses and services. The two smaller buildings are utilized by Signature to perform maintenance on Allegiant's ground support equipment. Signature also operates a fleet of fuel trucks which in addition to their customers, are used to provide fueling services to both Sun Country and Sunwing Airlines. Overall, there were 60 aircraft and rotorcraft based at the facilities within the Signature FBO area at the end of 2017. All of the facilities within the Signature FBO area have landside access via Airport Parkway Drive South with automobile parking adjacent to each.

Signature FBO General Aviation Terminal

National Aviation Academy

To the west of Signature's FBO there is a 10,000 SF hangar; however, this facility no longer has airside access and is currently being utilized by the National Aviation Academy to train aircraft mechanics. As such, the various aircraft and rotorcraft stored at this site are not considered active aircraft since they are only used in the various curriculums of the academy's programs. Landside access to the National Aviation Academy is via Airport Parkway Drive South with a large parking lot located just east of the hangar.

Pinellas County Sheriff's Office Hangar

The Pinellas County Sheriff's Office (PCSO) Aviation Division operates out of a facility located on the west side of the airport, just west of Taxiway B and the USCG North Ramp. The building provides approximately 6,000 SF of hangar and 1,275 SF of office space. This facility supports the three based Eurocopter AS350 Écureuil rotorcraft that the PCSO uses to support law enforcement activity throughout the county.

Built in 1974, the hangar has large doors on both the east and west ends that open to apron areas. The apron on the west side provides approximately 650 SY of space while the one on the east has approximately 1,100 SY. These two aprons are connected together by a 30 foot wide taxilane on the south side of the hangar, which also connects to Taxiway B. However, the rotorcraft are towed into and out of the hangar on individual dollies. The apron and taxilane pavements were not included as part of the 2015 FDOT pavement report, however, there are considered to be in fair condition based upon visual inspection. Additionally, there are two 10,000 gallon underground fuel tanks for Jet A and 100LL (AvGas) just north of the apron on the east side of the hangar. The PCSO rotorcraft only utilize the Jet A and the 100LL is utilized by the Pinellas County Mosquito Control's Bell 47 rotorcraft. The Mosquito Control rotorcraft are stored at a separate facility due south of PIE, off 118th Avenue N.

The Landings Hangar Area

On the east side of the airfield, there are a number of mostly T-hangar facilities located to the northeast of the approach end of Runway 22, off Taxiway Q. These include three 20-unit T-hangars, one 10-unit T-hangar, eight 6-unit T-hangars, and two small box hangars. The two box hangars measure approximately 3,500 SF and 2,000 SF. Overall, there were 117 aircraft stored within the hangar facilities at the end of 2017. There is also a small restroom building located northwest of the larger box hangar.

At the end of 2017, a new self-serve fuel tank system was installed at the southeast end of the third set of 20-unit T-hangars, just off Taxiway Q. This split tank provides 4,000 gallons of 100LL and 2,000 gallons of MoGas. Access to The Landings Hangar Area is via the eastern portion of the airport's on-airfield secure perimeter road. Tenants are able to access this portion of the secure perimeter road via a controlled gate at the end of Evergreen Avenue, which ties into Ulmerton Road on the south side of the airport.

Self-Serve Fuel at The Landings Hangar Area

2.4.2 Military Facilities

There are two military installations associated with the airfield, the USCG Air Station and U.S. Army Reserve Station. While neither is located on airport-owned property, they both utilize the airport and its facilities to conduct a number of different aviation activities.

United States Coast Guard

The USCG Air Station at PIE includes two parcels owned by the federal government within the overall airport property boundary (reference **Figure 2.1-1**). There are two large clearspan hangars within the USCG property. The one to the north accommodates ten based Sikorsky HH-60 Jayhawk rotorcraft while the one to the south supports four based Lockheed C-130 Hercules aircraft. The various USCG apron areas, including the North Ramp, and two large clearspan hangars, can be accessed by Taxiway B, Taxilane H, or Taxilane L. Landside access to the Air Station is via a security gate just off Fairchild Drive. The USCG operates and maintains all of it aviation related facilities, in addition to the various office, support, storage, recreational, and housing facilities of the station.

United States Army Reserve

The United States Army Reserve operates an air station on a parcel owned by the federal government within the overall airport boundary (reference **Figure 2.1-1**). The U.S. Army Reserve facilities primarily include a large hangar and operations center building and apron area located at the north end of the airfield, off of Taxiway A. This facility, as well as hangar space currently leased from Sheltair, supports the 23 based Sikorsky UH-60 Blackhawk rotorcraft. This includes a large fuel storage tank located off the southwest corner of the apron. Landside access to the U.S. Army Reserve facility is via a secured entrance at the end of Fairchild Drive.

2.4.3 Support and Service Facilities

There are a number of other facilities around the airfield which provide support and/or different services to the airfield and its operation. The key facilities are described in the following sections.

Airfield Electrical Vault

The airfield electrical vault is located to the immediate south of the passenger terminal building. The approximate 800 SF structure houses all of the airfield lighting regulators, meters, main disconnect, breaker panels, airfield lighting control panel, and radio equipment to facilitate pilot control of the airfield lighting. The vault also has a backup generator for the airfield lighting circuits.

Aircraft Rescue and Fire Fighting

Title 14, Code of Federal Regulations (CFR), Part 139 sets forth minimum safety standards for emergency response personnel and equipment needed at commercial service airports. The Aircraft Rescue and Fire Fighting (ARFF) department at PIE provides these services. Minimum personnel, equipment, and aqueous film forming foam (AFFF) agent quantities are based upon the class of airport and the longest commercial passenger aircraft having an average of five or more daily operations.

PIE is rated as a Class I, ARFF Index C airport based upon the current level of scheduled air service. The Class I designation is for scheduled air carrier aircraft with 31 or more passenger seats while

Index C includes aircraft at least 126 feet, but less than 159 feet in length. Index C requires the department to have at minimum two vehicles that carry at least 500 pounds of sodium-based dry chemical and can produce 3,000 gallons of AFFF.

The ARFF station is located on the west side of the airport off Spadco Drive. At approximately 8,800 SF, the station supports 24-hour service with three trucks, each of which meet the requirements of Index C. Two of the trucks remain active while one is kept on reserve at all times, giving backup capability and the ability to respond to numerous situations. Because of the airport's location on Old Tampa Bay, the ARFF station also has a marine rescue boat on a trailer that can be launched from a number of locations along the waterfront portions of the airport property.

Airport Maintenance Equipment Storage

The airport has various pieces of equipment to maintain the numerous facilities on the airport. These vary from simple hand tools to larger mowing and construction equipment. Most of the larger items, including temporary runway closure signage and vehicles are stored at a facility off 46th Street N across from the Overflow Lot. While on airport property, this site is on a parcel of airport property that is not contiguous with the airfield (see **Figure 2.1-1**). Equipment is also stored in the facility that was previously used to house golf carts from the now closed on-airport golf course. Combined, these facilities also provide the space for maintenance supplies, shop, and offices. There are plans to begin construction on a new airport maintenance building in 2019.

Fuel Farm

The airport fuel farm is located between Taxilane P and Fairfield Drive, adjacent to the facilities on the north side of the Sheltair FBO area. There are a number of above ground fuel storage tanks owned and maintained by the two FBOs and USCG, which are summarized in **Figure 2.4-1**.

FIGURE 2.4-1
FUEL FARM TANK SUMMARY

	Tank Type	Capacity (gallons)
Sheltair FBO	Jet A	90,000
	100LL	10,000
Signature FBO	Jet A	80,000
	100LL	12,000
United States Coast Guard	JAA F24	160,000

SOURCE: ESA, 2018.

Sheltair has six fuel tanks in the fuel farm, three of which are 20,000 gallons each for Jet A, two are 15,000 gallon Jet A, and one 10,000 gallon 100LL. Signature has seven tanks which include two 20,000 gallon Jet A, four 10,000 gallon Jet A, and one 12,000 gallon 100LL. The USCG has three 20,000 gallon tanks and two 50,000 gallon tanks, each containing JAA F24 fuel, a military grade jet fuel. In addition to the double wall construction of the tanks, they are also surrounded by a containment area and emergency shut-off valves to avoid and minimize the impact of spills.

Aircraft fueling operations are conducted by the fuel truck fleets owned and operated by the FBOs and USCG.

2.5 Airco Parcel

On the southeast side of the airport is a 131-acre tract of land currently referred to as the Airco Parcel. Previously this portion of the airport's property was developed and operated as a municipal golf course. Since the closure of the golf course in 2011, the land has sat idle. The airport is currently moving forward with plans to redevelop the Airco Parcel for both aviation related and non-aeronautical development. This effort requires certain decisions and approvals by the FAA which are subject to the *National Environmental Policy Act of 1969* (NEPA). At the beginning of 2018, an Environmental Assessment (EA) was underway in accordance with NEPA requirements. The EA is intended to identify and consider potential environmental impacts related to the proposed redevelopment of the Airco Parcel.

2.6 Non-Aeronautical Facilities

There are three other parcels of land owned by the airport which are not contiguous with the primary airport property boundary. The largest and furthest away from the airfield is approximately 140 acres on the west side of 49th Street N (County Road 611). This parcel contains a number of industrial and commercial businesses; however, the most predominant use is by the Pinellas County Justice Center (courthouse) and jail facilities. The second largest parcel is approximately 132 acres, which lies between 49th Street N and Roosevelt Boulevard (SR 686). In addition to the Economy/Remote #1 Lot, Overflow Lot, and airport maintenance facilities, this parcel also contains a number of different industrial, commercial, and other uses. This includes the Airport Business Center. The third and smallest outparcel is located just south of the Airco Parcel, off Ulmerton Road. At just under four acres, this property currently accommodates a hotel, restaurant, and bank.

Within the primary airport boundary, there are two additional parcels suited for non-aeronautical businesses. These include a large parcel of land to the southwest of Runway 4-22 (where Roosevelt Boulevard and Ulmerton Road intersect) and a parcel at the end of Turtle Lane on the northeast side of the airport property. Currently, there is only a restaurant in the parcel on the southwest side and the area on the northeast side is used for the Remote Economy #2 parking lot.

There is also a Green Area Buffer on the east side of the airfield. This area includes 46.5 acres of vegetated land that lies between Evergreen Avenue and the communities just east of the airport (reference **Figure 2.1-1**). In 2010, the FAA agreed to the airport's request to make the Green Area Buffer permanent as part of their ongoing commitment to be compatible with the surrounding community. Development rights were transferred to the Airco parcel as part of this agreement.

CHAPTER 3

Forecast of Aviation Activity

CHAPTER 3
Forecast of Aviation Activity

3.1 Introduction

This chapter presents projections of aviation activity that form the basis of future development needs for the St. Pete-Clearwater International Airport (PIE). Previous activity forecasts, industry trends, socioeconomic conditions, and historic data were analyzed and applied to methodologies accepted by both the Federal Aviation Administration (FAA) and Florida Department of Transportation (FDOT) to develop these forecasts.

The standard planning period for an airport master plan is 20 years and the key planning periods include the five, ten, and 20-year horizons. Since this study was largely conducted in 2018, the forecasts are presented for 2023, 2028, and 2038. The forecasts primarily use data obtained through calendar year 2017, although in a few cases, the most recent 12 months of data were also considered. Even though these forecasts were prepared and approved prior to the COVID-19 pandemic that began in 2020; they are still considered valid for the purposes of this study, especially since they were utilized to develop planning activity levels for key facility requirements.

For a complete picture of operational activities and emerging opportunities at PIE, interviews were also conducted with the passenger airlines, airport tenants, representatives of the military installations, and other significant users of the airfield's facilities, as well as airport and air traffic control management.

3.2 Recent Projections of Aviation Activity

The most recent local, state, and national forecasts for PIE include those prepared during the 2004 Airport Master Plan Update, the FDOT's Florida Aviation System Plan (FASP), and the FAA's 2017 Terminal Area Forecast (TAF). Each forecast projects different levels of passenger enplanements, annual operations, and based aircraft for the airport as summarized below. As required by the FAA, a direct comparison of the recommended forecasts must be made relative to the FAA TAF. This comparison is included at the end of this chapter.

3.2.1 2004 Airport Master Plan Update

The 2004 Airport Master Plan Update included forecasts which were projected over a 20-year planning period using 2001 as the base year. The expected number of passenger enplanements, annual operations, and based aircraft for the key planning horizons of that study are included in **Table 3.2-1** below. These figures have also been extrapolated based on the 2004 study's overall average growth rate over the 20-year period to provide a basis of comparison with the forecasts generated in this study.

TABLE 3.2-1
2004 AIRPORT MASTER PLAN UPDATE

	Passenger Enplanements	Annual Aircraft Operations	Based Aircraft
Base Year			
2001	319,416	222,472	327
Forecast			
2007	418,871	241,634	334
2012	493,860	259,076	347
2017	573,764	284,138	366
2022	665,745	316,963	391
Average Annual Change (2001 – 2022)	3.6%	1.7%	0.9%
Extrapolated			
2038	1,164,980	415,131	448

SOURCE: 2004 Airport Master Plan Update and ESA analysis, 2018.

3.2.2 Florida Aviation System Plan

The Florida Aviation System Plan (FASP) provides a comprehensive planning and development guide for the state's public airports. The FASP ensures that Florida has an effective statewide aviation transportation system that provides a link to the global air transportation network and effectively interfaces with regional surface transportation systems. In support of these goals, FDOT's Aviation Office provides regular updates of the historic aviation data and prepares forecasts of the passenger enplanements (as applicable), annual operations, and based aircraft for each public airport in the state. The FASP information is included as part of the Florida Aviation Database with the most recent update providing historic data through 2015 and projections out to 2035. FASP data for the key forecast horizons of this study, including extrapolation to 2038, are shown in **Table 3.2-2.**

3.2.3 FAA Terminal Area Forecast

The Terminal Area Forecast (TAF) is prepared annually by the FAA to meet the budget and planning needs of the agency, as well as to provide information for use by state agencies, local authorities, the aviation industry, and the public. Projections in the FAA TAF are prepared for each airport in the National Plan of Integrated Airport Systems (NPIAS). In the most recent version of the NPIAS (2019-2023), PIE continues to be designated as small hub primary airport. The TAF projections detailed in **Table 3.2-3** are based on the federal fiscal year, which ends on September 30th. The 2017 TAF, which was issued in January 2018, utilizes a 2016 base year for enplanements and based aircraft, while annual operations have a 2017 base year. For all, the projections go to 2038 and beyond.

TABLE 3.2-2
FLORIDA AVIATION SYSTEM PLAN

	Passenger Enplanements	Annual Aircraft Operations	Based Aircraft
Base Year			
2015	819,974	104,535	261
Forecast			
2017	882,455	108,777	272
2023	1,099,943	122,774	306
2028	1,321,604	136,092	338
Average Annual Change (2015 – 2028)	3.7%	2.1%	2.0%
Extrapolated			
2038	1,907,936	168,297	412

SOURCE: Florida Aviation Database, January 2018 and ESA analysis, 2018.

TABLE 3.2-3
FAA 2017 TERMINAL AREA FORECAST

	Passenger Enplanements	Annual Aircraft Operations	Based Aircraft
Base Year			
2016	895,059	108,555	261
Forecast			
2017	1,000,601	114,871[a]	268
2023	1,344,628	119,187	302
2028	1,577,507	123,400	329
2038	2,147,829	133,357	383
Average Annual Change (2016 – 2038)	4.1%	0.9%	1.8%

[a] Actual base year for annual operations.

SOURCE: 2017 FAA Terminal Area Forecast, issued January 2018.

3.3 Factors Influencing Forecast Approach

To guide the forecasting effort, an understanding of the relationship between industry trends and the airport operating environment is essential. Using historic information and data, it is possible to compare how changes in the commercial airline business and general aviation industry, as well as local area economics may have had on activity at PIE. The analysis of recent trends also allows educated assumptions to be made as to how the airport's service area and activity will be affected in the future.

National, regional, and local trends with the potential to impact existing, expanded, or even new passenger service were identified from several sources. These also help define the conditions which impact the expected level of general aviation activity. In addition to the historic data and recent activity forecasts, information was collected from a number of reports, studies, and industry articles including, but not limited to:

- FAA Aerospace Forecast (2017 – 2037)
- St. Pete-Clearwater International Airport Economic Activity Analysis conducted by Volaire Aviation Consulting (October 2017)
- Reports on the In-Airport and Online Passenger Surveys conducted by BFT International and Trailblazer Market Research (July 2016)
- Florida Statewide Aviation Economic Impact Study Update (August 2014)

The information gathered frames PIE's role in the national air transportation network and provides insight into how activity at the airport may change over time.

3.3.1 Evolution of Passenger Airline Industry

In broad terms, the U.S. passenger airline industry is characterized by mainline and regional carriers that provide scheduled domestic and international service. The FAA defines mainline carriers as those primarily providing service with aircraft of 90 or more seats, while the regionals largely utilize aircraft with 89 or less seats, on routes that feed the mainline carriers. For the purposes of this forecasting effort, the focus will primarily be on the U.S. mainline carriers since those carriers have historically been responsible for the passenger service at PIE; however, trends associated with the regional carriers are also considered. International passenger activity and trends by both U.S. and foreign flag carriers will be addressed specifically in later sections of this chapter.

Since the 2004 Airport Master Plan Update was conducted for PIE, there have been a number of events that have influenced commercial passenger levels at U.S. airports and how the airlines have reacted to serve the market. At the beginning of this period, many airports across the nation experienced decreases in passenger activity due to the effect of the September 11th, 2001 terrorist attacks. Airline activity then generally rebounded through 2007 until the economic downturn from the Great Recession of 2008. This general period was also marked by dramatic increases in fuel prices between 2003 and 2008. Since that time, fuel prices have dropped significantly, the economy has rebounded, and airlines are more profitable than during virtually any period in modern history.

Airline Restructuring and Consolidation

In addition to the economic impacts and higher fuel prices during the late 2000's, increased competition from low-cost carriers resulted in a series of mergers among the mainline carriers. This consolidation drove changes in airline business models as carriers modified their networks and shifted their focus from growth to efficiency and profitability. The result was reduced service at many commercial service airports, with medium, small, and non-hub airports experiencing the majority of the impacts. **Table 3.3-1** highlights the major airline consolidations that have occurred since the 2004 Airport Master Plan Update. The five resulting carriers, Delta Air Lines, United Airlines, Southwest Airlines, American Airlines, and Alaska/Virgin Airlines, along with JetBlue Airways accounted for 85 percent of the U.S. domestic market (as measured by revenue passenger miles) in 2016.

TABLE 3.3-1
MAJOR AIRLINE CONSOLIDATIONS SINCE 2004

Airlines	Integration Period
Delta / Northwest	2008 - 2010
United / Continental	2010 - 2012
Southwest / AirTran	2011 - 2014
American / US Airways	2013 - 2014
Alaska / Virgin America	2016 - 2019

SOURCE: ESA analysis, 2018.

While the economic downturn resulted in consolidation among the major airline ranks, regional carriers were hit hard as the higher fuel costs diminished the viability for the older and smaller regional aircraft to efficiently operate. Since that time, the response by regionals has been to replace their 37 and 50 seat aircraft with newer and larger variants in the 70 to 90 seat range.

Changing Airline Practices

The increases in fuel costs and mergers that began in 2008 also ushered in two major practices that have shaped today's airline industry: a focus on ancillary revenues and capacity discipline. It was at this time that airline executives started to introduce bag fees as a means to offset industry losses. This alternative revenue focus has continued across the board with even the largest major carriers selling an ever evolving list of products and services traditionally included in the ticket price. This unbundling of services, which was traditionally the hallmark of low-cost carriers, now spans the industry as most airlines charge some sort of fee for checked bags, seat assignments, or meals, while also adding fees for other services such as priority boarding, in-flight entertainment, and/or internet access. Airlines continue to use this strategy in combination with capacity discipline to cut loses and maximize profitability. In practice, airline capacity discipline saw many carriers exiting unprofitable routes, reducing frequency on others, and modernizing their fleets with more efficient aircraft. For most carriers this shifted the priority from gaining (or protecting) market share to simply becoming profitable.

It is worth noting that while the ancillary revenues and capacity discipline has enabled the airline industry to consistently make record profits over the past four years (including 2017), this success has not been shared equally among the industry. Specifically, the regional carriers have seen their market share shrink considerably as they compete for fewer contracts made available by the consolidated mainline carriers. In addition to the capital costs associated with improving the size and age of their fleets, they are also facing increases in labor costs. Much of this has stemmed from pilot shortages which have been exacerbated by increases in pilot training requirements.

Low-Cost and Ultra Low-Cost Carriers

Since the last master plan at PIE, there has also been a shift in the impact of low-cost carriers (LCC) on the U.S. domestic passenger market. Originally these carriers differentiated themselves through the unbundling of a few services traditionally included in the ticket price. Many were also able to lower their cost structure by utilizing secondary airports in a popular market as well as limiting the types of equipment in their fleets and preferring aircraft configured with a single passenger class. Currently, the most prominent LCCs serving U.S. domestic routes include Southwest and JetBlue. More recently, the term ultra low-cost carrier (ULCC) has come to represent those carriers that offer even lower costs and less items included in the base fare. Also referred to as "a la carte" carriers, in the U.S. these include Allegiant Air, Spirit Airlines, Frontier Airlines, and Sun Country Airlines.

A key characteristic of both LCC and ULCC carriers is that their route structures are typically based on point to point service; however most offer seamless reservations with flights to connect at certain airports. Most notable in the industry is how Southwest shifted its focus from smaller secondary airports to large-hub airports and with a myriad of connecting flight options. Since this shift has increased their costs, it has also tempered what the industry dubbed as the "Southwest Effect." Southwest Airlines no longer provides the pricing pressure that induces significant growth at smaller commercial airports. This effect has now largely shifted to the ULCC airlines like Allegiant, Spirit, and Frontier.

Airline Industry Outlook

The FAA has an optimistic outlook for the mainline and regional passenger carriers. Every year the FAA prepares an Aerospace Forecast document which utilizes statistical models to document and project how emerging trends effect different segments of the aviation industry. In its 2017 Aerospace Forecast, the agency projected modest increases in their forecasts between 2016 and 2037 for most passenger traffic indicators. The 2017 Aerospace Forecast documents the increase in domestic annual enplanements that has occurred since the Great Recession and predicts that increases will continue into the future at an average annual rate of 1.7 percent. System-wide capacity, also known as available seat miles (ASMs), is also projected by the FAA to increase over time. For the domestic market, U.S. commercial air carriers (mainline and regional combined), are projected to increase ASMs an average of 1.9 percent each year through 2037. Similarly, the FAA projects that revenue passenger miles (RPMs) will also continue to expand, based on a growing U.S. economy. RPMs are the basic measure of the airline passenger traffic produced and the FAA expects them to increase at an annual rate of 2.0 percent for the domestic market of all U.S. commercial air carriers.

Commercial airlines are also projected to continue to maximize the utilization of their aircraft. Over the past decade, both mainline and regional carriers have consistently increased their average load factor, indicating how efficiently seats are being filled, primarily due to the practice of capacity discipline. System-wide, domestic load factors are projected by the FAA to grow from the 2016 average of 84.7 percent to 86.4 percent by 2037. These figures are slightly higher for the mainline carriers at 85.3 percent in 2016, increasing to 86.9 percent by 2037. Finally, as the single largest cost for airlines, the industry has enjoyed lower fuel costs since 2012. However, IHS Global Insight believes oil prices are at the bottom of their latest cycle and projects prices to increase as a result of growing demand and the higher costs of extraction. Using data from IHS Global Insight, the FAA projects jet fuel prices to go up at an average annual increase of 5.9 percent through 2037.

3.3.2 Current Passenger Airline Service

In January 2004, the current Airport Master Plan Update for PIE was completed. By the end of that same year, the airport recorded its highest passenger levels since being converted from a military airfield in the 1940s. Unfortunately, Southeast Airlines ceased operations in 2004, ATA Airlines was acquired by Southwest Airlines and moved to TPA in 2005, and Jetsgo ceased operations in 2005. As a result, between 2004 and 2006, the airport lost over 70 percent of its passengers. Passenger levels did not begin their recovery until the end of 2006 when Allegiant Air inaugurated service with 12 non-stop destinations and Sunwing Airlines initiated non-stop international service. While Allegiant experienced rapid growth through the Great Recession, nearly doubling their non-stop destinations by 2011, and Sun Country Airlines took over the Beau Rivage Resort and Casino charters from Vision Airlines in 2014; it was not until 2015 that the airport was able to surpass the 2004 record for total passengers.

Passenger levels have experienced double digit growth each year since 2012. This despite the loss of two Canadian carriers (Air Transat and CanJet) in 2013. At the beginning of 2018, passenger airline service at PIE included 57 non-stop destinations provided by three airlines. Allegiant Air provides most with service to 54 domestic cities, while Sun Country Airlines serves one domestic route and Sunwing Airlines two seasonal Canadian destinations. All of the passenger air service offered at PIE is characterized in the industry as origin and destination (O&D) flights given there are no connecting flights or regional carriers feeding passengers into or out of the airport. The current service is also categorized as a predominately a leisure market. The passenger surveys conducted by BFT International and Trailblazer Market Research in 2016 documented that PIE was only used for business 9.7 percent of the time by local residents and 7.5 percent by those visiting the area.

3.3.3 Competing Commercial Service Airports

PIE is affected by the proximity of two other commercial service airports in the immediate region. Each of these competing facilities draw passengers from the PIE catchment area, which has historically been defined by a 90-minute drive time. These include the Tampa International (TPA) and Sarasota Bradenton International (SRQ) Airports. Each of these airports capture different passengers based on their proximity to the PIE market area, the choice of airlines, and/or the types of destinations offered.

The main passenger service airport in the area is TPA. One of the nation's 30 large hub primary airports, TPA accounted for 1.1 percent of the total enplanements conducted in the U.S. for 2016. As shown in **Table 3.3-2**, while TPA may not have a significantly higher number of non-stop destinations, it does have a number of different airline choices and more daily flight options.

TABLE 3.3-2
COMPETING COMMERCIAL SERVICE AIRPORTS

	Number of Non-Stop Destinations[a]	Number of Airlines[a]	2016 Annual Enplanements	Distance from PIE	Drive Time from PIE (no traffic)
Tampa International (TPA)	76	20	9,194,994	14 miles	16m
St. Pete-Clearwater International (PIE)	**57**	**3**	**915,117**	**-**	**-**
Sarasota Bradenton International (SRQ)	17	7	589,860	45 miles[b]	55m

[a] Based on schedules published January 2018.
[b] Fastest route with tolls.

SOURCE: Airport websites, FAA Air Carrier Activity Information System (ACAIS), and Google Maps.

SRQ primarily competes with TPA for passengers from the Tampa Bay area via flights offered by American, Delta, JetBlue, and United. Direct competition with PIE was limited to the seasonal service to Toronto Pearson International Airport (YYZ) by Air Canada and the seasonal charter service to Gulfport-Biloxi Airport (GPT) by Sun Country Airlines. However, in 2018 Allegiant will initiate service from SRQ to three city pairs: Cincinnati Northern Kentucky International (CVG), Indianapolis International (IND), and Pittsburgh International (PIT) Airports.

3.3.4 Characteristics of Passenger Catchment Area

A number of different elements define the region or catchment area of an airport's users. Geographical features, surface access, services offered, and competing facilities are primary factors in determining the true market area for an airport. The service area described in this section focuses on the commercial passenger market. While it also defines some characteristics of the general aviation users, they typically depend on more specific features of the airport and immediate surrounding area. This is especially true in Florida where there are a numerous airports capable of supporting significant general aviation operations.

As noted above, based on information provided by airport management, PIE's general passenger catchment area has been defined by a 90-minute drive time to the airport. This area incorporates all of the Tampa-St. Petersburg-Clearwater Metropolitan Statistical Area (MSA) which includes the counties of Hernando, Hillsborough, Pasco, and Pinellas. It also includes portions of Polk and Osceola Counties along the I-4 corridor, as well as much of Manatee and Sarasota Counties. It even includes parts of Citrus County to the north and parts of Charlotte County to the south. Passengers from the areas outside of Pinellas County typically access PIE from Interstate 275 (I-275) which is fed by Interstate 75 (I-75) from the north and south of the Tampa Bay area, and from the northeast via I-4.

While the areas described above define a general boundary of the passenger catchment area for PIE, the predominant passenger base resides or is traveling to/from the greater Tampa Bay area. A number of entities including the Tampa Bay Regional Planning Council, Tampa Bay Area Regional Transportation Authority, Tampa Bay Partnership, and even the Tampa Bay media have slightly different descriptions on what the greater Tampa Bay Area encompasses. For the purposes of evaluating PIE's passenger enplanements, the Tampa-St. Petersburg-Clearwater MSA (Bay Area MSA) incorporates the most essential areas when it comes to those factors that significantly influence passenger trends for PIE.

MSAs are defined by the U.S. government's Office of Management and Budget and used by federal agencies since they represent core statistical areas delineated on the basis of a central urban area population. For the Bay Area MSA, this includes population centers in excess of 100,000 inhabitants such as the cities of Clearwater, St. Petersburg, and Tampa, as well as the unincorporated communities of Brandon and Spring Hill. There are also 45 other cities and unincorporated communities within the Bay Area MSA with more than 10,000 inhabitants. While passengers also come from other portions of the counties surrounding the Bay Area MSA, the local socioeconomic conditions of these outlying areas does not have a direct impact on the core passenger base served by PIE.

3.3.5 Local Socioeconomic Factors

A number of socioeconomic indicators were evaluated that typically have a direct relationship to air travel and airport activity. Overall growth rates and average annual growth rates for Pinellas County, the Bay Area MSA, Florida, and the U.S. are presented based on data obtained from Woods & Poole Economics, Inc. The following sections identify a few of the most prominent characteristics of the local area, state, and nation that were considered for these aviation activity forecasts.

The Woods & Poole projections are updated annually, utilizing models which take into account specific local conditions based on historic data back to 1969. While the current historic data sets from Woods & Poole cover the period from 1969 to 2015, only data back to 2006 are shown in the tables that follow to show the general trends over the past 10 years. Historic socioeconomic data prior to 2006 was utilized in the various analyses of aviation activity, especially as part of the regression models evaluated.

Population

Both Pinellas County and the Bay Area MSA have had overall and annual population growth rates less than Florida's or the nation's (**Table 3.3-3**). For Pinellas County, this slower growth highlights the fact that it is already the most densely populated county in Florida. According to Pinellas County's website in 2018, there are 3,347 people per square mile, with the next most densely populated county being Broward which has 1,445 people per square mile. Nonetheless, the population in Pinellas County and certainly the Bay Area MSA have experienced growth since 2006 and are expected to continue to grow through 2038.

TABLE 3.3-3
TOTAL POPULATION

	Pinellas County	Bay Area MSA	State of Florida	United States
Historic Data				
2006	924,182	2,699,935	18,166,990	298,379,873
2007	918,624	2,726,780	18,367,842	301,231,161
2008	916,458	2,746,981	18,527,305	304,093,924
2009	915,330	2,763,937	18,652,644	306,771,487
2010	916,440	2,788,715	18,849,890	309,346,806
2011	917,730	2,828,490	19,105,533	311,718,780
2012	921,999	2,847,270	19,352,021	314,102,549
2013	929,683	2,873,489	19,594,467	316,427,327
2014	938,144	2,917,813	19,905,569	318,906,933
2015	949,827	2,975,225	20,271,272	321,420,589
Overall Growth (2006 – 2015)	2.8%	10.2%	11.6%	7.7%
Average Annual Change (2006 – 2015)	0.3%	1.1%	1.2%	0.8%
Forecast				
2023	991,841	3,311,652	22,756,779	345,864,633
2028	1,017,361	3,538,392	24,446,562	362,086,877
2038	1,057,359	3,998,503	27,929,895	393,507,447
Average Annual Change (2015 – 2038)	0.5%	1.3%	1.4%	0.9%

SOURCE: Woods & Poole Economics, Inc., 2017.

Employment

Employment data can provide one indication of the economic stability of a geographic area. As shown in **Table 3.3-4**, Pinellas County employment has had a slight decline since 2006 and the Bay Area MSA has had slower growth relative to the state and nation. It is assumed that these low rates might be attributed to the fact that the Bay Area, especially Pinellas County, continue to be a popular destination for retirement. Nonetheless, future projections show employment levels for the area increasing over the course of the planning period.

TABLE 3.3-4
TOTAL EMPLOYMENT (NUMBER OF JOBS)

	Pinellas County	Bay Area MSA	State of Florida	United States
Historic Data				
2006	576,608	1,593,720	10,400,600	176,123,566
2007	576,871	1,612,951	10,557,493	179,885,663
2008	552,197	1,558,277	10,296,804	179,639,868
2009	529,173	1,490,452	9,879,404	174,233,663
2010	516,322	1,465,819	9,813,714	173,034,686
2011	515,202	1,486,964	10,048,434	176,278,692
2012	523,407	1,517,838	10,255,578	179,081,672
2013	534,019	1,559,528	10,544,028	182,408,047
2014	545,634	1,604,547	10,930,490	186,168,101
2015	561,546	1,659,175	11,287,609	190,195,370
Overall Growth (2006 – 2015)	-2.6%	4.1%	8.5%	8.0%
Average Annual Change (2006 – 2015)	-0.3%	0.4%	0.9%	0.9%
Forecast				
2023	618,266	1,897,015	12,997,884	212,627,009
2028	651,789	2,043,452	14,091,999	226,668,566
2038	713,195	2,316,861	16,269,775	253,386,160
Average Annual Change (2015 – 2038)	1.0%	1.5%	1.6%	1.3%

SOURCE: Woods & Poole Economics, Inc., 2017.

Income

Personal income per capita represents the ratio of total personal income, before income taxes, to the total resident population. Adjustments are also made if the income was earned in a different area than where the person resides. While Pinellas County and the Bay Area MSA have outpaced the state, both are behind the historic growth for the nation (**Table 3.3-5**). What is interesting to note, is that the level of per capita income for Pinellas County has generally been higher than the Bay Area MSA and state. Pinellas County is also expected to outpace the Bay Area MSA, state, and nation (as well as its own historic growth) over the course of the planning period.

TABLE 3.3-5
TOTAL PERSONAL INCOME PER CAPITA (IN 2017 DOLLARS)

	Pinellas County	Bay Area MSA	State of Florida	United States
Historic Data				
2006	$40,614	$36,603	$38,738	$38,144
2007	$41,741	$37,696	$39,788	$39,821
2008	$41,388	$37,882	$39,655	$41,082
2009	$39,893	$36,719	$37,065	$39,376
2010	$42,136	$38,597	$38,624	$40,277
2011	$44,078	$40,939	$40,476	$42,453
2012	$43,336	$40,008	$40,983	$44,267
2013	$43,486	$39,687	$40,771	$44,462
2014	$45,941	$41,338	$42,868	$46,414
2015	$47,731	$43,008	$44,429	$48,111
Overall Growth (2006 – 2015)	17.5%	17.5%	14.7%	26.1%
Average Annual Change (2006 – 2015)	1.8%	1.8%	1.5%	2.6%
Forecast				
2023	$63,602	$56,116	$58,537	$62,813
2028	$80,358	$70,064	$73,729	$78,738
2038	$131,553	$111,500	$119,968	$127,307
Average Annual Change (2015 – 2038)	4.5%	4.2%	4.4%	4.3%

SOURCE: Woods & Poole Economics, Inc., 2017.

Households

Households represent the number of occupied housing units, which include homes, apartments, a group of rooms, or single rooms occupied as separate living quarters. The number of households does not include facilities such as retirement homes, college dormitories, military barracks, or prisons. The overall growth in the number of households for Pinellas County has been much less than that for the Bay Area MSA, state, or nation (**Table 3.3-6**). Similarly, the projection over the next 20 years is that Pinellas County will continue to have limited growth in the number of households. This is not surprising given the level of buildout throughout Pinellas County.

TABLE 3.3-6
TOTAL NUMBER OF HOUSEHOLDS

	Pinellas County	Bay Area MSA	State of Florida	United States
Historic Data				
2006	425,449	1,141,371	7,300,146	114,486,122
2007	424,172	1,153,424	7,389,493	115,939,528
2008	421,309	1,154,317	7,408,025	116,538,673
2009	417,946	1,150,974	7,393,209	116,761,870
2010	415,761	1,153,245	7,435,801	116,938,345
2011	421,888	1,182,961	7,617,373	119,315,163
2012	424,777	1,199,847	7,724,395	120,466,242
2013	428,251	1,218,795	7,845,644	121,834,231
2014	429,634	1,230,241	7,926,134	122,600,297
2015	433,004	1,247,325	8,047,925	123,951,413
Overall Growth (2006 – 2015)	1.8%	9.3%	10.2%	8.3%
Average Annual Change (2006 – 2015)	0.2%	1.0%	1.1%	0.9%
Forecast				
2023	465,456	1,416,581	9,183,357	135,939,466
2028	475,531	1,498,913	9,745,715	140,818,385
2038	486,041	1,646,170	10,768,076	148,472,937
Average Annual Change (2015 – 2038)	0.5%	1.2%	1.3%	0.8%

SOURCE: Woods & Poole Economics, Inc., 2017.

Gross Regional Product

Gross Regional Product (GRP) is based on the U.S. Bureau of Economic Analysis gross domestic product data for each state. The nation's figures represent a total for all states while the individual county data has been estimated by Woods & Poole. For the county data, this is done by allocating the state GRP to the counties based on the proportion of total state earnings by employees originating from a particular county. Much like employment, the GRP for Pinellas County has not performed well historically (**Table 3.3-7**). However, over the course of the planning period, GRP for the county is expected to grow at a positive rate.

TABLE 3.3-7
GROSS REGIONAL PRODUCT (IN MILLIONS OF 2009 DOLLARS)

	Pinellas County	Bay Area MSA	State of Florida	United States
Historic Data				
2006	$42,876	$121,198	$787,689	$14,539,610
2007	$43,282	$122,879	$792,792	$14,820,650
2008	$40,698	$117,393	$747,834	$14,617,095
2009	$40,245	$115,932	$721,755	$14,320,115
2010	$39,373	$114,993	$723,144	$14,618,132
2011	$37,393	$113,496	$711,918	$14,792,272
2012	$37,834	$115,408	$720,061	$15,115,991
2013	$38,202	$117,208	$737,538	$15,415,698
2014	$39,105	$119,753	$763,508	$15,829,180
2015	$40,391	$126,905	$809,155	$16,501,908
Overall Growth (2006 – 2015)	-5.8%	4.7%	2.7%	13.5%
Average Annual Change (2006 – 2015)	-0.7%	0.5%	0.3%	1.4%
Forecast				
2023	$45,122	$153,608	$985,688	$19,622,540
2028	$47,937	$171,416	$1,103,966	$21,688,340
2038	$53,108	$209,060	$1,358,881	$26,096,053
Average Annual Change (2015 – 2038)	1.2%	2.2%	2.3%	2.0%

SOURCE: Woods & Poole Economics, Inc., 2017.

Woods & Poole Wealth Index

Woods & Poole calculates a wealth index which provides a measure of relative total personal income per capita weighted by the source of income. In calculating the index, relative income per capita is weighted positively for income with a higher proportion from dividends, interest, and rent and negatively for income with a higher proportion from transfer payments (income where no goods or services are provided). The index is also based on weighted averages of the regional income per capita; regional income from dividends, interest, and rent; and regional income from transfer payments. Since Woods & Poole consider dividends, interest, and rent income good indicator of assets, their resulting index provides a measure of relative wealth to that of the nation as a whole (**Table 3.3-8**).

TABLE 3.3-8
WOODS & POOLE WEALTH INDEX (COMPARED TO UNITED STATES)

	Pinellas County	Bay Area MSA	State of Florida	United States
Historic Data				
2006	107	97	105	100
2007	105	95	104	100
2008	102	93	101	100
2009	102	94	98	100
2010	107	98	101	100
2011	106	99	100	100
2012	99	91	97	100
2013	99	90	96	100
2014	100	90	97	100
2015	100	90	96	100
Overall Growth (2006 – 2015)	-6.7%	-7.1%	-8.4%	n/a
Average Annual Change (2006 – 2015)	-0.8%	-0.8%	-1.0%	n/a
Forecast				
2023	102	90	97	100
2028	102	89	98	100
2038	103	88	98	100
Average Annual Change (2015 – 2038)	0.1%	-0.1%	0.1%	n/a

SOURCE: Woods & Poole Economics, Inc., 2017.

3.4 Projections of Passenger Enplanements

Enplanements, or the number of passengers departing the airport, are the most common measure used by the FAA to gauge passenger activity. They also drive many key elements of an airport's operations such as the aircraft used by airlines, the airfield elements to support those aircraft, various terminal building components, and even landside facilities. Over the past 20 years, a majority of the passenger activity at PIE has been domestic. International enplanements predominantly include seasonal flights to Canadian destinations. The total passenger enplanements recorded since 1998 are included in **Table 3.4-1**.

TABLE 3.4-1
PAST 20 YEARS OF PASSENGER ENPLANEMENTS

	Annual Enplanements	Change over Prior Year
1998	456,852	3.1%
1999	399,070	-12.6%
2000	368,709	-7.6%
2001	319,416	-13.4%
2002	311,980	-2.3%
2003	498,881	59.9%
2004	666,535	33.6%
2005	298,255	-55.3%
2006	194,999	-34.6%
2007	373,091	91.3%
2008	370,372	-0.7%
2009	386,711	4.4%
2010	385,253	-0.4%
2011	415,597	7.9%
2012	431,135	3.7%
2013	505,495	17.2%
2014	619,791	22.6%
2015	818,598	32.1%
2016	915,117	11.8%
2017	1,021,361	11.6%
Average Annual Change (1998 – 2017)	4.3%	n/a

SOURCE: PIE records and ESA analysis, 2018.

Between 1998 and 2000, the international enplanements represented nearly a third of the total passenger activity at PIE. However, since a high of 31.2 percent in 2000, that international share dropped to 8.1 percent by 2004 as a result of the bankruptcy of Canada 3000 and reduction in service by Air Transat. In 2005 and 2006 there was a slight increase in international passengers, but by 2013 that share had steadily dropped to 2.0 percent with Sunwing remaining the only carrier to serve any international markets. Since 2013, the number of seasonal passengers carried by Sunwing to and from Canada have fluctuated, but the overall share of these international passengers has continued to decline to the point where in both 2016 and 2017 they represented less than one percent of the overall passenger enplanements.

3.4.1 General Assumptions

A number of general assumptions have been made in the development and selection of the 20-year projections of passenger enplanements. The following outlines some of the local circumstances that impacted how the enplanement forecasts were analyzed and evaluated.

Domestic versus International Service

As noted, nearly all of the international passenger service at PIE over the past 20 years have been to/from Canadian markets. They have also been conducted between Canadian airports that have Preclearance capability with the U.S. Customs and Border Protection (CBP). The CBP Preclearance program includes stations at the Calgary, Edmonton, Halifax, Montreal, Ottawa, Toronto, Vancouver, and Winnipeg airports in Canada. This enables CBP officers to conduct the same immigration, customs, and agriculture inspections of those passenger boarding flights to the U.S., allowing them to arrive at PIE like a domestic traveler.

Given this and the fact that the share of the Canadian passengers has declined significantly, these passengers will be included as part of the projections for domestic enplanements. A separate section will address the potential for other international service. The combination of the domestic and international passenger projections will represent the overall baseline passenger demand. Additionally, high- and low-growth scenarios incorporating both domestic and international passengers were developed to evaluate the range of demand that could be placed on PIE’s facilities over the 20-year planning period. These alternative scenarios are presented at the end of the enplanement forecast section.

Predominantly Leisure versus Business Market

Information obtained from the passenger surveys conducted in 2016 by BFT International and Trailblazer Market Research documented that less than ten percent of the activity at PIE is related to business travel. From the survey data and market research, one of the final strategic recommendations was to not underestimate the business passenger demand. While this was based on the premise that certain routes could be viable, it needs to be taken in light of the differences between leisure and business travelers.

The leisure passenger market is price sensitive, especially if there are multiple travelers where the cost differential for a family quickly becomes two, three, four or more times higher. For this reason alone, leisure travelers are more prone to drive to an alternate airport if a substantial cost savings or other advantage can be realized. The leisure market also includes individuals that may not use air travel frequently, and therefore, have less brand loyalty and/or concern for the frequency of flights. These traits highlight why many travelers use PIE.

For business travelers, a differential in airfare is not as critical as it is for leisure passengers. Business travelers are more sensitive to the times and availability of flights than they are fares. Many are also very loyal to their frequent flyer programs and see the cost differential offset by the associated benefits of the program perks. The challenge of expanding the business traveler use at PIE is providing as much frequency as possible to the markets served. Schedule convenience and flexibility are critical to support the more dynamic business traveler demands; especially with respect to the ability to accommodate changing, missed, or cancelled flights in the same day. In short, as more frequency is added to individual routes, the airport will become more attractive to business travelers, thus increasing the overall passenger demand.

Potential Impacts to Passenger Retention

Although most passengers served by PIE travel to/from the greater Tampa Bay area, there are four other commercial service airports within or near the general passenger catchment area. While most competition clearly comes from TPA; the airlines and flights offered at SRQ also provides options for passengers in the PIE catchment area.

Currently there is direct competition with the seasonal Canadian flights offered by Sunwing from PIE to the Halifax Stanfield International (YHZ) and Toronto Pearson International (YYZ) Airports. Air Canada Rouge (a low-cost subsidiary of Air Canada) provides non-stop flights to YYZ out of SRQ. At TPA, Air Canada flies non-stop to YHZ and YYZ (by Rouge), as well as other Canadian cities. There are also non-stop flights from TPA to YYZ and other Canadian cities by Air Transat and WestJet Airlines. This low-cost competition is the primary reason Sunwing (and other carriers at PIE in the past) have slowly lost market share to Canadian destinations. This competition will continue to influence the future market share PIE captures from Canadian markets. In addition, there are three new Canadian ULCC airlines (Flair, Jetlines, and Swoop) poised to begin service in 2018; with some hinting to eventually include markets in Florida. It is not yet clear what airports in and around the Bay Area these carriers might serve; the success they may have; or how long they can compete (such as previous low-cost Canadian airlines such as CanJet, Jetsgo, and Zoom).

For Bay Area passengers, Allegiant competes both directly on the same routes and also by providing service to secondary airports in the market cities served from TPA and SRQ. However, this competition has historically only been from PIE, which is one of the largest operational bases in Allegiant’s system. For this reason, the announcement at the beginning of 2018 that Allegiant will begin service out of SRQ will be important to watch. While it appears to be a strategic move to protect Bay Area market share from other ULCCs such as Frontier or Spirit, it does have the limited potential to impact Allegiant’s current passenger levels at PIE, as well as for PGD.

The inaugural service from SRQ announced by Allegiant will begin in May 2018 to CVG, IND, and PIT. These three cities have been among the top performing markets for Allegiant at both PIE and PGD. According to the Bureau of Transportation Statistics (BTS) T-100 Domestic Market data, the CVG, IND, and PIT markets in 2016 accounted for 105,404 enplanements which represented 11.7 percent of the total enplanements carried by Allegiant out of PIE that year, a portion of which may have come from the SRQ catchment area. As a potential point of reference, a January 9, 2018 Tampa Bay Business Journal article entitled *Allegiant starting flights from Sarasota-Bradenton to three US cities* stated, “Nearly 52,000 new visitors are expected to be brought into the Sarasota region through the new service from Las Vegas-based Allegiant.” It is not yet clear where the Allegiant SRQ passengers are coming from, flying to, and/or how they may impact future enplanements levels at PIE. Nonetheless, it must be weighed into the equation when considering different future scenarios for PIE's passenger enplanement growth.

Development of Domestic Passenger Airline Service

For any current or future airline to expand service at PIE in a sustainable manner will require the right combination of non-stop destinations as well as frequency to markets served. The ability to provide additional flights to both existing and new destinations is a strategic business decision of the airlines operating at PIE. However, even though Allegiant, Sun Country, and Sunwing each serve a different market niche, the most promising growth opportunities will exist where the air carriers do not erode market share from one another. Likewise, any new air carriers would have to serve different markets and not compete head to head with the established networks of the three airlines. A recent example of this occurred at SRQ in January 2018. Just a few days after Allegiant announced their initiation of service out of SRQ, Elite Airways cancelled its planned route to PIT from SRQ, stating they could not compete with Allegiant's ultra low-cost fares on the same route.

Other Assumptions

Other general assumptions include that competition from other modes or forms of passenger transportation during the course of the planning horizon will not be significant enough to change the baseline demand for air travel. The other forms consist of alternates such as light, regional, and high-speed rail; more sophisticated rideshare or autonomous vehicles; or long-distance bus service. The use of technology such as virtual meetings, web conferencing, and other forms of business communication, as well as general aviation for corporate travel are also not considered a threat to the passenger demand at PIE. The foundation of these assumptions lies in the fact that the airport predominately serves the leisure O&D market, with passengers travelling distances best served by aviation. Finally, with the exception of the low-growth scenario, the various projections are made under the general assumption that the airport operating environment is unconstrained.

3.4.2 Domestic Passenger Enplanement Projections

Different methodologies were employed to forecast domestic passenger enplanements. Each are described in the following sections.

Historic Trend Analysis

A common projection method is to simply apply the historic growth rate to the base year figure. As illustrated in **Table 3.4-1**, PIE has experienced periods of both increases and decreases in the number of enplaned passengers over the past 20 years. The period of decline between 1998 and 2002 was marked by a number of different carriers vying to provide various levels of passenger service. During this period, Royal Airlines was acquired by Canada 3000, which in turn went bankrupt as a result of the terrorist attacks of September 11th.

The void in available passenger seats was quickly filled in 2003 and 2004 as both Southeast and ATA Airlines significantly increased their market shares at PIE. Additionally, USA 3000 Airlines inaugurated their service in 2003. This was short lived since Southeast Airlines folded in late 2004 and ATA Airlines finalized their move to TPA in 2005 as part of their partnership with Southwest Airlines. As noted in a previous section, this resulted in the airport losing over 70 percent of its passengers between 2004 and 2006.

At the end of 2006, passenger levels began their recovery when Allegiant inaugurated service with 12 non-stop destinations and Sunwing initiated seasonal non-stop international service. While Allegiant experienced rapid growth, it was not until 2011 when they doubled their non-stop destinations that PIE began the current period of consistent passenger growth. This modern era for PIE was also marked by the entrance and exit of Frontier (2010 – 2011); the exit of USA 3000 (2010); and the replacement of Vision Airlines by Sun County in 2014 to provide non-stop charter service to GPT for the Beau Rivage Resort and Casino.

As illustrated, the airline industry is very cyclical and PIE will likely experience other fluctuations in passenger levels in the future. However, given the current market dynamics and projected socioeconomic factors it is believed that the overall trend will be positive. Applying the historic average annual growth rate of 4.3 percent to the 2017 activity levels results in a projection of 2.5 million domestic passenger enplanements by 2038.

National Growth Trend Analysis

A forecast was generated based on the growth rate expected by the FAA for all domestic enplanements in the U.S. The FAA's 2017 Aerospace Forecast documents the increase in domestic enplanements which has occurred since the end of the Great Recession. It was noted previously that the FAA predicts domestic enplanements for mainline and regional carriers combined to increase at an average annual rate of 1.7 percent. When this growth rate is applied to the base year enplanements for PIE, the result is a projection of 1.5 million domestic enplanements by 2038.

Market Share Trend Analysis

Another projection based on the FAA's domestic enplanement forecast for the nation was created using market share analysis. This forecast methodology compares historic enplanement data for PIE to corresponding data for the nation's passengers. The analysis showed that while PIE's historic share of the nation's domestic passenger enplanements somewhat fluctuated in the first half of the historic 20-year period, overall it has increased. In fact, PIE's share has consistently grown over the last 11 years to nearly double what it was in 1998. Assuming PIE will continue to have a similar increase, the average annual growth in market share over the past 20 years was applied to estimate future potential. This resulted in an overall market share in 2038 that is nearly twice as high as it was in 2017 and just over three times the share back in 1998. When this increase in market share is applied to the national forecasts, the result is a projection of 2.7 million domestic enplanements at PIE by 2038; reflecting an average annual growth rate of 4.8 percent.

Regression Analyses

Regression forecasting methodologies were also employed to estimate the domestic enplanements for the planning period. The regression models developed and tested incorporated three types of independent variables to identify correlations with historic passenger activity. The first included a number of the socioeconomic datasets summarized previously. These were applied based on initial assumptions made for each as to their potential correlation to passenger activity. For example, it was assumed that the tendency for people to travel by air is related to their personal income. The second group of independent variables was comprised of industry indexes such as domestic passenger yield and jet fuel prices. Indicator variables were also introduced to take into consideration events that cannot be quantified. The two that were applied in developing the regression models facilitated accounting for the periods of passenger activity before and after September 11th as well as the activity before and after Allegiant operated at PIE.

For any model with multiple independent variables, an adjusted R^2 is used as the coefficient of determination. An adjusted R^2 value of zero shows no relationship while values approaching one show a strong relationship and overall fit between the estimated regression equation and the sample data. Typically, values of 0.95 or higher indicate a significant relationship.

Development of Initial Regression Models

A variety of models were evaluated using the different independent variables against the historic passenger enplanement data for PIE. Initially, simple regression analyses were conducted using the regional socioeconomic and industry datasets. This identified the general relationship between key socioeconomic variables for Pinellas County, the Bay Area MSA, and each of the counties adjacent to the MSA, as well as the industry factors with historic PIE enplanements. While none of the individual variables had a significant correlation, most did demonstrate the expected relationship with historic enplanement data. The highest correlations varied between the Pinellas County and Bay Area MSA datasets, with the outlying counties having the lowest. Multiple regression models where then evaluated using different combinations of the independent variables, but using either socioeconomic data from Pinellas County or the Bay Area MSA. Of these, the multiple regression models that showed the most significant correlation were those developed using Pinellas County data. It was at this point that multiple regression models were also developed utilizing the historic enplanements from TPA along with the PIE data in order to evaluate the Bay Area domestic passenger market as a whole.

Final Selected Regression Model

The final regression model selected had an adjusted R^2 of 0.94 using the independent variables of Bay Area MSA employment, Bay Area MSA income, U.S. mainline domestic passenger yields, and an indicator variable to indicate periods with or without Allegiant serving the area. It is worth noting that while the FAA passenger yield data utilized was for the nation, it is believed to have correlated well since it represents an overall indicator of the price for air travel. This more generalized industry data fits well given the mix of major, LCC, ULCC, and regional airlines in the Tampa Bay area. It is also interesting to note that no significant correlation could be found with the FAA’s historic data on jet fuel prices.

Using the final regression model, the passenger enplanements for the Bay Area were forecasted to increase from 10.7 million enplanements in 2017 to 16.6 million by 2038. A comparison of the historic shares of passenger enplanements between PIE and TPA was then utilized to estimate the future splits that could be reasonably expected. The historic domestic enplanements for TPA and

PIE (**Table 3.4-2**) shows that similar to PIE's share of the nation's domestic enplanements, the airport has also consistently accommodated more of the Bay Area passengers over the last 11 years. It has been assumed that PIE will continue to increase its share of the overall Bay Area enplanements, going from the 9.5 percent documented in 2017 to nearly 15 percent by 2038. The resulting projection from the final regression model forecasts 2.4 million annual domestic enplanements at PIE by the end of the 20-year planning period.

TABLE 3.4-2
HISTORIC BAY AREA DOMESTIC ANNUAL PASSENGER ENPLANEMENTS

	Tampa International	TPA Share	St. Pete-Clearwater International	PIE Share	Bay Area Total
1992	4,467,064	95.7%	199,523	4.3%	4,666,587
1993	4,702,907	94.3%	282,054	5.7%	4,984,961
1994	5,719,777	94.1%	361,334	5.9%	6,081,111
1995	5,386,196	90.8%	548,475	9.2%	5,934,671
1996	6,193,958	92.2%	524,314	7.8%	6,718,272
1997	6,392,146	93.5%	443,300	6.5%	6,835,446
1998	6,652,951	93.6%	456,852	6.4%	7,109,803
1999	7,297,315	94.8%	399,070	5.2%	7,696,385
2000	7,783,422	95.5%	368,709	4.5%	8,152,131
2001	7,713,232	96.0%	319,416	4.0%	8,032,648
2002	7,531,172	96.0%	311,980	4.0%	7,843,151
2003	7,547,241	93.8%	498,881	6.2%	8,046,121
2004	8,463,909	92.7%	666,535	7.3%	9,130,443
2005	9,275,669	96.9%	298,255	3.1%	9,573,924
2006	9,179,398	97.9%	194,999	2.1%	9,374,397
2007	9,391,089	96.2%	373,091	3.8%	9,764,180
2008	8,942,053	96.0%	370,372	4.0%	9,312,425
2009	8,282,902	95.5%	386,711	4.5%	8,669,613
2010	8,127,426	95.5%	385,253	4.5%	8,512,679
2011	8,121,912	95.1%	415,597	4.9%	8,537,509
2012	8,158,035	95.0%	431,135	5.0%	8,589,170
2013	8,194,962	94.2%	505,495	5.8%	8,700,457
2014	8,466,093	93.2%	619,791	6.8%	9,085,884
2015	9,048,082	91.7%	818,598	8.3%	9,866,680
2016	9,040,216	90.8%	915,117	9.2%	9,955,333
2017	9,689,000	90.5%	1,021,361	9.5%	10,710,361
Average Annual Change (1992 – 2017)	3.1%	-0.2%	6.7%	3.3%	3.4%

SOURCE: 2016 Tampa International Airport Master Plan Addendum, PIE records, and ESA analysis, 2018.

Selection of Domestic Enplanement Forecast

The forecasts of domestic enplanements generated using each of the methodologies described previously are summarized in **Table 3.4-3**. They are also presented graphically in **Figure 3.4-1** along with the other recent aviation activity forecasts for comparison. Of the new forecasts, all but the regression model was eliminated from further consideration. While each utilized accepted FAA and FDOT methods, they do not have the ability to reliably incorporate local and/or current industry conditions. Since it is anticipated that domestic passenger activity in Florida will continue to exceed the national average, the national growth projection, the most conservative forecast, does not reflect the future potential for PIE. The market share, historic trend, and regression model methodologies reflect more robust growth and are generally consistent with each other relative to the order of magnitude of that growth. While the market share approach captures Allegiant's dynamic growth over past decade and results in the highest projection of future passenger activity, it does so only using an overall general trend that does not have a direct relationship to anticipated changes in the local market drivers. Similarly, the historic trend projection, while somewhat less aggressive than the market share forecast, is not based on any of the future economic or industry conditions affecting passenger activity.

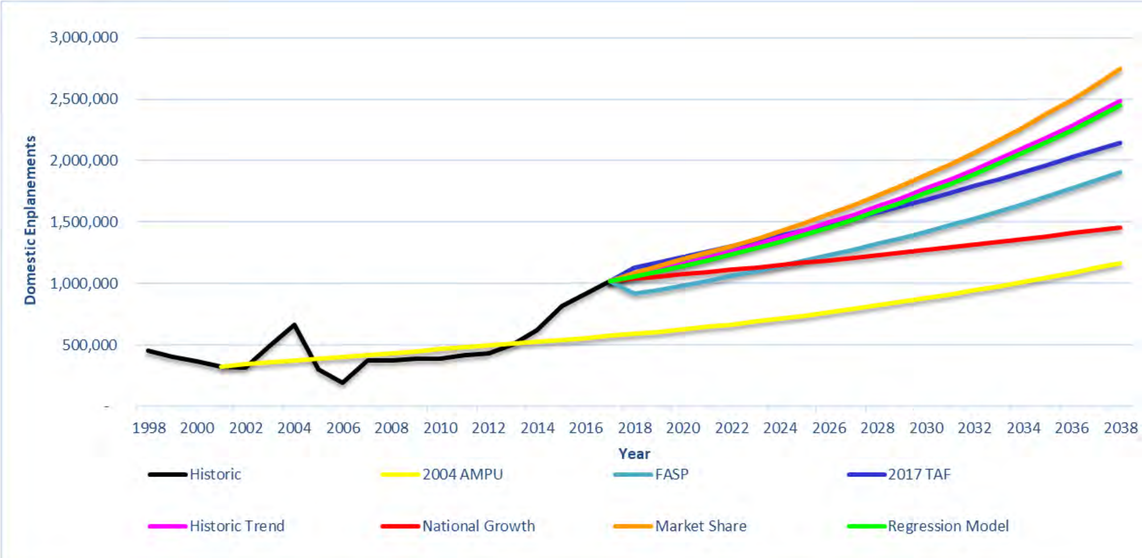
TABLE 3.4-3
PROJECTIONS OF DOMESTIC PASSENGER ENPLANEMENTS

	Historic Trend	National Growth	Market Share	Regression Model (recommended)
Base Year				
2017	1,021,361	1,021,361	1,021,361	1,021,361
Forecast				
2023	1,316,792	1,130,806	1,364,427	1,286,096
2028	1,627,293	1,230,916	1,714,562	1,589,779
2038	2,485,206	1,458,511	2,744,926	2,446,634
Average Annual Change (2017 – 2038)	4.3%	1.7%	4.8%	4.2%

SOURCE: ESA, 2018.

The regression model methodology was selected as the preferred domestic passenger forecast since it is the only forecast approach based on estimating future domestic enplanements using local and industry variables with a demonstrated correlation to historic enplanements. As such, the regression model forecast is considered the most realistic of the methodologies considered. In addition to the statistical correlations, the regression model projection reflects growth that is aligned with all of the information and assumptions made that the airport's domestic passenger levels will continue to expand.

Figure 3.4-1: Projections of Domestic Passenger Enplanements



To quantify this, the *St. Pete-Clearwater International Airport Economic Activity Analysis* completed by Volaire Aviation Consulting in 2017 was referenced. Part of this study evaluated the potential economic impacts of both new domestic and international passenger service scenarios. New domestic service impacts were based on an Allegiant A320-200 with 177 seats flying a new route, twice a week, with an 84.7 percent average load factor. This scenario, which could also represent expanding service in an existing market, was based on data through July 2017. At that time Allegiant only utilized their 177 seat Airbus A320-200s and some 156 seat Airbus A319-100s at PIE. However, in August of 2017, Allegiant started to assign their newest A320-200 aircraft with 186 seats on PIE routes. At the beginning of 2018, the A320-200s with 186 seats have come to represent approximately one-third of the overall Allegiant A320-200 fleet. Current orders will ultimately balance their A320-200 fleet between the two different seating configurations.

Given this newer information, the same general methodology utilized by Volaire was applied to each of the aircraft currently operated by Allegiant at PIE, using their updated average load factor for calendar year 2017. The figures shown in **Table 3.4-4** represent the potential enplanements that could be generated by just one weekly flight being added to either a new or existing market.

TABLE 3.4-4
POTENTIAL IMPACT OF NEW OR EXPANDED DOMESTIC SERVICE

Aircraft	Weekly Departures	Annual Departures	Number of Seats	Average Load Factor	Annual Enplanements
Allegiant Airbus A319-100	1	52	156	83.1%	6,741
Allegiant Airbus A320-200	1	52	177	83.1%	7,649
Allegiant Airbus A320-200	1	52	186	83.1%	8,037
				Average	7,476

SOURCE: Volaire Aviation Consulting 2017 Economic Activity Analysis, airline data, and ESA analysis, 2018.

Using 7,500 enplanements as the rounded average number of enplanements generated by each additional weekly flight (from **Table 3.4-4**), the selected domestic forecasts show that at least 35 new weekly flights could be added by 2023. This increases to another 40 added by 2028 and another 114 by 2038. Overall, the recommended domestic enplanement forecast represents nearly 200 new weekly flights in addition to the approximately 140 weekly flights flown in 2017. Because this estimate is based on the larger narrow-body aircraft currently utilized at PIE, it also could represent even more potential weekly flights by a new air carrier operating smaller regional type aircraft on short-haul or even intrastate routes.

It should be noted that the selected domestic enplanement forecast is not as high as the historic growth recorded over the past five years (shown in **Table 3.4-1)**. Much of the historic double digit growth was the result of Allegiant increasing the 24 non-stop destinations offered in 2012 to 47 in 2015. Since that time the airline has continued to explore different markets and adjust their non-stop offerings, which reached a high of 59 in 2017, but was then reduced to 54 at the beginning of 2018. While the airline is expected to offer additional new non-stops destinations in the future and terminate service in any underperforming markets; continuation of the past double digit growth is not considered sustainable. To some extent the domestic network that Allegiant can serve from PIE is beginning to mature given their operating model. This is reflected in the tempered growth projections in the regression model. For Allegiant, future growth is expected to primarily include expanding service in the highest performing markets and entering into international service, which is addressed in a later section.

3.4.3 International Passenger Enplanement Potential

Carriers providing service to/from Canadian destinations with CBP services make up most of the international service at PIE over the past 20 years. Since these passengers are already precleared prior to reaching PIE, they are included in the domestic activity forecast. For the purposes of this master plan, the international passenger forecast will focus on enplanements to/from other international markets. To date, this service has historically consisted of very limited charter service.

Ability to Process International Passengers

Over the course of the 20-year planning horizon, there is the potential to initiate both regularly scheduled and charter international passenger service out of PIE. Airport management is actively working to explore new opportunities for this service. As noted by Volaire Aviation Consulting in the recent *St. Pete-Clearwater International Airport Economic Activity Analysis*, there are approximately 34 potential international routes with 13 different air carriers being pursued. However, ongoing improvements to the Federal Inspection Services (FIS) and U.S. Customs facilities at PIE temporarily restrict the ability to accommodate international flights that have not been precleared. Essentially, the airport cannot clear any international passengers until the current project to bring the immigration and passport control facilities up to the latest CBP standards is complete. These improvements are scheduled for completion in 2019. Until that time, only those international flights to/from airports with CBP Preclearance capability can occur.

Growth in International Market Regions

Looking ahead, the FAA's Aerospace Forecast documents that international flights have been the primary growth market for U.S. air carriers over the last decade. While a small period after 2015 did reflect faster domestic growth, the FAA projects that in 2018 international markets will again outpace domestic. Previously, it was noted that the FAA projects domestic passenger enplanements (by U.S. air carriers) to increase 1.7 percent annually between 2016 and 2037. For the same period, international enplanements by U.S. carriers are expected to increase at an average annual rate of 3.4 percent. This average annual growth increases to 3.7 percent when U.S. and foreign flag carriers are considered together. The FAA further subdivides their international enplanement growth into three regions: Atlantic, Latin America, and Pacific. The Atlantic, which includes Europe, Africa, and the Middle East, is considered the most mature market; Latin America is the largest destination for U.S. air carriers; and the Pacific, which includes China and India, with the most people. Of these, the highest growth projected is in the Latin American region where enplanements are expected to increase 4.0 percent each year by U.S. carriers.

Short- versus Long-haul International Markets

For a number of years, Allegiant has indicated their interest in adding international service to Latin American markets. Discussions with the airline have revealed their focus would be on small to mid-sized markets in both Mexico and the Caribbean that they believe are currently under served. As such, there exists the potential that Allegiant will ultimately establish a number of new non-stop destinations to this area of the Latin American market from their larger operating bases in Florida, including PIE. The short-haul routes being considered are consistent with the operating model of the airline. To date, Allegiant's establishment of such routes has been hampered by the need to update their computer systems to handle foreign currency sales and reservations. Regardless, it is considered highly likely they will begin to offer flights from PIE within the short-term planning horizon.

In their economic activity study for PIE, Volaire Aviation Consulting developed two international scenarios in order to estimate the potential economic impacts that would result. These included twice weekly service to Mexico using an Airbus A320-200 aircraft and to Iceland with a larger Airbus A321-200. As a basis for forecasting potential enplanements associated with short- and long-haul international markets, a similar approach was used. Enplanements resulting from a single weekly frequency were estimated based on the different aircraft types that would likely serve each market. These enplanement levels can then be applied to different levels of frequency to determine a reasonable estimate of future activity. For the Mexico and Caribbean (shorter haul) markets, assumptions were updated to include all of the aircraft Allegiant currently operates. Longer haul routes to the Atlantic (including Iceland) and Latin American (primarily South America) regions were modified to reflect a range of potential aircraft types that would likely be operated by other airlines. Load factors projected by the FAA in the 2017 Aerospace Forecast for different international regions were also used to revise the two scenarios. The anticipated load factors for 2020 were applied since that is when the updated FIS facilities at PIE will be fully available to accommodate international flights. **Table 3.4-5** shows the anticipated international passenger enplanement levels that would be generated by a single weekly departure for aircraft likely to be used in both short- and long-haul markets.

TABLE 3.4-5
POTENTIAL IMPACT OF NEW INTERNATIONAL SERVICE

Market Region and Representative Aircraft	Weekly Departures	Annual Departures	Number of Seats	Anticipated Load Factor	Annual Enplanements
Mexico and Caribbean (short-haul)					
Allegiant Airbus A319-100	1	52	156	81.6%	6,619
Allegiant Airbus A320-200	1	52	177	81.6%	7,510
Allegiant Airbus A320-200	1	52	186	81.6%	7,892
				Average	7,341
Atlantic and Latin America (long-haul)					
Airbus A321-200	1	52	220	80.4%	9,198
Boeing 757-300	1	52	243	80.4%	10,159
Boeing 767-300ER	1	52	261	80.4%	10,912
Boeing 787-800	1	52	291	80.4%	12,166
Airbus A330-300	1	52	300	80.4%	12,542
				Average	10,996

SOURCE: Volaire Aviation Consulting 2017, airline data, FAA 2017 Aerospace Forecast, and ESA analysis, 2018.

International Passenger Enplanement Projections

It is difficult to project what type and when PIE might obtain new international service, given there has been none for the past ten years with the exception of the Canadian flights. However, it is assumed that international service will initiate in or around 2020 upon completion of the FIS facility updates. Similar to their initiation of service at a new airport; the inauguration of international service by Allegiant could easily see six weekly flights serving either two or three non-stop markets in Mexico and/or the Caribbean. Given their aggressive approach to expanding service, it has been projected that they could add as many as two new non-stop markets from PIE each year within the first five years. Beyond that, their international enplanement growth was projected to increase 4.0 percent annually, based on the 2017 Aerospace Forecast projection for annual enplanements into Latin American markets by U.S. air carriers. Assuming an average of at least two weekly flights to each destination, by 2038 this growth (32 weekly departures) would be just below the lower end (40 weekly departures) of what Allegiant believes their international market could be out of PIE. The resulting international enplanements from this projection are included in **Table 3.4-6**.

TABLE 3.4-6
PROJECTIONS OF INTERNATIONAL PASSENGER ENPLANEMENTS

	Mexico / Caribbean (short-haul)		Atlantic / Latin America (long-haul)		
	Weekly Departures	Annual Enplanements	Weekly Departures	Annual Enplanements	Total International Enplanements
Forecast					
2023	18	131,400	3	33,000	164,400
2028	22	159,868	6	61,334	221,202
2038	32	236,644	8	88,204	324,848

SOURCE: Airport data, airline interviews, FAA 2017 Aerospace Forecast, and ESA analysis, 2018.

For longer haul international service, the potential exists for both regularly scheduled as well as charter airline service. These offerings would be to markets in the Atlantic and/or Latin American regions and airport management is pursuing a range of opportunities to secure this type of activity at PIE. These efforts, along with the updated FIS facilities, are expected to create an opportunity in the short-term planning horizon for at least one carrier to offer new long-haul international service out of PIE. This service will come from either a traditional international charter airline or perhaps one of the newer low-cost international carriers such as Eurowings, Level, or Wow Air; to name a few. In either case, the expectation of such long-haul service is based on the ability for PIE to offer these air carriers a cost effective airport option for their international operations into the Tampa Bay area. As such, it has been estimated that the first long-haul international carrier could begin operating two weekly flights out of PIE by 2022. It is then expected that an additional weekly departure would be added each year until long-haul international flights are offered five days per week to one or more destinations (may or may not be non-stop). Afterwards, the growth in long-haul international passenger enplanements (shown in **Table 3.4-6**) was based on the 2017 Aerospace Forecast average of 3.7 percent annual growth for both U.S. and foreign flag air carrier enplanements (all international regions).

3.4.4 Recommended Baseline Enplanement Forecast

The recommended baseline enplanement forecast combining the preferred domestic and international activity forecasts is shown in **Table 3.4-7** (with the final values rounded to the nearest hundred).

TABLE 3.4-7
RECOMMENDED BASELINE ENPLANEMENT FORECAST

	Domestic	International	Combined Total	Recommended Baseline
Base Year				
2017	1,021,361	-	1,021,361	1,021,361
Forecast				
2023	1,286,096	164,400	1,450,496	1,450,500
2028	1,589,779	221,202	1,810,981	1,811,000
2038	2,446,634	324,848	2,771,481	2,771,500
Average Annual Change (2017 – 2038)	4.2%	n/a	4.9%	4.9%

SOURCE: ESA Analysis, 2018.

3.4.5 Alternate Passenger Enplanement Growth Scenarios

The following sections outline two potential scenarios that have been developed to define the alternate annual enplanement conditions if passenger demand should exceed or fall short of the recommended baseline forecast. Both scenarios will be utilized to delineate additional planning activity levels and the related facility requirements in subsequent chapters of this study.

High-Growth Scenario

The domestic enplanement portion of the high-growth scenario was developed based on information provided during interviews with the different airlines. Specifically, Allegiant anticipates continued growth at PIE as one of their primary operations bases albeit at slower rates than recent history. Allegiant indicates that it is reasonable to assume ten percent growth in 2018, nine percent in 2019, and then five to seven percent from 2020 to 2022. This relatively long range outlook for an airline was also prefaced by the fact that Allegiant does not believe their service at SRQ will cannibalize any of the current PIE market share. It was also noted that Allegiant's future growth would in large part come from adding flights to the shoulders of the current peaks, since they feel there is not enough passenger terminal capacity to accommodate more peak hour demand.

Given that the high-growth scenario is considered an unconstrained projection, Allegiant's estimates of growth were applied using the higher seven percent for 2020 to 2022 and then the average of their out year projection (six percent) for the remainder of the planning horizon. The resulting growth (**Table 3.4-8**) is well above the expected domestic passenger growth rate for the nation and any previous forecasts prepared for PIE. For planning purposes, this high growth scenario is considered reasonable as it also accounts for even more potential enplanements from a new air carrier serving different markets than those by the current airlines at PIE.

For the international enplanements, the shorter haul flights expected by Allegiant to markets in Mexico and the Caribbean were increased to four new non-stop destinations for the 2020 inaugural year of service. Two new non-stop destinations were then added each year through 2028 bringing the total non-stop destinations to 20. This higher growth was based on Allegiant's belief that there are 20 to 30 non-stop destinations that are under served in this market region. Beyond 2028, an additional destination is then added each year through the long-term planning period, bringing the total offered by 2038 to 30. As with the previous projection, each non-stop destination was assumed to be served an average of twice weekly. However, the number of enplanements generated by each weekly departure was increased from the initial average of 7,300 in 2020 to 7,900 by 2038 to account for a gradual upgauging from the average aircraft size to the larger capacity Airbus A320-200s, as the market matures towards the end of the planning period.

On the longer haul international flights, it is still expected that the most likely markets exist within the Atlantic and Latin American regions. The difference under the high-growth scenario is that while the traditional international charter airline activity is expected, an increase in the number and/or substantial increase in the frequency of low-cost international carriers' flights would occur. It is also assumed that this activity would begin earlier with an initial projection of two weekly flights in 2020. These would then increase by two additional weekly departures each year until there are 14 long-haul international flights offered each week. At that point, the average annual growth is based on the 3.7 percent projected in the 2017 Aerospace Forecast for U.S. and foreign flag air carrier enplanements combined. Assuming the long-haul international markets will mature over the planning period, the average enplanements generated by each weekly departure under this scenario (11,000 in 2020) would increase to 12,600 by 2038. As before, this accounts for the gradual aircraft upgauging that is expected to occur in such rapidly developing markets. These and the overall high-growth scenario projections are included in **Table 3.4-8** (with the final values rounded to the nearest hundred).

TABLE 3.4-8
HIGH-GROWTH ENPLANEMENT FORECAST

	High-Growth Domestic	High-Growth International	Combined Total	High-Growth Scenario Total
Base Year				
2017	1,021,361	-	1,021,361	1,021,361
Forecast				
2023	1,590,214	237,949	1,828,164	1,828,200
2028	2,128,065	478,343	2,606,408	2,606,400
2038	3,811,041	746,800	4,557,841	4,557,800
Average Annual Change (2017 – 2038)	6.5%	n/a	7.4%	7.4%

SOURCE: ESA Analysis, 2018.

Low-Growth Scenario

A low-growth scenario was developed in order to estimate the lower level of passenger enplanements that might occur over the 20-year planning period. Unlike previous projections, this effort assumes there are factors beyond the airport's control which have the potential to constrain or impact the passenger activity at PIE. This exercise did not attempt to project events (such as September 11th or the Great Recession), rather plausible local and industry threats to the activity at PIE:

- Domestic enplanements include those passengers currently taking seasonal flights with Sunwing from Canadian destinations. Enplanements from the Canadian markets has steadily declined from 2.2 percent of the overall passenger activity at PIE in 2012, to 0.8 percent in 2017. This represents a 62.3 percent decline over the past five years. Under the low-growth scenario, it is assumed that the Canadian passenger base for PIE disappears or shifts its use to another Bay Area airport.

- Industry Risk Factors - Various industry and economic factors could also contribute to a much lower growth in domestic enplanements than projected. Key examples include unforeseen increases in jet fuel prices, another recession, or changes in passenger yields.

- Regional Competition - There is the potential that Allegiant's new service out of SRQ will erode some of the passenger base currently served from PIE and there is always the threat that other ULCCs, such as Frontier, Spirit, or Sun Country will create more head to head competition on the markets Allegiant serves.

The domestic enplanement forecasts based on the FAA's average annual growth rate (1.7 percent) for both mainline and regional carriers was rejected for the baseline projection since it was considered constrained with respect to the potential at PIE. This 1.7 percent was averaged with the 4.2 percent average annual growth of the selected baseline domestic enplanements, resulting in a 3.0 percent growth rate to apply to the low-growth scenario.

Based on the interviews with airport and airline management, it is highly likely that new international passenger service will occur in the short-term planning period, even under a constrained scenario. However, for the low-growth scenario, it is assumed that Allegiant would be delayed until 2023 in establishing service to the Mexican and Caribbean markets. This would also include scaling back service to no more than two markets with two weekly departures. Then, the overall growth would be limited to the 4.0 percent average annual rate projected by the FAA for annual enplanements into Latin American markets by U.S. air carriers. A mix of the current aircraft fleet would be utilized generating an average of 7,300 enplanements for each weekly departure projected. Similarly, establishment of weekly departures to new long-haul markets in the Atlantic and Latin American regions would be delayed. Commencing in 2023 with two weekly departures, these would then only increase at the average annual rate (3.7 percent) projected by the FAA for U.S. and foreign flag air carrier enplanements. The average enplanements generated by each weekly departure would remain at 11,000 based on the typical aircraft operated by charters and the low-cost international carriers. The domestic, international, and overall enplanements expected under the low-growth scenario are included in **Table 3.4-9** (with the final values rounded to the nearest hundred).

TABLE 3.4-9
LOW-GROWTH ENPLANEMENT FORECAST

	Low-Growth Domestic	Low-Growth International	Combined Total	Low-Growth Scenario Total
Base Year				
2017	1,021,361	-	1,021,361	1,021,361
Forecast				
2023	1,219,558	53,583	1,273,141	1,273,100
2028	1,413,802	64,808	1,478,610	1,478,600
2038	1,900,032	94,819	1,994,852	1,994,900
Average Annual Change (2017 – 2038)	3.0%	n/a	3.2%	3.2%

SOURCE: ESA Analysis, 2018.

3.5 Passenger Service Activity Forecasts

Passenger service activity consists of the aircraft operations conducted by both regularly scheduled and non-scheduled air carriers. The following sections define the type and level of passenger service operations that are expected to support the recommended baseline enplanement forecast, as well as the high- and low-growth scenarios. The FAA defines an aircraft operation as either a single aircraft landing or a single aircraft takeoff.

The FAA categorizes commercial passenger operations as either air carrier or air taxi/commuter in their various datasets, airport traffic control tower logs, and Aerospace Forecast. Traditionally, the FAA has defined air carrier operations as those conducted by scheduled and non-scheduled passenger carriers operating aircraft with more than 60 seats. Following this definition, the air taxi/commuter operations have included those carriers operating aircraft having 60 seats or less. However, these definitions now overlap somewhat as the industry has evolved to include larger regional aircraft with capacities in the 60 to 90 seat and higher range.

At PIE, the commercial passenger operations by Allegiant, Sun Country, and Sunwing are all included in the air carrier category, as are those by any regularly scheduled air cargo carrier. By FAA definition, air taxi operations are commercial operations since they are "for hire" and can include non-scheduled general aviation flights, as well as scheduled airline service. ATCT management at PIE noted that since there have only been a limited number of smaller regional aircraft that have historically operated at the airport; the air taxi/commuter category is predominantly used to record fractional jet or life flight type operations. As a result, the air taxi category of operations will be included as part of the overall general aviation activity forecasts.

The different projections of domestic and international passenger enplanements made in the previous section will be used to calculate the future annual operations conducted by the regularly scheduled and non-scheduled (charter) passenger carriers. The methodology utilized to estimate this activity is based on the operational characteristics of the 2017 passenger airline data. Because of the differences in operational characteristics, domestic and international air carrier operations are evaluated individually.

3.5.1 Domestic Airline Fleet Mix and Load Factors

It is anticipated that a similar mix of narrow-body aircraft will serve the domestic routes throughout the planning period. Even as daily domestic flights are added, new routes announced, or different carriers established; the majority of the aircraft serving these routes are expected to remain relatively the same. This future mix of aircraft is based on discussions with the current air carriers serving PIE and specific information about their future fleet orders.

The three different Airbus narrow-body aircraft utilized by Allegiant at the end of 2017 were described in the previous section which evaluated the potential for new or expanded domestic service. When a pro-rated average is calculated PIE's airline records, Allegiant's fleet had an average of 173 seats per departure in 2017. Also as noted previously, Allegiant's overall average load factor for 2017 was 83.1 percent. For future domestic flights, it is assumed Allegiant will continue to use a mix of their different Airbus A319-100 and A320-200 models. Over the course of the planning period, Allegiant's average seats per departure is expected to increase as they continue to obtain more of the 186 seat derivatives of the A320-200. Likewise, their average annual load factor is expected to increase. System-wide the FAA indicates that the average domestic mainline air carrier load factor was 85.3 percent in 2016. In the 2017 Aerospace Forecast, the FAA projects this will increase to 86.9 percent by 2037. Similar growth for Allegiant is likely given the airline has already recorded annual average load factors at PIE in the 90 percent range.

Sun Country's service between PIE and GPT is provided by either Boeing 737-700 (126 seats) or Boeing 737-800 (162 seats) aircraft. In 2017, the pro-rated average seats per departure for Sun Country's flights was 138. Based on information provided by the airline's management, they expect to phase out their Boeing 737-700 aircraft over the next five years. Ultimately, Sun Country will only operate the larger seating capacity Boeing 737-800s for flights out of PIE. Because of the nature of their operation, Sun Country has traditionally operated with load factors below the industry average. In 2017, their average load factor was 69.7 percent. It is assumed that they will continue to operate with an average load factor in the 70 percent range throughout the planning period.

Sunwing currently only operates 189 seat Boeing 737-800 aircraft. Based on airport records, the airline had an average annual load factor of 60.7 percent in 2017. For 2016 the average load factor was similar, while the year prior it was closer to 70 percent. For the purposes of this study it is assumed that Sunwing will gradually increase their load factor over the course of the 20-year planning period, back up to the 70 percent range.

There is also the potential for the future domestic air carrier fleet mix to include some smaller regional aircraft models within the next five years. As noted in the enplanement section, these would likely be operated on new short-haul or even intrastate flights. Common turboprops on these types of domestic routes include aircraft such as the Saab 340B (34 seats) and ATR 72-600 (70 seats). There are also a variety of regional jet aircraft such as the Bombardier CRJ-200 (50 seats), CRJ-700 (67 seats), or CRJ-900 (80 seat) models used on shorter routes. A small share of these types of aircraft have been included in the future domestic air carrier fleet mix. In the 2017 Aerospace Forecast, the FAA documents the system-wide average load factors for regional carriers at 80.1 percent. The FAA projects this to increase to an average of 82.4 percent by 2037.

Table 3.5-1 presents the projection of passenger service operations for the recommended, high-growth, and low-growth domestic enplanement forecasts. The average seats per departure and load factor percentages were calculated using the various fleet assumptions described previously and an extrapolation of future market share by the different mainline and future regional carriers.

TABLE 3.5-1
EXPECTED DOMESTIC PASSENGER SERVICE OPERATIONS

	Base Year	Forecast		
	2017	**2023**	**2028**	**2038**
Domestic (Recommended)				
Average Seats per Departure	173	174	175	183
Average Load Factor	82.7%	85.3%	85.9%	86.4%
Enplanements per Departure	143	148	150	158
Enplanements	1,021,361	1,286,096	1,589,779	2,446,634
Annual Departures	7,142	8,690	10,599	15,485
Annual Operations	14,284[a]	17,380	21,198	30,970
Average Daily Departures	20	24	29	42
High-Growth Domestic				
Average Seats per Departure	173	174	175	183
Average Load Factor	82.7%	85.3%	85.9%	86.4%
Enplanements per Departure	143	148	150	158
Enplanements	1,021,361	1,590,214	2,128,065	3,811,041
Annual Departures	7,142	10,745	14,187	24,121
Annual Operations	14,284[a]	21,490	28,374	48,242
Average Daily Departures	20	29	39	66
Low-Growth Domestic				
Average Seats per Departure	173	174	175	183
Average Load Factor	82.7%	85.3%	85.9%	86.4%
Enplanements per Departure	143	148	150	158
Enplanements	1,021,361	1,219,558	1,413,802	1,900,032
Annual Departures	7,142	8,240	9,425	12,026
Annual Operations	14,284[a]	16,480	18,850	24,052
Average Daily Departures	20	23	26	33

[a] Estimate derived from methodology. Actually 14,317 passenger service operations in 2017.

SOURCE: ESA Analysis, 2018.

3.5.2 International Airline Fleet Mix and Load Factors

Projections of the expected international departures over the course of the planning period were outlined in the previous section describing the international airline market potential. The recommended international enplanement forecast was based on the weekly departures to both the Mexico/Caribbean (short-haul) and Atlantic/Latin American (long-haul) markets summarized in **Table 3.4-6**.

For the short-haul flights to Mexico and/or Caribbean destinations, it was assumed Allegiant will use a mix of Airbus A319-100 and A320-200 models. As with the enplanement projections, the FAA's 81.6 percent average load factor for Latin American markets was applied. This average load factor holds constant between 2017 and 2037 in the 2017 Aerospace Forecast.

Long-haul flights to international destinations in the Atlantic and Latin American regions are expected to be served by a mix of both narrow-body and wide-body passenger aircraft, as shown in **Table 3.4-5**. It is assumed that the long-haul international routes would initially be served by more narrow-body aircraft. As the long-haul markets grow and/or new routes are established, the average aircraft size will increase, to include a greater percentage of wide-body aircraft. The average load factor during the short-term planning period is projected by the FAA to be 80.4 percent for the Atlantic and Latin American markets. The Aerospace Forecast indicates a slight increase to 80.9 percent in the average load factor for these international markets by 2037.

Using a similar methodology as applied to the domestic activity, the fleet mix and load factor assumptions for both short- and long-haul international flights were utilized with the projected enplanements. This included pro-rating the different number and types (size) of aircraft that would serve the different short- and long-haul international routes. The resulting projections of passenger service operations for the recommended, high-growth, and low-growth international enplanement forecasts are included in **Table 3.5-2**.

TABLE 3.5-2
EXPECTED INTERNATIONAL PASSENGER SERVICE OPERATIONS

	Forecast		
	2023	**2028**	**2038**
International (Recommended)			
Average Seats per Departure	181	192	195
Average Load Factor	81.4%	81.4%	81.4%
Enplanements per Departure	147	156	159
Enplanements	164,400	221,202	324,848
Annual Departures	1,118	1,418	2,043
Annual Operations	2,236	2,836	4,086
Average Daily Departures	3	4	6
High-Growth International			
Average Seats per Departure	191	197	203
Average Load Factor	81.4%	81.4%	81.4%
Enplanements per Departure	155	160	165
Enplanements	237,949	478,343	746,800
Annual Departures	1,535	2,990	4,526
Annual Operations	3,070	5,980	9,052
Average Daily Departures	4	8	12
Low-Growth International			
Average Seats per Departure	171	190	192
Average Load Factor	81.4%	81.4%	81.4%
Enplanements per Departure	139	155	156
Enplanements	53,583	64,808	94,819
Annual Departures	385	418	608
Annual Operations	770	836	1,216
Average Daily Departures	1	1	2

SOURCE: ESA Analysis, 2018.

3.5.3 Passenger Service Operations

Tables 3.5-3 through **3.5-5** reflect the total annual passenger service operations expected (with the final values rounded to the nearest hundred) for the recommended baseline forecast, the high-growth scenario, and the low-growth scenario.

TABLE 3.5-3
RECOMMENDED BASELINE PASSENGER SERVICE OPERATIONS

	Domestic	International	Combined Total	Recommended Baseline
Base Year				
2017	14,317	-	14,317	14,317
Forecast				
2023	17,380	2,236	19,616	19,600
2028	21,198	2,836	24,034	24,000
2038	30,970	4,086	35,056	35,100
Average Annual Change (2017 – 2038)	3.7%	n/a	4.4%	4.4%

SOURCE: ESA Analysis, 2018.

TABLE 3.5-4
HIGH-GROWTH PASSENGER SERVICE OPERATIONS

	High-Growth Domestic	High-Growth International	Combined Total	High-Growth Scenario Total
Base Year				
2017	14,317	-	14,317	14,317
Forecast				
2023	21,490	3,070	24,560	24,600
2028	28,374	5,980	34,354	34,400
2038	48,242	9,052	57,294	57,300
Average Annual Change (2017 – 2038)	6.0%	n/a	6.8%	6.8%

SOURCE: ESA Analysis, 2018.

TABLE 3.5-5
LOW-GROWTH PASSENGER SERVICE OPERATIONS

	Low-Growth Domestic	Low-Growth International	Combined Total	Low-Growth Scenario Total
Base Year				
2017	14,317	-	14,317	14,317
Forecast				
2023	16,480	770	17,250	17,300
2028	18,850	836	19,686	19,700
2038	24,052	1,216	25,268	25,300
Average Annual Change (2017 – 2038)	2.5%	n/a	2.7%	2.7%

SOURCE: ESA Analysis, 2018.

3.6 Air Cargo Projections

Commercial air cargo is generally split into the activity conducted by dedicated all-cargo carriers and the freight handled by passenger airlines. For a number of years, PIE was United Parcel Service's (UPS) base of operation for their Bay Area air cargo activity. However, in October 2017, UPS moved to TPA. At the beginning of 2018, there were no regularly scheduled air cargo flights at PIE and very little freight moved through the airport. The little that does is typically in the form of small packages carried in the bellies of the commercial passenger aircraft.

Although PIE does not currently have regularly scheduled air cargo operations, there are some factors that could generate such activity in the future. Current plans for the redevelopment of the Airco Parcel could easily accommodate a dedicated air cargo facility. The expanding operations by Amazon's Prime Air is one factor that could also change the dynamics of the national and Bay Area air cargo market. Similarly, the potential to also develop a maintenance, repair, and overhaul (MRO) facility on the Airco Parcel could very quickly generate demand for regular all-cargo carrier services.

While it is uncertain what the level of a future dedicated all-cargo operation might be; the airport is continuously pursuing new opportunities. For planning purposes, it is estimated that there could be as many as seven flights per week (728 annual operations) occurring by 2023. The size and type of aircraft is difficult to predict given that no service currently exists.

The FAA does not evaluate the actual enplaned versus deplaned air cargo levels. Rather, the industry measure of revenue ton miles (RTMs) is used to document and project trends associated with the all-cargo carrier and passenger airline cargo activity. The FAA projects both domestic and international all-cargo carrier RTMs, using the nation's economy (primarily the gross domestic product) and other factors such as fuel prices and trends in world trade. For the projection of all-cargo operations at PIE, the Bay Area MSA's Gross Regional Product data was utilized. This index was projected by Woods and Poole to increase 2.2 percent each year through 2038. Applying this growth rate to the 2023 projected activity level results in 1,000 annual all-cargo aircraft operations by the end of the planning period or approximately ten flights per week. The annual all-cargo operations shown in **Table 3.6-1** have been rounded to the nearest hundred.

For a high-growth scenario, it has been assumed that there could be 14 flights per week (1,456 annual operations) by 2023. This essentially replicates the level of activity conducted by UPS prior to relocating their operation. Such a scenario reflects the changes underway in the air cargo industry (Amazon's Prime Air), the strong area economy, and international opportunities given PIE is within Foreign Trade Zone 193. The initial 14 flights per week under this high-growth scenario were increased annually through the planning period based on the FAA's projection of 3.2 percent annual growth in all-cargo RTMs (domestic and international). As shown in **Table 3.6-1**, this would result in approximately 2,300 annual all-cargo operations, equating to about 22 flights per week, in 2038.

TABLE 3.6-1
PROJECTIONS OF ALL-CARGO CARRIER OPERATIONS

	Forecast (recommended)	High-Growth Scenario
Base Year		
2017	1,210	1,210
Forecast		
2023	700	1,500
2028	800	1,700
2038	1,000	2,300
Average Annual Change (2017 – 2038)	2.2%	3.2%

SOURCE: ESA Analysis, 2018.

3.7 General Aviation Activity Forecasts

General aviation encompasses all segments of the aviation industry except for the activity that is conducted by commercial airlines or the military. Example activities include pilot training, law enforcement flights, medical transportation, aerial surveys, aerial photography, agricultural spraying, advertising, and various forms of recreation, not to mention business, corporate, and personal travel. As history shows, general aviation is an industry that has struggled through some very significant impacts, both positive and negative.

As the 2004 Airport Master Plan Update for PIE was being finalized, the general aviation industry was working to recover from the impacts of September 11th. Between 2003 and 2007, the industry experienced major advances in aircraft and navigation technologies, which created new product offerings and services during a period with an overall good economy. These included widespread use of Global Positioning Satellite (GPS) technology, the emergence of very light jet aircraft, and the introduction of an entirely new category; the light sport aircraft. These new product offerings and services bolstered most every segment of the general aviation industry. In spite of this, there was limited growth in activity during this period.

By the end of 2008, most segments of the industry experienced losses as the overall national economy declined during the Great Recession. The very light jet industry was hit hardest as many manufacturers delayed development plans and/or went bankrupt. Data from the General Aviation Manufacturer's Association (GAMA) showed that general aviation aircraft manufactured in the U.S. fell from 3,279 aircraft in 2007 to 1,334 in 2010. It was not until 2011 that GAMA reported the first increase in new general aviation shipments since 2007. While manufacturing has increased most every year since 2011, 2017 levels are still less than half of those before the Great Recession. Compounding this issue, the 2017 FAA Aerospace Forecast documents the decline in the number of aircraft in the nation's overall general aviation fleet between 2007 and 2013. It is interesting to note that the greatest decline between 2011 and 2013 was attributed to the 2010 Rule for Re-Registration and Renewal of Aircraft Registration. According to the FAA, this removed cancelled, expired, or revoked a number of records from the national database.

Overall, the 2017 FAA Aerospace Forecast projects general aviation growth over the next 20 years, despite the industry fluctuations that are likely to continue. While the number of active general aviation aircraft is expected to increase 0.1 percent annually through 2037, this growth is not consistent across all segments of GA activity. The most common single-engine piston aircraft are expected to decline 0.9 percent annually for the period while jet aircraft are forecast to grow 2.3 percent each year. The number of hours flown by all general aviation aircraft is projected to increase at a rate of 0.9 percent each year. Similar to the fleet projections, the hours flown by turbine aircraft are forecast to grow 3.0 percent annually while the single-engine piston aircraft show a decline in activity of 0.9 percent each year. These turbine aircraft projections are supported by figures in the FAA's monthly Business Jet Reports which shows that operations conducted by general aviation jet aircraft have consistently increased since the low in 2009. They are however, still just below the level recorded for 2007, prior to the negative press during the 2008 and 2009 corporate bailouts which resulted in a 20 percent decrease in total business jet activity by the end of 2009.

3.7.1 Forecast of Based Aircraft

Based aircraft are those aircraft that are located at an airport, for a majority of the year. For PIE, this figure includes the military aircraft assigned to the United States Coast Guard (USCG) Air and U.S. Army Reserve Stations. It does not however, consider any of the aircraft that may be based at the airport on a regular basis by the commercial passenger or cargo airlines. The number of aircraft owners projected to base their aircraft at PIE is an important consideration for airfield planning since it is a key indicator of the demand for facilities. Projections of based aircraft also provide an indication of the anticipated growth in general aviation activity.

As a commercial service airport, PIE is not included in the FAA's National Based Aircraft Inventory Program. As a result, a comprehensive count of PIE's based aircraft at the end of 2017 was conducted as part of this study. **Table 3.7-1** summarizes the current count by major aircraft category based on the interviews and records of the airport's primary tenants and users.

TABLE 3.7-1
2017 BASED AIRCRAFT

	Sheltair FBO	Signature FBO	The Landings	Pinellas Co. Sheriff	USCG Air Station	U.S. Army Reserve	Subtotals
Single-Engine	19	38	111	-	-	-	168
Multi-Engine (piston & turboprop)	32	7	6	-	4	-	49
Jet	29	13	-	-	-	-	42
Rotorcraft	-	2	-	3	10	23	38
Other (gliders, balloons, etc.)	-	-	-	-	-	-	0
						Overall Total	**297**

SOURCE: Individual airport tenant and military installation records, compiled by ESA, 2018.

For comparison, the most recent 5010 data for the airport includes 98 single-engine, 29 multi-engine, 56 jet, 39 rotorcraft, one other, and 36 military aircraft, for a total based aircraft count of 259 in 2017. Similarly, as shown in **Tables 3-2** and **3-3**, the FDOT FASP and FAA TAF both reflect 261 based aircraft in their respective base years. Upon examination, it is clear none of these previous counts are correct. First, The Landings Hangar Area alone accommodates 111 single-engine aircraft, while the 5010 data only reflects 98 total. Also, the 5010 data includes 39 rotorcraft, plus another 36 military aircraft (of which approximately 32 would also be rotorcraft). The airport does not have 71 based rotorcraft. For these reasons, the actual based aircraft count documented in **Table 3.7-1** will be used for the purposes of the master plan.

Historic Data and Growth

For any aviation forecast, historic data should be considered when analyzing potential growth. Unfortunately, the most recent based aircraft counts prior to this study are not considered reliable.

The lack of reliable historic data makes it impossible to generate any based aircraft projections using either market share or regression type analyses.

Previous Growth Projections

Based aircraft projections from the 2004 Airport Master Plan Update had an average annual growth of 0.9 percent through 2022. This forecast was developed using the historical data available at that time. Because there were more based aircraft in 2001 than today, even this relatively low growth rate projected there to be 366 based aircraft by 2017. If this rate were applied to the current 2017 count, it would result in 358 based aircraft by 2038 (**Table 3.7-2**).

As mentioned, the FASP is updated regularly and therefore incorporates changes in the industry that can ultimately affect the level of based aircraft. The most recent data for the system plan projects an average annual growth of 2.0 percent for the based aircraft at PIE. Applied to the actual 2017 count, this would result in 450 based aircraft by 2038 (**Table 3.7-2**).

The current TAF projects an average growth rate of 1.8 percent for the based aircraft at PIE. When applied to the current 2017 level, this would result in a projection of 432 based aircraft by 2038 (**Table 3.7-2**).

National Active Fleet Forecasts

Each year the FAA provides a long-term projection for the active general aviation fleet, with active being defined as any aircraft flying at least one hour during the year. Decreases in the nation’s total active fleet occurred between 2007 and 2013. This was followed by a two-year increase and then another decline in 2016. The FAA does not reverse the downward trend for active aircraft until 2021, and even then, their projections do not exceed the 2016 level until 2028. Overall the FAA projects the active general aviation fleet to only increase at a rate of 0.1 percent each year through 2037. For the last ten years of the FAA projection (2028 to 2037), this average growth doubles to 0.2 percent. Applying the higher growth to PIE’s based aircraft count results in 310 based aircraft by 2038 (**Table 3.7-2**).

Recommended Based Aircraft Forecast

For the recommended based aircraft projection, the average annual growth rate of 2.0 percent projected by FDOT for PIE was adopted (**Table 3.7-2**). This higher growth rate is supported by the fact that the airport has 100 percent occupancy of its general aviation hangar facilities as well as the fact that both Sheltair and Signature indicated they could immediately fill any vacant hangar spaces, especially with the larger jet aircraft in the general aviation fleet. This stands to reason when the limited options for aircraft storage in the Bay Area are considered. PIE is the only Bay Area airport with the ability to accommodate a large number of additional based aircraft over the course of the 20-year planning horizon.

TABLE 3.7-2
COMPARISON OF BASED AIRCRAFT PROJECTIONS

	Previous Master Plan[a]	Florida Aviation System Plan (recommended)	2017 FAA TAF	National Active Fleet
Base Year				
2017	297	297	297	297
Forecast				
2023	313	334	331	301
2028	328	369	361	304
2038	358	450	432	310
Average Annual Change (2017 – 2038)	0.9%	2.0%	1.8%	0.2%

[a] Based on historic growth projection at that time.

SOURCE: ESA, 2018.

The selection of the FASP growth rate was also made in consideration that the U.S. Army Reserve Station will change aviation units within the short-term planning horizon. Based on the information from the U.S. Army, the current 23 Sikorski UH-60 Blackhawk helicopter unit will relocate across the bay to MacDill Air Force Base (AFB) in December 2019. Then between January and March 2020, a new U.S. Army Reserve fixed wing transportation unit will start. This unit will include five Cessna Citation Jet V (military UC-35) and two Beechcraft King Air 200 (military C-12 Huron) aircraft. While these aircraft will be based/stored within the U.S. Army Reserve property at PIE, what the change in units will do is make the two northern most Sheltair hangars (19,700 and 19,900 SF) available for future general aviation aircraft. The current lease of these Sheltair hangars by the U.S. Army for the Blackhawk helicopters also expires in December 2019 and will not be renewed since the hangars are not needed for the new fixed wing unit coming in.

3.7.2 Forecast of Based Aircraft Fleet Mix

Projecting the types of based aircraft is necessary since different aircraft require different facilities. Overall, the future based aircraft fleet mix was determined by studying the projections of the national fleet, then comparing those to the current aircraft types operating at PIE. While the overall growth in the nation's active fleet was not utilized to forecast based aircraft, the individual projections of aircraft types are useful in predicting the future based aircraft fleet mix.

The Nation's Active General Aviation Fleet

Every year, the nation's active general aviation fleet is published as part of the FAA Aerospace Forecast. In 2016 there were 209,905 active general aviation aircraft. As noted previously, this figure has primarily declined since 2007 and is not expected to recover back to the 2016 level until 2028. However, by 2037 the FAA predicts this figure will increase to 213,420 aircraft. While the FAA provides counts for a number of aircraft categories, they have been simplified into the five major categories shown in **Table 3.7-3**. Within the single-engine grouping are the single-engine piston, experimental, and light sport aircraft categories. The multi-engine group contains both piston and turboprop models, as the rotorcraft group contains both piston and turbine models. The jet category covers all ranges of turbojet general aviation aircraft, from the very light jets to the heaviest business jets.

The FAA projects considerable growth in the jet category. While the use of business aircraft fell after 2007, jet aircraft use by smaller companies continues to increase as various charter, lease, time-share, partnership, and fractional ownership agreements provide more cost effective options for these aircraft users resulting in higher utilization rates. More businesses also rely on general aviation because it provides safe, efficient, flexible, and reliable transportation. Fractional ownership offers consumers a more efficient use of time by providing faster point-to-point travel, the ability to conduct business while flying, and more convenient enplaning and deplaning of flights (when compared to the airlines).

TABLE 3.7-3
FAA FORECAST OF NATIONAL ACTIVE GENERAL AVIATION FLEET

	2016 Fleet Mix	2037 Fleet Mix	Average Annual Growth Rate
Single-Engine	75.1%	68.8%	-0.3%
Multi-Engine (piston & turboprop)	10.8%	11.5%	0.4%
Jet	6.6%	10.3%	2.3%
Rotorcraft	5.1%	7.0%	1.6%
Other (gliders, balloons, etc.)	2.4%	2.4%	0.0%

SOURCE: FAA 2017 Aerospace Forecast.

The continuing popularity of travel by general aviation aircraft is also due to the ability to use smaller, less-congested airports which are more convenient to the final destination. A large part of this is the result of the expanded application of GPS technologies in navigation, but more specifically the myriad of new runway specific instrument approach procedures that have been established at even the smallest airports. In the FAA's projections, jet aircraft models (including the very light jets) are expected to replace a number of the piston aircraft in the future. This is just one of the reasons the single-engine (piston) category is on a decline and the multi-engine group shows virtually no growth. In all jets are expected to represent over 10 percent of the active general aviation fleet by 2037.

Current and Future Based Aircraft Fleet Mix

The 2017 based aircraft fleet mix at PIE is comprised of 56.6 percent single-engine, 16.5 percent multi-engine, 14.1 percent jet, and 12.8 percent rotorcraft. Throughout the planning period, the mix of aircraft is expected to remain predominately single-engine, but they will account for a lower overall percentage of based aircraft. The more significant changes are expected to occur in the number of jets based at the airport. This is reasonable considering that the FAA has predicted that turbojet technology is at the point where it is truly feasible as a replacement to the more traditional piston-powered fleet. The expected future based aircraft types are shown in **Table 3.7-4**.

TABLE 3.7-4
FORECAST OF BASED AIRCRAFT FLEET MIX

	Base Year	Forecast		
	2017	**2023**	**2028**	**2038**
Single-Engine	168	199	214	249
Multi-Engine (piston & turboprop)	49	57	63	77
Jet	42	59	69	90
Rotorcraft	38	19	23	34
Other (gliders, balloons, etc.)	0	0	0	0
Total	**297**	**334**	**369**	**450**

SOURCE: ESA, 2018.

As with most airports, the single and multi-engine categories are predominantly comprised of Beech, Cessna, Mooney, and Piper models. Likewise, the multi-engine aircraft tend to include the Beech King Air series; Cessna models, such as the 414 Chancellor; or Piper Seminole aircraft. As indicated previously, the national fleet of single-engine aircraft is expected to decline slightly while the multi-engine group is only anticipated to increase slightly in the future. While many of the additional single-engine aircraft are expected to be similar to those currently at PIE, additional aircraft in the multi-engine category are expected to be mostly turboprops. This includes the four USCG Lockheed HC-130 Hercules aircraft currently at PIE, as well as the two U.S. Army Beechcraft King Air 200 (military C-12 Huron) aircraft that will be based at PIE in 2020.

Based jets will continue to include the small to medium-sized business jet aircraft, with popular models from the Embraer, Bombardier Learjet, Cessna Citation, and Dassault Falcon series. This group includes the five U.S. Army Cessna Citation Jet V (military UC-35) aircraft that will be based at PIE in 2020. The future based aircraft will also include the larger jet aircraft models from the Beechcraft Hawker, Bombardier Challenger, Dassault Falcon, and Gulfstream series.

Rotorcraft will continue to include both piston and turbine powered models, such as the popular Bell, Eurocopter, and Robinson models, as well as the ten USCG Sikorsky HH-60 Jayhawks currently based at the airport. It should be noted that even though the overall number of rotorcraft are expected to increase nationally, this is not evident in the figures included in **Table 3.7-4**. This is simply due to the fact that the U.S. Army's 23 UH-60 Blackhawk helicopters will not be at PIE at the end of the short-term planning period. Based rotorcraft increases in the short-term include the Pinellas County Sheriff's Office (PCSO) plan for a fourth Eurocopter AS350 Écureuil helicopter.

While there were no aircraft within the "Other" category documented in 2017 or expected over the course of the planning period, this category was included since past 5010 records for PIE have included aircraft, including an ultralight, in this group.

3.7.3 General Aviation Operations

As described previously, the FAA defines an aircraft operation as either a single aircraft landing or takeoff. Further, a touch and go operation is counted as two operations, since the aircraft technically lands and immediately takes off. The FAA categorizes general aviation operations as either local or itinerant. Local operations are those arrivals or departures performed by aircraft that remain in the airport traffic pattern or are within sight of the ATCT. Local operations are most often associated with training activity and flight instruction. Itinerant operations are arrivals or departures other than local operations, performed by either based or transient aircraft. Itinerant operations are generated by a wide range of recreational, business/corporate, and air charter/taxi flights. As noted previously, historic general aviation operations at PIE include the itinerate air taxi category since the PIE ATCT management predominantly uses this category to record fractional jet and life flight type operations. The FAA's Operations Network (OPSNET) data provides the official activity counts based on the actual ATCT activity logs. **Table 3.7-5** summarizes the general aviation operations recorded since 1998 for PIE.

TABLE 3.7-5
PAST 20 YEARS OF GENERAL AVIATION OPERATIONS

	Annual Operations	Change over Prior Year
1998	174,956	21.2%
1999	190,070	8.6%
2000	203,380	7.0%
2001	198,120	-2.6%
2002	172,351	-13.0%
2003	180,686	4.8%
2004	177,035	-2.0%
2005	180,238	1.8%
2006	180,493	0.1%
2007	162,911	-9.7%
2008	132,095	-18.9%
2009	118,830	-10.0%
2010	101,323	-14.7%
2011	98,304	-3.0%
2012	99,932	1.7%
2013	115,952	16.0%
2014	99,107	-14.5%
2015	77,138	-22.2%
2016	84,002	8.9%
2017	84,251	0.3%
Average Annual Change (1998 – 2017)	-3.8%	n/a

SOURCE: FAA OPSNET database, 2018.

Historic Activity

As shown in **Table 3.7-5**, the level of general aviation operations at PIE have fluctuated over the past 20 years. When reviewing the historic data, the general aviation aircraft operations are quite dynamic and can increase or decrease significantly in short periods of time. While general aviation activity is generally linked to the local area economy, major impacts to the overall industry have had the most significant impact.

Prior to September 11th, the general aviation activity at the airport was increasing nearly every year through 2000, which saw the highest levels since 1981. The impacts of September 11th created one of the first times the airport experienced double digit losses in general aviation operations. A subsequent slight uptick in activity was followed by large decreases during the Great Recession. Finally, growth in 2012 and 2013 were followed by two more years of double digit losses, culminating in the airport's lowest level of general aviation operations in 2015. The last two years have seen growth return, but the average annual decrease has been nearly four percent over the last 20 years.

Previous Growth Projections

General aviation operations in the 2004 Airport Master Plan Update were projected to have an average growth rate of 1.5 percent over the 20-year planning period. This projected rate was based on the FAA's outlook for growth in the nation's general aviation activity at that time. This resulted in a forecast of approximately 235,000 operations by 2017 (nearly three times the actual number that occurred). Because so much has changed at the airport, this previous master plan growth rate was not utilized to develop a new forecast.

As with based aircraft, projections of annual operations in the FASP benefit from being updated on a regular basis. Not only does this help temper annual industry fluctuations, it also allows adjustments to be made to accommodate any local or regional changes. The most recent system plan forecast uses 2015 as the base year and, therefore, captures the substantial decline in general aviation operations experienced at PIE through that year. Regardless, general aviation operations are projected by FDOT to recover and grow at 1.7 percent each year. This rate has been applied to the current base year level (**Table 3.7-6**) to provide an updated projection based on the FASP forecast.

The general aviation operations data in the 2017 TAF utilize data from the FAA's 2017 fiscal year as the base level of activity. Therefore, it too incorporates the relatively steady decline in general aviation at PIE through 2015. As a result, the current TAF only projects 0.1 percent growth each year through 2038.

Utilization of the General Aviation Fleet

Each year as part of their Aerospace Forecast, the FAA provides historic data and projections on the number of hours flown by general aviation aircraft. In the 2017 Aerospace Forecast, the FAA anticipates the utilization of the fleet to increase at an average annual rate of 1.0 percent between 2016 and 2037. The primary assumption by the FAA for this growth is that new aircraft utilization will increase. The turbine fleet (including rotorcraft), which already have a high utilization rate, are expected to increase the most. Over the course of the planning period, jet aircraft alone are expected to increase their utilization an average of 3.0 percent each year.

The FAA's positive outlook on the overall general aviation hours flown have been applied to the general aviation operations for PIE to create another forecast scenario. As shown in **Table 3.7-6**, this results in nearly 104,000 annual general aviation operations by the end of the planning period.

Market Share

A common methodology for forecasting aviation activity is the use of market share analysis. This approach allows a comparison to be made of the annual operations PIE has supported against a defined data set. In the Aerospace Forecast, the FAA documents and projects the operations conducted at all of the towered airports in the nation. A separate count and forecast for the general aviation operations are also included in these data sets. It is important to note that just like similar PIE historic data, the nation's level of general aviation operations has decreased nearly every year, especially after the Great Recession, with 2016 marking the lowest levels recorded.

The general aviation operations for PIE over the past 20 years were evaluated against this FAA data. When compared to the nation's general aviation activity, PIE had the highest market share in 2006 and the lowest in 2015. In 2016 and 2017, PIE's share of the nation's activity was up significantly. By the end of the planning period, it is assumed that PIE will at least re-obtain its historic average share of the nation's general aviation operations. The FAA expects the nation's aviation activity to reverse its nearly two-decade decline, beginning in 2017. When the expected local market share is combined with the FAA's projected increase in general aviation activity, approximately 115,000 of those operations (**Table 3.7-6**) would be accommodated at PIE.

Operations per Based Aircraft

Another forecast was generated by assigning a representative level of annual operations for each based aircraft. This methodology is not considered the most accurate if a set ratio is assigned to a group of similarly categorized airports (since no two airports operate the same). However, to develop an alternative estimate for the level of general aviation operations at PIE, this methodology can be useful if local data is utilized. In doing so, the based aircraft associated with both the USCG and U.S. Army Reserve Stations were not considered. Without these aircraft, there were approximately 325 general aviation operations per based aircraft in 2017. When applied to the selected forecast of based aircraft (also adjusted to eliminate the military aircraft), nearly 140,000 annual general aviation operations would occur by 2038 (see **Table 3.7-6**).

Regression Analysis

Regression modeling was used in an attempt to forecast the annual general aviation activity at PIE. However, no significant correlations could be derived using different combinations the independent variables. Essentially, none of the local socioeconomic or industry data available would generate a model that could reliable explain the past activity. Therefore, this method to project future annual operations was not included in the analysis.

TABLE 3.7-6
COMPARISON OF PROJECTIONS FOR GENERAL AVIATION OPERATIONS

	State System Plan Growth (recommended)	2017 FAA TAF Growth	Utilization of National Fleet	Market Share Analysis	Operations per Based Aircraft
Base Year					
2017	84,251	84,251	84,251	84,251	84,251
Forecast					
2023	93,218	84,758	89,434	92,124	101,725
2028	101,416	85,182	93,996	99,243	113,100
2038	120,037	86,038	103,830	115,176	139,425
Average Annual Change (2017 – 2038)	1.7%	0.1%	1.0%	1.5%	2.4%

SOURCE: ESA, 2018.

Recommended Forecast of General Aviation Operations

Each of the projections shown in **Table 3.7-6** were generated using commonly accepted methods. Therefore, selection of a preferred forecast largely depends on the potential of the airport's general aviation users and the associated assumptions on future airport activity. In addition to the expected changes in the industry, the selection of a preferred forecast also needs to take into account the airport improvements that have occurred and will continue to occur. Finally, no future projection should be selected if it might include embedded constraints to the airport's potential growth.

Between 2000 and 2016, general aviation operations at the nation's towered airports decreased an average of 2.7 percent each year. Activity for Florida's towered airports over the same period only had an average annual decrease of 0.9 percent. Even more significant is that since 2010 (after the Great Recession) the nation's total general aviation activity at towered airports declined 0.7 percent annually while Florida's have increased 1.5 percent. This demonstrates that Florida's general aviation industry has been recovering each year since 2010. This creates an optimistic outlook when coupled with the population and economic growth expected in Pinellas County, as well as the surrounding Bay Area.

Given the state's recovery, the two forecasts generated utilizing the 2017 TAF growth rate and the overall utilization of the nation's general aviation fleet are considered constrained for the Florida market. Operations per based aircraft does utilize local conditions to predict future activity; however, the results appear overly optimistic. Therefore, these three projections were excluded from further consideration.

The market share analysis essentially creates a performance index between PIE's general aviation activity and those airports in the nation with an ATCT. The index is then utilized with the FAA's projected level of general aviation operations for all towered airports through 2037. While the market share analysis is considered an accepted overall forecast, the projection generated utilizing the expected growth from the FASP was considered more applicable. Updated on a regular basis, the FASP projection accounts for changes at the airport, in the local area, and the surrounding region, as well as taking into consideration the continuous changes to the industry. Therefore, for the purposes of this study, the recommended forecast of general aviation operations is based on FDOT's projected annual growth rate for PIE, applied to the most recent annual data (2017).

3.8 Military Activity Forecasts

Military operations are those conducted by aircraft from one of the U.S. military service branches. For PIE, the historic military activity documented in the FAA OPSNET data predominantly includes the activity conducted by the four USCG Lockheed HC-130 Hercules aircraft, ten USCG Sikorsky HH-60 Jayhawk rotorcraft, and 23 U.S. Army Sikorski UH-60 Blackhawk helicopters based at the airport. As shown in **Table 3.8-1**, the activity conducted by these military aircraft is almost split equally between local training operations and itinerant missions.

TABLE 3.8-1
HISTORIC ANNUAL MILITARY OPERATIONS

	Local		Itinerant		Total
2008	5,885	38%	9,558	62%	15,443
2009	7,932	44%	10,119	56%	18,051
2010	9,594	47%	10,817	53%	20,411
2011	9,764	48%	10,653	52%	20,417
2012	8,018	46%	9,407	54%	17,425
2013	8,681	48%	9,407	52%	18,088
2014	6,279	41%	9,158	59%	15,437
2015	5,854	39%	9,319	61%	15,173
2016	6,665	44%	8,596	56%	15,261
2017	6,162	42%	8,642	58%	14,804
Averages	7,483	44%	9,568	56%	17,051

SOURCE: FAA OPSNET database, 2018.

The ability to accurately forecast aircraft operations by a military service is complicated by a number of factors. Essentially operational levels can fluctuate annually as they are dependent on unpredictable variables such as annual defense budgets, national security threats, global military needs, and even natural disasters, which impacts the missions for both military installations at PIE. Another complicating factor is that once the U.S. Army's Reserve Blackhawk unit relocates to MacDill AFB in December 2019, the military activity will change. Unfortunately, even after interviews with the current U.S. Army operations management, an estimate could not be made with respect to the level of operations that would be generated by the incoming fixed wing transportation unit (five jet and two multi-engine turboprop aircraft). For these reasons, no new projections for the future level of military activity at PIE have been generated.

The 2017 FAA TAF has a flatlined projection of 15,523 annual military operations out to 2045, with a local versus itinerant split that is similar to the historic averages. While slightly lower than the 10-year average number military operations shown in **Table 3.8-1**, the TAF figures have been rounded to the nearest hundred for use in this study. This is considered reasonable since while an estimate could not be made by the U.S. Army on the level of activity conducted by the future seven aircraft fixed wing unit, it was agreed that the overall number of operations would be less than those conducted by the 23 Blackhawk helicopters. Therefore, throughout the planning period, it is assumed that there will be a total of 15,500 annual military operations, comprised of 6,700 local (43 percent) and 8,800 itinerant (57 percent) operations each year.

3.9 Total Annual Operations

Table 3.9-1 combines the separate projections to create the recommended forecast of total annual operations. For each, the forecast values have been rounded to the nearest hundred.

TABLE 3.9-1
TOTAL ANNUAL OPERATIONS – RECOMMENDED FORECAST

	Passenger Service Carriers	All-Cargo Carriers	General Aviation	Military	Total
Base Year					
2017	14,317	1,210	84,251	14,804	114,582
Forecast					
2023	19,600	700	93,200	15,500	129,000
2028	24,000	800	101,400	15,500	141,700
2038	35,100	1,000	120,000	15,500	171,600
			Average Annual Change (2017 – 2038)		1.9%

SOURCE: ESA, 2018.

Table 3.9-2 combines the high-growth scenarios developed for both the passenger service and all-cargo carriers. High-growth scenarios were not created for the general aviation or military categories. As with the recommended forecast, each of the projections have been rounded to the nearest hundred.

TABLE 3.9-2
TOTAL ANNUAL OPERATIONS UNDER HIGH-GROWTH SCENARIOS

	Passenger Service Carriers	All-Cargo Carriers	General Aviation[a]	Military[a]	High-Growth Total
Base Year					
2017	14,317	1,210	84,251	14,804	114,582
Forecast					
2023	24,600	1,500	93,200	15,500	134,800
2028	34,400	1,700	101,400	15,500	153,000
2038	57,300	2,300	120,000	15,500	195,100
			Average Annual Change (2017 – 2038)		2.6%

[a] No high-growth scenarios were developed for general aviation or military operations.

SOURCE: ESA, 2018.

Table 3.9-3 reflects the total annual operations under the low-growth scenario for the passenger service carriers with the baseline general aviation and military projections. Low-growth scenarios were not created for the general aviation or military categories. There are no operations for the all-cargo carriers as it is assumed under a low-growth scenario, this type of activity would not return to PIE during the planning period. As with the recommended forecast, each of the projections have been rounded to the nearest hundred.

TABLE 3.9-3
TOTAL ANNUAL OPERATIONS UNDER LOW-GROWTH SCENARIOS

	Passenger Service Carriers	All-Cargo Carriers[a]	General Aviation[b]	Military[b]	Low-Growth Total
Base Year					
2017	14,317	1,210	84,251	14,804	114,582
Forecast					
2023	17,300	-	93,200	15,500	126,000
2028	19,700	-	101,400	15,500	136,600
2038	25,300	-	120,000	15,500	160,800
			Average Annual Change (2017 – 2038)		1.6%

[a] Under a low-growth scenario, it is assumed that all-cargo activity would not return during the planning period.
[b] No low-growth scenarios were developed for general aviation or military operations.

SOURCE: ESA, 2018.

3.10 Categories of Aircraft Operations

The following sections present different categories or types of activity that will make up the forecasted operations. This includes a break out of the local, itinerant, and instrument operations. Further analyses include determining the operational aircraft fleet mix and estimates of activity peaks. While only the recommended forecasts have been included in these sections, it is assumed that the high- and low-growth scenarios would have similar traits.

3.10.1 Local versus Itinerant Operations

The split between operations has averaged 42 percent local and 58 percent itinerant over the past ten years. However, for the past three years, itinerant activity has been in the 60 percent range, with 2017 recording the highest percent since the Great Recession. Much of this recent shift is attributed to the continued growth in the passenger service carriers over the same period.

When determining future splits, the passenger service and all-cargo carrier operations were included in the itinerant count by default. Military activity was split based on the TAF figures adopted for use in this study. For general aviation operations, the itinerant share has also historically exceeded the local share conducted at PIE. Since the general aviation operations represent a significant part of PIE's activity and continued growth is expected in passenger airline and air cargo activity, the overall share of itinerant operations will increase throughout the planning period. The future splits are summarized in **Table 3.10-1**.

TABLE 3.10-1
FORECAST OF LOCAL VERSUS ITINERANT OPERATIONS

	Local		Itinerant		Total
Base Year					
2017	44,513	39%	70,069	61%	114,582
Forecast					
2023	48,600	38%	80,400	62%	129,000
2028	50,300	35%	91,400	65%	141,700
2038	54,700	32%	116,900	68%	171,600

SOURCE: ESA, 2018.

3.10.2 Instrument Operations

A separate estimate of instrument operations conducted at PIE is important when evaluating future facility requirements. Using FAA OPSNET data, the number of instrument flight rule (IFR) operations was calculated. Over the past ten years, instrument operations peaked at 36 percent twice in 2015 and 2016. This was eclipsed in 2017 when 38 percent of the activity was operating under IFR; setting the highest level in the datasets going back to 1990.

Similar to the increase in itinerant traffic described previously, the higher number of operations conducted under IFR at PIE likely has a lot to do with the growth in passenger service. It is also related to the fact that even the smallest of general aviation aircraft now have fairly sophisticated instrument capability and conduct more IFR operations than they have in the past. This trend of increasing IFR operations is expected to continue over the course of the planning period. However, its growth has been limited to approximately 40 percent of the total operations, by the end of the planning period. The resulting estimate of future instrument operations are shown in **Table 3.10-2**.

TABLE 3.10-2
ESTIMATE OF INSTRUMENT OPERATIONS

	Instrument Operations
Base Year	
2017	43,384
Forecast	
2023	49,000
2028	55,300
2038	68,600

SOURCE: ESA, 2018.

It should be noted that the percent of instrument operations is different from the actual percentage of the year that the airport experiences IFR conditions. Unlike the weather observations addressed in the following chapter, the count and subsequent estimate of instrument operations include those conducted during actual instrument meteorological conditions as well as the ones simply under an IFR flight plan. The latter would include all commercial airline operations, regardless of weather conditions and flight training for simulated instrument conditions or approaches.

3.10.3 Operational Fleet Mix

Operational fleet mix is an important factor in determining the needs for airfield improvements. While PIE supports all types of aircraft, a majority of the current operations are conducted by single-engine aircraft since this is the predominate aircraft based at the airport and they tend to conduct more takeoffs and landings. Even at airports with an ATCT, it is difficult to estimate the type of aircraft conducing operations since this information is not recorded by tower staff. Instead, the current operational fleet mix percentages were estimated based on information provided by airport management, tenant/user interviews, and the FlightAware data.

Information from the 2017 FAA Aerospace Forecast was then utilized to predict how the operational fleet mix would change over the next 20 years. For this analysis, the “Other” category (gliders and balloons) has been omitted since their numbers are not significant at PIE.

TABLE 3.10-3
PROJECTED OPERATIONAL FLEET MIX

	Base Year	Forecast		
	2017[a]	**2023**	**2028**	**2038**
Single-Engine	52,236	56,400	59,800	64,800
Multi-Engine (piston & turboprop)	24,748	27,400	28,000	30,100
Jet	26,480	38,000	45,700	65,000
Rotorcraft	11,118	7,200	8,200	11,700
Total	**114,582**	**129,000**	**141,700**	**171,600**

[a] Estimate as records do not include type of aircraft conducting operation.

SOURCE: FAA OPSNET database, FAA 2017 Aerospace Forecast, 2017 FlightAware data for PIE, and ESA analysis, 2018.

The projections reflected in **Table 3.10-3** are generally based on expected national trends. The significant growth shown for jet aircraft operations at PIE also takes into consideration the expected level of based jets, as well as the business and overall economic outlook for Pinellas County and the surrounding Bay Area. Due to their size, weight, and performance requirements, jet aircraft are typically the critical aircraft for most airside airport facilities. This will be addressed further as part of the facility requirements.

The FAA anticipates growth and increased utilization for every aircraft category with the exception of the single-engine piston and multi-engine piston types. As described previously, the most significant growth and utilization is expected to occur in the jet and rotorcraft categories. Activity by single- and multi-engine aircraft at PIE is expected to increase given the large number of these aircraft at the airport and in Florida overall. The multi-engine segment also includes the activity conducted by the four USCG Lockheed HC-130 Hercules and the two U.S. Army Beechcraft King Air 200s that will arrive in 2020.

Overall, the general aviation jet activity will continue to include a number of the light to medium-sized business jets that have a maximum allowable takeoff weight between 10,000 and 60,000 pounds. This group includes the Embraer Phenom and Legacy aircraft, Beechcraft Hawker, Bombardier Learjet, Cessna Citation, and Dassault Falcon type jet aircraft that currently operate into PIE on a regular basis. In the short-term, jet activity will also include an increase in the current operations conducted by the much larger and heavier business jet fleet over 60,000 pounds. This would include the Bombardier Global Express, larger Dassault Falcon, and Gulfstream series of aircraft, as well as the Boeing Business Jet and Airbus Corporate Jet.

The jet activity also accounts for the existing and future passenger airline activity. As for the anticipated types of jets in the commercial passenger fleet, these were described previously, including some larger wide-body aircraft serving long-haul international routes. And finally, those related to all-cargo operations could vary quite substantially, with the possibility of heavy lift jet aircraft and/or some turboprop aircraft.

3.10.4 Peak Activity Projections

Annual projections provide a good overview of the activity at an airport, but may not reflect certain operational characteristics of the facility. In many cases, facility requirements are not driven by annual demand, but rather by the capacity shortfalls and delays experienced during peak times. Therefore, estimates of the peak month, the average day in the peak month, and the peak hour demand for airline passengers and aircraft operations are needed.

Peaks in Passenger Enplanements

Typically, the total passenger activity levels (both arriving and departing passengers) are utilized to evaluate peak passenger movements in a terminal. However, due to the nature of the Allegiant's operating model, the most significant passenger peaks at PIE occur during the morning push, when only departures are occurring. Therefore, only the passenger enplanements have been evaluated in this peaking analysis. While there is a midday to afternoon push when both enplaning and deplaning activity occur simultaneously; they will be analyzed later as part of the facility requirements for the passenger terminal.

A review of the historic monthly passenger activity between 2008 and 2017 showed that March was the busiest month for passengers, for all but two years. In both 2015 and 2016, July was the busiest, but only by about half of a percent. Historically, passengers in March have accounted for 11.5 percent of the total annual passengers. This percentage was applied to the projected passenger enplanement levels to calculate future peak month activity and then divided by 31 to reflect the average day activity for March (or July).

Because hourly passenger data was not available, the total number of enplanements that could be expected during the peak hour were estimated using the daily airline schedules from March 2018. The schedules showed that for all but four of the 31 days in March, the morning peak has six departures. These departures take place every 10 minutes and on most days continuously occur during a rolling hour between 7:00 a.m. and 9:00 a.m. To estimate the current peak hour enplanements, first the average number of seats per departure (173) was multiplied by the six departures and then the historic load factor (87.1 percent) over the past 10 years applied. This resulted in 904 enplanements during the peak hour of the average day for 2017.

It was noted previously that the projected domestic passenger enplanements will be accommodated through a similar narrow-body fleet mix with the potential for some smaller regional aircraft. It is also expected that many of the future domestic flights will be scheduled off peak to add frequency, since PIE is not a hub airport and the need to provide additional flight options/flexibility throughout the day was a common goal of the airlines. For peak hour calculations, it was also assumed that the relatively lower level of international passenger enplanements projected, served by a mix of narrow and wide-body aircraft, would not occur during the current peaking periods. As such, no substantial changes are expected in the future with respect to the share of departures that are scheduled during the peak hour. The average number of seats per departure will increase slightly over the planning period as projected in the domestic passenger service operations.

The March daily schedules reflect an average 14-hour day when the passenger airline departures occur. This period was utilized to estimate when additional daily flights would likely occur, given that nearly 200 new weekly flights (±28 daily) are expected by the end of the 20-year planning period. When combined with the expected average seats per departure, the future peaks for passenger enplanements were calculated. These figures, included in **Table 3.10-4**, have been rounded to the nearest ten for the forecast years. The expected change in the number of departing flights during the peak hour is also included.

TABLE 3.10-4
PEAKS IN PASSENGER ENPLANEMENTS

	Annual Passenger Enplanements	Peak Month	Average Day of Peak Month	Peak Hour of Average Day
Base Year				
2017	1,021,361	102,396	3,303	904
Forecast				
2023	1,450,500	166,810	5,380	1,060
2028	1,811,000	208,260	6,720	1,220
2038	2,771,500	318,720	10,280	1,750

SOURCE: ESA, 2018.

Peaks in Total Aircraft Operations

Review of the monthly FAA OPSNET data reveals that since 2008, operations have peaked in March six out of the ten years. The other peaks include one in February, one in October, and two in November. Regardless, these months all reflected similar percentages with respect to the overall annual operations. On average the peak months represent 10.0 percent of the annual operations. When the days of the peak months were pro-rated, the value of 30.5 was derived for the average number of days in the peak month. No historical data was available to determine the peak hour operations; therefore, it was estimated that 10 percent of the peak month average day would best represent the number of peak hour operations. With the exception of the peak hour, the resulting estimates in **Table 3.10-5** have been rounded to the nearest ten for the forecast years.

TABLE 3.10-5
PEAKS IN TOTAL AIRCRAFT OPERATIONS

	Total Annual Operations	Peak Month	Average Day of Peak Month	Peak Hour of Average Day
Base Year				
2017	114,582	12,018	388	39
Forecast				
2023	129,000	12,900	420	42
2028	141,700	14,170	460	46
2038	171,600	17,160	560	56

SOURCE: ESA, 2018.

3.11 FAA Terminal Area Forecast Comparison

If an airport is included in the FAA TAF, any new forecasts need to be reviewed and approved by the agency before they can be applied to further analyses. During this review the FAA looks to see if the passenger enplanements, annual operations, or based aircraft forecasts differ from the TAF by any more than ten percent in the five-year and/or 15 percent in the ten-year planning periods.

Regarding the review, the FAA Airport Planning and Programming division published a guidance paper entitled, *Review and Approval of Aviation Forecasts*. This guidance states: "If the forecast is not consistent with the TAF, differences must be resolved if the forecast is to be used in FAA decision-making. This may involve revisions to the airport sponsor's submitted forecasts, adjustments to the TAF, or both. FAA decision-making includes key environmental issues (e.g. purpose and need, air quality, noise, land use), noise compatibility planning (14 CFR Part 150), approval of development on an airport layout plan, and initial financial decisions including issuance of LOI's and calculation of BCA's."

As shown in **Table 3.11-1**, the recommended forecasts for passenger enplanements, annual operations, and based aircraft are within the FAA's review criteria for consistency with the TAF.

TABLE 3.11-1
COMPARISON OF FORECAST TO 2017 FAA TAF

	Recommended Baseline Forecast	2017 FAA TAF[a]	Difference
Passenger Enplanements			
Base Year (2017)	1,021,361	1,000,601	2.1%
5 Year (2023)	1,450,500	1,344,682	7.9%
10 Year (2028)	1,811,000	1,577,507	14.8%
Annual Operations			
Base Year (2017)	114,582	114,871	-0.3%
5 Year (2023)	129,000	119,187	8.2%
10 Year (2028)	141,700	123,400	14.8%
Based Aircraft			
Base Year (2017)	297	268	10.8%
5 Year (2023)	334	302	10.8%
10 Year (2028)	369	329	12.2%

[a] Issued January 2018 with data based on FAA fiscal year which ends September 30th.

SOURCE: 2017 FAA TAF and ESA Analysis, 2018.

3.12 Aviation Activity Forecast Summary

Table 3.12-1 presents an overview of the recommended forecasts. The data and methods used to forecast aviation demand for the airport are consistent with those used by the FAA, FDOT, and other airports around the nation. These forecasts are considered to reasonably reflect the activity anticipated at PIE through 2038 given the information available during this study.

TABLE 3.12-1
SUMMARY OF AVIATION ACTIVITY FORECASTS

	Base Year	Forecast		
	2017	**2023**	**2028**	**2038**
Passenger Enplanements	1,021,361	1,450,500	1,811,000	2,771,500
Annual Operations				
Passenger Service Carriers	14,317	19,600	24,000	35,100
All-Cargo Carriers	1,210	700	800	1,000
General Aviation	84,251	93,200	101,400	120,000
Military	14,804	15,500	15,500	15,500
Total	**114,582**	**129,000**	**141,700**	**171,600**
Based Aircraft				
Single-Engine	168	199	214	249
Multi-Engine (piston & turboprop)	49	57	63	77
Jet	42	59	69	90
Rotorcraft	38	19	23	34
Total	**297**	**334**	**369**	**450**
Categories of Operations				
Local Operations	44,513	48,600	50,300	54,700
Itinerant Operations	70,069	80,400	91,400	116,900
Instrument Operations	43,384	49,000	55,300	68,600
Operational Fleet Mix				
Single-Engine	52,236	56,400	59,800	64,800
Multi-Engine (piston & turboprop)	24,748	27,400	28,000	30,100
Jet	26,480	38,000	45,700	65,000
Rotorcraft	11,118	7,200	8,200	11,700
Peaks in Passenger Enplanements				
Peak Month	102,396	166,810	208,260	318,720
Average Day of Peak Month	3,303	5,380	6,720	10,280
Peak Hour of Average Day	904	1,060	1,220	1,750
Peaks in Total Aircraft Operations				
Peak Month	12,018	12,900	14,170	17,160
Average Day of Peak Month	388	420	460	560
Peak Hour of Average Day	39	40	50	60

SOURCE: ESA, 2018.

CHAPTER 4

Facility Assessment and Requirements

CHAPTER 4
Facility Assessment and Requirements

4.1 Introduction

To ensure that the St. Pete-Clearwater International Airport (PIE) will adequately accommodate demand expected during the 20-year planning period, this chapter evaluates and establishes the improvements necessary to maintain a safe and efficient facility. As a commercial service airport, PIE holds a Title 14, Code of Federal Regulations (CFR), Part 139 *Airport Operating Certificate*. This certification process includes, among other things, annual inspections of the airfield and various airport facilities. Even though the airport maintains its operating certificate, improvements are needed to maintain the facility's existing infrastructure and meet future requirements. The following sections use planning activity levels and the appropriate design criteria to identify and define the necessary facility requirements over the 20 year planning horizon.

4.1.1 Planning Activity Levels

Since there are a number of uncertainties associated with long-term activity forecasting, planning activity levels (PALs) were established to represent future levels at which different facility improvements would be required. This demand-based approach allows certain improvements to be correlated to when the future PAL is actually reached, rather than a set point in time. **Table 4.1-1** defines the PAL thresholds (that may differ from forecast timelines) where certain improvements or actions will need to be undertaken. PAL thresholds were not included for based aircraft since the additional hangar facilities or aircraft parking apron space needed would be provided by the various general aviation (GA) tenants, Pinellas County Sheriff's Office, or U.S. military branches at the airport. This is not to say that such facilities will not be considered in this or subsequent chapters of the study, rather how and when the demand is met is not a decision that will be programmed by airport management.

TABLE 4.1-1
PLANNING ACTIVITY LEVELS

	Passenger Enplanements	Annual Operations
Base Year		
2017	1,021,361	114,582
Planning Activity Level		
PAL-1	1,250,000	129,000
PAL-2	1,750,000	145,000
PAL-3	2,250,000	155,000
PAL-4	2,750,000	165,000

SOURCE: ESA, 2018.

4.1.2 Applicable Airport Design Standards

The airport planning criteria and design standards for various airfield elements are based on the critical aircraft that make regular use of the airport. Regular use is defined as 500 annual operations, including both itinerant and local operations, but excluding touch and go operations. These aircraft classify airport facilities based on Approach Reference Codes (APRC), Departure Reference Codes (DPRC), Runway Design Codes (RDC), and Taxiway Design Groups defined in Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5300-13A, Change 1, *Airport Design*.

Runway Reference and Design Codes

Approach and departure codes identify the current operational capabilities for each runway with a parallel taxiway, where no special procedures are required for landing or takeoff operations. As such, runways can have more than one APRC or DPRC code for different aircraft groups and these codes may change as airfield improvements are made. Conversely, while the APRC and DPRC designations identify existing operational limitations for each runway, the RDC is utilized to plan future runway requirements.

For all three codes, the first component is the Aircraft Approach Category (AAC) which is depicted by a letter and relates to the aircraft's landing approach speed (operational characteristic). The second component is the Airplane Design Group (ADG) which uses Roman numerals to identify the critical aircraft wingspan or tail height (physical characteristics). For APRC and RDC, a third component relates to the visibility minimums associated with the runway, or group of runways, expressed in the Runway Visual Range (RVR) values. For runways with only existing and future visual approaches, the third component should be "VIS" in lieu of the visibility minimums. The ranges for these three components are included in **Table 4.1-2**. An Airport Reference Code (ARC) is the overall airport designation, signifying the highest RDC for the facility, minus the third (visibility) code.

Critical Aircraft

The two active runways at PIE each have their own critical aircraft. This is primarily due to the physical dimensions, wind coverage requirements, and the types of aircraft each runway was designed to accommodate. Runway 18-36 accommodates the largest commercial, air cargo, and military aircraft, as well as every type of GA aircraft. Conversely, the crosswind runway, Runway 4-22 is somewhat limited to only supporting the mid-sized aircraft in the commercial, military, or GA aircraft fleets. The current and future critical aircraft for each runway are described in the following sections and summarized in **Table 4.1-5**. The representative aircraft presented are based on the activity documented in the 2017 FlightAware data for PIE and the detailed fleet mix information presented in the forecast chapter.

TABLE 4.1-2
RUNWAY REFERENCE AND DESIGN CODE COMPONENTS

Aircraft Approach Categories		
Category	Approach Speeds	
A	Less the 91 Knots	
B	91 knots or more but less than 121 knots	
C	121 knots or more but less than 141 knots	
D	141 knots or more but less than 166 knots	
E	166 knots or more	
Airplane Design Groups		
Group	Tail Height (feet)	Wingspan (feet)
I	<20	<49
II	20 – 30	49 < 79
III	30 – 45	79 < 118
IV	45 – 60	118 < 171
V	60 – 66	171 < 214
VI	66 - <80	214 - <262
Visibility Minimums		
Runway Visual Range (feet)	Instrument Flight Visibility Category (statute mile)	
5000	Not lower than 1 mile	
4000	Lower than 1 mile but not lower than ¾ mile	
2400	Lower than 3/4 mile but not lower than 1/2 mile	
1600	Lower than 1/2 mile but not lower than 1/4 mile	
1200	Lower than 1/4 mile	
VIS	Visual	

SOURCE: FAA Advisory Circular 150/5300-13A, Change 1, *Airport Design*

Runway 18-36 Critical Aircraft

Over the past several years, the most demanding aircraft operating on Runway 18-36 on a regular basis include the runway design components of C-III and C-IV. These have included the Airbus A319 (C-III), Airbus A320 (C-III), Airbus A300 (C-IV), Boeing 737 (C-III), Boeing 757 (C-IV), and McDonnell Douglas 80 (C-III) series aircraft. The United States Coast Guard (USCG) also operates the Lockheed HC-130 Hercules (C-IV) on a daily basis.

All of the Airbus A300 and a majority of the Boeing 757 operations in 2017 were related to United Parcel Service's (UPS) activity at PIE, which ended in October 2017. Nonetheless, there continue to be a few Boeing 757-200 (C-IV) charters which bring Major League Baseball teams into town to play the Tampa Bay Rays; however, not enough to be considered a critical aircraft. There were also 7,898 operations conducted by the USCG Lockheed HC-130s (also C-IV) in 2017, but as documented in FAA Order 5100.38D, *Airport Improvement Program Handbook*, annual operations by military or federally-owned aircraft cannot be included for the critical aircraft determination. Therefore, the Airbus A320 (C-III) is the existing critical aircraft for Runway 18-36. In 2017, there were over 14,000 C-III aircraft operations at PIE, of which more than half (8,780) were conducted by the Airbus A320. For comparison purposes, the airfield design standards for the critical military aircraft (USCG HC-130) will also be included in the tables and sections that follow.

Given the runway's current Category II Instrument Landing System (ILS) and parallel Taxiway A offset of 500 feet, the APRCs are D-VI-2400 and D-V-1600. The 500 foot offset of Taxiway A also results in a DPRC of D-VI.

In the future, neither the parallel taxiway separation nor the ILS minimums are expected to change. However, between the expected long-haul international air charter service and planned re-establishment of dedicated all-cargo activity, D-V aircraft such as the Boeing 787 and 747 are expected to exceed 500 annual operations within the next five to ten years. The forecast chapter included projections of the weekly departures for both short- and long-haul international carriers. For the long-haul international flights, the Boeing 787 was selected as the representative aircraft to conduct these operations, since it is one of the largest in the group of international aircraft described in the forecast. For the all-cargo projections, it was stated that the size and type of aircraft was difficult to predict given that no service currently exists at PIE. Therefore, given the most common aircraft utilized for air cargo, it was conservatively assumed that 10 percent of the annual operations could be conducted by the larger D-V Boeing 747 freighters. These critical aircraft operations for Runway 18-36 are summarized in **Table 4.1-3**

TABLE 4.1-3
PROJECTED OPERATIONS BY D-V AIRCRAFT

	Boeing 787-800 (long-haul international)		Boeing 747-400F (dedicated air cargo)		Total Annual D-V Aircraft Operations
	Weekly Departures	Annual Operations	Annual Cargo Operations	Annual Operations by B747 (10%)	
Forecast					
2023	3	312	700	70	382
2028	6	624	800	80	704
2038	8	832	1,000	100	932

SOURCE: ESA analysis, 2018.

With a RDC of D-V-1200, the Boeing 787 was selected as the representative future critical aircraft for the Runway 18-36, since it alone is expected to generate more than 500 annual operations by 2028.

Runway 4-22 Critical Aircraft

A crosswind runway is recommended by the FAA when the primary runway orientation cannot provide 95 percent wind coverage. Therefore, historical wind conditions were evaluated to determine the percentage of wind coverage for the airport's current runway system. Wind coverage is based on a crosswind not exceeding 10.5 knots for aircraft with reference codes of A-I and B-I; 13 knots for reference codes A-II and B-II; 16 knots for reference codes A-III, B-III and C-I through D-III; and 20 knots for reference codes A-IV through E-VI.

FAA AC 150/5300-13A, Change 1 recommends that ten consecutive years of wind data be examined when carrying out the evaluation. Wind coverage calculations also need to take into account the different ceiling and visibility minimums associated with aircraft operations. Therefore, the most recent ten years of data for all weather, visual flight rules (VFR), and instrument flight rules (IFR) conditions were obtained from the FAA's online Windrose File Generator site. The data was used to calculate the 10.5, 13, 16, and 20 knot crosswind components shown in **Table 4.1-4** using the FAA's online Standard Wind Analysis tool.

The wind rose analysis documented that during instrument meteorological conditions, a crosswind runway is needed for the 13 knots category, which includes B-II aircraft. With a current length of 5,903 feet, Runway 4-22 is capable of supporting a large portion of the GA fleet, including those within the B-II category. Additionally, due to the 335 foot centerline offset between Runway 4-22 and the northeast end of the parallel Taxiway G, the taxiway can also accommodate unrestricted B-II aircraft operations. A review of the FlightAware data indicates that the existing critical aircraft is the Dassault Falcon 50 (B-II), which conducted 568 operations in 2017.

When combined with the existing visibility minimums, the current APRCs for the runway are B-III-5000 and D-II-5000. This means that when the occasional ADG III aircraft with a higher aircraft approach category utilize Runway 4-22, they must operate with certain limitations and/or obtain prior approval from the airport during instrument conditions. Similarly, the 335 foot offset of Taxiway G results in DPRCs of B-III and D-II, indicating that special operating procedures are required for the C-III or even D-III aircraft that might use Runway 4-22. These limitations and/or special operating procedures manage simultaneous ADG III movements on Runway 4-22 and parallel Taxiway G, in lieu of adequate centerline separation for this size aircraft.

TABLE 4.1-4
WIND COVERAGE ANALYSIS

Runway	Crosswind Component (knots)			
	10.5	**13**	**16**	**20**
All-Weather				
18-36	92.96%	96.55%	99.29%	99.87%
4-22	91.21%	95.01%	98.60%	99.71%
Combined	96.86%	98.87%	99.77%	99.97%
VFR				
18-36	93.14%	96.73%	99.44%	99.92%
4-22	91.34%	98.42%	98.72%	99.76%
Combined	96.96%	98.96%	99.83%	99.99%
IFR				
18-36	91.18%	94.74%	97.82%	99.39%
4-22	89.75%	93.72%	97.39%	99.18%
Combined	95.96%	98.00%	99.18%	99.81%

SOURCE: FAA Windrose File Generator and Standard Wind Analysis Tool, 2018.

As indicated previously, Runway 4-22 can be utilized by C-III and even D-III aircraft due to its length and width. And while a parallel taxiway might be established on the southeast side with a greater centerline separation, the future critical aircraft group for Runway 4-22 will not change. Likewise, it is not anticipated that the current instrument minimums established to either end of Runway 4-22 will change in the future. These issues are address further in other sections of this chapter. Therefore, the RDC for Runway 4-22 is B-II-5000. The Dassault Falcon 900 has been selected as the representative future critical aircraft expected to use the runway on a regular basis, as it is one of the largest within the B-II family of aircraft and representative of the newer business jet aircraft that will continue to increase activity at PIE over the planning period.

TABLE 4.1-5
CURRENT AND FUTURE RUNWAY CODES

Runway	Current Critical Aircraft	Approach Reference Code (APRC)	Departure Reference Code (DPRC)	Runway Design Code (RDC)
18-36	C-III (Airbus A320)	D-VI-2400 D-V-1600	D-VI	D-V-1200 (Boeing 787)
18-36 MILITARY	C-IV (Lockheed HC-130)	Same as above	Same as above	C-IV-1200 (Lockheed HC-130)
4-22	B-II (Dassault Falcon 50)	B-III-5000 D-II-5000	B-III D-II	B-II-5000 (Dassault Falcon 900)

SOURCE: FAA AC 150/5300-13A, Change 1, *Airport Design*.

Taxiway Design Groups

When the previous 2004 Master Plan was prepared, taxiways were designed solely based on the ADG (wingspan) of the critical aircraft they served. Now some of the taxiway design standards utilize a Taxiway Design Group (TDG) which is based on the overall width of the aircraft's main gear as well as the distance between the main gear and the cockpit. Designation of the TDG is determined through the use of a chart in FAA AC 150/5300-13A, Change 1.

This newer approach combines identification of proper taxiway width and separation dimensions with a better method for determining the required turning radii and edge fillets. The intent is to provide the appropriate taxiway geometry while minimizing excess pavement and limiting the potential for confusing layouts. As illustrated in **Table 4.1-6**, it is possible to have different taxiway design standards on an airfield, depending on which facilities they serve. Aircraft parking aprons and hangar areas will also vary based on the aircraft they serve and whether or not the facility is accessed via a taxiway or taxilane.

TABLE 4.1-6
TAXIWAY DESIGN GROUPS

Runway	Existing	Future
18-36	4	5
18-36 MILITARY	2	2
4-22	2	2/3

SOURCE: FAA AC 150/5300-13A, Change 1, *Airport Design*.

4.2 Airport Capacity

Airport capacity is defined by the FAA as a measure of the maximum number of aircraft operations that an airfield can support with reasonable levels of delay. Estimates of airfield capacity at PIE were developed in accordance with FAA AC 150/5060-5, Change 2, *Airport Capacity and Delay*. Methodologies from this AC were used to calculate the hourly capacity of the runway system and annual service volume (ASV) of the airfield. These calculations were based upon the specific airfield, operational, and meteorological characteristics at PIE on a typical day.

4.2.1 Airfield Geometry

The airfield configuration is the primary factor in determining the overall airport capacity due to its direct influence on how aircraft can operate. In theory, as the number of runways and taxiways increase, so should the capacity at a given airfield. However, the physical orientation and proximity of the various runway and taxiway surfaces may or may not contribute to the overall airfield capacity.

Runway Configuration

Under certain conditions the airport is capable of supporting simultaneous operations using both runways. Runway 18-36 has a north to south alignment and is located west of the crosswind runway (Runway 4-22) which has a northeast to southwest orientation. Since the south ends of the two runways intersect, this orientation is referred to as either an intersecting or closed “V” configuration. Different runway configuration and use diagrams are provided in FAA AC 150/5060-5, Change 2. These diagrams allow calculations reflecting both simultaneous operations and when the airfield is limited to a single runway operation.

Exit Taxiways

The capacity of a runway system is greatly influenced by the ability of aircraft to exit the runway as quickly and safely as possible. Once an aircraft has left the runway, another is able to either land or takeoff. Therefore, the number and location of exit taxiways directly influence runway occupancy time and overall capacity of the airfield system. Capacity is also enhanced if a parallel taxiway system is provided since these taxiways generally have several connector taxiways (increasing the number of runway exits) and eliminate the need to back-taxi on the runway. Both runways at PIE have parallel taxiway systems with multiple connectors.

The FAA methodology utilizes an exit factor based upon the number of connector taxiways within a certain range. The optimal range for exit taxiways varies for different runway configurations and is primarily based on the aircraft mix index (described in a following section) which varies for each of the two runways. For the purposes of the capacity calculations, each exit taxiway must also be separated by at least 750 feet. For the entire planning period, the optimal exit range is 3,000 to 5,500 feet from each landing threshold of Runway 18-36. For Runway 4-22, the exit range varies between 2,000 to 4,000 feet and 3,000 to 5,500 feet from each landing threshold. This is due to the expected changes in the mix index for Runway 4-22.

Using these criteria, the number of taxiway exits for each runway that can be used when calculating capacity are shown in **Table 4.2-1**. In the case of Runway 18-36, **Figure 4.2-1** and **Figure 4.2-2** shows that Taxiway A2 is also utilized as an exit on a regular basis, even though it does not fall within the optimal FAA range. The decommissioned Runway 9-27 pavement is also utilized by local operators during daylight hours as an exit, but not by the larger commercial aircraft operators. For Runway 4, only one taxiway is considered an eligible exit in the 3,000 to 5,500 foot range, but as shown in **Figure 4.2-3**, Taxiway G-1 is just outside this range and used as an exit on a regular basis for the larger aircraft operating on the runway.

TABLE 4.2-1
ELIGIBLE TAXIWAY EXITS FOR CAPACITY CALCULATIONS

	2,000 to 4,000 Foot Range	3,000 to 5,500 Foot Range
Runway 18	n/a	A3
Runway 36	n/a	A3
Runway 4	G2, G3	G2
Runway 22	G2, G3	G3, A

SOURCE: ESA, 2018.

4.2.2 Operational Characteristics

Operational characteristics relative to airfield capacity include the aircraft mix index, the percent of aircraft arrivals, and the percent of aircraft touch and go operations. Each of these are described in the following sections as they each are variables when estimating capacity using the FAA methodology.

Aircraft Mix Index

The FAA has designated four categories (A through D) of aircraft for capacity determinations which are based upon the maximum certificated takeoff weight, the number of engines, and the wake turbulence classifications. In the simplest terms, larger and heavier aircraft create more wake turbulence and require more spacing to allow this turbulence to subside before another aircraft travels through the same area. Likewise, as an aircraft's size and weight increases, so does the time typically needed for it to slow to a safe taxiing speed or to achieve the needed speed for takeoff. Therefore, larger aircraft occupy the runway longer than smaller ones. For these reasons, aircraft classifications are used to determine the aircraft mix index which relates directly to the capacity of the airfield.

The mix index is calculated by adding the percent of Class C aircraft plus three times the percent of Class D aircraft. The percent of Class A and B aircraft (both under 12,500 pounds) is not considered to significantly affect airfield capacity because the wake turbulence generated by these smaller aircraft dissipates fairly rapidly. Thus, the spacing can be reduced for Class A and B aircraft relative to a Class C or D aircraft. Class C aircraft include multi-engine aircraft greater than 12,500 pounds, but less than 300,000 pounds with a large wake turbulence classification. Class D are multi-engine aircraft over 300,000 pounds with a heavy wake turbulence classification. It should be noted that these capacity classes differ from the Aircraft Approach Categories described in other sections of this study.

The largest group of Class C aircraft operating at PIE is the narrow-body passenger airline fleet. However, there are also a number of business jets that fall into this category, as well as all of the USCG HC-130 Hercules, USCG HH-60 Jayhawks, and U.S. Army UH-60 Blackhawks. The Jayhawk and Blackhawk helicopters are included in the mix index calculation since they regularly operate to/from the runway environment and certainly create a wake turbulence condition for other aircraft. Base year Class D aircraft at PIE have included the all-cargo operations using the Airbus A300 and other occasional heavy aircraft operations.

In the future the percent of operations conducted by both Class C and Class D aircraft are projected to increase. The one exception to this statement is that the operations currently conducted by the Class C U.S. Army UH-60 Blackhawks will not continue in 2020 since this unit will move to MacDill Air Force Base (AFB) in December 2019. However, this decrease in the share of Class C will have limited impact from a capacity standpoint given the additional Class D aircraft anticipated as part of the expected re-establishment of all-cargo activity and the planned long-haul international air charter service.

For the planning period, the aircraft mix index for Runway 18-36 will increase from the current base year figure of 35 to 44 by the end of the planning period. It should be noted that this mix index does not change significantly under the high-growth annual operations scenario presented in the forecast chapter. While the number of Class C and D aircraft operations would increase under the high-growth scenario, their overall percentages do not increase significantly with respect to the total annual operations projected. For Runway 4-22, the aircraft mix index will initially decrease from the current base year figure of 22 to 19 by 2023 and then increase back up to 22 by the end of the planning period. The mix index values for Runway 4-22 are lower than Runway 18-36 since Class D aircraft cannot operate on this runway and the decrease in the short-term planning period reflects the decrease in the overall level of Class C using this runway after the U.S. Army's Blackhawks relocate across the bay.

Percent of Aircraft Arrivals

The percent of arrivals is simply the ratio of aircraft arrivals to total operations during a peak or average hour of operations. The FAA methodology considers a 40, 50, or 60 percent arrivals factor to compute airfield capacity. Since aircraft on final approach are given priority over departures, a higher percent of arrivals during peak periods of operations can reduce the hourly capacity due to the longer runway occupancy times for arrivals over departures. However, this is typically only considered when estimating capacity during peaks at airports with predominately commercial airline operations. While PIE has commercial service operations, they do not represent a majority of the operations. As such the percent of arrivals is assumed to equal those of departures for the majority of the time and therefore, the 50 percent arrivals factor was applied to the capacity calculations.

Percent of Touch and Go Operations

A touch and go operation refers to a training procedure in which the pilot performs a normal landing followed by an immediate takeoff, without stopping or taxiing clear of the runway. While each touch and go operation actually accounts for two runway operations (one landing and one takeoff), this procedure typically takes less time than two operations by separate aircraft. Therefore, airports with any significant touch and go operations will have a greater airfield capacity than a similar airport with less of these training operations.

The touch and go activity at PIE is significant due to the level of both GA and military flight training. The *Categorical Exclusion (CatEx) for the Rehabilitation of Runway 18-36* approved by the FAA in August of 2017 assumed that all of the local operations at PIE were touch and go operations. This was based on detailed discussions with the airport traffic control tower (ATCT) management and review of activity data. The same assumption for the level of touch and go operations has been made for this study.

4.2.3 Meteorological Conditions

Different meteorological conditions influence the utilization of an airfield's runways. Variations in the weather resulting in limited cloud ceilings and reduced visibility typically lower airfield capacity, while changes in wind direction and velocity will dictate runway usage.

Ceiling and Visibility

As weather conditions deteriorate, pilots must rely on instruments to define their position both vertically and horizontally. Capacity is lowered during such conditions because aircraft are spaced further apart when they cannot see each other. For capacity calculations, FAA AC 150/5060-5, Change 2 defines three general weather categories, based upon the height of the clouds above ground level and visibility:

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

Since PIE has precision instrument approach procedures established to both ends of Runway 18-36, a straight-in non-precision approach procedure to Runway 4, and a circling approach to Runway 22, the airport is capable of accommodating aircraft during IFR conditions. The ten years of wind, cloud ceiling, and visibility data obtained for the wind rose analysis from the FAA's online Windrose File Generator site was utilized for the capacity calculations. For PIE, the data showed that VFR conditions occurred 91 percent of the time, IFR conditions 9 percent of the time, and that PVC conditions occur much less than 1 percent of the time.

Runway Utilization

The wind coverage analysis in **Table 4.1-4** documents that on average, Runway 18-36 had slightly better coverage than Runway 4-22. However, wind coverage is not the only factor that determines operational flow, especially at an airport with an ATCT. In addition to wind conditions; the type of aircraft and type of operation are also important. Runway 18-36 typically accommodates all of the passenger airline activity, the dedicated air cargo operators, larger military aircraft, and the larger GA aircraft. Runway 4-22 typically supports the smaller GA activity and a number of rotorcraft operations, including a majority of the airport's touch and go activity. Using data from 2017 *CatEx for the Rehabilitation of Runway 18-36*, the individual runway end utilization applied to the airfield capacity calculations are shown in **Table 4.2-2**.

TABLE 4.2-2
RUNWAY END UTILIZATION

	Annual Average
Runway 18	32%
Runway 36	52%
Runway 4	7%
Runway 22	9%

SOURCE: ESA, 2018.

4.2.4 Airfield Capacity Calculations

The preceding airfield geometry, operational characteristics, and meteorological conditions were first utilized to calculate hourly capacity. The results were then applied to determine the annual service volume in order to evaluate the ability of the airfield to accommodate the projected demand.

Hourly Capacity of the Runway System

The hourly capacity for PIE was calculated by analyzing the appropriate runway-use diagrams and figures for both VFR and IFR conditions. From the diagrams and figures, the aircraft mix index and percent of aircraft arrivals were utilized to calculate the hourly capacity base. Next, a touch and go factor was determined using the percent of touch and go operations with the aircraft mix index. Finally, the taxiway exit factor was determined by the aircraft mix index, percent of aircraft arrivals, and number of exit taxiways. A weighted hourly capacity was then calculated (**Table 4.2-3**) based on the percent that VFR and IFR conditions have historically been observed for each different operational flow.

TABLE 4.2-3
HOURLY CAPACITIES OF THE RUNWAY SYSTEM

	Average VFR Hourly Capacity	Average IFR Hourly Capacity	Weighted Hourly Capacity
Base Year			
2017	77	49	74
Forecast			
2023	73	50	71
2028	71	49	69
2038	69	47	67

SOURCE: ESA, 2018.

Annual Service Volume

Annual service volume (ASV) is the overall measure of runway capacity at an airport. It represents the number of total operations that an airfield can support annually. In other words, ASV is the theoretical limit of operations that the airport can safely accommodate without unreasonable levels of delay occurring on a regular basis. To calculate ASV, first the ratio of annual demand to average daily demand, during the peak month, is calculated. Next, the ratio of average daily demand to average peak hour demand, during the same time is determined. These values are then multiplied together with the corresponding weighted hourly capacity to compute ASV. The calculated ASV is included in **Table 4.2-4** and compared to the annual operations from the approved forecasts.

A demand that exceeds ASV results in significant delays on the airfield. However, no matter how substantial an airport's capacity may appear, it should be realized that delays can occur even before an airport reaches its stated capacity. In fact, according to FAA Order 5090.5, *Formulation of the NPIAS and ACIP*, capacity enhancing projects need sufficient lead times so that the improvements can be properly planned, environmentally reviewed, designed, and constructed before the resulting delays become critical. For most every type of airfield capacity enhancing project, the FAA recommends planning for such improvements when activity levels reach 60 percent of the annual capacity. For additional exit taxiways, the activity level trigger is 50 percent of the annual capacity.

TABLE 4.2-4
AIRFIELD CAPACITY ANALYSIS

	Annual Operations	Annual Service Volume (ASV)	Capacity Level
Base Year			
2017	114,582	217,700	53%
Forecast			
2023	129,000	216,200	60%
2028	141,700	210,200	67%
2038	171,600	203,700	84%

SOURCE: ESA, 2018.

As shown, PIE will eclipse the 60 percent threshold during the 10 year forecast horizon. More specifically with the current runway and taxiway configuration, the airfield capacity will reach the 60 percent threshold at 129,000 annual operations, 70 percent at 145,000 annual operations, 75 percent at 155,000 annual operations, and 80 percent at 165,000 annual operations. These thresholds were used to set the four planning activity levels (PALs) for annual operations shown in **Table 4.1-1**. Similarly, if the approved forecast for annual operations is exceeded, the capacity levels would increase accordingly as reflected in **Table 4.2-5** which includes the annual operations projected under the high-growth scenario presented in the forecast chapter.

TABLE 4.2-5
CAPACITY LEVELS UNDER THE HIGH-GROWTH SCENARIO

	Annual Operations	Annual Service Volume (ASV)	Capacity Level
Base Year			
2017	114,582	217,700	53%
Forecast			
2023	134,800	216,200	62%
2028	153,000	210,200	73%
2038	195,100	203,700	96%

SOURCE: ESA, 2018.

4.2.5 Runway and Taxiway Flow Analysis

In addition to the FAA airfield capacity calculations, evaluations of the different airfield arrival and departure flows were made to identify any areas of concern. While the ability exists to utilize both runways simultaneously through a coordinated mix of arrivals and departures by the ATCT, the evaluation focused on the following scenarios:

- Runway 18-36 Movements – North and South Flows
- Runway 4-22 Movements – Northeast and Southwest Flows

In lieu of an airfield simulation model, assessing the different flows individually and then understanding how they can be combined for simultaneous operations, provides the simplest way to observe how aircraft movements typically occur on the current taxiway system. Through meetings and conversations with ATCT management as well as major tenants, the most common taxi routes utilized to access or exit the runway environment were documented. Documenting how the airfield is operated enables the evaluation to identify where future improvements should be considered, especially in light of the new FAA taxiway design guidance in AC 150/5300-13A, Change 1.

This evaluation included discussion on how ATCT utilizes the established land and hold short operations (LAHSO) to enhance the ability to conduct simultaneous operations on the two, non-parallel runways. LAHSO is an air traffic control procedure which increases the capacity of an airfield, without sacrificing safety. LAHSO procedures essentially enable aircraft to land and hold short of an intersecting runway or even an intersecting taxiway, thus providing the ATCT with a tool to increase capacity and reduce delays. At PIE, LAHSO provides aircraft landing on Runway 18 with 7,557 feet of runway length before affecting operations on Runway 4-22. Also, aircraft landing on Runway 22 have 4,514 feet of usable runway length before affecting operations on Runway 18-36.

Also of note for the runway and taxiway flow analysis is the use of the decommissioned Runway 9-27 pavement as a taxiway. This pavement bisects Runway 18-36 providing direct airfield connectivity for a number of facilities on both the east and west sides of the airport. However, the decommissioned runway pavement is predominantly limited to local operators who are familiar with the airfield, since there is no signage indicating the pavement for use as a taxiway and given that it does not have standard taxiway markings, including taxiway centerlines coming off of Runway 18-36. In addition, the decommission runway pavement is not lighted; therefore, its usage as a taxiway is also limited to daylight hours.

Finally, it is worth noting, that on rare occasions, commercial passenger aircraft have utilized Runway 4-22 when Runway 18-36 is not available due to maintenance or another reason. In these instances, the aircraft may have to take a takeoff weight penalty depending on the aircraft and weather conditions.

Runway 36 Movements – North Flow

Typical aircraft arrival and departure movements for Runway 18-36 in a north flow are illustrated on **Figure 4.2-1**. Generally speaking, the primary runway accommodates all of the passenger airline activity, the dedicated air cargo operators, larger military aircraft, and the larger GA aircraft. The runway is also utilized for a large number of small GA operations, as many originate from the two fixed base operator (FBO) areas on the west side of the airfield. Taxiway A is used primarily for aircraft traveling to and from either end of the runway. **Figure 4.2-1** also depicts the FAA taxiway exit range described previously as part of the capacity calculations. The primary observations include:

Arrivals

- Taxiways A1 and A2 are primarily used by larger aircraft exiting the runway and taxiing back to the passenger terminal apron and FBO areas.
- Taxiway A3 is used by both large and small aircraft exiting the runway and going to the FBO areas. It is also utilized frequently by the USCG HC-130s.
- Occasionally aircraft exit east or west onto the decommissioned Runway 9-27 pavement (daylight hours only).

Departures

- Taxiway A7 is used by all commercial aircraft and most large aircraft in order to get the full runway length for takeoff.
- Taxiways A4, A5, and A6 are typically used for intersection departures by smaller aircraft, including a number of GA business jets, coming from the FBO areas.
- Taxiways G and F are primarily used for intersection departures by small aircraft coming from the Landings Hangar Area.

Runway 18 Movements – South Flow

Typical aircraft arrival and departure movements for Runway 18-36 in a south flow are illustrated on **Figure 4.2-2**. The figure also depicts the FAA taxiway exit range and LAHSO limits described previously. The primary observations include:

Arrivals

- Taxiways A4 and A5 are primarily used by larger aircraft exiting the runway and taxiing back to the passenger terminal apron and FBO areas, including the USCG HC-130s.
- Taxiways A2 and A3 are used by small aircraft and some smaller jets exiting the runway and going to the FBO areas.
- Taxiway F is utilized primarily by small aircraft exiting the runway and going to the Landings Hangar Area.

- Occasionally local aircraft exit east or west onto the decommissioned Runway 9-27 pavement (daylight hours only).

Departures

- Taxiway A1 is used by all commercial aircraft and most large aircraft in order to get the full runway length for takeoff.

- Taxiway A2 is used by some small aircraft for intersection departures depending upon the amount of inbound air traffic.

Runway 4 Movements – Northeast Flow

Typical aircraft arrival and departure movements for Runway 4-22 in a northeast flow are illustrated on **Figure 4.2-3**. The crosswind runway typically supports the smaller GA and a number of rotorcraft operations. This includes a majority of the airport's touch and go activity. Taxiway G, as well as a portion of Taxiway A, provide access to the runway. **Figure 4.2-3** also depicts the FAA taxiway exit ranges described previously as part of the capacity calculations. The primary observations include:

Arrivals

- Taxiway G1 is used by small aircraft going to the Landings Hangar Area as well as by the larger aircraft which occasionally use the runway.

- Taxiways G2 and G3 are typically used by small aircraft conducting touch and go operations, but also by aircraft going to either the east or west sides of the airport.

- Taxiway F is used by aircraft moving from Runway 4 to the Signature FBO area.

- During daylight hours, the decommissioned Runway 9-27 pavement is used by local operators returning to the Sheltair FBO area.

Departures

- A majority of the aircraft use Taxiway A in order to get the full runway length for takeoff.

- Taxiway G3 is used for intersection departures by small aircraft typically from the Landings Hangar Area.

Runway 22 Movements – Southwest Flow

Typical aircraft arrival and departure movements for Runway 4-22 in a southwest flow are illustrated on **Figure 4.2-4**. The figure also depicts the FAA taxiway exit ranges and LAHSO limits described previously. The primary observations include:

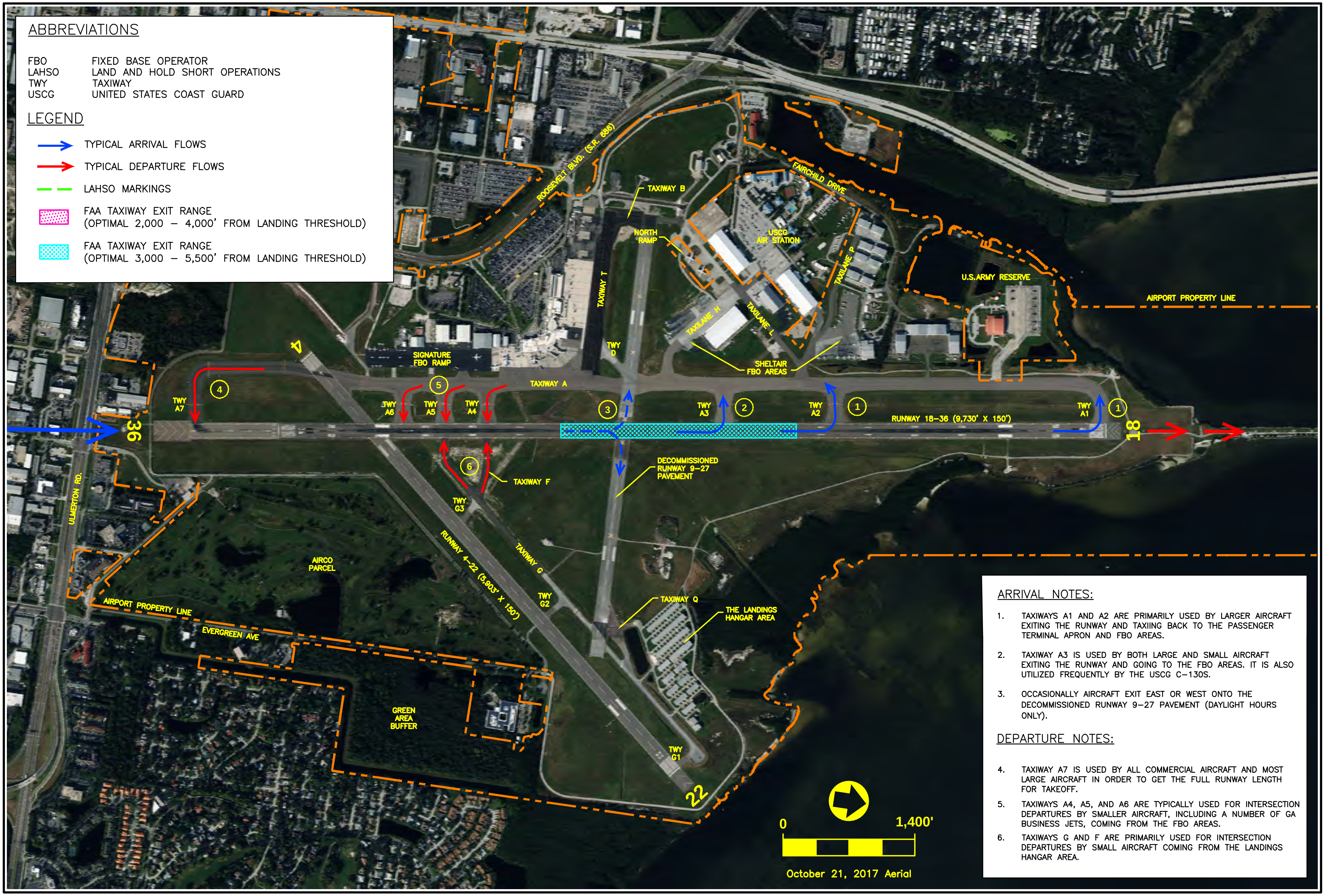
Arrivals

- Taxiways G2 and G3 are typically used by small aircraft conducting touch and go operations, but also by aircraft going to the Landing Hangar Area.

- Taxiway G3 is also used by small aircraft going to the west side of the airfield and are typically routed via Taxiway F to cross Runway 18-36.
- Taxiway A is used by small aircraft, as well as the larger aircraft which occasionally use the full runway and are going to the Signature FBO area.
- During daylight hours, the decommissioned Runway 9-27 pavement is used by local operators returning to the Sheltair FBO area.

Departures

- A majority of the aircraft use Taxiway G1 in order to get the full runway length for takeoff.
- Aircraft moving from the Signature FBO area use Taxiway A5 to access Taxiway G when departing Runway 22.
- During daylight hours, the decommissioned Runway 9-27 pavement is used by local operators moving from the Sheltair FBO area to Runway 22.



Source: ESA, 2018.

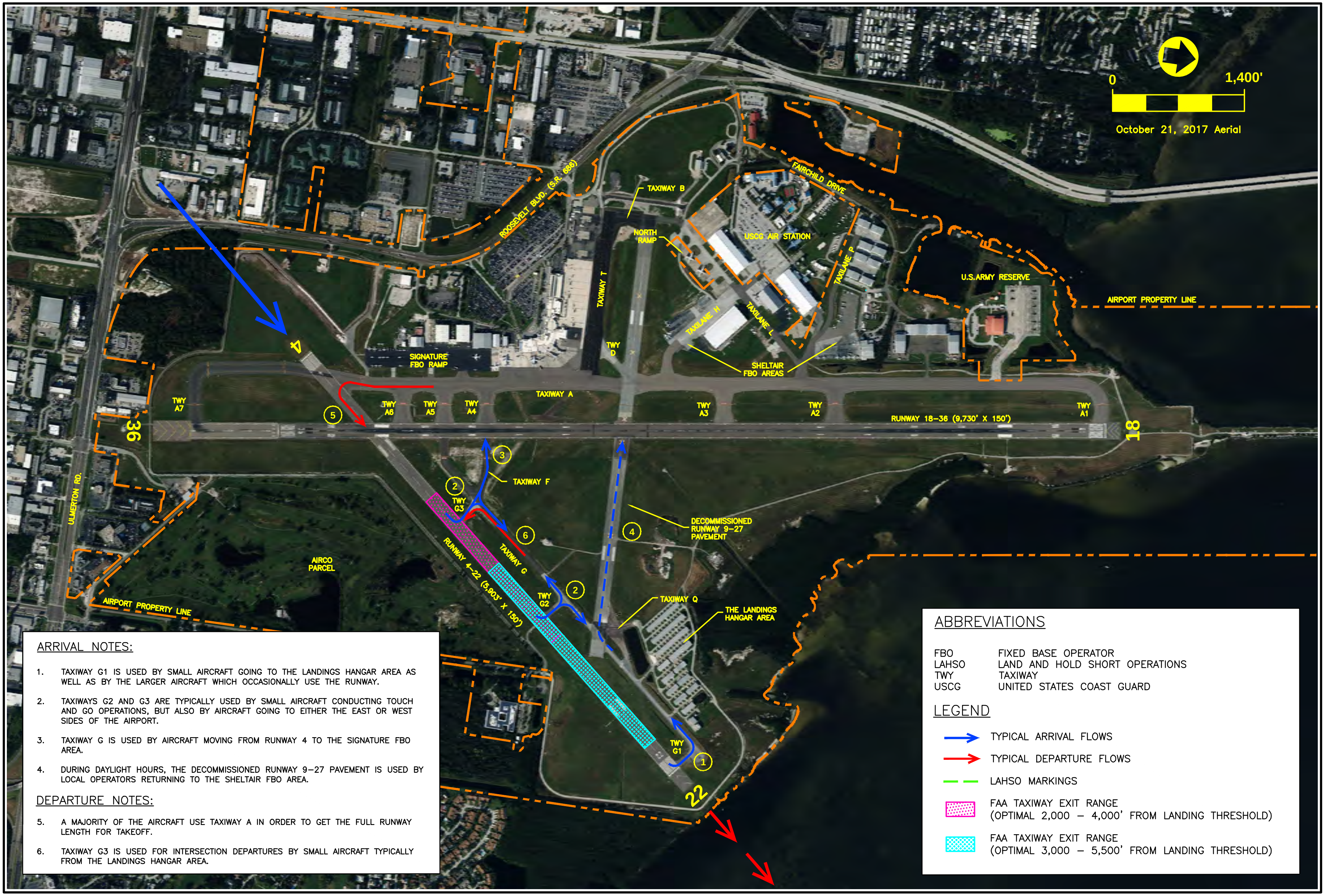
FIGURE 4.2-1
RUNWAY 36 MOVEMENTS - NORTH FLOW

Source: ESA, 2018

St. Pete-Clearwater International Airport Master Plan

FIGURE 4.2-2

RUNWAY 18 MOVEMENTS - SOUTH FLOW

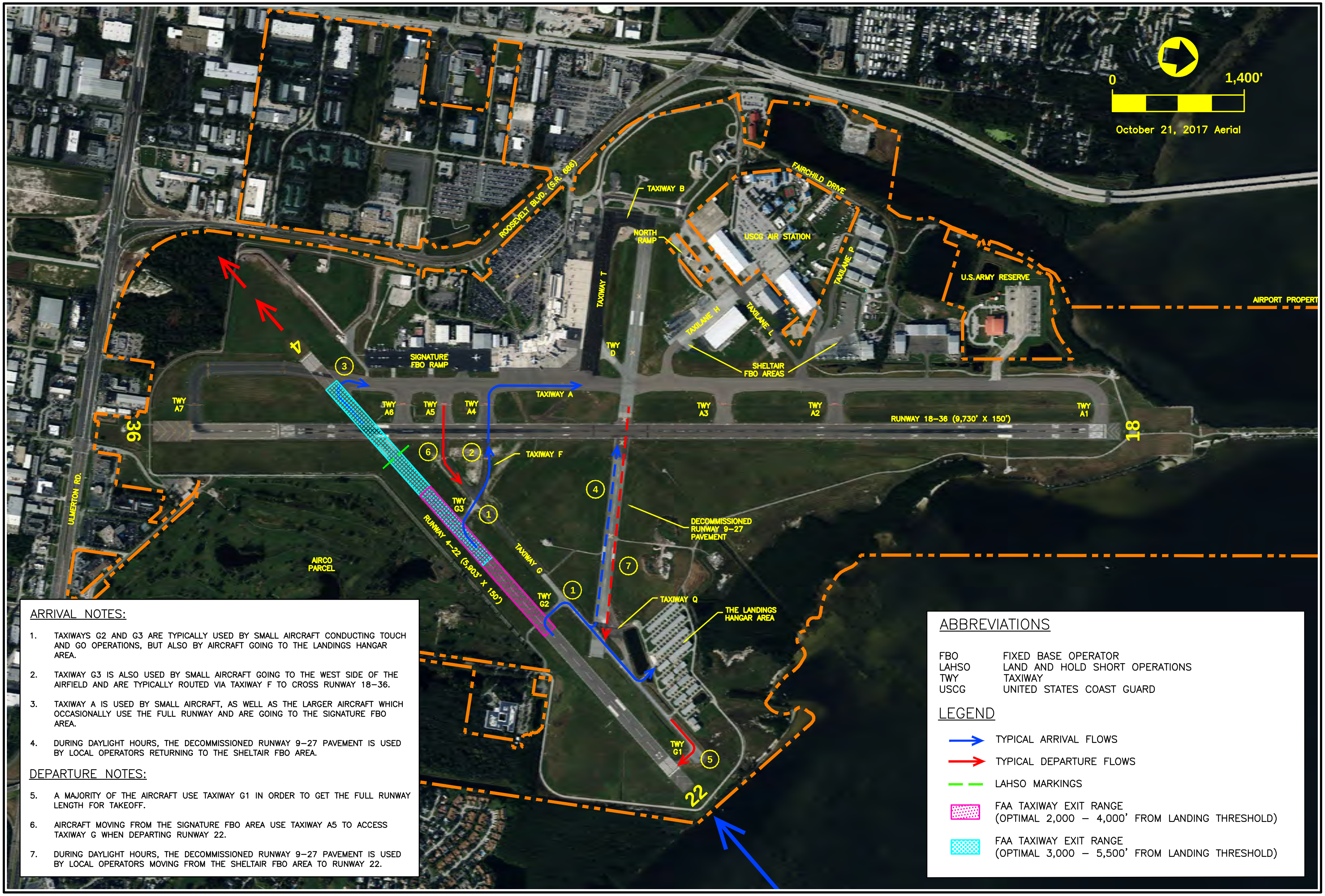


Source: ESA, 2018.

St. Pete-Clearwater International Airport Master Plan

FIGURE 4.2-3

RUNWAY 4 MOVEMENTS - NORTHEAST FLOW



ARRIVAL NOTES:

1. TAXIWAYS G2 AND G3 ARE TYPICALLY USED BY SMALL AIRCRAFT CONDUCTING TOUCH AND GO OPERATIONS, BUT ALSO BY AIRCRAFT GOING TO THE LANDINGS HANGAR AREA.
2. TAXIWAY G3 IS ALSO USED BY SMALL AIRCRAFT GOING TO THE WEST SIDE OF THE AIRFIELD AND ARE TYPICALLY ROUTED VIA TAXIWAY F TO CROSS RUNWAY 18-36.
3. TAXIWAY A IS USED BY SMALL AIRCRAFT, AS WELL AS THE LARGER AIRCRAFT WHICH OCCASIONALLY USE THE FULL RUNWAY AND ARE GOING TO THE SIGNATURE FBO AREA.
4. DURING DAYLIGHT HOURS, THE DECOMMISSIONED RUNWAY 9-27 PAVEMENT IS USED BY LOCAL OPERATORS RETURNING TO THE SHELTAIR FBO AREA.

DEPARTURE NOTES:

5. A MAJORITY OF THE AIRCRAFT USE TAXIWAY G1 IN ORDER TO GET THE FULL RUNWAY LENGTH FOR TAKEOFF.
6. AIRCRAFT MOVING FROM THE SIGNATURE FBO AREA USE TAXIWAY A5 TO ACCESS TAXIWAY G WHEN DEPARTING RUNWAY 22.
7. DURING DAYLIGHT HOURS, THE DECOMMISSIONED RUNWAY 9-27 PAVEMENT IS USED BY LOCAL OPERATORS MOVING FROM THE SHELTAIR FBO AREA TO RUNWAY 22.

ABBREVIATIONS

FBO	FIXED BASE OPERATOR
LAHSO	LAND AND HOLD SHORT OPERATIONS
TWY	TAXIWAY
USCG	UNITED STATES COAST GUARD

LEGEND

- TYPICAL ARRIVAL FLOWS
- TYPICAL DEPARTURE FLOWS
- LAHSO MARKINGS
- FAA TAXIWAY EXIT RANGE (OPTIMAL 2,000 – 4,000' FROM LANDING THRESHOLD)
- FAA TAXIWAY EXIT RANGE (OPTIMAL 3,000 – 5,500' FROM LANDING THRESHOLD)

Source: ESA, 2108.

FIGURE 4.2-4

RUNWAY 22 MOVEMENTS - SOUTHWEST FLOW

4.2.6 Recommendations for Capacity Enhancement

As identified previously, airfield capacity enhancements should be considered when the 60 percent capacity level is exceeded. Examples of enhancements to increase the capacity of the runway system include additional runways, taxiways, instrument approaches, and/or operational procedures. For PIE, potential capacity improvements do not include improved instrument approach capability or changes to the operational procedures since a majority of the operations are conducted during visual conditions and the ATCT already maximizes the runway utilization. The more effective enhancements would result from improving the overall runway and taxiway system to obtain additional capacity for the long term demand.

Improved Taxiway Exits

The number of existing taxiway exits meeting the appropriate criteria for enhancing capacity were identified in **Table 4.2-1**. Based on the FAA methodology for calculating capacity, the exit taxiway factor is not maximized for either runway at PIE. Therefore, the FAA methodology was reevaluated to estimate the ASV if the taxiway exit factor was maximized for arrivals to each runway end. The results illustrated that the overall airfield capacity could be increased; however, the airport would still see capacity figures that exceed 60 percent during the second half of the planning period (reference **Table 4.2-6**). More important relative to the current airfield configuration, no more than one additional taxiway exit (within the proper range) could be realistically be added to either runway for operations in either direction. In other words, the taxiway exit factors cannot physically be maximized as calculated in the FAA methodology.

For Runway 18-36, the potential for high-speed taxiway exits onto Taxiway A were reviewed; however, none are currently considered a critical facility need. Discussions with ATCT management as part of the overall runway and taxiway flow analysis documented that the large aircraft utilizing Runway 18-36 have no real problems being able to exit the runway in an expedited manner. The more significant issues noted were related to those times when smaller aircraft are trying to arrive or depart at the same time one of the larger aircraft operations occur. As such, the cost associated with one or certainly two high-speed exits (for operations in either direction) is not considered feasible.

Run-up Areas and Bypass Capability

Due to the level of flight training at PIE, consideration should also be given to ensure aircraft have access to a dedicated run-up area and/or bypass taxiway capability to increase the ability for aircraft to depart more efficiently. Currently there are no run-up areas on the airfield. There used to be a small one at the northeast end of Taxiway G by Taxiway G1, but it was removed as part of the taxiway reconstruction project in 2017 since it was not properly sized and, as a result, rarely used. For Runway 18-36, the configuration of Taxiways A4, A5, and A6 provide bypass capability for aircraft using Runway 36 for intersection departures while at the same time also keeping Runway 4 available for use. The 500 foot separation between Taxiways A4, A5, and A6 also facilitate wake turbulence issues between intersection departures. While there is no mechanism in the FAA methodology to quantify these characteristics or similar future improvements that would result from run-up areas or additional bypass capability, they do have the ability to increase overall capacity, especially during peak activity periods, and are addressed in a subsequent section.

Additional Capacity

Given that future taxiway improvements at PIE cannot realistically address the long term projected demand, other improvements need to be considered. The only option to significantly increase the airport capacity is to consider a new runway parallel to one of the existing runway orientations. As described previously, the touch and go activity at PIE is significant due to the level of both GA and military flight training. Airports with any significant touch and go operations have a greater airfield capacity since they do not require as much runway occupancy time as two individual aircraft operations. However, ATCT management has to continuously sequence the large and small aircraft on the runway system to accommodate the different uses and obtain some simultaneous runway operations. Segregation of these activities can significantly improve airport capacity.

Because the need for additional capacity is not related to inclement weather conditions, the new parallel runway would only require a 700 foot runway centerline to runway centerline separation, to allow simultaneous VFR operations. Under IFR, the level of activity is reduced enough that a single primary runway and crosswind runway operating environment would be sufficient to accommodate the demand during those conditions. Additionally, since the parallel runway will serve to segregate the smaller training activity, it is only need for GA aircraft. As such, the airport capacity calculations were re-run using a parallel GA runway system. For this configuration, the same information was applied for the operational characteristics and meteorological conditions. The recalculations also assumed some improvements to the existing taxiway systems. The resulting increases in capacity are shown in **Table 4.2-6**.

TABLE 4.2-6
ANNUAL SERVICE VOLUMES WITH RECOMMENDED IMPROVEMENTS

	Annual Operations	Maximum Taxiway Exits (ASV)	Capacity Level	Parallel GA Runway and Improved Taxiway Exits (ASV)	Capacity Level
Base Year					
2017	114,582	256,500	45%	453,600	25%
Forecast					
2023	134,800	250,300	52%	446,600	29%
2028	153,000	243,400	58%	433,200	33%
2038	195,100	239,800	72%	412,000	42%

SOURCE: ESA, 2018.

Because these calculations are highly dependent on varying parameters such as the aircraft fleet mix or level of touch and go operations, an updated and more specific capacity analysis will be required when annual operations at PIE are between 129,000 and 145,000 (PAL-1 and PAL-2) which reflect 60 to 70 percent of the current airfield's ASV. It is worth noting that prior to the Great Recession, PIE handled much higher numbers of annual operations, peaking around 230,000 in 2000. While the exact fleet mix for those years is not known, what is known is that for a period of time, the north half of Taxiway A was utilized as both a parallel taxiway and parallel runway (designated at Runway 18R-36L) to accommodate the demand. That dual purpose designation has since been abandoned.

Therefore, the requirements of a new parallel GA runway are addressed in the following sections while the layout options are evaluated in the airport alternatives chapter. The various configurations will include offsets to the parallel GA runway thresholds; however, these offsets will be to minimize any potential environmental impacts. Operationally, offset thresholds are only significant when simultaneous IFR approach and departure procedures must be established, which is not the case in this scenario.

The FAA will require that an Environmental Assessment (EA) for the proposed parallel GA runway be conducted. Because of the timeframe required to conduct the environmental review, as well as the actual design and construction of the improvements, planning, NEPA compliance and implementation of the parallel GA runway system should begin when PIE approaches PAL-2 at 145,000 annual operations.

4.3 Runway Requirements

As the primary airfield component, a runway must have the proper length, width, and strength to safely accommodate the critical aircraft. In addition to the physical characteristics of a runway, there are a number of other safety-related design standards that must be met, including the Runway Safety Area, Runway Object Free Area, Runway Protection Zones, and Obstacle Free Zones. Each of these, as well as other runway requirements for PIE, are described in the following sections.

4.3.1 Runway Length Analysis

FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*, provides the current standards and methods for computing recommended runway lengths. Use of this AC is required when a runway extension project is intended to request or receive federal funding. Different methods for calculating runway length are categorized by the maximum certificated takeoff weight (MTOW) groups of 12,500 pounds or less; over 12,500 pounds, but less than 60,000 pounds; and 60,000 pounds or more.

While the procedures and design rationale vary depending on the weight category, each still requires some basic airfield data. This data is used in adjusting how an aircraft's takeoff and landing performance might be influenced by the unique characteristics of a specific airport. For PIE these include the airfield elevation of 11 feet above mean sea level (AMSL) and the mean daily maximum temperature of the hottest month, which is 91 degrees Fahrenheit.

Length Required for Small Aircraft

Small aircraft are defined as those that have a maximum certificated takeoff weight of 12,500 pounds or less. The small aircraft group includes almost all single- and multi-engine (piston and turboprop) aircraft. Charts in FAA AC 150/5325-4B require the local mean daily maximum temperature and airport elevation to determine runway length for small aircraft. These runway length curves have taken effective runway gradient into consideration, so no additional adjustments are required for the lengths derived.

There are different runway length curves depending on whether the small aircraft has fewer than or more than 10 passenger seats. Using the temperature and airfield elevation data for PIE, the resulting runway length requirement ranges from 3,100 to 3,650 feet to accommodate 95 to 100 percent respectively, of the small aircraft with less than 10 passenger seats. For those small aircraft having 10 or more passenger seats a length of 4,150 feet is required.

Requirements for Large Aircraft up to 60,000 Pounds

Using approved aircraft flight manuals, FAA AC 150/5325-4B also provides performance curves to determine the runway length required for large aircraft weighing between 12,500 and 60,000 pounds. In addition to the mean daily maximum temperature and airport elevation, information on the useful load factor, effective runway gradient, and typical weather conditions are required.

Useful load refers to the difference between an aircraft's maximum allowable takeoff weight and the empty weight. As such, the useful load factor provides an indication of the amount of passengers, cargo, and fuel carried by an aircraft. In the FAA's charts there is an option to select either a 60 or 90 percent useful load factor. Essentially, the heavier the aircraft (higher useful load percentage) the more runway length required. Because of the airport's southeastern location within the nation, flights of 1,000 miles, 1,500 miles, or even longer (to get to the west coast) are common and occur on a regular basis. As a result, both the 60 and 90 percent useful loads were calculated.

The FAA performance curves for jet aircraft weighing 12,500 to 60,000 pounds are also split into the categories of 75 and 100 percent of the fleet. FAA AC 150/5325-4B provides lists of the GA jet aircraft that represent 75 percent of the fleet flying in the U.S. This list combined with a second list represents 100 percent of the U.S. business jet fleet in this weight range. The FAA's 100 percent of the fleet table includes the larger Beechcraft Hawker, Bombardier Challenger, Bombardier Learjet, Cessna Citation, and Dassault Falcon series business jets (including the future critical aircraft for Runway 4-22). All of these aircraft conduct operations at PIE on a regular basis; therefore, the 100 percent of the fleet performance curves were used. Applying local conditions to these performance curves yields an initial runway length requirement based on no wind, a dry runway surface, and zero effective runway gradient. These initial runway length requirements were 5,400 feet under a 60 percent useful load and 8,400 feet for the 90 percent useful load.

Adjustments are then made to these initial lengths for either takeoff or landing operations, but not for both, as the increases are not cumulative. Takeoff adjustments are based on the difference in centerline elevation of the runway being considered while landing adjustments are only made for runways serving jet aircraft operations. For jet runways, the length is increased by 15 percent (up to a specified limit) to account for the decrease in landing performance under wet and slippery conditions. Since the initial takeoff lengths are adjusted for the effective gradient of a specific runway, the centerline elevation difference for the most critical (Runway 4-22 at 5 feet) was applied as both runways accommodate aircraft in this weight range. After both takeoff and landing adjustments are considered, the final recommended length for large aircraft weighing between 12,500 and 60,000 pounds is 6,210 feet at a 60 percent useful load and 8,450 feet at a 90 percent useful.

Specific Lengths for Aircraft Greater than 60,000 Pounds

Airport Planning Manuals (APMs) provided by the aircraft manufacturers are used for calculating specific takeoff and landing lengths of large aircraft over 60,000 pounds. Using the appropriate performance charts for the mean daily maximum temperature of the hottest month (91 degrees Fahrenheit) and the different aircraft model and engine configurations, the takeoff distances required MTOW were calculated. In addition, the landing distances required assuming wet surface conditions and under the maximum landing weight (MLW) were also calculated.

While there are GA aircraft operating at PIE that weigh more than 60,000 pounds, most of the manufacturers of these aircraft do not publish APMs. Therefore, the lengths were calculated primarily for the commercial service fleet. As described in the forecast chapter, these include the current and future commercial passenger service, international charter, and all-cargo aircraft. Calculations were also made for the Airbus Corporate Jet (Airbus A320) and Boeing Business Jet (Boeing 737) GA aircraft since they are included in the manufacturers' APMs.

Runway Length Requirements for Maximum Certificated Takeoff Weights

The runway length required at MTOW for each commercial aircraft operating or expected to operate at PIE was calculated using the airport temperature and elevation information. This determines the length required for unrestricted operations (i.e. no weight penalties). It should be noted that depending on the aircraft manufacturer, MTOW may also be referred to as the maximum takeoff weight or maximum design takeoff weight. Regardless, all of these represent the heaviest an aircraft can be at the start of its takeoff roll, due to strength and airworthiness requirements.

Within each APM, the manufacturer provides performance charts for the specific versions, configurations, and engine types of the aircraft model produced. Yet even commercial aircraft operators with a single type of aircraft in their fleet, typically have multiple versions of the same base aircraft model, each of which has specific performance requirements. This is true for both mainline carriers that have acquired their fleets as the result of different mergers as it is for the ultra low-cost carriers that typically have a mix of both new and used aircraft.

Through interviews with Allegiant Air, Sun Country Airlines, and Sunwing Airlines this use of different models and engine configurations was confirmed. In addition, aircraft registration data for each airline was evaluated to understand and confirm the models and engine types representative of their respective fleets. The most common aircraft model and engine combination for each operator was selected since they are likely to conduct a majority of the operations at PIE.

Since most APMs have multiple MTOWs listed for a particular aircraft model and engine combination, the highest was selected for the purposes of the length analysis. However, if the aircraft included a high gross weight, long range, or extended range configuration, these were not selected to ensure consistency with the routes currently served in the PIE market. It should also be noted that the Airbus A319, Airbus A320, and Boeing 737 aircraft currently serving PIE include models with winglets (or sharklets in the case of Airbus). However, none of the APMs for these aircraft provide separate takeoff performance charts for models with winglets. For the Airbus A319-100, Airbus A320-200, and Boeing 737-700/-800 aircraft, winglets or sharklets are offered by the manufacturer, but Boeing only mentions them in their takeoff performance charts with the following note: "Non-Winglet Performance Shown. Winglet Aircraft Will Have Slightly Improved Performance."

Table 4.3-1 presents the final adjusted takeoff lengths using the MTOW of the commercial aircraft model and engine combinations. As per AC 150/5325-4B, the initial takeoff lengths were calculated using the APM performance charts for a dry runway with zero wind and zero effective runway gradient, and local conditions for PIE (i.e., temperature). The maximum difference of the Runway 18-36 centerline elevation (3 feet) was used to adjust each for effective gradient. Also per the FAA guidance, any runway lengths with 30 feet or more were rounded up to the next 100-foot interval.

Landing Length Requirements

FAA AC 150/5325-4B also provides the procedures for determining the required landing lengths. These were also evaluated using the maximum allowable landing weight, or MLW, for each aircraft. Depending on the aircraft manufacturer, MLW may also be referred to as the maximum landing weight or maximum design landing weight. Nonetheless, each represent the maximum weight an aircraft can safely land based on its strength and airworthiness requirements.

TABLE 4.3-1
TAKEOFF RUNWAY LENGTH REQUIREMENTS – MAXIMUM CERTIFICATED TAKEOFF WEIGHT (MTOW)

Critical Aircraft Model	Engine Type	Airport Reference Code (ARC)	Maximum Certificated Weight (pounds)	Runway Length (feet)
Commercial Passenger Service Fleet				
Airbus A319-100	CFM56	C-III	166,449	7,100
Airbus A320-200	CFM56	C-III	171,961	7,500
Boeing 737-700	CFM56-7B26	C-III	154,500	5,700
Boeing 737-800	CFM56-7B	D-III	174,200	8,200
International Charter Fleet				
Airbus A321-200	CFM 56	C-III	206,132	9,100
Airbus A330-300	PW4000	C-V	513,677	10,300
Boeing 757-300	RB211-535E4B	D-IV	270,000	8,400
Boeing 767-300ER	PW4062	D-IV	412,000	8,800
Boeing 787-800	GE or Rolls Royce	D-V	502,500	10,800
All-Cargo Fleet				
Airbus A300F4-600	CF6-80C2F	C-IV	375,887	7,900
Boeing 747-400F	CF6-80C2B1F	D-V	875,000	11,500
Boeing 757-200PF	PW2037	C-IV	255,000	10,100
Boeing 767-300F	CF6-80C2B7F	C-IV	412,000	9,300
General Aviation Aircraft				
Airbus Corporate Jet (A320)	CFM56	C-III	171,961	7,500
Boeing Business Jet 1 (B737)	CFM56-7B	C-III	171,000	7,300

SOURCE: Aircraft information from individual aircraft manufacturer Airport Planning Manuals and compiled by ESA, 2018.

The MLW for each aircraft evaluated was used with the corresponding APM landing chart that provided the highest landing flap setting for zero wind and zero effective gradient conditions. Depending on the aircraft manufacturer, some landing performance charts include curves for both dry and wet runway conditions. As per AC 150/5325-4B, wet runway conditions are required only for determining the landing length for turbojet aircraft. This includes all of the commercial aircraft serving or expected to serve PIE. For the APM landing charts without performance curves under wet conditions, AC 150/5325-4B recommends increasing the dry runway landing length by 15 percent. However, no adjustments for the effective runway gradient are made to landing lengths under the FAA methodology. The final landing lengths with the appropriate adjustment and rounding are included in **Table 4.3-2**.

TABLE 4.3-2
LANDING LENGTH REQUIREMENTS – MAXIMUM ALLOWABLE LANDING WEIGHT (MLW)

Critical Aircraft Model	Engine Type	Airport Reference Code (ARC)	Operating Weight (pounds)	Runway Length (feet)
Commercial Passenger Service Fleet				
Airbus A319-100	CFM56	C-III	137,789	5,400
Airbus A320-200	CFM56	C-III	142,198	5,600
Boeing 737-700	CFM56-7B26	C-III	129,200	5,500
Boeing 737-800	CFM56-7B	D-III	146,300	6,700
International Charter Fleet				
Airbus A321-200	CFM 56	C-III	171,520	6,600
Airbus A330-300	PW4000	C-V	412,264	6,900
Boeing 757-300	RB211-535E4B	D-IV	224,000	6,500
Boeing 767-300ER	PW4062	D-IV	320,000	6,300
Boeing 787-800	GE or Rolls Royce	D-V	380,000	6,200
All-Cargo Fleet				
Airbus A300F4-600	CF6-80C2F	C-IV	308,646	5,700
Boeing 747-400F	CF6-80C2B1F	D-V	666,000	8,500
Boeing 757-200PF	PW2037	C-IV	210,000	5,900
Boeing 767-300F	CF6-80C2B7F	C-IV	326,000	6,400
General Aviation Aircraft				
Airbus Corporate Jet (A320)	CFM56	C-III	142,198	5,600
Boeing Business Jet 1 (B737)	CFM56-7B	C-III	134,000	5,700

SOURCE: Aircraft information from individual aircraft manufacturer Airport Planning Manuals and compiled by ESA, 2018.

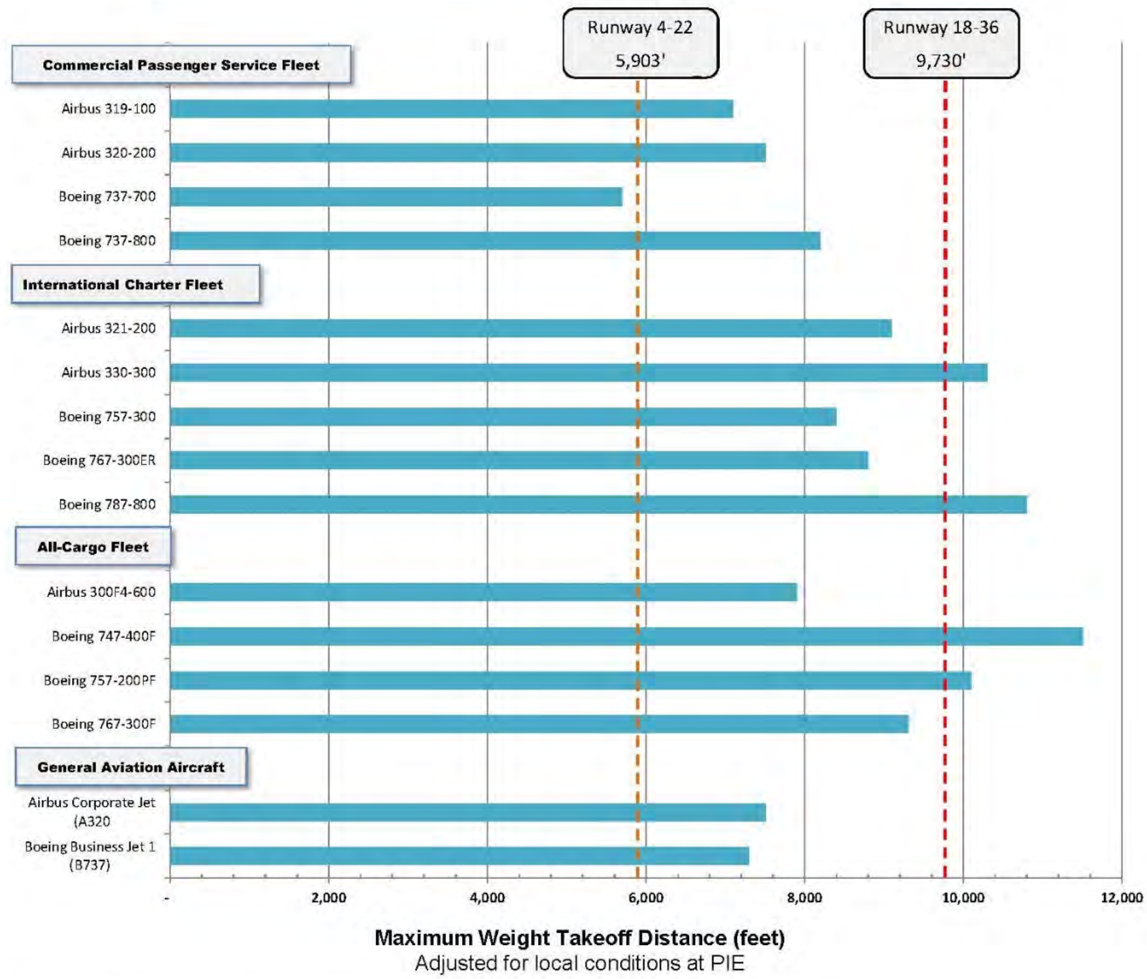
Recommended Runway Lengths

The current runway lengths at PIE are 9,730 feet for Runway 18-36, and 5,903 feet for Runway 4-22. However, declared distances have been applied to Runway 18-36 to provide the proper Runway Safety Area (addressed in a following section) and since the Runway 36 landing threshold has been displaced 930 feet due to obstructions. Therefore, depending on the type of operation on Runway 18-36, the full 9,730 feet may not be available.

Runway 18-36

PIE's primary runway, Runway 18-36 needs to be able to accommodate the landing and takeoff lengths required for any aircraft conducting 500 or more annual operations. As shown in **Table 4.3-1** and **Table 4.3-2**, as well as graphically in **Figure 4.3-1**, the current length of Runway 18-36 could accommodate all but four aircraft without any potential takeoff limitations. For the international charter fleet, both the Airbus A330-300 and Boeing 787-800 might require some additional runway length for takeoffs. Similarly, both the all-cargo Boeing 747-400F and Boeing 757-200PF might require additional runway length to operate without any sort of limitation or weight penalty. The Boeing 767-300F may also have a slight limitation when taking off on Runway 18 due to the published declared distances. For landings, all of the aircraft evaluated would be able to utilize Runway 18-36 without any weight limitations, even given the published declared distances.

Figure 4.3-1
Takeoff Distances for Aircraft Greater than 60,000 Pounds Operating or Projected to Operate at PIE



Source: Aircraft information from individual aircraft manufacturer Airport Planning Manuals and compiled by ESA, 2018.

As noted above, the runway length requirements were calculated based on the mean daily maximum temperature of the hottest month and the MTOW for each aircraft. If one of the five aircraft identified as potentially needing additional runway length at PIE were to propose operating at PIE on a regular basis at MTOW, a more detailed analysis with the aircraft operator at that time would need to be conducted based on the specific aircraft airframe, engine types, times of year (for weather), useable payload, and trip length. Regardless, the potential to provide up to 10,800 feet of length on Runway 18-36 for the future Boeing 787 critical aircraft will be evaluated in the alternatives chapter.

Runway 4-22

Based on interviews with the ATCT management and a number of the tenants at PIE, the current length of Runway 4-22 accommodates a majority of the business jet fleet. In most instances the larger business jet aircraft utilized Runway 18-36 given its overall length and even instrument approach capability. In the analysis, it was noted that the future critical aircraft for Runway 4-22 was included in the FAA's 100 percent of the fleet for those aircraft weighing between 12,500 and 60,000 pounds. The recommended runway length for this group of aircraft ranged from 6,210 feet at a 60 percent useful load to 8,450 feet at a 90 percent useful. Regardless, no additional length is required given that it is highly unlikely there would be 500 annual operations conducted on Runway 4-22 by aircraft within this group at their MTOW and on the hottest days of the year. Under these conditions, the aircraft would simply utilize the primary runway.

New Parallel General Aviation Runway

In order to provide additional airfield capacity, a new parallel GA runway is needed before the airfield reaches PAL-3 for annual operations. The new parallel GA runway would segregate the small GA aircraft (less than 12,500 pounds) conducting touch and go training operations from the activity conducted by other larger aircraft and rotorcraft. As such, the FAA runway length curves for small aircraft resulted in a range of 3,100 to 3,650 feet in order to accommodate 95 to 100 percent of the small aircraft with less than 10 passenger seats. Given that a majority of the activity would be conducted by either small single-engine or light multi-engine aircraft that would be within the 95 percent category, the new parallel GA runway should have a minimum length of 3,100 feet.

The Piper PA-44 Seminole has been selected as the representative critical aircraft for the new parallel GA runway. While there are a number of small aircraft utilized for flight training, the Piper Seminole is one of the more popular trainers in the multi-engine category. Even though the new parallel GA runway is not required to accommodate activity during IFR conditions, the ability to accommodate instrument approach procedures (addressed in a subsequent section) with visibility minimums of not lower than one mile should be planned. Therefore, the new parallel GA runway should have a RDC of A-I-5000 and taxiways with meeting TDG 1A standards. Taxiways associated with the new parallel GA runway may require higher design standards depending on the final configuration and how they tie into other portions of the airfield utilized by larger aircraft. This will be addressed as part of the alternatives chapter.

4.3.2 Runway Width Requirements

Runway width requirements are based on the runway design standards (AAC and ADG) of the most critical aircraft. The existing and future requirements for each runway are listed in **Table 4.3-3** along with the corresponding runway shoulder width and blast pad dimensions.

TABLE 4.3-3
RUNWAY WIDTHS, SHOULDERS, AND BLAST PADS REQUIREMENTS

	Critical Aircraft	Pavement Width	Shoulder Width	Blast Pad Width	Blast Pad Length
Existing Design Standards					
Runway 18-36	C-III	150’	25’ paved	200’	200’
Runway 4-22	B-II	75’	10’ stabilized	95’	150’
Future Design Standards					
Runway 18-36	D-V	150’	35’ paved	220’	400’
Runway 4-22	B-II	75’	10’ stabilized	95’	150’
New Parallel GA Runway	A-I	60’	10’ stabilized	80’	60’

SOURCE: FAA AC 150/5300-13A, Change 1, *Airport Design*.

Currently Runway 18-36 has the proper width for both the existing and future critical aircraft. However, the current 15 foot paved shoulders are substandard for both the existing and future conditions. Similarly, the blast pad on the Runway 18 end is currently 180 feet wide and 150 feet long, which is smaller than what is required for both the existing and future conditions.

At 150 feet wide, Runway 4-22 provides the pavement width required for both the existing and future critical aircraft. This extra runway width also serves to provide the minimum ten foot stabilized shoulders required. And while the paved blast pad on the Runway 22 end is of the proper size, there is not one located on the other end. Since the runway is utilized by jet aircraft on a regular basis, it is recommended to have paved blast pads on both ends to prevent soil erosion. Therefore, a project to construct a paved 95 foot wide by 150 foot long blast pad for the Runway 4 end should be conducted in the near term planning period.

The future parallel GA runway requires a width of 60 feet with 10 foot stabilized shoulders. This width would also allow instrument approach procedures with not lower than on mile visibility minimums to be established. While the centerline spacing for this runway would only allow simultaneous VFR operations, the ability to establish such instrument approaches to both ends should be considered since they would not alter the design standards for the runway. The new parallel will also require 80 foot wide by 60 foot long paved blast pads at each end to prevent erosion from propeller wash.

4.3.3 Runway Pavement Strength and Condition

Pavement strength requirements for each runway at an airport are predicated upon the critical aircraft's weight and how that weight is distributed through the landing gear. The Pavement Condition Index (PCI) provided for each runway in the existing conditions chapter was based on the June 2015 Florida Department of Transportation (FDOT) pavement evaluation report.

For Runway 18-36, the pavement strength documented in the existing conditions chapter is more than adequate for the current and future critical aircraft at MTOW. Regardless, the 2015 pavement evaluation report documented that Runway 18-36 needed to be rehabilitated as soon as possible due to the area weighted PCI of 68 (fair). During this master plan, PIE accepted a grant to rehabilitate the Runway 18-36 pavement. The project is expected to be completed by 2020.

For Runway 4-22, the current pavement strength can accommodate both the existing and future critical aircraft at MTOW. The pavement condition was documented with an area weighted PCI of 96 (good) since it had been rehabilitated just prior to the 2015 pavement evaluation. The new parallel GA runway pavement needs to be able to accommodate, at a minimum, 12,500 pound aircraft with a single wheel landing gear configuration. If the final airfield configuration is such that larger aircraft might taxi across portions of the new parallel GA runway, then consideration needs to be given to those areas that would accommodate the ground movements of aircraft heavier than those utilizing the new runway for takeoff and landing.

Projects to rehabilitate runway pavements are routinely conducted every 15 to 20 years after the previous major rehabilitation, strengthening, or new construction. These projects, which repair damage to the runway pavement resulting from normal wear, need to be conducted even at airports with regular pavement maintenance programs, including crack sealing and surface seal coats. Recurring projects to maintain general airfield pavements need to be programmed throughout the planning period. Additionally, the FAA considers the grooving of any runway serving or expected to serve jet aircraft as a high safety priority. Therefore, both Runways 18-36 and Runway 4-22 should continue to remain grooved. Grooving of the new parallel GA runway surface is not required.

4.3.4 Runway Safety Criteria

The primary surfaces to protect aircraft operations include the Runway Safety Area, Runway Object Free Area, Runway Protection Zones, and Obstacle Free Zones. The FAA definitions for these surfaces are included below and each, as well as a number of others, are depicted on the Airport Layout Plan (ALP) drawing set:

> **Runway Safety Area (RSA) -** A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overrun, or veer off the runway. The RSA needs to be: (1) cleared and graded with no potentially hazardous ruts, humps, depressions, or other surface variations; (2) drained by grading or storm sewers to prevent water accumulation; (3) capable, under dry conditions of supporting the occasional passage of aircraft without causing structural damage to the aircraft; and (4) free of objects,

except for those that need to be located in the safety area because of their function. It should be noted that the FAA does not allow modifications to any RSA standards.

Runway Object Free Area (ROFA) - The ROFA is centered on the runway centerline. Standards for the ROFA require clearing the area of all ground objects protruding above the RSA edge elevation. Except where precluded by other clearing standards, it is acceptable to place objects that need to be located in the ROFA for air navigation or aircraft ground maneuvering purposes and to taxi and hold aircraft in the ROFA. Objects non-essential for air navigation or aircraft ground maneuvering purposes are not to be placed in the ROFA. This includes parked airplanes and agricultural operations.

Runway Protection Zone (RPZ) – The RPZ is trapezoidal shaped area typically beginning 200 feet from the usable pavement end of a runway. The primary function of this area is to preserve and enhance the protection of people and property on the ground. While there is no vertical component, airports are required to maintain control of each runway's RPZ. Such control includes keeping the area clear of incompatible objects and activities. While not required, this control is much easier to achieve and maintain through the acquisition of sufficient property interests in the RPZs.

Runway Obstacle Free Zone (ROFZ) - The ROFZ is a three-dimensional volume of airspace centered on the runway that supports the transition of ground to airborne operations (or vice versa). The ROFZ clearing standards prohibit taxiing, parked airplanes, and other objects, except frangible navigational aids or fixed-function objects (such as signage), from penetrating this zone. Precision instrument runways also require an Inner-transitional OFZ and Precision OFZ. If there is an approach lighting system, then an Inner-approach OFZ is also required.

Dimensions of the required RSA, ROFA, RPZ, and ROFZ shown in **Table 4.3-4** are directly related to runway design standards (AAC and ADG) and visibility minimums. Because the current and future critical aircraft for each runway is within the same general group of aircraft and since there are no significant changes expected to the instrument approach minimums (addressed in a subsequent section), both the existing and future runway safety criteria will remain the same throughout the planning period. For Runway 18-36, the 1,000 foot RSA and ROFA lengths are for the protection of takeoffs and reflect the space required beyond the departure end of the runway. For landing operations, the RSA and ROFA lengths only need to be 600 feet prior to the threshold.

TABLE 4.3-4
EXISTING AND FUTURE RUNWAY SAFETY CRITERIA

	Runway Safety Area	Runway Object Free Area	Runway Protection Zone	Runway Obstacle Free Zone
Runway 18-36	500' wide 600' prior 1,000' beyond	800' wide 600' prior 1,000' beyond	1,000' x 1,750' x 2,500' (Approach RPZ – both ends) 500' x 1,010' x 1,700' (Departure RPZ – both ends)	400' wide 200' beyond
Runway 4-22	150' wide 300' prior / beyond	500' wide 300' prior / beyond	500' x 700' x 1,000' (both ends)	400' wide 200' beyond
New Parallel GA Runway	120' wide 240' prior / beyond	250' wide 240' prior / beyond	250' x 450' x 1,000' (both ends)	250' wide 200' beyond

SOURCE: FAA AC 150/5300-13A, Change 1, *Airport Design*.

While both runways have compliant RSAs, ROFAs, and ROFZs, periodic trimming of some vegetation at the north end of Runway 18-36 is required to keep the ROFA clear of obstructions. As noted previously, declared distances have been applied in order to achieve the proper RSA for Runway 18-36, as well as to account for the displaced threshold to Runway 36. The use of declared distances is typically limited to those airport facilities that cannot provide certain design standards without shifting the landing thresholds and/or departure points of a runway. The application of declared distances is runway specific and requires FAA approval. Under declared distances, four different lengths are calculated for operations to/from a specific runway end. These distances are used by pilots to determine whether or not their aircraft (in a given configuration) can takeoff or land based on the lengths available. Declared distances include:

TORA	Takeoff Run Available
TODA	Takeoff Distance Available
ASDA	Accelerate Stop Distance Available
LDA	Landing Distance Available

The RSA needs to extend 1,000 feet beyond the distance declared for both the ASDA and LDA. In addition, there needs to be 600 feet of RSA prior to the landing threshold for the LDA calculations. For takeoffs and landings on Runway 18, there is only 450 feet of full width RSA available beyond the runway end; therefore, the ASDA and LDA must both be reduced by 550 feet. For takeoffs on Runway 36, there is only 920 feet of full width RSA available beyond the runway end; therefore, the ASDA and LDA must both be reduced 80 feet. For landings on Runway 36, the LDA needs to be further reduced by 930 feet due to the displaced threshold location. The declared distances published for Runway 18-36 are shown in **Table 4.3-5**.

TABLE 4.3-5
PUBLISHED DECLARED DISTANCES FOR RUNWAY 18-36

	TORA	TODA	ASDA	LDA
Runway 18	9,730’	9,730’	9,180’	9,180’
Runway 36	9,730’	9,730’	9,650’	8,720’

SOURCE: FAA Chart Supplement, May 24, 2018.

When declared distances are applied, separate Approach and Departure RPZs may be required on each runway end. This is the case on the approach end of Runway 36 due to the 930 foot displaced threshold. The Approach RPZ begins 200 feet prior to the landing threshold (displaced or not), while the Departure RPZ would begin 200 feet beyond the length declared for the TORA. At PIE, the areas encompassed by the existing RPZs off the approach ends of both Runway 18 and Runway 4 are entirely within the airport property boundary. For the approach end of Runway 36, approximately 39.4 acres of the Approach RPZ is located off airport property and for the Runway 18 Departure RPZ, approximately 11.7 acres extend off airport property. Within these areas are public roads and their associated right-of-ways, as well as a number of commercial business located along Ulmerton Road. For the approach end of Runway 22, approximately 9.5 acres of the RPZ extends beyond the airport property line and over Old Tampa Bay. Each RPZ extending off-airport property will be evaluated as part of the airport development alternatives with respect to the FAA’s current guidance on compatible land uses within RPZs.

In addition to the ROFZ for Runway 18-36, Inner-transitional OFZs and Precision OFZs are also required due to the precision approaches with lower than ¾ mile visibility minimums. The Inner-transitional OFZ is based on the type of precision approach established and the most demanding wingspan of the critical aircraft for the runway. The Precision OFZ is a defined volume of airspace 800 feet wide and 200 feet from the threshold. Finally, an Inner-approach OFZ is required for any runway end where an approach lighting system has been installed. The Inner-approach OFZ begins 200 feet from the threshold (end of Precision OFZ) and extends 200 feet beyond the last light unit of the associated approach lighting system. Its width is the same as the ROFZ and it rises at a slope of 50 (horizontal) to 1 (vertical) from its beginning.

4.3.5 Line-of-Sight Requirements

As part of the design and safety criteria, there are also two critical line-of-sight requirements that must be considered. The first is the Runway Visibility Zone (RVZ) which protects the proper line-of-sight between both existing and future runway configurations. A clear RVZ allows aircraft operating on the airfield to verify the location and movements of other aircraft and vehicles on the ground that could create a conflict. This zone must be kept clear of any fixed or movable objects (parked aircraft) at PIE while the ATCT is closed. The other line-of-sight requirement is directly related to the ATCT and the ability for the controllers to have an unobstructed view of all existing and future aircraft movement areas. In addition to other setbacks and imaginary surfaces, the ATCT line-of-sight is a critical element when considering the location and height of future airport facilities, as well as the location of future aircraft movement areas. While the overall ATCT height is 172 feet AMSL, all future ATCT line-of-sight calculations need to be based on the established eye height for the ATCT cab which is 145 feet AMSL.

4.4 Taxiway System Requirements

Taxiway systems include parallel taxiways, entrance/exit taxiways, connector taxiways, apron taxilanes, hangar taxilanes, by-pass taxiways, and run-up areas. Circulation of the airport's three future critical aircraft were utilized to establish the minimum taxiway system requirements for the two existing runways and future parallel GA runway. Some of the taxiway standards reflected in **Table 4.4-1** are based on the newer TDG while others still remain a function of the critical aircraft's ADG.

TABLE 4.4-1
MINIMUM TAXIWAY SYSTEM REQUIREMENTS

Taxiways Serving	Width	Safety Area	Object Free Area	Offset to Runway
Runway 18-36	75'	214'	320'	400'
Runway 4-22	50'	79'	131'	400'
New Parallel GA Runway	25'	49'	89'	150'

SOURCE: FAA AC 150/5300-13A, Change 1, *Airport Design*.

4.4.1 Taxiways and Taxilanes

Since the last master plan was conducted, the FAA has implemented new guidance on taxiways, primarily with respect to fillet design and layouts to enhance the safety of aircraft movements by minimizing the potential for runway incursions. An overview of the existing and future design standards for each taxiway is provided in **Table 4.4-2** while the location for each are depicted on **Figure 4.4-1**. In some instances, the future design criteria noted may change based on the final airfield development and therefore type of aircraft served by a taxiway. Specific information is provided after the table for the existing taxiways and taxilanes needing improvements beyond periodic maintenance.

As with runway pavements, projects to rehabilitate the taxiways are routinely conducted every 15 to 20 years after the previous major rehabilitation, strengthening, or new construction. As documented in the existing conditions chapter, a majority of the taxiways and taxilanes at PIE have been recently rehabilitated, including a number since the 2015 FDOT pavement evaluation.

Taxiway A

In 2018 the FAA Southern Region identified the holding position on Taxiway A south of the intersection with Runway 4-22 as a potential runway incursion mitigation location, due to two incursions reported in this area. As such, this location was evaluated to determine what, if any, improvements may be required. After a detailed review, which included airport operations management, ATCT management, and the FAA Orlando Airports District Office, it was determined that this location had all of the proper pavement markings, lighting, and signage required, to include enhanced taxiway centerline markings and runway guard lights (commonly known as wig-wag lights) prior to the holding position. Since that time, an additional sign was installed on the left hand side of the taxilane connecting the aircraft parking apron closest to this Taxiway A holding position location. The new sign reads, "CAUTION - RUNWAY HOLDING POSITION AHEAD." It should also be noted that none of PIE's 14 CFR Part 139 certification inspections (including the most recent in May of 2019) resulted in any discrepancies for this location. Therefore, it has been determined that no additional changes or improvements are necessary for this location, at this time.

TABLE 4.4-2
INDIVIDUAL TAXIWAY AND TAXILANE STANDARDS

Taxiway	Minimum Width	Existing TDG - ADG	Future TDG - ADG	Meets Current FAA Standards
A	75'	5 – IV	5 – V	Yes
B	50' (north half)	4 – IV	4 – IV	Yes
B	75' (south half)	5 – IV	4 – IV	Yes
D	75'	4 – IV	5 – V	Yes
F	50'	3 – III	3 – III	Yes
G	50'	3 – III	3 – III	All except Taxiway G3
Q	25'	1B – I	1B – I	Yes
T	75'	4 – IV	4 – IV	Yes
Taxilane				
H	60'	3 – III	3 – III	Yes
L	50'	3 – III	3 - IV	Yes
P	50'	3 – I	3 – I	Yes

SOURCE: October 21, 2017 Airports Geographic Information Systems (AGIS) mapping of PIE and ESA, 2018.

Taxiway D

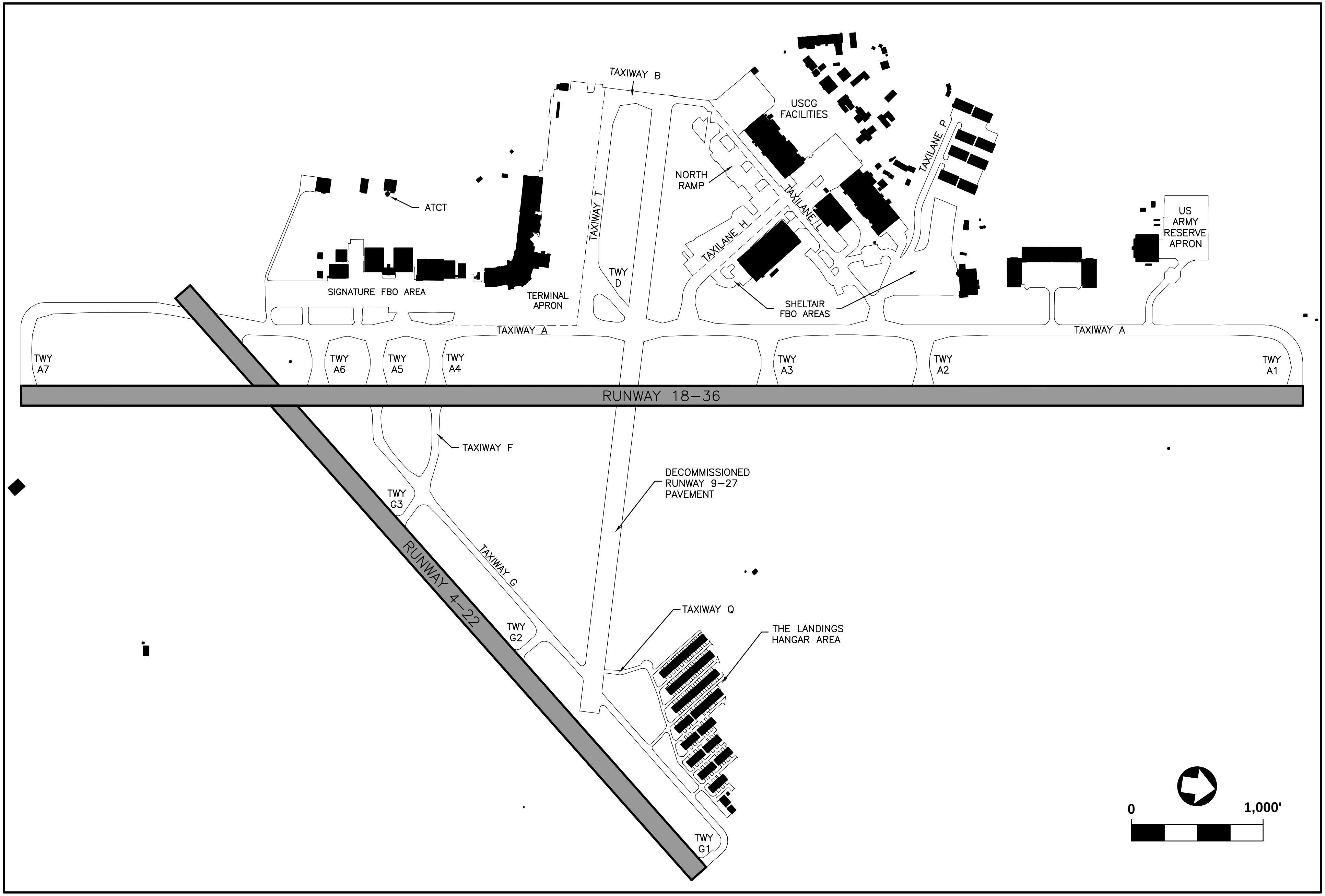
In the 2015 FDOT pavement evaluation, Taxiway D was assigned an area weighted PCI of 49 (poor) and recommended for rehabilitation as soon as possible. However, given the eventual expansion of the passenger terminal apron, the project has not been considered a priority given that Taxiway D will be removed in the near future. Therefore, the airport will continue to utilize and maintain this pavement until such time it is considered unsafe for the passage of aircraft.

Taxiway G

Connector Taxiway G3 is at a 78 degree angle with Runway 4-22 versus the FAA standard of 90 degrees. Right angle connector taxiways provide the best visibility left and right for pilots when approaching the intersection with a runway. The alternatives chapter addresses providing a right angle taxiway at this intersection to improve the visibility with the runway environment.

Taxilane L

Taxilane L is comprised of different sections of pavement along its length between Taxiway A and Taxiway B. In the 2015 pavement report, the overall area weighted PCI was 85 (satisfactory), with individual PCIs for the taxilane ranging between 32 (very poor) to 100 (good). The worst sections, which bisect the USCG facilities and North Ramp, were recommended for rehabilitation as soon as possible. However, this portion of Taxilane L is part of a perpetual easement with the USCG, where they are responsible for the condition and maintenance of the taxilane.



Source: ESA, 2018

FIGURE 4-4.1
EXISTING AIRFIELD PAVEMENT AREAS

4.4.2 Apron Edge Taxiways and Hangar Taxilanes

Taxiway A and Taxiway T also serve as apron edge taxiways to the aircraft parking positions of the passenger terminal apron. Because of this dual role, aircraft ground movements along either can be delayed when an aircraft is pushing back from an aircraft parking position. In the future, especially as the commercial passenger activity continues to increase, dedicated apron edge taxiways or taxilanes are needed. These can be located either within or outside the aircraft movement area, so long as they provide the bypass capability necessary to avoid blocking other aircraft ground movements around the passenger terminal area.

There are a number of taxilanes serving different aircraft hangar facilities on the airfield that do not have a designation. On the west side of the airfield, two taxilanes extend north off Taxilane P to provide access to the eight clearspan hangars within the Sheltair FBO leasehold, referred to as Pirates Cove. On the east side of the airport there are a number of taxilanes that provide access to the Landings Hangar Area off of both Taxiway G and Taxiway Q. Since these taxilanes are within the leaseholds of the tenants operating the facilities, they were not included in the FDOT pavement evaluation. Similarly, future improvements are subject to the terms of the individual leaseholds.

4.4.3 New Taxiways and Taxilanes

The following sections address the need for new taxiways and taxilanes in order to support the activity projected in the aviation forecasts.

Parallel Taxiways

Currently PIE is sufficiently served by the parallel taxiway systems for each runway. However, in the future there will be the need for at least three new parallel taxiway systems as described in the following sections.

Parallel Taxiway East of Runway 18-36

The redevelopment of the Airco Parcel in the short-term planning horizon will require the construction of parallel taxiways on the southeast side of the current runway system. As documented, in the *EA for the Redevelopment of the Airco Parcel*, a partial parallel taxiway east of Runway 18-36 will need to be 75 feet wide. This taxiway would also need the ability to accommodate ADG V aircraft with a TDG 5 designation and provide a minimum runway centerline to taxiway centerline separation of 400 feet to support the larger aircraft ultimately expected to operate in the area.

Parallel Taxiway Southeast of Runway 4-22

Also documented in the *EA for the Redevelopment of the Airco Parcel*, a partial parallel taxiway southeast of Runway 4-22 will be needed. Because the redevelopment of the Airco Parcel will accommodate larger aircraft, this taxiway would need to be 50 feet wide to accommodate ADG III aircraft with a TDG of 3 and a runway centerline to taxiway centerline separation of 300 feet. While this exceeds the minimum runway centerline to taxiway centerline separation required for Runway 4-22's critical aircraft (240 feet for B-II aircraft), FAA AC 150/5300-13A, Change 1 states that if a taxiway serves larger aircraft, the runway to taxiway separation distance should be based on the ADG of the larger aircraft. This is why the current ALP shows a 300 foot separation for the future parallel taxiway on the southeast side of Runway 4-22.

Parallel Taxiway to New Parallel General Aviation Runway

Given the current airfield configuration, the new parallel GA runway will need to have a full length parallel taxiway that ties into the existing taxiway system. The parallel taxiway would need to be 25 feet wide, have the ability to accommodate ADG I aircraft with a TDG of 1A, and a minimum runway centerline to taxiway centerline separation of 150 feet.

Additional Taxiway Exits

At least one additional connector taxiway within the appropriate exit range for Runway 18-36 should be provided to decrease the runway occupancy time for aircraft arrivals. These ranges were illustrated for the different operational flows on **Figure 4.2-1** and **Figure 4.2-2**. A properly designed, marked, and lighted taxiway along the decommissioned Runway 9-27 pavement could be utilized by aircraft landing in either direction on Runway 18-36. During the various capacity calculations, flow analyses, and discussions with ATCT management, it was determined that high speed exists were not needed nor could their cost be justified since one would be needed for each direction of operation. Conversely, ATCT management also noted that the ability to occasionally use the decommissioned Runway 9-27 pavement as a taxiway was invaluable. This use is limited to mostly local operators of the smaller aircraft since there are no official taxiway markings, signage, or lights along the pavement section. In fact, it is such an efficient east/west connector for the airfield that ATCT management indicated converting it to a permanent taxiway was their highest airfield improvement priority.

For Runway 4-22, an additional connector taxiway within the appropriate exit ranges shown on **Figure 4.2-3** and **Figure 4.2-4** should also be considered. Given the current connectors to Taxiway G, an additional connector would most likely be included as part of the new parallel taxiway on the southeast side of the runway. The appropriate exit ranges for both runways will be considered as part of the runway development alternatives.

Access Taxilanes

Various taxilanes will be required to access future airfield facilities as they are developed. The final configuration will depend on the ultimate hangar sites and aircraft parking apron areas while the taxilane widths will be contingent on the intended use by different aircraft. The layouts of any additional taxiways and taxilanes will depend upon the facilities they are constructed to serve.

4.4.4 Run-up Areas

The FAA recommends providing holding bays or run-up areas when a runway's operations reach a level of 30 operations per hour. The activity forecasts showed that PIE conducted up to 39 operations during the peak hour in 2017 on the current two runway system. At a minimum, run-up areas for ADG I size aircraft need to be considered for both ends of Taxiway A given the mix of flight training and large aircraft activity that occurs on Runway 18-36. This will facilitate the efficiency of operations on the primary runway until additional airfield capacity can be provided by a parallel GA runway. Run-up areas for Runway 4-22 are not considered necessary given the more similar mix of aircraft that utilize that runway as well as the fact that the run-up area that use to exist off the northeast end of Taxiway G was rarely used. Any future run-up area or bypass area will need to take ATCT line-of-sight into consideration and insure the area can accommodate ADG I aircraft without impacting the movement of aircraft along the adjacent taxiway. This would include making sure the project includes the proper entrance and exit, as well as other markings to provide appropriate wingtip clearances.

4.5 Instrument Approach Procedures

As detailed in the existing conditions chapter, instrument approaches enable pilots to safely descend into the airport environment for landing during times of inclement weather and/or reduced visibility. There are three categories for instrument approaches: precision approaches, approach procedures with vertical guidance, and non-precision approaches.

While instrument procedures are runway end specific, the authorization to establish any new approach begins with an Airport Airspace Analysis. The subsequent approval process of the ALP drawings created as part of this study will include an Airport Airspace Analysis conducted by the FAA to determine the ability of the runways to accommodate any new instrument approach minimums proposed. When an actual instrument procedure is requested by the airport sponsor, all requirements, including the proper environmental review, desired approach minimums, whether circling approach procedures are desired, the survey needed to support the procedure, and the approved ALP must be provided to the FAA. The following sections as well as other sections of this chapter discuss these requirements, which are also reflected on the final ALP drawing set.

4.5.1 Precision Approaches

The aviation activity forecasts identified that 38 percent of the activity at PIE was conducted as an instrument operation under an instrument flight plan; however, only a small portion of these were conducted under actual instrument conditions. The previous section on airfield capacity documented that over the last 10 years, actual instrument meteorological conditions have occurred 9 percent of the time. Discussions with ATCT management and aircraft operators at PIE confirmed that the current precision approaches established to both ends of Runway 18-36 are sufficient.

4.5.2 Approach Procedures with Vertical Guidance

Approach procedures with vertical guidance have only been established to the ends of Runway 18-36. While one has been planned to the end of Runway 4 for a number of years, it has yet to be established. This is likely due to the setbacks required to properly accommodate such approaches which will be addressed in the alternatives chapter. Additionally, due to the predominant use of Runway 18-36 (84 percent of the time) and actual times when instrument conditions exist, approach procedures with vertical guidance are not necessarily needed for Runway 4-22.

4.5.3 Non-Precision Approaches

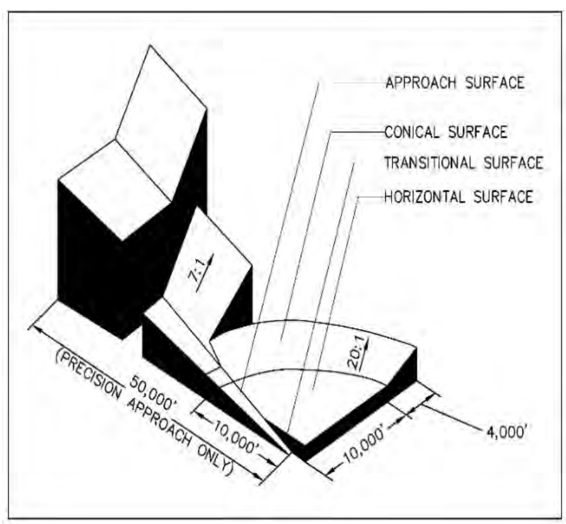
Non-precision approach procedures are one of the easiest to establish at an airport given the smaller setbacks required and the fact that they can be based on either Global Positioning System (GPS) or on-airfield navigational aids such as the VHF omnidirectional range (VOR) at PIE. Non-precision approaches can provide procedures with straight-in lateral guidance only to a runway end or circling procedures to the airport environment, during instrument conditions where the visibility is not lower than ¾ of a statute mile. Currently all four runway ends have established non-precision approach procedures which provide one mile visibility minimums. For Runway 4 and Runway 36, the non-precision approaches are straight-in procedures while the ones for Runway 18 and Runway 22 are circling procedures. No improvements are needed for Runway 18 given it also has both precision approach and approach procedures with vertical guidance. For Runway 22, a more sophisticated approach has not been established due to the proximity of Tampa International Airport's airspace. It should also be noted for Runway 22 that the FAA classifies runways with only circling approach minimums as visual runways.

While the new parallel GA runway is not required to provide capacity during instrument conditions, non-precision approaches with visibility minimums of not lower than one mile should be established to both ends. This would provide additional utility to the runway without a significant cost given the setbacks required and ability to establish either through GPS or the on-airfield VOR. FAA AC 150/5300-13A, Change 1 requires a Non-Vertically Guided Survey (NVGS) for any new non-precision approach. Information related to the details of this survey requirement is found in FAA AC 150/5300-18B, *General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collection and Geographic Information System (GIS) Standards*. Essentially, this AC provides the specifications for the collection of airport survey data needed to support the aeronautical and airport engineering information required.

4.5.4 14 CFR Part 77 Imaginary Surfaces

The airspace around airports is protected by the imaginary surfaces defined in Title 14 Code of Federal Regulations (CFR) Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*. When combined, the five different imaginary surfaces of this federal regulation protect airspace and the ability for aircraft to safely fly into and out of an airport. These surfaces must ultimately be incorporated into the local planning and land use ordinances to control the height of objects in the vicinity of the airport. As such, the future surfaces are the most critical in order to protect the ability of the airfield improvements identified in this study. **Figure 4.5-1** provides a general illustration of the five different imaginary surfaces, while the

FIGURE 4.5-1: 14 CFR PART 77 IMAGINARY SURFACES



descriptions and specific dimensions as they apply to PIE are described in the following sections.

Primary Surface

The Primary Surface is a rectangular area symmetrically located about each runway centerline and extending a distance of 200 feet beyond each paved runway threshold. The width of the Primary Surface is based on the type of approach a particular runway has, while the elevation follows, and is the same as that of the runway centerline, along all points. For Runway 18-36 the width is 1,000 feet for the precision approaches. Runway 4-22 requires a 500 foot wide surface for the non-precision approaches with visibility minimums greater than ¾ of a mile. The new parallel GA runway will also require a 500 foot wide primary surface to accommodate the planned non-precision approaches.

Horizontal Surface

The Horizontal Surface is a level oval-shaped area situated 150 feet above the established airport elevation, extending 5,000 or 10,000 feet outward, from the Primary Surface, depending on the runway category and approach procedure available. For both Runway 18-36 and Runway 4-22, the Horizontal Surfaces will have a radius of 10,000 feet. For the new parallel GA runway, the radius only needs to be 5,000 feet since it will be a utility runway (limited to aircraft less than 12,500 pounds).

Conical Surface

The Conical Surface extends outward for a distance of 4,000 feet beginning at the outer edge of the Horizontal Surface, and sloping upward at a ratio of 20:1. This surface is the same for both existing and the future parallel GA runway at PIE.

Approach Surface

The Approach Surfaces begin at the end of the Primary Surface (200 feet beyond paved runway thresholds) and slope upward at a ratio determined by the runway category and type of instrument approach available to the specific runway end. The width and elevation of the inner end conforms to that of the Primary Surface while Approach Surface width and length to the outer end are governed by the runway category and instrument approach procedure available.

For the Runway 18 and Runway 36 precision approaches, the Approach Surfaces extend out 10,000 feet at a slope of 50:1 and then an additional 40,000 feet at a slope of 40:1 to an outer width of 16,000 feet. For Runway 4, the Approach Surface extends out 10,000 feet at a slope of 34:1 to an outer width of 3,500 feet for the non-precision approach with one mile visibility standards. Being classified as a visual runway, the Approach Surface to Runway 22 extends out 5,000 feet at a slope of 20:1 to an outer width of 1,500 feet. For the new parallel GA runway, both ends will require Approach Surfaces that extend out 5,000 feet at a slope of 20:1 to an outer width of 2,000 feet (utility runway with non-precision approaches).

Transitional Surface

The Transitional Surface is a sloping area beginning at the edges of the Primary and Approach Surfaces and sloping upward and outward at a 7:1 slope.

4.5.5 Departure Surfaces

If any of the runway ends at an airport have a published instrument approach procedure, the FAA applies an instrument departure surface off every active runway end. When there are no declared distances, the departure surface starts at the departure end of the runway. For a runway with declared distances, the departure surface starts at the end of the TODA. In either case, Section 1 of the departure surface begins at the same elevation as the departure end of the runway, has an inner width equal to the runway width, splays out from the corners of the usable runway at 15 degree angles, and extends out to 12,152 feet (2 nautical miles) at a 40:1 slope to end 304 feet above the runway end elevation. From the edge of the usable runway, Section 2 rises upward to 150 feet above the runway end elevation at a point 500 feet on either side of the runway centerline. Section 2 also rises upward along the extended runway centerline at the same 40:1 slope until reaching 304 feet above the runway end elevation. Upon reaching 304 feet, the surface levels out until the end of Section 1. The departure surface criteria are found in FAA Engineering Brief 99A dated July 24, 2020.

Both sections of the departure surface should be clear of all obstacles. If it is not possible, penetrations to the surface must be evaluated through the FAA's Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) process. If obstacles cannot be removed, minimum takeoff climb rates are published (as part of the departure procedure) which are higher than the 200 feet per minute required for the 40:1 surface. An airport sponsor can also request that a specific runway end(s) be designated as Not Authorized (NA) for instrument departures, in which case the 40:1 departure surface would not apply.

4.6 Airfield Environment

A number of facilities are necessary to support the operations of the airfield environment. Airfield lighting is required for airports intended to be utilized for nighttime operations as well as for operations during less than visual meteorological conditions. These along with pavement markings, signage, and other navigational aids are addressed in the following sections.

4.6.1 Runway Lighting

Runway 18-36 has High Intensity Runway Lights (HIRLs) to support the precision instrument approaches with Runway Visual Range (RVR) based minimums. This includes touchdown zone and centerline lights for the approaches to Runway 18. Runway 4-22 has Medium Intensity Runway Lights (MIRLs) to support the non-precision instrument approaches. Both systems are considered to be in good condition and are maintained regularly by the airport. They also meet the individual future runway requirements given that there are no plans to change the current instrument approach procedures.

MIRLs will be required for the new parallel GA runway to support nighttime operations as well as the planned non-precision instrument approaches. Also due to the non-precision approaches, the runway lighting should include eight inboard threshold lights (four on each side) to each runway end. As with the other lighting systems, the MIRLs for the new parallel GA runway need to be base mounted light-emitting diode (LED) light fixtures on cans with the cables in electrical conduit between each fixture.

4.6.2 Taxiway Lighting

Each taxiway has Medium Intensity Taxiway Lights (MITLs) that utilize base mounted LED fixtures on cans with conduit. These systems are considered to be in good condition since most have been recently rehabilitated or replaced as part of the recent taxiway improvement projects. Any new taxiways, including the three new parallel taxiway systems, should also include MITL systems with LED fixtures installed on cans with conduit.

4.6.3 Airfield Signage

Currently the airfield has a number of illuminated signs installed as part of the various runway and taxiway lighting circuits. The signs primarily consist of LED fixtures and are in good condition since many were replaced as part of the recent taxiway improvement projects. In the future, the inclusion of lighted airfield signage is required for any future taxiway in order to maintain the efficient and safe movement of aircraft to and from the runway environment. Typically, these are placed on the left side of the taxiway but can be located on the right when necessary to meet clearance requirements or if is it just impractical on the left side. Any new fixtures should also be LED units.

4.6.4 Pavement Markings

Runway pavement and displaced threshold markings are painted white, while taxilane pavement markings are painted yellow. FAA guidelines state that all taxiways should have centerline markings and runway holding position markings whenever they intersect with a runway. Many surface markings on light-colored pavements require glass reflector beads and need to be outlined in black paint without beads to enhance their conspicuity. This is true for all Portland Cement Concrete (PCC) surfaces and older asphalt pavements. In as little as two years, many asphalt surfaces (new or treated) can become ‘light-colored pavements,’ this is especially true in Florida. Therefore, glass beads and black outlines should be considered for all future pavement marking.

Runways

Runway pavements are marked with painted lines and numbers in order to aid in the identification of the runways from the air and to provide information to the pilot during the approach phase of flight. The FAA classifies three marking schemes depending on the type of runway:

Visual – minimum requirement for landing designator markings and a centerline stripe.

Non-precision – minimum requirement for landing designator markings, a centerline stripe, and threshold markings.

Precision - minimum requirement for landing designator markings, a centerline stripe, threshold markings, aiming point markings, touchdown zone markings, and edge markings.

The non-precision group includes runways with vertical guidance but not lower than ¾ mile visibility minimums. Depending on the type of aircraft activity and physical characteristics of the pavement, additional markings may be required for visual and non-precision runways.

As noted in the existing conditions, both runways have the appropriate markings for the types of operations and instrument approaches they support. Since this is not expected to change over the course of the planning period, only periodic remarking is required. Runway markings typically last for ten years; however, there are a number of variables that could significantly shorten that period, especially given the rain, sun, and bayside conditions at PIE. Therefore, at least two remarking projects will be required for the runways during the course of the planning period.

For the new parallel GA runway, the non-precision marking scheme described above is required. Aiming point markers would only be required if the runway was greater than 4,200 feet in length, which is not the case. Similarly, edge markings would not be required unless the new parallel GA runway were to include paved shoulders, which are not required or recommended.

Taxiways and Taxilanes

With the current precision approaches and C-III critical aircraft, the taxiways serving Runway 18-36 only require the holding position markings to be offset 250 feet, perpendicular to the runway centerline. However, they are all currently offset at 280 feet, which is the future requirement for the RDC designation D-V-1200. For Runway 4-22, both the existing and future critical aircraft, when combined with the instrument approach capability, require the holding position markings to be offset 200 feet from the runway centerline. All of the taxiways serving Runway 4-22, including Taxiway A at the southwest end, have holding position markings currently offset at 200 feet. Therefore, no changes will be necessary to the current holding position markings for both runways throughout the course of the planning period.

The same setbacks that exist today should be applied to any future taxiway serving Runway 18-36 and Runway 4-22, respectively. This will predominately be the future parallel taxiways on the southeast side of the airfield which are necessary to provide access into the Airco Parcel once redeveloped. For any taxiway serving the new parallel GA runway, the holding position markings need to be offset at least 150 feet.

All of the taxiways at PIE currently have enhanced taxiway centerline markings, prior to the holding position markers. These markings are required for all 14 CFR Part 139 airport taxiways that lead to a runway holding position marking to improve situational awareness and minimize the potential for runway incursions. For consistency, this is applied to all taxiways and therefore needs to be included as part of any future taxiways connecting directly to a runway, including the new parallel GA runway. Any new taxiways or taxilanes should also have the appropriate centerline and holding position markings required by the FAA. And as with the runway pavements, periodic taxiway and taxilane remarking will be required at least twice during the course of the planning period due to normal weathering and wear from regular usage.

4.6.5 Takeoff and Landing Aids

Over the course of the planning period, some new takeoff and landing aids will need to be installed and existing equipment will require repair or replacement. The following sections describe these systems.

Runway End Identification Lights

Runway End Identification Lights (REIL) consist of a pair of synchronized white flashing lights which are situated on each side and abeam of the runway end threshold lights. The current REILs installed on both ends of Runway 4-22 are considered to be in good condition. No REILs are installed on Runway 18-36 due to the full approach lighting system to the Runway 18 end and the displaced threshold on the Runway 36 end. REILs should be installed at both ends of the new parallel GA runway given the runway will be used at night and during instrument weather conditions. REILs also aid in identification of the runway end in areas having a high concentration of lighting, such as the developed areas surrounding much of the airfield or areas that lack contrast with the surrounding terrain, which is the case on the north side of the airport due to Old Tampa Bay.

Approach Lighting

A Medium-intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) has been installed for the precision approaches to Runway 18. The MALSR has light stations positioned symmetrically every 200 feet from the runway threshold out along the extended centerline for an overall distance of 3,000 feet. In addition to threshold lights, 5-unit light bars, and sequencing flashing lights, the MALSR also has a decision bar at 1,000 feet (three 5-unit light bars) from the runway threshold to serve as a visible horizon to ease the transition from instrument flight to visual flight.

Typically, an Approach Lighting System with Sequenced Flashing Lights (ALSF) 1 or 2 is required for Category II Instrument Landing System (ILS) approaches like the procedure to Runway 18. The ALSF, which is also 3,000 feet long, is wider due to the 5-unit light bar fixtures between each sequencing flashing light in the first 2,000 feet. The MALSR only has 5-unit light bars in the 1,200 feet before the landing threshold. At the time the approach lighting system was installed, the MALSR was selected over an ALSF system since construction of a man-made peninsula for the installation was required. Given the physical constraints of the peninsula, it is recommended that the MASLR will remain as an alternative to an ALSF system. The drawback is that the Category II ILS procedure published for Runway 18 is classified as Special Aircrew and Aircraft Certification Required.

Even though the MALSR is considered to be in good condition and maintained regularly by the FAA, there is a project in the FAA Air Traffic Organization (ATO) program to replace the system in 2028. The new MALSR equipment would also include upgrading the lightning protection. Discussions with the FAA's Service Support Center (SSC) management for PIE's navigational aids indicated that the 10-year horizon for replacement is reasonable given their maintenance of the existing MALSR equipment which includes continuously fighting corrosion from the saltwater environment.

Of concern is the significant erosion that has occurred to the man-made peninsula which supports the MASLR and extends north into Old Tampa Bay. This is true particularly on the east side of the peninsula which experiences much greater exposure and wave action due to the expanse of open water across the bay. The FAA initiated a design-build project in 2007 to repair the erosion and improve the associated seawalls. However, this project was abandoned in 2008 due to economy. Ten years later, the erosion has continued and in some locations the seawall has completely failed. As part of this master plan, a request has been made to the FAA ATO to re-initiate the project.

It should be noted that when the man-made peninsula was originally built, it’s overall length into Old Tampa Bay was based on the location of the Runway 18 ILS Middle Marker beacon (navigational aid). That beacon, which was approximately 3,300 feet from the Runway 18 threshold, is no longer there. The first light fixture for the MALSR is 3,000 feet from the Runway 18 threshold. Therefore, when the project to repair the erosion and improve the seawall structures is re-initiated by the FAA, it needs to be determined if there would be any financial and/or environmental benefit to removing a portion of the current man-made peninsula. In general terms, approximately 300 feet of the peninsula is no longer needed. Restoring previously filled bay bottom is a very high level mitigation that may also offset potential impacts associated with other future improvement projects.

Visual Glide Slope Indicators

Visual descent information is provided to pilots at PIE using Precision Approach Path Indicator (PAPI) systems on each of the four runway ends. The current systems are considered to be in good condition but only the ones on Runway 4-22 are owned and maintained by the airport. It is likely these units will need to be replaced before the end of the planning period. For the new parallel GA runway, 4-light (PAPI-4L) units should be installed on the left side of each runway end.

Wind Indicators

Windsocks indicate both direction and wind speed. All but Runway 4 have lighted windsocks near the landing thresholds that are in good condition. One has not been installed for Runway 4 due to the physical constraints where the two runways cross near the threshold for Runway 4. A lighted windsock should be included at each end of the new parallel GA runway, especially given that the runway will be primarily used for flight training activity.

VHF Omnidirectional Range

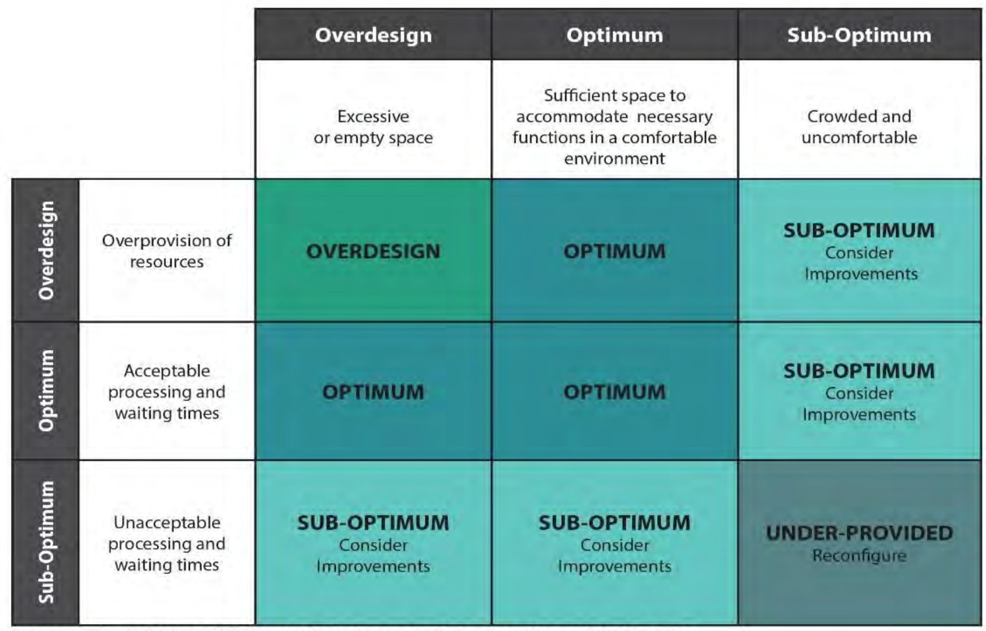
The current VHF Omnidirectional Range (VOR) is actually a VORTAC system, which combines the civilian VOR with the military tactical air navigation system. The PIE VORTAC projects straight line courses in all directions (radials) that pilots can use to navigate to and from the station. As described in the existing conditions, the on airport station also provides some of the non-precision approaches to the runways.

Currently, the VOR has permanent Notices to Airmen (NOTAMS) for unusable portions between the 025 and 054 degree radials (beyond 21 NM, below 5,000 feet) and between the 233 and 250 degree radials (beyond 20 NM). Also, for many months in 2017, the VOR was inoperative. This is of concern for the airport since the VOR is a crucial element of the current noise abatement program. As such, the FAA's SSC management has been contacted in order to obtain a better understanding of the VOR's historic problems. As part of that dialogue it was confirmed that there were no plans to upgrade the PIE VOR to a Doppler VOR system in the FAA ATO's current program through 2030. However, since the VORTAC is owned and maintained by the FAA, their Operations Engineering Support Group is reviewing whether a feasibility study for converting the current VOR portion to a Doppler VOR could be initiated. It is believed that such a conversion would eliminate the current radial restrictions.

4.7 Passenger Terminal Facilities

The following section summarizes the passenger terminal facility requirements and related assumptions. These requirements were developed based on meetings with PIE staff, discussions with key airport tenants, on-site walk-throughs, knowledge of industry-wide trends, and published guidelines including International Air Transport Association (IATA's) *Airport Development Reference Manual, FAA Advisory Circular (AC) 150/5360-13, Planning and Design Guidelines for Airport Terminal Facilities,* and *ACRP-25 Airport Passenger Terminal Planning and Design.* **Figure 4.7-1** explains how IATA determines level of service (LOS). "Optimum" LOS is the industry standard goal for developing terminal facilities.

FIGURE 4.7-1: IATA LEVEL OF SERVICE STANDARDS



Source: Adapted from IATA Airport Development Reference Manual 10th Edition

Requirements were generated for each of the PALs for aircraft parking positions/gates, public circulation, check-in positions, passenger security screening, holdrooms, concessions, restrooms, baggage handling systems, and baggage claim. Secondary functions such as circulation and some "back of house" space needs were also considered in the analysis.

4.7.1 Circulation Areas

Adequate circulation is critical to move passengers from one functional area to the next in an efficient and comfortable manner. Often times, circulation is based on available space created by another functional area or constraints such as concourse width. Circulation is typically split into three areas: public circulation, Federal Inspection Services (FIS) sterile arrivals circulations, and non-public walkways. Minimum clear circulation widths for public areas is typically 25 feet between major functional elements. For a concourse, the minimum width is 20 feet for a single loaded concourse, and 30 feet for a double loaded concourse without a moving walkway. For FIS sterile corridors, the minimum width standard is 15 feet for a single direction flow. For non-public areas, such as back-of-house spaces, office space, etc., the width should be determined by the function (i.e. moving supplies in a corridor near a loading dock) and local building codes.

PIE is unique because it has a separated circulation corridor that runs almost the entire length of the terminal frontage, from Ticketing A to the start of the baggage claim hall. This provides a direct route that avoids congested areas in the check-in lobbies. The number of check-in processes and units are adequate to accommodate the existing demand. At peak periods, the total check-in area is congested. As demand grows, but faster check-in processes are adopted by the airlines, the number of units needed will decrease from the current available. However, the physical space needed to accommodate passengers must increase, especially since the area is also used by arriving passengers headed to baggage claim. This creates a cross flow of passengers, which can cause further congestion of the area. More depth in the check-in lobbies for circulation, queuing, and processing will be-needed. The circulation in the baggage claim hall is adequate. Based on visual inspections and site walk-throughs, the non-public or back-of-house circulation is in accordance with local building codes.

The holdroom circulation is currently inadequate, and passenger level of service will continue to decline as demand grows. Standard circulation aisles are also needed in order to facilitate access from the hold rooms to the gates. Per ACRP-25, circulation areas typically represent 15 to 30 percent of total public area and 10 to 15 percent of the total non-public area. Because of the circulation corridor along the entire length of the building and the generous circulation within the baggage claim area, the airport generally meets the standard. However, there are certain areas within the check-in area, security checkpoint, or holdroom areas that do not meet the standards.

4.7.2 Passenger Check-In/Bag Drop

There are two check-in areas, Ticketing A and Ticketing B. During the development of the master plan there was a construction project underway to increase Ticketing A baggage screening and baggage makeup capacity. When complete, Allegiant Air will move all operations to Ticketing A, while Sun Country Airline and Sunwing Airlines will move to Ticketing B. Future check-in requirements were based on the following assumptions:

- ✈ Check-in position capacity was evaluated as a whole system, and not separated between Ticketing A and Ticketing B.
- ✈ Existing check-in type percentages and estimated future check-in percentages are shown in **Table 4.7-1**. Data is based on information provided by Allegiant. These inputs are unique to Allegiant, and could result in significantly different requirements based on more typical check-in profiles associated with other carriers.
- ✈ Different check-in types process passengers at different rates. While the percentage by processing type will change, it is assumed that processing rates for each will remain consistent. This is a conservative assumption since there is a lot of uncertainty as to the efficiency of new processes.

- Industry standard, maximum passenger wait time is 10 minutes. While this is consistent with industry standards, it is likely more than the airport currently experiences, except during peak periods or holidays.

- Based on experience, approximate processing time per passenger is five minutes for traditional check-in, one minute for a kiosk with checked bags, and two minutes for a premium check-in position.

TABLE 4.7-1
CHECK-IN PERCENTAGE BY TYPE

	Existing	Base Year	PAL-1	PAL-2	PAL-3	PAL-4
Full-Service	n/a	6.2%	2.6%	1.1%	0.5%	0.2%
Online with Bag Drop	n/a	36.9%	38.1%	38.6%	38.8%	38.9%
Online with Carry-On	n/a	56.1%	57.3%	57.8%	58.0%	58.1%
Premium	n/a	0.8%	2.0%	2.5%	2.7%	2.8%

SOURCE: Allegiant Air, 2018.

Table 4.7-2 shows, Ticketing A, with 22 standard positions, and Ticketing B, with 12 standard positions, combined can accommodate the check-in demand throughout the planning period. Congestion may occur in the middle of the planning period because all of the demand will be focused on Ticketing A and very minimal demand will be focused on Ticketing B. In other words, 98 percent of the demand will be accommodated by 67 percent of the facilities. Maximizing Ticketing A for Allegiant, and accommodating other carriers in Ticketing B makes sense, but a consolidated check-in, baggage screening, and baggage makeup would be most efficient.

There are currently no specific bag drop positions, but per discussions with Allegiant, in the near future, the check-in process will be predominantly online check-in with bag drop and limited standard or premium check-in positions. If this change does not occur, check-in requirement could be significantly different than what is shown below. Allegiant did not express a need for curbside check-in. Adding curbside check-in would only be explored if a new airline requested the ability to provide this service.

TABLE 4.7-2
CHECK-IN REQUIREMENTS

	Existing	Base Year	PAL-1	PAL-2	PAL-3	PAL-4
Full-Service	"A" 22, "B" 12	3	2	2	2	2
Online with Bag Drop	-	7	9	10	12	15
Online with Carry-On	-	n/a	n/a	n/a	n/a	n/a
Premium	-	1	2	2	2	2

SOURCE: C&S Companies, 2018.

4.7.3 Office Space

This includes the non-public areas that accommodate airport, airline, and Transportation Security Administration (TSA) employees and functions, as well as other tenants. In the terminal building, this includes airline ticket offices, TSA offices, baggage service offices, some storage space, and airport offices on the second level. Per field observations and walk-throughs with airport staff, most of these spaces are occupied. There are no official industry standard calculations to determine required office space; it is generally determined by airport or tenant site-specific requirements. Various stakeholders expressed difference of opinion regarding adequacy of available space. Allegiant was concerned about losing airline office space after the completion of the Ticketing A in-line baggage system, since it will eliminate much of their space. Allegiant intends to occupy any of the remaining space, leaving little to no office space available for new airlines. TSA noted that their space is adequate, although larger than their national standards, which is a function of the second floor layout. The airport has expressed they have adequate space, but not much flexibility to grow.

4.7.4 Explosive Detection System Baggage Screening

There are two TSA baggage screening areas, one for each of the check-in areas. There are two explosive detection screening (EDS) machines in each of the screening areas. Future requirements are based on the current Ticketing A project now under construction, and the following assumptions:

- Percentage of domestic passengers checking bags is 50 percent (source: Allegiant Air).
- On average, 0.5 checked bags per domestic passenger (source: Allegiant Air).
- Ticketing A EDS screening equipment throughput is 600 bags/hour. Ticketing B EDS screening equipment throughput is 180 bags/hour (source: PIE).
- Current processing rates continue throughout the planning period (source: C&S Companies).

As a whole, the current system, which includes the current Ticketing A construction project, appears to be able to handle demand throughout the planning period. However, when the project is complete, the airline configuration will place almost all of the demand on the Ticketing A system. As a result, the new Ticketing A system, which is designed to include another screening machine, will need that third machine early in the planning period. If 98 percent of the demand occurs at Ticketing A, by PAL-4, the Ticketing A system will be beyond capacity, but the Ticketing B system will be underutilized. Once this change occurs, there is a desire to remove the screening equipment from Ticketing B, but it is recommended that system remains to be reserved for airlines other than Allegiant, including international airlines. A consolidated check-in, baggage screening, and baggage makeup would be most efficient in the long-term. **Table 4.7-3** outlines the checked baggage system requirements for the planning period

TABLE 4.7-3
EXPLOSIVE DETECTION SYSTEM BAGGAGE SCREENING REQUIREMENTS

	Existing	Base Year	PAL-1	PAL-2	PAL-3	PAL-4
EDS screening machines	4	2	3	3	3	4
Total Area (square feet)	4,440	2,880	4,320	4,320	4,320	4,400

SOURCE: C&S Companies, 2018.

4.7.5 Outbound Baggage

Outbound baggage is sorted and loaded onto airline carts for each departing flight. This function occurs in two areas consistent with the two check-in and baggage screening areas. The current Ticketing A construction project will add additional baggage makeup capacity, which is included in this analysis. The added capacity is limited because of the airfield and infrastructure constraints near the terminal building. Typically, baggage makeup requirements are calculated in terms of the area needed for the number of carts required to accommodate aircraft in the peak departure peak, with an allowance for baggage tug circulation. Typically, requirements are based on the aircraft size (e.g. ADG III aircraft is 1.0 equivalent gate, but smaller aircraft like a medium regional jet is 0.7 equivalent gates while larger aircraft like an ADG IV is 1.2 equivalent gates).

The current outbound baggage makeup areas are significantly undersized. Both in Ticketing A and B, the number of carts that can service the baggage make up areas are limited due to the lack of space. In Ticketing B, the adjacent CBP baggage carousel increases the level of congestion when both are in use. The number of peak hour operations is expected to almost double during the planning period, and the outbound baggage makeup requirements will follow. By the end of the planning period, outbound baggage requirements will be approximately 34,500 total square feet (SF). The current building has approximately 5,400 total SF split between the two check-in zones. Once the Ticketing A construction project is complete, Allegiant will be on the A side, but with a split baggage makeup operation, will not have direct access to all of the screening capacity or baggage makeup capacity. Over the planning period, the congestion created by placing 98 percent of the demand on the A side makeup area, will create operational challenges.

4.7.6 Passenger Security Screening

There are two separated holdroom/gate areas; therefore, there are two passenger screening checkpoints, one at the entrance to each of the holdroom areas. Each screening area has two standard screening lanes and one TSA PreCheck lane. There is limited width and depth in both security checkpoint areas which has created a non-standard layout. Future passenger security screening requirements are based on the following assumptions:

- An average throughput for a standard lane is 150 passengers per lane per hour. This is a conservative assumption relative to TSA standards, but is a result of the non-standard and constrained layout.

- An average throughput for a PreCheck lane is 250 passengers per lane per hour. Throughout the planning period, there are no more than 2 PreCheck lanes, one for each checkpoint (source: C&S Companies).
- Airport and airline employee screening was including in the overall passenger volumes. This adds an additional 6 percent to the peak hour demand (source: C&S Companies).
- Passenger wait times will not exceed 10 minutes (source: IATA industry standard).
- Passengers require approximately 13 SF per person while waiting in the queue, equivalent to IATA's "Optimum" level of service.

Both passenger security screening checkpoints are currently undersized. This is largely due to the constrained location of both. By PAL-1, more than double the existing area is required, and by the end of the planning period, as many as 7 passenger screening modules, two TSA standard screening lanes and one imaging machine, and 28,600 SF will be needed to accommodate passenger demand at an "Optimal" level of service. The requirements are presented in **Table 4.7-4.**

TABLE 4.7-4
PASSENGER SECURITY SCREENING REQUIREMENTS

	Existing	Base Year	PAL-1	PAL-2	PAL-3	PAL-4
Standard Lanes	4	5	7	8	8	11
Pre-Check Lanes	2	2	2	2	2	2
Required Modules	-	4	5	5	5	7
Total Area including Queue (SF)	10,330	16,170	20,080	20,380	20,710	28,600

SOURCE: C&S Companies, 2018.

4.7.7 Holdrooms and Boarding Gates

There are two common ways to calculate holdroom requirements. One is to apply a standard area to a gate based on the maximum aircraft size allowable for that gate. The approximate areas used for narrow-body aircraft is 2,500 SF. The other is to estimate the demand based on the estimated gate requirements in the peak hour of operation. The latter was chosen for this analysis because of the unique operation at PIE. Industry standard areas by aircraft category, including holdroom areas, with gate circulation areas, agent podiums, and seating areas were applied to create the overall requirement.

During the master plan study, the airport was in the process of expanding the holdroom space for the terminal. Review of the existing holdroom capacity and the forecast demand determined that even with the Terminal Renovation – Phase 3 holdroom construction project, the facility will be at capacity. By PAL-1, holdrooms will be significantly undersized. By the end of the planning period, the holdroom requirement is more than double the current area. Total holdroom area required for each PAL is depicted in **Table 4.7-5.**

TABLE 4.7-5
HOLDROOM REQUIREMENTS

	Existing	Base Year	PAL-1	PAL-2	PAL-3	PAL-4
Narrow-body	-	16,600	23,720	28,460	30,830	37,950
Wide-body	-	5,000	5,000	5,000	5,000	5,000
Total Area (SF)	**19,380**	**21,600**	**28,720**	**33,460**	**35,830**	**42,950**

SOURCE: C&S Companies, 2018.

Also, there is no airport lounge if an airline offering a two class configuration of aircraft cabin, with premium service, would request one. To attract international service, it would be beneficial to consider a location for an airline specific or common use lounge.

4.7.8 Concessions

Concession areas provide an improved passenger level of service, create a sense of place for the airport, and provide an opportunity for increased revenue generation. Ultimately, the airport, working with a master concessionaire or a series of concessionaires, will determine what concessions areas are appropriate based on the airport's passenger profile. To generate an estimate of the size of the future area that would provide the airport with a reasonable program, demand was projected using the following industry standard planning assumptions:

- For the period of time when the airport has 1 to 2 million enplanements, approximately 12.4 SF of concessions space was calculated per every 1,000 annual enplanements; 7.9 SF for food and beverage, 1.1 SF for convenience retail, and 3.4 SF for specialty retail (source: ACRP-54 In-Terminal Concessions).

- For the period of time when the airport has 2 to 3 million enplanements, approximately 12.0 SF of concessions space was calculated per every 1,000 annual enplanements; 7.9 SF for food and beverage, 2.1 SF for convenience retail, and 2.0 SF for specialty retail (source: ACRP-54 In-Terminal Concessions).

- 90 percent or more concessions space should be allocated post-security, and 10 percent or less for pre-security. Often at smaller airports, there is a desire to have one pre-security restaurant that employees can use, but that was not reflected in discussions with the airport. A coffee shop or small grab and go may be sufficient to accommodate well-wishers and meeters/greeters, as well as employees. (source: C&S Companies).

- On average, an additional 25 percent should be allocated for food and beverage storage, and an additional 20 percent should be added for retail storage, away from the immediate concessions area (source: ACRP-54 In-Terminal Concessions).

Currently, the airport has too much pre-security concessions area, and not nearly enough post security area based on the existing and projected passenger demand. There is no ability to cook/grill or effectively dispose of trash. This is largely due to the fact that the facility was mostly developed prior to September 11th 2001, which changed how concessions are utilized. By the end of the planning period, the airport will need an additional 20,000 SF of concessions space throughout the facility. Pre-security requirements could include a news and gifts/retail shop, similar to what exists today, and a small coffee/quick serve offering. The majority of future concession areas should be located post-security, in the concourse, to maximize value. Current concessions storage area, typically 20 to 25 percent of the active concessions area, was not calculated, but based on discussions with the airport and the current concessionaire, these areas are undersized. Three other operational issues exist today: no loading dock and screening of concessions goods with passengers. No loading dock requires that deliveries be made at the curbside and goods to be screened through the passenger checkpoint, creating congestion and unsightly trash and items for passengers to see. No loading dock and lack of storage area adjacent to a loading dock should be addressed in the alternatives development phase. Finally, all goods going to and trash removed from the second level concessions areas must use the passenger or airport administration elevators. The result is passengers and goods/trash mixing, and excessive utilization of the elevator. Like a separate goods corridor and storage, separated vertical circulation should be considered in the alternatives phase. **Table 4.7-6** depicts the concession area requirements.

TABLE 4.7-6
CONCESSION REQUIREMENTS

	Existing	Base Year	PAL-1	PAL-2	PAL-3	PAL-4
Pre-Security (SF)	2,510	1,270	1,560	1,890	2,450	2,940
Post-Security (SF)	6,560	11,400	14,060	16,980	22,050	26,420
Storage (SF)	-	2,940	3,620	4,370	5,680	6,840

SOURCE: C&S Companies, 2018.

4.7.9 Inbound Baggage

Passenger baggage from arriving flights is unloaded and tugged to the inbound baggage handling area in the back-of-house side of the domestic baggage claim. There are four inbound belts, which are directly connected to the four flat-plate devices in the baggage claim hall. Requirements for inbound baggage makeup are tied to the requirements for the baggage claim. Baggage claim demand is calculated by number of linear feet per carousel or flat-plate device. For either device type used to accommodate that demand, there is a minimum length of inbound baggage belt that is required based on average aircraft size and number of airlines using that belt. Similar to domestic baggage claim requirements noted in the following section, there is enough frontage to accommodate the inbound baggage makeup demand, but as activity increases and there are more baggage carts, the area will become congested. By PAL-3, the inbound baggage makeup area will be congested during peak periods. If there are any changes to airline flight schedules or significantly more passengers start to check bags, these requirements would increase and congestion would occur sooner in the planning period.

4.7.10 Baggage Claim

The domestic baggage claim hall is located at the west end of the terminal building and is one of the newer areas of the facility. There are four flat plate baggage devices to accommodate the baggage demand. Baggage claim requirements were calculated based on the following assumptions.

- Peak 20-minute arriving passenger counts (source: ACRP-25).
- Approximately 0.5 bags per passenger (source: Allegiant Air).
- 50 percent of passengers checking bags in the peak period (source: Allegiant Air).
- An additional 30 percent of passengers representing “meeters and greeters” at baggage claim (source: C&S Companies).
- Main circulation corridor through baggage claim not included in area calculations.

Throughout the planning period, there is enough baggage claim capacity to accommodate the expected demand. However, as the level of activity increases throughout the planning period and more passengers are arriving in the peak period, the baggage claim area will be congested. By PAL3, the baggage claim area will be overburdened in the peak arrival periods. **Table 4.7-7** depicts the domestic baggage claim requirements. If there are any changes to the projected airline flight schedules or significantly more passengers start to check bags, these requirements would increase and congestion would occur sooner in the planning period.

TABLE 4.7-7
BAGGAGE CLAIM REQUIREMENTS

	Existing	Base Year	PAL-1	PAL-2	PAL-3	PAL-4
Required Carousels	4	2	3	3	4	4
Baggage Claim Area (SF)	19,590	17,880	24,310	24,310	30,750	30,750

SOURCE: C&S Companies, 2018.

4.7.11 Federal Inspection Services

During the master plan study, the airport was in the process of renovating their existing FIS facility to bring it up to the current U.S. Customs and Border Protection (CBP) standards. The improved facility will be able to accommodate 300 passengers per hour. This could accommodate one wide-body aircraft (like the Boeing 787) or two narrow-body aircraft (such as the Airbus A319 or A320) envisioned for future international service at PIE. If Allegiant introduces more international arrivals in a peak period or the airport wants more flexibility to attract foreign flag carriers, then the facility will need to increase capacity. The airport lacks the space needed for an in transit lounge if ever required by an international airline. There is potential for a connection between an international low-cost carrier and Allegiant, as evidence from other small hub airports.

4.7.12 Restrooms

Restrooms are an important, but often overlooked element at an airport. They are not one of the major functional terminal areas, but are often the area that receives the most passenger complaints when surveyed. Restroom requirements can be calculated using one of the two following assumptions:

- For terminal buildings: 2.0 to 2.5 SF per peak hour arriving and departure passengers and well-wishers/meeters and greeters (source: ACRP-25).
- For concourses: A restroom module of 10 to 12 fixtures/sex for every eight gates (source: ACRP 25).

Given the unique layout of the airport, the first assumption will be used for all calculations. For pre-security, the existing area can accommodate the demand until PAL-4. However, the post security restrooms are undersized today, during peak periods, and will reflect an unacceptable level of service by the end of the planning period. **Table 4.7-8** depicts the concession area requirements.

TABLE 4.7-8
RESTROOM REQUIREMENTS

	Existing	Base Year	PAL-1	PAL-2	PAL-3	PAL-4
Pre-Security (SF)	2,450	850	1,040	1,240	1,560	1,800
Post-Security (SF)	2,140	2,540	3,110	3,710	4,670	5,380

SOURCE: C&S Companies, 2018.

4.7.13 Aircraft Parking Positions

There are currently 12 aircraft parking positions at the terminal and 3 remain overnight (RON)/inactive parking positions just to the west. Gates 4 and 5 are the only two positions with passenger boarding bridges.

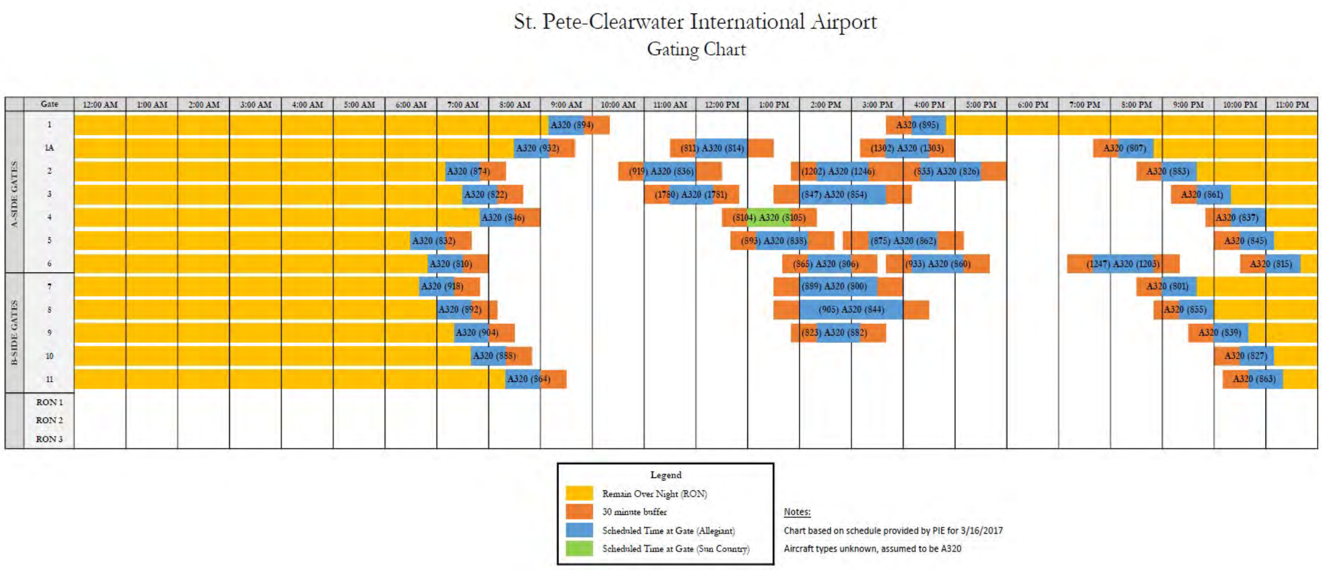
Allegiant is the dominant carrier at the airport. Their general operating model, which is different from many other airlines, is to ensure that their airplanes and crew are back at their home base by the end of the day. This results in large departure peaks early in the morning, large arrival peaks in the late afternoon or early evening, and relatively limited amount of activity during the day (see **Figure 4.7-2**). The gate requirements were modeled based on Allegiant's operating characteristics and the following planning assumptions:

- Maintain the current flight schedule profile, but slightly increase the gate utilization in PAL-3 and PAL-4 (source: C&S Companies, PIE, and Allegiant Air).
- Develop requirements for a one-and-a-half-hour morning peak (source: C&S Companies).

- Maintain the current split of active versus remote positions through PAL-2, then slightly increase the RON percentage to match the increase in gate utilization in PAL-3 and PAL4 (source: C&S Companies).

- Develop the gate requirements using a combination of "enplaned passengers per gate" and "departures per gate" approaches, which interpolate historical data to predict future requirements (source: C&S Companies).

FIGURE 4.7-2: 2017 EXISTING AIRLINE FLIGHT SCHEDULE



SOURCE: C&S Companies, 2018.

By the end of the planning period, the airport will require a total of 23 aircraft parking positions, made up of 17 active gates and 6 RON/inactive positions. This reflects an average gate utilization of under two daily departures per gate during the peak month average day. The current domestic passenger airline fleet mix, which is overwhelmingly narrow-body aircraft, is not expected to change over the planning period. However, with the expectation of attracting international charters and/or foreign carriers, it would be prudent for the airport to have one or two gates capable of accommodating wide-body aircraft. **Table 4.7-9** depicts the anticipated aircraft parking position requirements.

TABLE 4.7-9
AIRCRAFT PARKING POSITION REQUIREMENTS

	Active Gates	RON/Inactive Positions	Total Positions
Existing	12	3	15
Base Year	9	3	12
PAL-1	12	3	15
PAL-2	13	4	17
PAL-3	14	5	19
PAL-4	17	6	23

SOURCE: C&S Companies, 2018.

The airport is highly reliant on one dominant carrier, Allegiant. If Allegiant's operating model changes or their gate utilization philosophy changes, the gate requirements could significantly change. The airport could also implement minimum requirements for gate utilization, which would increase utilization and minimize facility requirements. Ongoing discussions between the airport and Allegiant must continue during design and construction to implement a development plan that is acceptable to both parties and financially feasible.

4.7.14 Summary

Figure 4.7-3 depicts a summary of the passenger terminal facility requirements. The stoplight chart shows approximately whether the different functional areas will have an acceptable (green); congested, but operational (yellow); or crowded and uncomfortable (red) LOS based on current conditions.

FIGURE 4.7-3: TERMINAL FACILITY REQUIREMENTS STOP LIGHT CHART SUMMARY

	Existing	Base Year	PAL-1	PAL-2	PAL-3	PAL-4
Annual Enplanements	1,021,361	1,021,361	1,250,000	1,750,000	2,250,000	2,750,000
Peak Hour Enplanements	904	904	1,060	1,220	1,400	1,750
Passenger Check-in/Bag Drop						
Full Service Positions	34	3	2	2	2	2
Self Service Bag Drop Kiosk	0	7	9	10	12	15
Premium	2	1	2	2	2	2
Online check-in, carry-on only	-	n/a	n/a	n/a	n/a	n/a
Total Check-In/Ticketing Area	6,790	5,220	5,370	5,490	5,670	6,560
Explosive Detection System Baggage Screening						
Number of Level 1 EDS Required	4	2	3	3	3	4
Outbound Baggage Screening Area	4,440	2,880	4,320	4,320	4,320	4,400
Outbound Baggage Make-up Area	5,390	20,410	25,510	30,620	33,170	34,560
Passenger Security Screening						
Regular Passenger Lanes	4	5	7	8	8	11
Pre-Check Passenger Lanes	2	2	2	2	2	2
Required Modules	-	4	5	5	5	7
Total Security Screening and Queue Area	10,330	16,170	20,080	20,380	20,710	28,600
Holdrooms and Boarding Gates						
Narrow-body Holdrooms	-	5,000	5,000	5,000	5,000	5,000
Wide-body Holdrooms	-	16,600	23,720	28,460	30,830	37,950
Total Holdroom Area	19,380	21,600	28,720	33,460	35,830	42,950
Concessions						
Concessions Area (Pre-Security)	2,510	1,270	1,560	1,890	2,450	2,940
Concessions Area (Post-Security)	6,560	11,400	14,060	16,980	22,050	26,420
Remote Concessions Storage	-	2,940	3,620	4,370	5,680	6,840
Baggage Claim						
Required Carousels	4	2	3	3	4	4
Baggage Claim Area	19,590	17,880	24,310	24,310	30,750	30,750
Inbound Baggage Handling Area	6,200	5,250	7,875	7,875	10,500	10,500
Restrooms						
Restrooms (Pre-Security)	2,450	850	1,040	1,240	1,560	1,800
Restrooms (Post-Security)	2,140	2,540	3,110	3,710	4,670	5,380
Aircraft Parking Positions						
Domestic Active Gates	11	8	11	12	13	16
Remote Positions	3	3	3	4	5	6
Domestic/International Active Gates	1	1	1	1	1	1
Total	15	12	15	17	19	23

SOURCE: C&S Companies, 2018.

4.8 Landside Facilities

The landside components analyzed in the volume/capacity analysis consist of airport roadways, including terminal area roadways and terminal curbfronts, short-term and long-term parking, employee parking, and rental car facilities.

Today there is much discussion among airport executives and planners regarding the impact of emerging technology on landside facility requirements. Emerging technology runs the gamut from airport implemented infrastructure including dynamic messaging systems and parking guidance systems, to cell phone applications that change how the customer may rent automobiles or share rides, to the potential for self-driving, autonomous vehicles. Of these emerging technologies, transportation network companies (TNC's) and ultimately autonomous vehicles represent some of the highest potential for significant impact on landside facility requirements. There is anecdotal evidence to suggest that parking and rental car demand as a percentage of airline passengers is declining. Since TNC's only became widely available in 2014 and fully autonomous vehicles are not operational, there is not sufficient empirical data to provide clear guidance on this subject. However, it is widely thought that if TNC use continues to increase, and autonomous vehicles become available, parking and rental car demand will decline and curbfront demand will increase.

The FAA has commissioned two studies to give guidance on the emerging technology issue through the Airport Cooperative Research Program (ACRP). These studies are expected to be completed in 2018. As technology in both vehicles and infrastructure continues to evolve, the proportioned utilization of curbfronts, ground transportation areas, parking facilities, and rental car facilities may continue to change as a share of airline passengers. Because of the lack of data to support the potential impact of emerging technology, this master plan does not attempt to quantify the impact and assumes that users will continue to access the airport with the same mode of travel used today. The guidance provided by this master plan should be tempered with continual monitoring of data as it becomes available to validate that the requirements are still applicable to the current operations environment.

4.8.1 Airport Roadways

The following sections discuss the projected volumes, roadway capacities, and facility requirements for the two separate roadway types: terminal area roadways and terminal curbfronts. The Transportation Research Board's (TRB) ACRP methodology was used to calculate the level of service (LOS). A summary of the methodology is provided in **Appendix E**.

Terminal Area Roadway Assessment

Facility requirements were assessed for three exiting terminal area roadways (Airport Parkway Drive North, Airport Parkway Drive South, and Terminal Boulevard) and future terminal area roadways. These roadways are depicted in **Figure 4.8-1** and **Figure 4.8-2**, respectively.

FIGURE 4.8-1: EXISTING TERMINAL AREA ROADWAYS

SOURCE: Google Earth; Kimley-Horn and Associates, Inc., 2018.

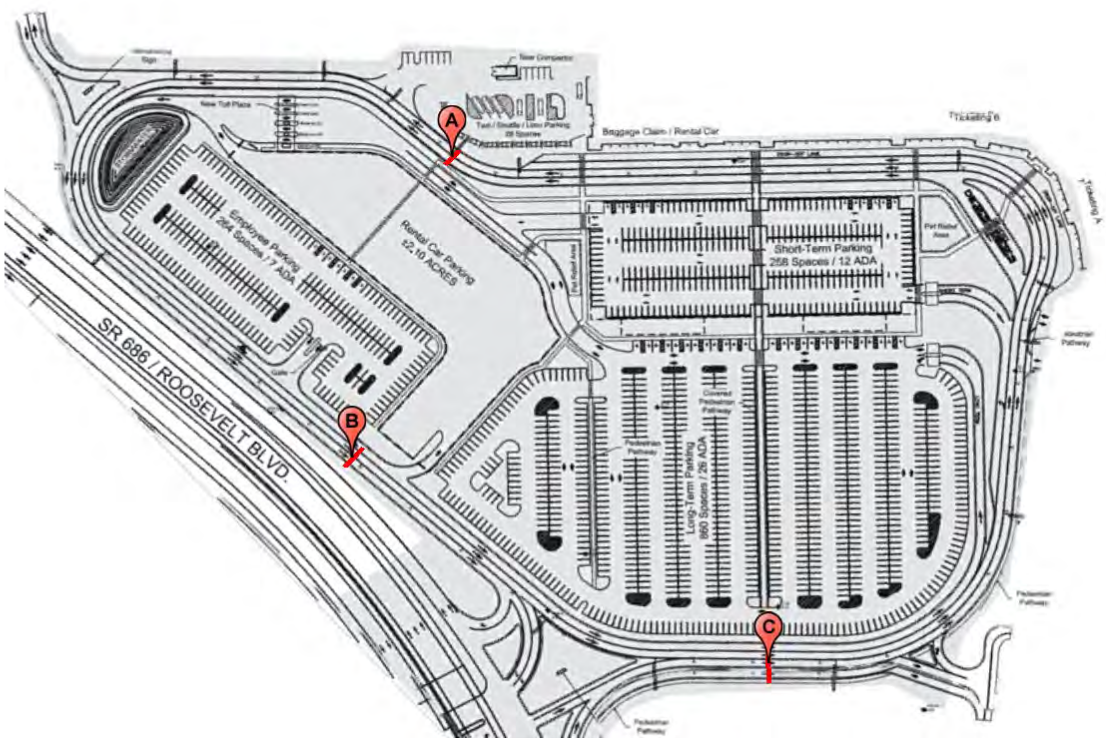


FIGURE 4.8-2: FUTURE TERMINAL AREA ROADWAYS

SOURCE: FDOT Gateway Expressway Reverse Access Road Drawing and Kimley-Horn and Associates, Inc., 2018.

As part of the inventory, two and seven-day counts were conducted. The results of the two-day counts (representative of an average day in December) were used to determine the baseline year vehicle volumes and calculations were applied to adjust for vehicle volumes on roadways currently under construction. Additional details on projected traffic demand is provided in **Appendix E**.

Terminal Area Roadways Vehicular Volume

Observed traffic volumes for the baseline year are presented in **Table 4.8-1** and the count locations are shown in **Figure 4.8-1**. The traffic volume projections for PAL-1, PAL-2, PAL-3, and PAL-4 are presented in **Table 4.8-2** and the locations are shown in **Figure 4.8-2**. Volumes are presented in terms of vehicles per hour (vph) and vehicles per hour per lane (vphpl).

Growth factors shown in **Table 4.8-3** were applied to the baseline roadway volumes based on the projected growth in peak hour enplanements for the morning; combined enplanements and deplanements for midday; and deplanements for the evening. The methodology for calculating the growth factors is included in **Appendix E**.

TABLE 4.8-1
EXISTING TERMINAL AREA ROADWAYS TRAFFIC VOLUMES

Location	Peak Hour	Vehicles vph (vphpl)
1: Main Entry (Eastbound)	AM	221
	Midday	205
	PM	131
1: Main Entry (Westbound)	AM	395 (198)
	Midday	413 (207)
	PM	304 (152)
2: Airport Parkway (Northbound)	AM	14
	Midday	103
	PM	80
2: Airport Parkway (Southbound)	AM	28
	Midday	109
	PM	66
3: Terminal Boulevard	AM	248
	Midday	241
	PM	122
4: Curbfront Entry	AM	501 (251)
	Midday	478 (239)
	PM	301 (151)

SOURCE: Kimley-Horn and Associates, Inc., 2018.

TABLE 4.8-2
PROJECTED TERMINAL AREA ROADWAYS TRAFFIC VOLUMES

Location	Peak Hour	Vehicles vph (vphpl) for Planning Activity Levels			
		PAL-1	PAL-2	PAL-3	PAL-4
A: Exiting Terminal Curbfront Area	AM	552 (276)	636 (318)	729 (365)	912 (456)
	Midday	615 (307)	733 (367)	922 (461)	1,062 (531)
	PM	375 (188)	432 (216)	496 (248)	619 (310)
B: Before Rental Car Entrance	AM	760 (253)	875 (292)	1,004 (335)	1,254 (418)
	Midday	796 (265)	949 (316)	1,194 (398)	1,376 (459)
	PM	566 (189)	652 (217)	748 (249)	935 (312)
C: Before Parking Lot Entrances	AM	587 (196)	676 (225)	776 (259)	970 (323)
	Midday	585 (195)	698 (233)	878 (293)	1012 (337)
	PM	353 (118)	406 (135)	466 (155)	583 (194)

SOURCE: Kimley-Horn and Associates, Inc., 2018.

TABLE 4.8-3
APPLIED GROWTH FACTORS FOR TRAFFIC FORECASTS

Peak Hour	Planning Activity Level			
	PAL-1	PAL-2	PAL-3	PAL-4
AM	1.173	1.350	1.549	1.936
Midday	1.224	1.460	1.836	2.117
PM	1.173	1.350	1.549	1.936

SOURCE: Kimley-Horn and Associates, Inc., 2018.

Terminal Area Roadways Volume/Capacity Results

Terminal area roadway capacities were determined using ACRP methodology as summarized in **Appendix E**. **Table 4.8-4** and **Table 4.8-5** depict the resulting volume-to-capacity (V/C) ratios and the LOS for the existing and future terminal area roadways, respectively.

TABLE 4.8-4
EXISTING TERMINAL AREA ROADWAYS LEVEL OF SERVICE

Location	Peak Hour	V/C Ratio (LOS)
1: Main Entry (Eastbound)	AM	0.22 (A)
	Midday	0.20 (A)
	PM	0.13 (A)
1: Main Entry (Westbound)	AM	0.20 (A)
	Midday	0.20 (A)
	PM	0.15 (A)
2: Airport Parkway (Northbound)	AM	0.01 (A)
	Midday	0.10 (A)
	PM	0.08 (A)
2: Airport Parkway (Southbound)	AM	0.03 (A)
	Midday	0.11 (A)
	PM	0.07 (A)
3: Terminal Boulevard	AM	0.25 (A)
	Midday	0.24 (A)
	PM	0.12 (A)
4: Curbfront Entry	AM	0.25 (A)
	Midday	0.24 (A)
	PM	0.15 (A)

SOURCE: Kimley-Horn and Associates, Inc., 2018.

TABLE 4.8-5
PROJECTED TERMINAL AREA ROADWAYS LEVEL OF SERVICE

Location	Peak Hour	V/C Ratio (LOS)			
		PAL-1	PAL-2	PAL-3	PAL-4
A: Exiting Terminal Curbfront Area	AM	0.27 (B)	0.31 (B)	0.36 (B)	0.45 (C)
	Midday	0.30 (B)	0.36 (B)	0.46 (C)	0.53 (C)
	PM	0.19 (A)	0.21 (A)	0.25 (A)	0.31 (B)
B: Before Rental Car Entrance	AM	0.25 (A)	0.29 (B)	0.33 (B)	0.41 (C)
	Midday	0.26 (B)	0.31 (B)	0.39 (B)	0.45 (C)
	PM	0.19 (A)	0.22 (A)	0.25 (A)	0.31 (B)
C: Before Parking Lot Entrances	AM	0.19 (A)	0.22 (A)	0.26 (B)	0.32 (B)
	Midday	0.19 (A)	0.23 (A)	0.29 (B)	0.33 (B)
	PM	0.12 (A)	0.13 (A)	0.15 (A)	0.19 (A)

SOURCE: Kimley-Horn and Associates, Inc., 2018.

The information presented in **Table 4.8-4** and **Table 4.8-5** demonstrates that the anticipated LOS for the terminal area roadways is equivalent to or better than LOS C through PAL-4. Therefore, the LOS for all terminal area roads is anticipated to remain at acceptable levels through PAL-4.

In assessing the Gateway Project modifications and proposed roadway layout, and accounting for the analysis and acceptable LOS results detailed above, the following geometric considerations are offered. These geometric considerations may be further evaluated in the alternatives chapter. **Figure 4.8-3** contains location references for clarity.

- Provide only one recirculation lane (instead of two) between the egress and access points (location 1).
- Convert the yield-controlled northbound right-turn to be free-flow with its own receiving lane - instead of yield-controlled (location 2).
- Preserve space to provide future dual southbound left-turn lanes from the frontage road adjacent to Roosevelt Boulevard southbound. This may be feasible by converting the southbound through to be a shared thru/left-turn (location 3).
- Preserve space to provide future dual through lanes from under Roosevelt Boulevard into the airport, which would require conversion of the northbound right-turn lane from free-flow to yield-controlled. This may be feasible by converting the eastbound left-turn lane to be a shared thru/left-turn but would still require construction downstream of the intersection. (location 4)

Note that at location C, three through lanes remain: one from recirculation, one from the through coming from underneath the Roosevelt Boulevard bridge, and one from the Roosevelt Boulevard northbound right-turn.

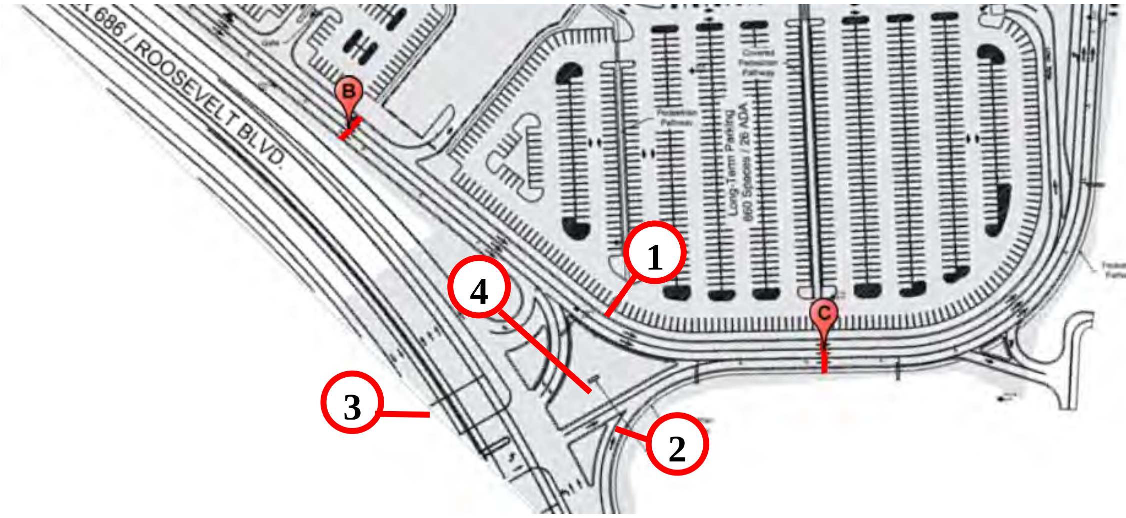


FIGURE 4.8-3: FUTURE TERMINAL AREA ROADWAYS

SOURCE: FDOT Gateway Expressway Reverse Access Road Drawing and Kimley-Horn and Associates, Inc., 2018.

Curbfront Assessment

Curbfront Vehicle Volumes

For the remainder of this section, the term "existing" will refer to the geometric configuration of the curbfront that is shown in **Figure 4.8-1**. The existing curbfront consists of a primary and secondary curbfront. The term "baseline" will refer to the analysis that was conducted on the existing roadway geometry with the 2017 two-day vehicle counts. The traffic volumes that were used in the curbfront analysis for the baseline and PALs are presented in **Table 4.8-6** and **Table 4.8-7**, respectively. The methodology for calculating the volumes for the PALs is included in **Appendix E**. The growth factors used to develop the terminal curbfront traffic volumes are the same as the growth factors used to develop the terminal area roadway traffic volumes.

TABLE 4.8-6
BASELINE TRAFFIC VOLUMES USED IN TERMINAL CURBFRONT ANALYSIS

Location	Peak Hour		
	AM	**Midday**	**PM**
Primary Curbfront	338	348	255
Secondary Curbfront	149	124	60

SOURCE: Kimley-Horn and Associates, Inc., 2018.

TABLE 4.8-7
PROJECTED TRAFFIC VOLUMES USED IN TERMINAL CURBFRONT ANALYSIS

Planning Activity Level	AM	Midday	PM
PAL-1	552	615	375
PAL-2	636	733	432
PAL-3	729	922	496
PAL-4	912	1,062	619

SOURCE: Kimley-Horn and Associates, Inc., 2018.

Future curbfront volumes were increased based on forecast increases in enplanements/deplanements, but also accounted for vehicle classification. Details on the curbfront forecasting methodology, including vehicle classification and dwell time, are provided in **Appendix E**.

Curbfront Level of Service

Curbfront LOS was determined using ACRP methodology and a macroscopic analysis tool – Quick Analysis Tool for Airport Roadways (QATAR). The assumptions used for the analysis are provided in **Appendix E**.

Table 4.8-8 and **Table 4.8-9** provide a summary of the LOS by activity level for each curbfront area in the baseline scenarios. In addition, **Figure 4.8-4** and **Figure 4.8-5** show examples of the graphical representations of the LOS for each section in the baseline scenarios. Due to the unique two-lane configuration in the existing secondary curb, the curbfront through capacity was reduced and applied to the QATAR Analysis.

TABLE 4.8-8
BASELINE PRIMARY CURBFRONT LEVEL OF SERVICE

	Ticketing A and B (Zone 1)			Unassigned and Baggage Claim (Zone 3)			Baggage Claim (Zone 5)			Baggage Claim (Zone 7)			Baggage Claim (Zone 9)		
	Curb LOS	Road LOS	Resulting LOS	Curb LOS	Road LOS	Resulting LOS	Curb LOS	Road LOS	Resulting LOS	Curb LOS	Road LOS	Resulting LOS	Curb LOS	Road LOS	Resulting LOS
AM Peak Hour	A	A	**A**	A	A	**A**	A	A	**A**	A	A	**A**	A	A	**A**
Midday Peak Hour	A	A	**A**	A	A	**A**	A	A	**A**	A	A	**A**	A	A	**A**
PM Peak Hour	A	A	**A**	A	A	**A**	A	A	**A**	A	A	**A**	A	A	**A**

SOURCE: Kimley-Horn and Associates, Inc., 2018.

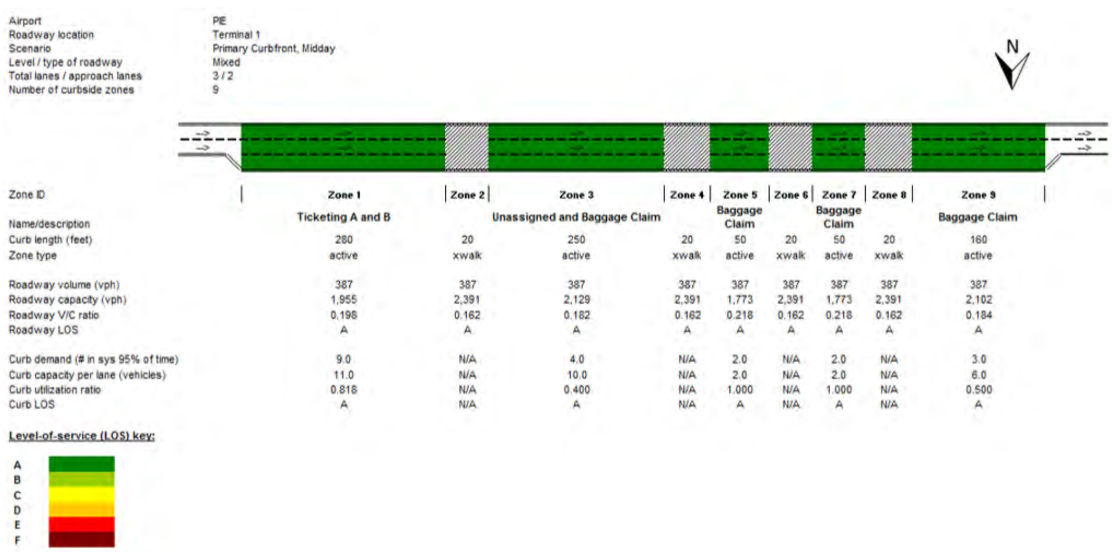


FIGURE 4.8-4: ANTICIPATED LOS FOR BASELINE (PRIMARY CURBFRONT), MIDDAY PEAK HOUR

SOURCE: Kimley-Horn and Associates, Inc., 2018.

TABLE 4.8-9
BASELINE SECONDARY CURBFRONT LEVEL OF SERVICE

	Island 1 (Zone 1)			Island 1 (Zone 3)			Island 2 (Zone 6)			Island 2 (Zone 8)		
	Curb LOS	Road LOS	Resulting LOS	Curb LOS	Road LOS	Resulting LOS	Curb LOS	Road LOS	Resulting LOS	Curb LOS	Road LOS	Resulting LOS
AM Peak Hour	F	A	**F**	C	A	**C**	C	B	**C**	A	A	**A**
Midday Peak Hour	C	A	**C**	B	A	**B**	C	B	**C**	A	A	**A**
PM Peak Hour	A	A	**A**	A	A	**A**	C	A	**C**	A	A	**A**

SOURCE: Kimley-Horn and Associates, Inc., 2018.

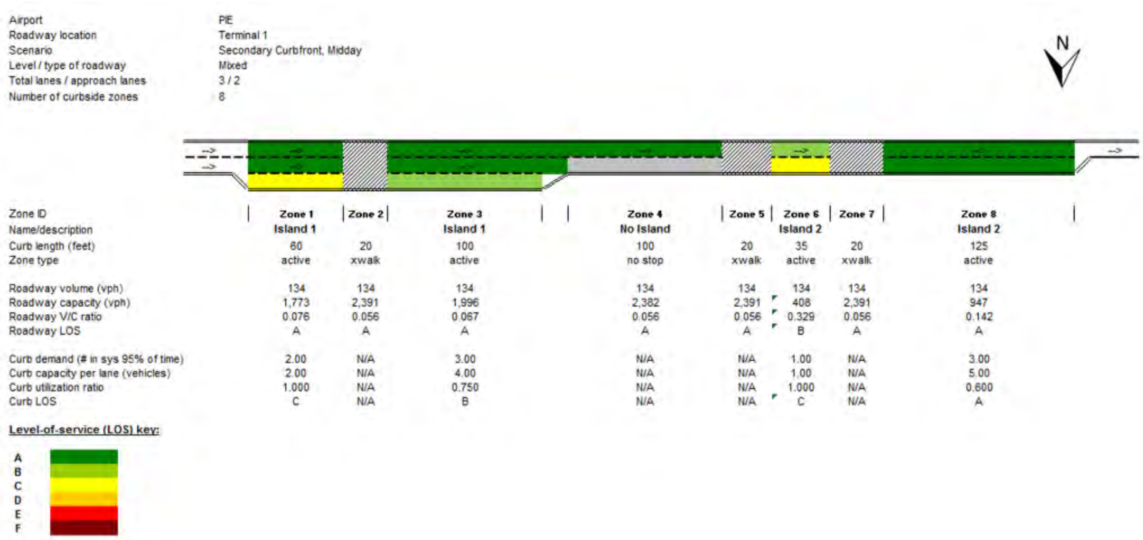


FIGURE 4.8-5: ANTICIPATED LOS FOR BASELINE (SECONDARY CURBFRONT), MIDDAY PEAK HOUR

SOURCE: Kimley-Horn and Associates, Inc., 2018.

In the baseline scenario, the secondary curbfront is heavily utilized because vehicles dwell for long durations and occupy the entirety of the curbfront length. However, despite the curbfront occupancy, the roadway along the secondary curbfront remains relatively uncongested. In each baseline scenario, the primary curbfront indicates no congestion. **Figure 4.8-6** depicts the current conditions of the primary curbfront during the midday peak hour. The images in **Figure 4.8-6** were taken during a field survey.

FIGURE 4.8-6: EXISTING CONDITIONS OF THE PRIMARY CURBFRONT DURING MIDDAY

SOURCE: Kimley-Horn and Associates, Inc., 2017.

Table 4.8-10 provides a summary of the LOS by activity level for each PAL. Additionally, an example of the graphical output from QATAR depicting the future curbfront conditions and projected LOS is presented in **Figure 4.8-7**.

TABLE 4.8-10
PROJECTED CURBFRONT LEVEL OF SERVICE

Activity Level		Ticketing A (Zone 1) Curb LOS	Ticketing A (Zone 1) Road LOS	Ticketing A (Zone 1) Resulting LOS	Ticketing B (Zone 3) Curb LOS	Ticketing B (Zone 3) Road LOS	Ticketing B (Zone 3) Resulting LOS	Unassigned (Zone 5) Curb LOS	Unassigned (Zone 5) Road LOS	Unassigned (Zone 5) Resulting LOS	Baggage Claim (Zone 7) Curb LOS	Baggage Claim (Zone 7) Road LOS	Baggage Claim (Zone 7) Resulting LOS
AM	**PAL-1**	D	B	**D**	D	B	**D**	A	A	**A**	A	A	**A**
	PAL-2	D	B	**D**	D	B	**D**	A	B	**B**	A	B	**B**
	PAL-3	E	C	**E**	E	C	**E**	A	B	**B**	A	B	**B**
	PAL-4	F	E	**F**	F	E	**F**	A	B	**B**	A	B	**B**
Midday	**PAL-1**	D	B	**D**	D	B	**D**	A	B	**B**	A	A	**A**
	PAL-2	D	B	**D**	D	B	**D**	A	B	**B**	A	B	**B**
	PAL-3	E	C	**E**	E	C	**E**	A	B	**B**	A	B	**B**
	PAL-4	E	D	**E**	E	D	**E**	A	C	**C**	C	C	**C**
PM	**PAL-1**	A	A	**A**	A	A	**A**	A	A	**A**	C	A	**C**
	PAL-2	A	A	**A**	A	A	**A**	A	A	**A**	D	A	**D**
	PAL-3	A	A	**A**	A	A	**A**	A	A	**A**	D	A	**D**
	PAL-4	A	B	**B**	A	B	**B**	C	B	**C**	E	B	**E**

SOURCE: Kimley-Horn and Associates, Inc., 2018.

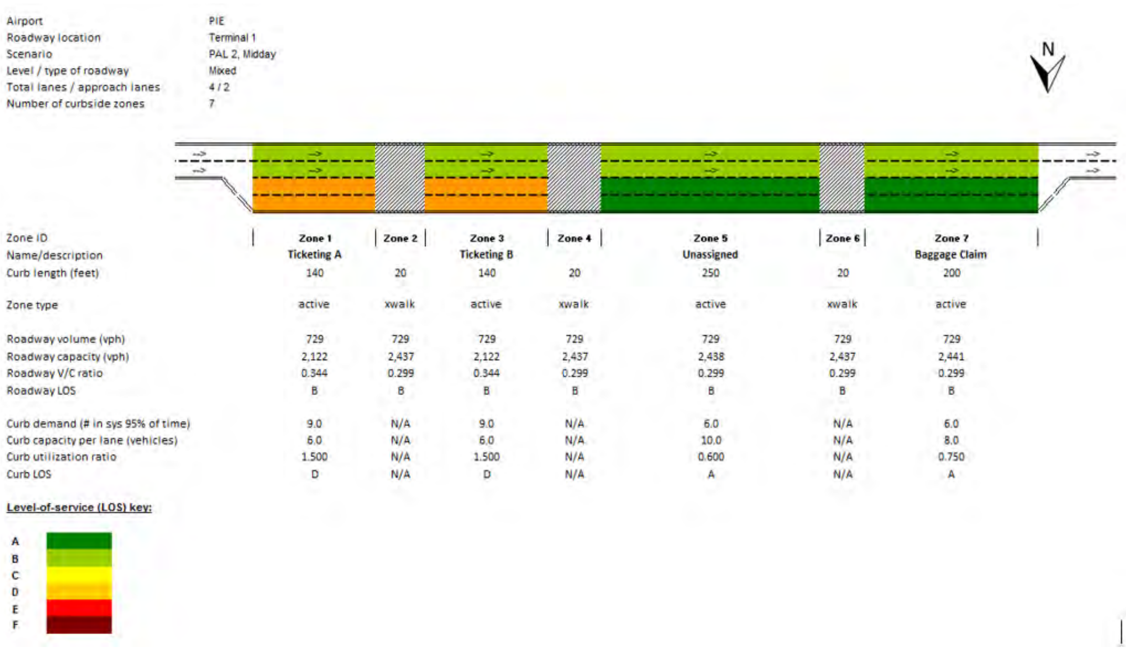


FIGURE 4.8-7: ANTICIPATED LOS FOR PAL-2, MIDDAY PEAK HOUR

SOURCE: Kimley-Horn and Associates, Inc., 2018.

The analysis indicates acceptable LOS D or better for both PAL-1 and 2. During the AM and midday peak hours, PAL-3 is projected to experience unacceptable LOS. However, during the PM peak hour PAL-3 is projected to have acceptable LOS. PAL-4 is projected to experience unacceptable LOS for all peak hours.

In all PALs, the Ticketing A and Ticketing B zones are projected to have worse LOS during the AM and midday peak hours than the Unassigned and Baggage Claim zones. Additionally, the Unassigned zone is projected to have acceptable LOS for all peak hours in all PALs.

Ground Transportation Area (GTA)

The Ground Transportation Area (GTA) is located beyond Baggage Claim and is primarily used for passenger pick-up by taxis and shuttles (rental car, hotel, courtesy, etc.). However, today the GTA is also utilized by employees, rental cars, limousine services, and commercial vehicles. In future scenarios, it was assumed that all taxi, shuttle, and limousine pick-up as well as airport vehicle and law enforcement parking will occur in the GTA. It was also assumed that private vehicles would be prohibited from utilizing the GTA. The future GTA configuration is shown in the red box in **Figure 4.8-8**.

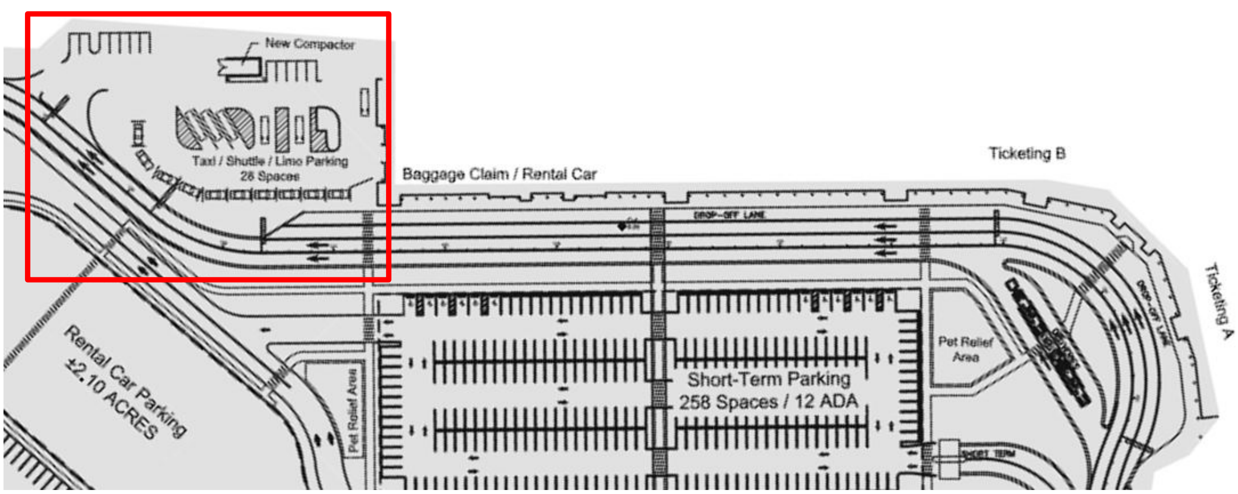


FIGURE 4.8-8: FUTURE CURBFRONT AND GTA CONFIGURATION

SOURCE: FDOT Gateway Expressway Reverse Access Road Drawing and Kimley-Horn and Associates, Inc., 2018.

Based on the previous assumptions, the vehicle volumes for the baseline and PAL-1 through PAL-4 were projected based on field survey counts conducted in December 2017. The GTA projected shuttle and limo volumes are presented in **Table 4.8-11**. Since it was assumed that only departures occur during the morning peak hour, no vehicles were assumed to utilize the GTA during the morning peak hour.

TABLE 4.8-11
GTA PEAK HOUR VEHICLE VOLUMES

		AM	Midday	PM
Base Year - 2017	**Taxi**	0	9	9
	Rental Car/Economy Lot Shuttle	0	18	18
	Hotel/Courtesy Shuttle	0	4	4
	Other	0	11	11
PAL-1	**Taxi**	0	11	11
	Rental Car/Economy Lot Shuttle	0	20	20
	Hotel/Courtesy Shuttle	0	4	4
	Other	0	12	12
PAL-2	**Taxi**	0	13	12
	Rental Car/Economy Lot Shuttle	0	22	21
	Hotel/Courtesy Shuttle	0	5	5
	Other	0	14	13
PAL-3	**Taxi**	0	17	14
	Rental Car/Economy Lot Shuttle	0	26	23
	Hotel/Courtesy Shuttle	0	6	5
	Other	0	13	14
PAL-4	**Taxi**	0	19	17
	Rental Car/Economy Lot Shuttle	0	28	26
	Hotel/Courtesy Shuttle	0	6	6
	Other	0	17	16

SOURCE: Kimley-Horn and Associates, Inc., 2018.

The average dwell time for a vehicle in the GTA was estimated to be 2.17 minutes. The methodology for calculating dwell times is included in **Appendix E**. Based on the dwell time, projected vehicle volumes, and number of available parking spots (28), it is anticipated that the GTA will have sufficient capacity through PAL-4.

Conclusions and Requirements

The terminal area roadways operate at an acceptable LOS through the planning horizon. The existing primary curbfront currently operates at an acceptable level of service but the secondary curbfront experiences a curb LOS F during the morning peak hour due to a small number of vehicles with very long dwell times. Although the curb LOS on the secondary curbfront is at an unacceptable level, the roadway LOS does not exceed LOS B for any of the peak hours. This LOS is likely due to the types of vehicles that utilize the secondary curbfront. Currently, the airport reports that the secondary curbfront is utilized by airport and law enforcement vehicles. These types of vehicles have long dwell times, which leads to an increase in the curb utilization ratio. However, the volume of these vehicles is low, which causes little to no congestion on the curbfront roadway.

The curbfront is projected to experience congestion and undesirable LOS during the AM and midday peak hours for all PALs. The only PAL scenario where the LOS for all zones is projected to remain at an LOS C or better was the PM peak hour for PAL-1. Although LOS C is a desirable planning target as defined by ACRP 40, a LOS D is acceptable for existing facilities. The curb LOS for PAL-1 and PAL-2 are projected to remain at LOS D or better for all peak hours while PAL-3 and PAL-4 are projected to operate at unacceptable levels of service.

Additional QATAR scenarios were run to determine the curb lengths required to achieve a LOS D or better during all peak hours in PAL-4. To achieve LOS D or better under PAL-4 conditions, the following required curb lengths are anticipated:

- Ticketing A: 225 LF (an increase of 85 LF from 140 LF)
- Ticketing B: 225 LF (an increase of 85 LF from 140 LF)
- Baggage Claim: 225 LF (an increase of 25 LF from 200 LF)

4.8.2 Public Parking Requirements

Definitions

The following terms are referred to throughout this section.

Parking Demand – the number of spaces required to satisfy the parking needs of a specific planning period.

Absolute Peak Day – the day of the year with the highest parking occupancy. The airport should be able to accommodate peak day demand, but available parking options may be limited. On the absolute peak day, parking patrons seeking long-term parking may be required to park in an overflow lot or in more expensive short-term parking.

Design Day – when the full range of parking options should be available to parking patrons. It is an industry standard to select a design day to satisfy parking demand for between 90 percent and 95 percent of the days of the year.

Parking Demand Ratios – the number of spaces per thousand annual passenger enplanements. Ratios are typically calculated for the design day and the absolute peak day.

Midday Occupancy – the time of day with the highest parking occupancy at the airport.

Overnight Inventory – the parking occupancy at night after the conclusion of operations, and represents the lowest parking occupancy for any given day.

Methodology

The methodology used to project future parking demand identified the midday occupancy during the design day and the absolute peak day. To project future parking demand, demand ratios were applied to future enplanements. Projected future parking demand was compared to the parking supply to estimate future parking adequacy.

Public Parking Demand Ratios

Parking data provided by the airport was used to calculate parking demand ratios for the absolute peak day and the design day. Overnight data for each day of the year was also provided by the airport.

Figure 4.8-9 and **Figure 4.8-10** depict the overnight inventory for 2017. The 20th busiest day (approximately 95th percentile) was selected for the design day. Parking at the airport tends to peak over weekends and holidays. The design day was selected because it represents a peak accumulation during a weekend, but it does not reflect the highest weekend accumulation. Six weekends or holidays in 2017 exceeded the parking demand during the selected design day.

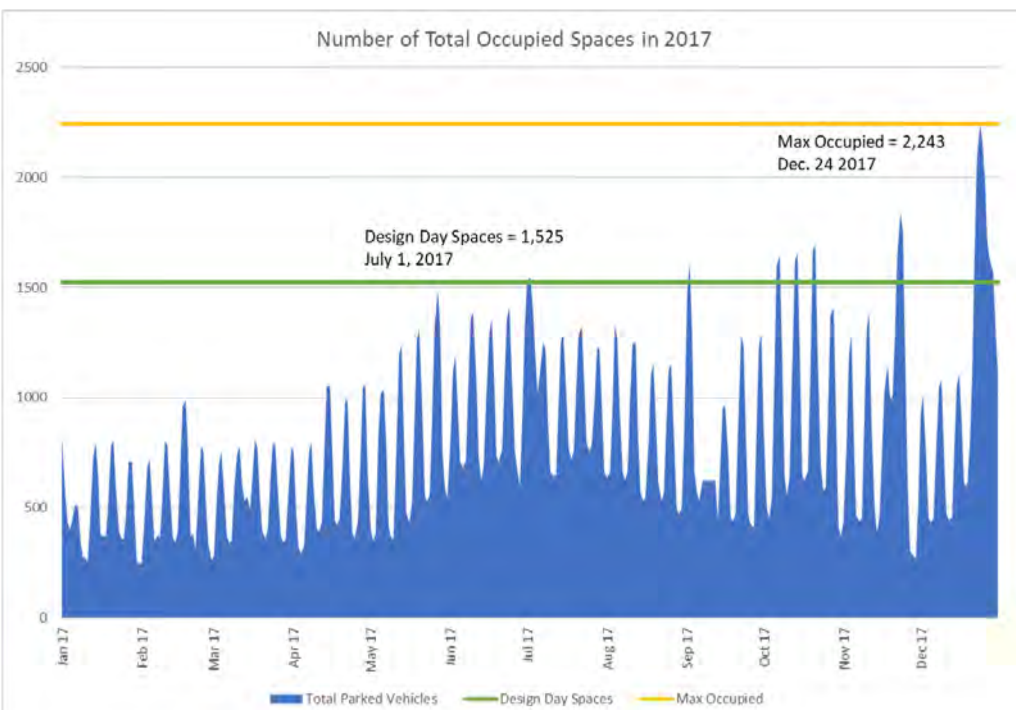


FIGURE 4.8-9: OVERNIGHT PARKING INVENTORY

SOURCE: Kimley-Horn and Associates, Inc., 2018.

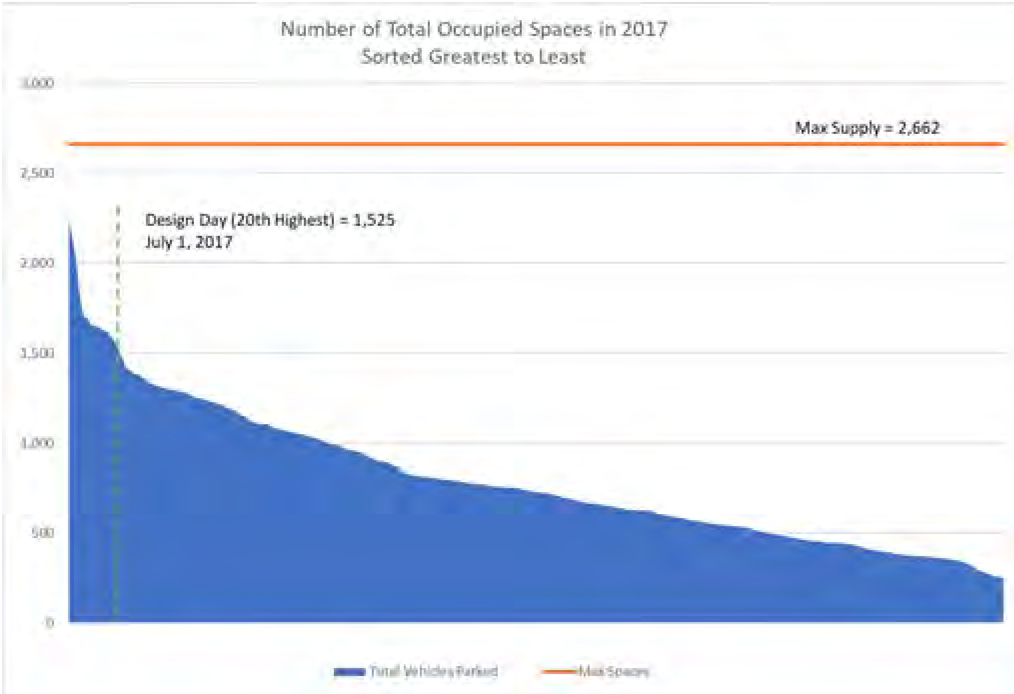


FIGURE 4.8-10: SORTED OVERNIGHT PARKING INVENTORY

SOURCE: Kimley-Horn and Associates, Inc., 2018.

Midday occupancy information for 2017 was not available, and therefore, midday occupancy data for January and February of 2018 was used. To estimate the percent increase in midday occupancy over the overnight inventory, the overnight inventory data was compared to midday occupancy for January and February of 2018. Based on this survey, midday occupancy increased on average 20 percent over overnight inventory. The parking ratio for the design day was calculated by dividing the projected midday occupancy by the 2017 enplanements (1,021,361). **Table 4.8-12** presents the projected midday occupancy and parking demand ratio for the design day and absolute peak day.

TABLE 4.8-12
PARKING DEMAND RATIOS

	Overnight Occupancy	Projected Mid-Day Occupancy	Parking Demand Ratio[a]
Design Day	1,525	1,830	1.79
Absolute Peak Day	2,243	2,692	2.64

[a] Parking spaces per 1,000 annual enplanements.

SOURCE: Kimley-Horn and Associates, Inc., 2018.

Projected Future Public Parking Demand

Parking ratios were applied to each PAL to determine future parking demand for the design day and absolute peak day. **Table 4.8-13** and **Table 4.8-14** presents parking demand for the design day and absolute peak day, respectively.

TABLE 4.8-13
DESIGN DAY PROJECTED PUBLIC PARKING DEMAND

	Enplanements	Design Day Demand
Base Year		
2017	1,021,361	1,830
Planning Activity Level		
PAL-1	1,250,000	2,238
PAL-2	1,750,000	3,133
PAL-3	2,250,000	4,028
PAL-4	2,750,000	4,923

SOURCE: Kimley-Horn and Associates, Inc., 2018

TABLE 4.8-14
ABSOLUTE PEAK DAY PROJECTED PUBLIC PARKING DEMAND

	Enplanements	Absolute Peak Day Demand[a]
Base Year		
2017	1,021,361	2,692
Planning Activity Level		
PAL-1	1,250,000	3,300
PAL-2	1,750,000	4,620
PAL-3	2,250,000	5,940
PAL-4	2,750,000	7,260

[a] Calculated based on effective parking supply.

SOURCE: Kimley-Horn and Associates, Inc., 2018

Employee Parking Demand

Currently, employees park primarily in a dedicated parking lot. The lot provides parking for flight crews, mechanics, airline support staff, TSA, concessions staff, and some airport employees. According to airport staff, employee parking demand previously peaked on Thursday through Sunday when most of the Allegiant flights occurred. Since Allegiant added flights on Tuesday and Wednesday, employee parking demand is more consistent throughout the week. Airport staff also indicated that employee parking demand has three peaks throughout the day with the first occurring at 4:00 a.m. with 190 occupied spaces, the second at 1:00 PM with 250 occupied spaces, and the last between 8:00 p.m. and 10:00 p.m. with 140 occupied spaces. In addition to parking in the employee parking lot, some staff park in other lots at the airport. For the purpose of this study, it is assumed that design day employee parking demand is 260 to account for employees who park in parking lots other than the designated employee parking lot.

Typically, employee parking demand is a function of commercial service operations and increases at a slower pace than public parking demand, which is directly related to passenger enplanements. **Table 4.8-15** summarizes projected employee parking demand as a function of projected annual aircraft operations, since they differ from the PALs for the airfield facilities.

TABLE 4.8-15
PROJECTED EMPLOYEE PARKING DEMAND

	Annual Operations[a]	Airport Employee Demand
Base Year		
2017	114,582	260
Planning Activity Level		
2023	129,000	293
2028	141,700	322
2033	156,650	355
2038	171,600	389

[a] Annual operations by year are utilized since PALs are based on airfield facility thresholds.

SOURCE: Kimley-Horn and Associates, Inc., 2018.

Cell Phone Lot Demand

Based on field observations, a limited portion of the cell phone lot is utilized in baseline conditions during peak hours. In addition to private vehicle traffic, TNC's were observed utilizing the cell phone lot for staging purposes.

Based on observations and growth projections, if the existing cell phone lot is only used for private vehicle (passenger) traffic, the cell phone lot should adequately serve the demand through PAL 4. However, if TNC's will continue to be allowed to stage there, the TNC demand may outgrow the capacity of the cell phone lot in the future. Consideration should be given to relocating TNC staging elsewhere as TNC demand continues to grow.

4.8.3 Rental Car Requirements

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

Methodology

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

Customer Service Counters

Based on the rental car survey, it was determined that the peak rental day was a Saturday with 75 cars rented during the peak hour between 12:00 p.m. and 1:00 p.m. The rental car survey noted that 5 percent of rental car customers bypass the counter and go direct to the ready and return area. Based on industry standards, the average time at the counter to complete a transaction is 8 minutes. Planning incorporates an industry standard surge factor of 125 percent to accommodate unanticipated peaks. Applying the formula to the customer counters suggests the existing demand is 12 counter positions. The projected customer service counter demand for each PAL is presented in **Table 4.8-16**.

TABLE 4.8-16
PROJECTED CUSTOMER SERVICE COUNTER DEMAND

	Enplanements	Counter Positions
Base Year		
2017	1,021,361	12
Planning Activity Level		
PAL-1	1,250,000	15
PAL-2	1,750,000	21
PAL-3	2,250,000	27
PAL-4	2,750,000	33

SOURCE: Kimley-Horn and Associates, Inc., 2018.

Ready and Return Facilities

Peak week rental and return information was provided by the rental car agencies, and is presented in **Table 4.8-17**. Based on the survey it was determined that a Saturday was the peak rental day with 607 cars rented and 531 cars returned.

TABLE 4.8-17
DESIGN WEEK RENTALS AND RETURNS

	Rentals	Returns
Sunday	444	680
Monday	418	569
Tuesday	324	362
Wednesday	441	365
Thursday	573	402
Friday	584	437
Saturday	607	531

SOURCE: Kimley-Horn and Associates, Inc., 2018.

It is a common industry standard that the number of parking spaces required in a rental car ready and return area be equal to 2.5 times the number of rentals plus the number of returns in the peak hour on the design day. **Table 4.8-18** presents the peak hour rental and return information for the design day. Applying the formula to the rental car ready and return area suggests that the existing demand for ready and return is 320 spaces. The projected ready and return space demand for each PAL is presented in **Table 4.8-19**.

TABLE 4.8-18
EXISTING READY AND RETURN DEMAND

Rental Demand Factor	**2.5**
Peak Hour Returns	132
Return Demand Factor	1.0
Estimated Demand	320

SOURCE: Kimley-Horn and Associates, Inc., 2018.

TABLE 4.8-19
PROJECTED READY AND RETURN DEMAND

	Enplanements	Spaces
Base Year		
2017	1,021,361	320
Planning Activity Level		
PAL-1	1,250,000	392
PAL-2	1,750,000	549
PAL-3	2,250,000	705
PAL-4	2,750,000	862

SOURCE: Kimley-Horn and Associates, Inc., 2018.

4.9 Air Cargo Facilities

While there are currently no regularly scheduled cargo operations at PIE, the activity forecasts identified the potential for dedicated all-cargo operations to return to PIE in the near future. Under the recommended forecasts, the all-cargo carrier activity ranged from seven to ten weekly flights over the 20-year planning horizon. Under the high-growth scenario, these figures increase from 14 to 22 weekly flights. Since it is difficult to predict the type of aircraft that might be utilized for regularly scheduled service, typical dedicated cargo freighters were considered. These include the Airbus A300F4-600, Boeing 747-400F, Boeing 757-200PF, and Boeing 767-300F. For planning purposes, a cargo apron capable of accommodating two of the largest cargo aircraft at the same time is recommended for even the baseline condition. Taking the physical dimensions of the Boeing 747-400F and space required for wingtip clearance, ground support equipment, and staging of cargo; approximately 7,000 SY would be required for each aircraft parking position. Therefore, the ability to provide approximately 14,000 SY of apron next to a future air cargo facility will be evaluated in the airport development alternatives.

While 7,000 SY of apron would provide flexibility relative to aircraft parking requirements, the total space required for a future air cargo facility will vary significantly with the ultimate air cargo operator(s) using the facility. This is particularly true given that some air cargo operations utilize portions of the aircraft apron to load, unload, and sort the cargo and/or containers. The alternatives will consider a dedicated air cargo facility that is proportionate with the apron area needed to support two Boeing 747-400F aircraft concurrently. Consideration will also be given to the need to provide space for the potential to support future passenger airline cargo. Currently, the lack of a dedicated cargo facility at PIE makes it difficult for the passenger airlines to process even the smallest shipments to include as belly-haul cargo when space/weight is available in the regularly scheduled flights.

4.10 General Aviation Facilities

The following sections address various airport facilities required to support existing and projected GA activity, which represented over 73 percent of the annual operations at PIE in 2017. The two full-service FBOs, Sheltair Aviation and Signature Flight Support, have developed GA terminal facilities, hangars, and aircraft parking aprons on land leased from the airport. These FBOs serve both based and itinerant customers. As GA activity and demand for services increase over time, areas available to support additional GA facility development need to be identified as part of the future development plans.

A number of one-on-one interviews with GA users and tenants, including the two FBOs, were conducted at the onset of the study. GA user and tenant survey forms were also created and provided at the different public workshops and via the dedicated website developed for the new master plan study. This outreach provided valuable input for this portion of the master plan process. The need for additional hangar and apron space to support the anticipated growth in GA activity is a critical element of this study and the following sections identify future GA needs. However, no assessment was made with respect to existing or projected FBO building space requirements because the size and types of space, as well as amenities, would be determined by each FBO. Responses to the existing and projected increases in GA activity, and the related demand for additional GA facilities and services is a business decision made by each FBO and other tenants at PIE providing commercial aeronautical services such as charter flights, maintenance, or flight training.

4.10.1 Aircraft Hangar Requirements

Because hangars provide protection from weather and a level of security for the aircraft, they are one of the most desirable means for aircraft storage at any airport. Most of the hangar space at PIE is used for the long-term storage of based aircraft, with occasional use by itinerant aircraft during maintenance or extended visits. The hangars generally available to the public include T-hangars, box hangars, and executive hangars. There are also a number of large clearspan hangars managed by the FBOs for different corporations, aviation businesses, or private aircraft owners. The most common hangar types at PIE are T-hangars and clearspan hangars.

T-hangars are fully enclosed buildings which have individual t-shaped stalls, each capable of storing one aircraft (typically a single-engine or a light multi-engine aircraft) in a nested back to back configuration. Box hangars typically also serve a single aircraft with the primary difference being the shape of the stall. Clearspan hangars are capable of holding multiple aircraft and commonly have an attached office, shop, and/or storage space. The executive hangars at PIE are typically larger than the box hangars and can therefore accommodate larger or multiple GA aircraft.

Based on a review of aircraft served by the two FBOs and Landings Hangar Area, approximately 80 percent of the PIE's based GA aircraft were stored in hangars in 2017. In some cases, a large hangar may be used primarily for maintenance, but if extra space is available, it may also be used for the storage of based and/or itinerant aircraft. Given PIE's coastal location and harsh weather environment, it is expected that at a minimum, the current high percentage of based aircraft stored in hangars will continue throughout the planning period. This is supported by the FBOs' current waiting lists and 100 percent occupancy rate for hangars.

Of the based GA aircraft currently stored in hangars, just over half are in T-hangars. While the future activity forecasts noted that the most noticeable changes in the based aircraft fleet mix will be an increase in the number of business jets and rotorcraft, there will still be a demand for additional T-hangar space. A majority of based aircraft will still remain single-engine, most of which tend to prefer T-hangars, if available. Based on the trends today, space for at least 65 additional T-hangar units needs to be considered during the planning period.

Similarly, there will also be a demand for additional clearspan and/or executive type hangars that can accommodate the larger multi-engine aircraft, business jets, and helicopters. This is supported by the fact that Sheltair has recently rehabilitated one of the largest hangars at the airport for the storage of GA aircraft and Signature has expressed their need for additional clearspan hangar space. As indicated, the number of aircraft stored in clearspan hangars can vary depending on the size and how the hangar is managed. Conversely, it is possible for some private or executive hangars to store only one or two aircraft. Based on the projected demand, a mix of large and small clearspan hangars should be planned to provide space for storage of at least 70 additional based GA aircraft in the multi-engine, jet, or rotorcraft categories. **Table 4.10-1** provides a summary of the minimum number of additional GA aircraft that are expected to be in hangars each forecast year.

TABLE 4.10-1
ADDITIONAL GENERAL AVIATION AIRCRAFT IN HANGARS

	T-Hangars	Clearspan Hangars
2023	25	18
2028	12	15
2038	28	37
Total	**65**	**70**

SOURCE: ESA, 2018.

4.10.2 General Aviation Parking Aprons

For planning purposes, based and itinerant aircraft apron requirements are considered separately since they serve different functions. However, since parking aprons typically accommodate both, the two will be combined to identify the overall need. Aircraft parking aprons are also usually divided into areas for small versus large aircraft. Areas for small aircraft are typically designed for ADG I or II with tie-down capability sized for the single-engine and light multi-engine aircraft. Large aircraft apron space includes the area necessary to park the larger turboprop multi-engine and business jet aircraft, as well as rotorcraft. The methods used to estimate the minimum apron space required for based and itinerant aircraft parking are provided in the following sections.

Based Aircraft Parking Area

Following the hangar utilization rate, approximately 20 percent of the based aircraft were parked on aprons at PIE in 2017. Of these, a majority were single-engine and light multi-engine aircraft. Consistent with the previous section, it is assumed that the same percentage of based aircraft will be parked on the aprons throughout the planning period. It was also assumed that the additional aircraft stored outside will continue to primarily smaller aircraft. As such, a minimum area of 300 SY has been applied for each of the smaller GA aircraft and an average area of 700 SY for each of the based multi-engine aircraft, jet, and rotorcraft which require more space. For planning purposes, this value is then typically increased ten percent to account for changes that might occur before the additional space is provided.

Itinerant Aircraft Parking Area

Itinerant apron space is intended for relatively short-term parking, usually less than 24 hours (possibly overnight), primarily associated with transient aircraft. When possible, such aprons should also be located as to provide easy access to the FBO terminal areas, aviation fuel services, and/or ground transportation facilities. For planning purposes, a preferred approach to determining space needs is to calculate the total number of peak day itinerant aircraft that can be expected on the apron at any given time.

For PIE this was performed by using the peak activity, local versus itinerant, and operational fleet mix figures from the approved aviation activity forecasts. Based on typical space and maneuvering requirements, a minimum area of 360 SY per small itinerant aircraft was applied, while space for the larger aircraft was based on the physical footprint of the larger business jet aircraft fleet that the two FBOs typically accommodate. These areas range from 1,200 to 2,000 SY per aircraft. Given that the size of the itinerant GA fleet has been increasing, a range from 1,200 SY to the average of 1,600 SY was applied to estimate the itinerant apron space required by the end of the planning period.

Summary of General Aviation Aircraft Parking Area Requirements

Table 4.10-2 summarizes the GA aircraft parking apron requirements and then compares them to the combined apron area available at the two FBOs in 2017. As shown, there is already a need for additional space, which was confirmed by both FBOs during the individual interviews. By the end of the planning period nearly three times the existing GA aircraft parking apron space will be required to accommodate the projected demands.

TABLE 4.10-2
GENERAL AVIATION AIRCRAFT PARKING APRON REQUIREMENTS

	2017	2038
Based Aircraft		
Approximate Number of Aircraft on Apron	51	85
Recommended Area for Based Aircraft (subtotal)	24,800 SY	55,200 SY
Itinerant Aircraft		
Small Aircraft on Peak Day	40	51
Area Required for Small Aircraft	14,400 SY	18,400 SY
Large Aircraft on Peak Day	32	64
Area Required for Large Aircraft	38,400 SY	102,400 SY
Minimum Area Required for Itinerant Aircraft (subtotal)	52,800 SY	120,800 SY
Combined Apron Space Requirements		
Total Area for Based and Itinerant Aircraft	77,600 SY	176,000 SY
Combined FBO Apron Areas Available in 2014	64,000 SY	64,000 SY
Surplus (+) / Deficit (-)	-13,600 SY	-112,000 SY

SY = Square Yards

SOURCE: ESA, 2018.

4.11 Support and Service Facilities

The key facilities which support the airport activity were described in the existing conditions chapter. Any improvements identified for these over the course of the 20-year planning horizon are identified in the following sections.

4.11.1 Airfield Electrical Vault

For the current airfield configuration, the existing airfield electrical vault is considered to be of adequate size and in relatively good condition, including the various equipment to control the airfield systems. However, the electrical vault is limited to 800 SF and may not be capable of accommodating the equipment required for the future airfield improvements. These include the regulators and circuits associated with the lighting for the new parallel GA runway, the new taxiways serving the parallel GA runway, the new parallel taxiway east of Runway 18-36, and the new parallel taxiway southeast of Runway 4-22. In addition to the space constraints, the current airfield electrical vault is located in an area that is low lying and prone to frequent flooding from heavy rain events. Given this flooding and the need for additional space, a project to relocate the airfield electrical vault needs to occur as soon as possible. When this is evaluated as part of the airfield development alternatives, consideration must be given to the various electrical homeruns, as they will have a major impact on the sites that are feasible for a relocated facility.

4.11.2 Aircraft Rescue and Fire Fighting

As noted in the existing conditions, the current Aircraft Rescue and Fire Fighting (ARFF) facility provides the proper Class I, Index C rating required by the airport for its current scheduled air carrier operations. The ARFF index required is based on the length of the longest air carrier aircraft making an average of five or more daily departures. The aircraft lengths are grouped as follows:

Index A	< 90 feet
Index B	90 feet but < 126 feet
Index C	126 feet but < 159 feet
Index D	159 feet but < 200 feet
Index E	at least 200 feet

Presently, the longest aircraft at PIE meeting these parameters (Airbus A-320) falls within Index C. Based on an ARFF Index C, the airport requires, at a minimum, either three or two vehicles with the following capabilities:

Three ARFF Vehicle Capabilities (Index C)

Vehicle 1	500 pounds of sodium-based dry chemical, halon 1211, or clean agent *or* 450 pounds of potassium-based dry chemical and water with a commensurate quantity of Aqueous Film Forming Foam (AFFF) to total 100 gallons for simultaneous dry chemical and AFFF application
Vehicle 2	At least 500 pounds of sodium-based dry chemical, halon 1211, or clean agent *and* 1,500 gallons of water and the commensurate quantity of AFFF for foam production
Vehicle 3	A quantity of water and the commensurate quantity of AFFF so that the total quantity of water for foam production carried by both Vehicle 2 and Vehicle 3 is at least 3,000 gallons

Two ARFF Vehicle Capabilities (Index C)

Vehicle 1	500 pounds of sodium-based dry chemical, halon 1211, or clean agent *and* 1,500 gallons of water and the commensurate quantity of AFFF for foam production
Vehicle 2	At least 500 pounds of sodium-based dry chemical, halon 1211, or clean agent *and* A quantity of water and the commensurate quantity of AFFF so that the total quantity of water for foam production carried by both Vehicle 1 and Vehicle 2 is at least 3,000 gallons

SOURCE: Title 14 CFR Part 139, Certification of Airports.

At PIE, all three ARFF trucks have the Index C capabilities required when only two trucks are needed and therefore, a third truck is always kept on reserve as a backup. While the current vehicles are considered to be in good condition, it is anticipated that each will need to be replaced over the course of the 20-year planning horizon. The current marine rescue boat, which was acquired in 2014, will also need to be replaced during the study period.

As noted in the activity forecasts, future air carrier activity is expected to include an increased level of international commercial passenger service. This is expected to include a mix of ARFF Index C (Airbus A-321), Index D (Boeing 757-300, Boeing 767-300ER, and Boeing 787-800), and Index E (Airbus A330-300) operations. Similarly, the dedicated air cargo activity might include ARFF Index D (Airbus A300F4-600, Boeing 757-200PF, and Boeing 767-300F) and Index E (Boeing 747-400F) operations. While larger aircraft are forecast, it is not clear whether the combined activity of these aircraft will average five or more daily departures during the 20-year planning period. Therefore, the ARFF Index for PIE would remain at C, for the foreseeable future.

The three ARFF vehicles at PIE allow the ability to provide Index D coverage. Basically, Index D requires three vehicles with the nearly the same capabilities as Index C; the only difference being the amount of water and the commensurate quantity of AFFF for foam production carried by all three vehicles is at least 4,000 gallons (versus 3,000). To meet Index E requirements, the total foam production by all three would increase to 6,000 gallons. However, then the airport would not have a truck on reserve to serve as a backup. As such, there should be a plan to expand existing ARFF facilities and capabilities to fully meet Index D or E requirements at such time that international passenger service and/or air cargo activity approaches five or more departures per day.

4.11.3 Airport Maintenance Equipment Storage

As indicated in the existing conditions chapter there are plans to construct a consolidated airport maintenance facility in 2018. The site for the new facility is located directly west of the Pinellas County Sheriff’s hangar and would provide a total of 10,500 SF of space. The first floor will include 1,900 SF of office space and 4,100 SF of shop space. The second floor will have 3,000 SF of office space and 1,500 SF of optional loft area. It is expected that this facility will meet the airport’s needs throughout the planning period.

4.11.4 Fuel Farm

The various storage tanks in the airport’s fuel farm are privately-owned and are operated by the two FBOs and USCG. Therefore, any decision to upgrade equipment or expand storage capacity is a decision by each tank owner. Overall, the fuel farm infrastructure is in good condition and well maintained. There is also space within the current area to accommodate additional fuel tanks. Notably, Sheltair indicated that they plan to add up to five additional 20,000-gallon Jet-A tanks over the next few years within their portion of the fuel farm.

The ability to provide space for additional fuel tanks around the existing fuel farm should be evaluated as part of the various airport development alternatives. Any additions or expansions to the fuel farm will need to comply with the most recent version of National Fire Protection Agency

(NFPA) 30, Flammable and Combustible Liquids Code as well as the applicable Environmental Protection Agency (EPA) requirements.

4.12 Summary of Facility Requirements

Table 4.12-1 provides a summary of the key facility requirements necessary to satisfy the approved aviation activity forecasts. Additional facilities will also be included as part of the ALP drawing set and Capital Improvement Program to maximize the airport's flexibility to respond to future opportunities. The order in which these improvements are listed does not have any relation to the priority or phasing of such projects.

TABLE 4.12-1
MINIMUM FACILITY REQUIREMENTS

Category	Proposed Improvements
Runways	Potential to Extend Runway 18-36 to 10,800 feet New Parallel General Aviation Runway with Non-Precision Approaches Increase Runway 18-36 Shoulder Width and Runway 18 end Blast Pad Add Blast Pad to Runway 4 end Rehabilitate Runway 18-36 and Runway 4-22 Periodic Runway Pavement Maintenance
Taxiways	Dedicated Apron Edge Taxiways or Taxilanes to Passenger Terminal Apron Parallel Taxiway East of Runway 18-36 Parallel Taxiway Southeast of Runway 4-22 Parallel Taxiway to New Parallel General Aviation Runway Additional Exit Taxiway for Runway 18-36 and Runway 4-22 Taxilane Access to New Facilities Aircraft Run-up Areas Periodic Taxilane Pavement Maintenance
Airfield	Medium Intensity Runway Lights (MIRL) for New Parallel General Aviation Runway Periodic Remarking of All Airfield Pavements REILs on both ends of New Parallel General Aviation Runway Repair Erosion to Man-made Peninsula and Improve Seawalls (FAA Project) Replace Runway 4-22 PAPIs and Install PAPIs on New Parallel General Aviation Runway Convert PIE VOR to a Doppler VOR (FAA Project)
Airport Facilities	Expansion of Passenger Terminal Facilities and Aircraft Parking Positions Air Cargo Facilities including at least 14,000 SY Aircraft Parking Apron Additional T-Hangar Facilities and Clearspan Hangars Additional General Aviation Aircraft Parking Apron Space (at least 112,000 SY) Relocate Airfield Electrical Vault Replace ARFF Vehicles and Marine Rescue Boat Expand ARFF Capabilities to Index D or E
Other Facilities	Increase Public Automobile Parking Capacity and Improve Access Provide Additional Rental Car Parking Landside Access and Parking to New Development Areas

SOURCE: ESA, 2018.

CHAPTER 5

Environmental Overview

CHAPTER 5
Environmental Overview

5.1 Introduction

Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5070-6B, Change 2, *Airport Master Plans*, encourages the consideration of environmental factors in airport master planning to "help the sponsor thoroughly evaluate airport development alternatives and to provide information that will help expedite subsequent environmental processing." Also, Florida Department of Transportation (FDOT) *2016 Guidebook for Airport Master Planning* notes that there are different environmental processes for projects that are funded by the FAA or FDOT. However, both agencies clearly recognize that it is not the intent of a master plan to complete the federal and state environmental review processes. Instead, the information should identify and set the stage for understanding what future environmental evaluations and clearances may be needed.

This chapter provides an overview of known environmental resources that will be considered during the identification and evaluation of development alternatives in this master plan. The types of environmental reviews are addressed at the end of this chapter while potential environmental impacts associated with specific conceptual development alternatives are discussed as part of the evaluation of airfield alternatives. The environmental resources discussed in this chapter include many of those identified in FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*, and FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*. This overview does not constitute an Environmental Assessment (EA); instead, it is intended to help prepare for NEPA review that may be required by the FAA for future projects occurring at St. Pete-Clearwater International Airport (PIE). Based on the research conducted and documented in this chapter, the resource categories with the greatest potential to affect future development actions at PIE include Wetlands and Floodplains.

5.2 Air Quality

The federal *Clean Air Act*, as amended, required the U.S. Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) for principle air pollutants considered harmful to public health and the environment. Those areas where the NAAQS are not met are designated as "nonattainment." Pinellas County is currently classified as "attainment" for all criteria air pollutants listed in the NAAQS. Emission sources at PIE, which are typical of airports, include aircraft engines, ground support equipment, auxiliary power units, motor vehicles, temporary use of construction equipment, and various stationary sources. Stationary sources at PIE include, back-up electric power generators and fuel storage tanks.

The existing and projected number of passengers and aircraft operations at PIE, in conjunction with the County's attainment status, indicates that continued development at the airport is not likely to substantially affect air quality, exceed thresholds that require detailed air quality analyses, or require conformance with a State Implementation Plan (SIP). Future airport development projects that require NEPA review will consider the project's effect on air quality. Certain projects and tenant activities, such as operating paint booths, will need to comply with applicable regulations and permit requirements.

5.3 Biological Resources

5.3.1 Biotic Communities and Vegetation

PIE covers a land area of approximately 1,900 acres. The existing land use and cover types have been mapped for PIE using the Southwest Florida Water Management District (SWFWMD) Florida Land Use, Cover and Forms Classifications Systems (FLUCCS) data for Pinellas County. The FLUCCS communities are listed in **Table 5.3-1** below and are depicted on **Figure 5.3-1**.

TABLE 5.3-1
FLORIDA LAND USE, COVER AND FORMS CLASSIFICATION SYSTEMS (FLUCCS) COMMUNITIES AT PIE

Land Use Code	Description
540	Bays and Estuaries
140	Commercial and Services
644	Emergent Aquatic Vegetation
641	Freshwater Marshes
182	Golf Courses
434	Hardwood – Coniferous Mixed
150	Industrial
170	Institutional
653	Intermittent Ponds
612	Mangrove Swamps
190	Open Land
530	Reservoirs / Open Water
615	Stream and Lake Swamps (Bottomland)
810	Transportation
630	Wetland Forested Mixed

SOURCE: SWFWMD, 2011, and ESA, 2019.

Potential impacts to biotic communities are regulated by a variety of agencies at the federal, state and local level depending upon the project type and resource affected. In Pinellas County, local agencies support development review but it is the federal and state regulatory agencies that have jurisdiction over the resource categories discussed in this section. These agencies and the coordination typically required are discussed in the following sections related to the specific resources they govern, and include federal and state wetland regulations, water quality protection, and federal and state regulations for protected species.

Source: Southwest Florida Water Management District 2011 and ESA, 2019.

FIGURE 5.3-1

FLORIDA LAND USE, COVER AND FORMS CLASSIFICATION SYSTEM COMMUNITIES

In addition to the current FLUCCS data, **Figure 5.3-1** depicts the location of a 46.5-acre airport buffer area, known as the Green Area Buffer. This buffer is located along a portion of the airport's easternmost property boundary. Due to the limited development potential of the Green Buffer Area (existing wetlands and known archeological areas), the rights to do so have been transferred to other portions of PIE property. Although a perpetual conservation easement does not exist, the transfer of the development rights and the designation of this land as a Green Area Buffer was determined to be the highest and best use for this portion of the airport property. Documentation from the FAA supporting this designation is provided in **Appendix A**.

5.3.2 Wildlife, Listed Species, and Essential Fish Habitat

Wildlife Hazard Management

A FAA compliant Wildlife Hazard Assessment (WHA) was completed and submitted to the FAA in 2011. Subsequently, it was determined that a Wildlife Hazard Management Plan (WHMP) was required at PIE. The WHMP was developed and included recommendations that are currently in place at the airport. The WHMP is included in the airport's Title 14, Code of Federal Regulations (CFR), Part 139 *Airport Operating Certificate* and identifies actions and permits required to manage wildlife at the airport, including protected species. PIE maintains a Depredation Permit from the U.S. Fish and Wildlife Service (USFWS) as part of these controls. Future airport development will need to consider the current WHMP and its' recommendations and may lead to the need to update the WHMP as development occurs.

Listed Species

In addition to assessing impacts under NEPA, airport development projects are subject to other federal and state laws associated with wildlife and protected species. Most notable is the federal *Endangered Species Act*, which protects and recovers imperiled species and the habitats upon which they depend. The FAA and/or other federal agencies that may be involved with airport development projects at PIE are required to determine if their action(s) would affect listed species. Depending upon the potentially impacted habitat or species affected, coordination with the USFWS and the Florida Fish and Wildlife Conservation Commission (FFWCC) may be required. In cases where wetlands are also impacted, this coordination typically occurs in conjunction with the wetland permitting process. A discussion of the listed wildlife species with a likelihood of occurrence at the airport, and the coordination required for impacts to each, is included in this section.

A review of publically available resources such as the Florida Natural Areas Inventory (FNAI) and previous environmental studies (including the WHA) has identified suitable habitat at PIE for a number of federal and state listed wildlife species. **Table 5.3-2** provides a list of the listed species for which suitable habitat exists, or there is a likelihood of occurrence on or adjacent to PIE.

TABLE 5.3-2
FEDERAL AND STATE LISTED WILDLIFE SPECIES IN THE VICINITY OF PIE

Common Name	Scientific Name	USFWS Listing	FFWCC Listing
Fishes			
Gulf Sturgeon	*Acipenser oxyrinchus desotoi*	T	
Opossum Pipefish	*Microphis brachyurus*	SC	
Reptiles			
American Alligator	*Alligator mississipiensis*	T(S/A)	
Loggerhead Sea Turtle	*Carettas*	T	
Green Sea Turtle	*Chelonia mydas*	T	
Leatherback Sea Turtle	*Dermochelys coriacea*	E	
Kemp's Ridley Sea Turtle	*Lepidochelys kempii*	E	
Short-tailed Snake	*Lampropeltis extenuate*		T
Eastern Indigo Snake	*Drymarchon corais couperi*	T	
Gopher Tortoise	*Gopherus polyphemus*	C	T
Birds			
Crested Caracara	*Caracara cheriway*	T	
Bald Eagle	*Haliaeetus leucocephalus*	*	
Piping Plover	*Charadrius melodus*	T	
Florida Burrowing Owl	*Athene cunicularia floridana*		T
Snowy Plover	*Charadrius nivosus*		T
Little Blue Heron	*Egretta caerulea*		T
Reddish Egret	*Egretta rufescens*		T
American Oystercatcher	*Haematopus palliates*		T
Least Tern	*Sternula antillarum*		T
Florida Scrub Jay	*Aphelocoma coerulescens*	T	
Little Blue Heron	*Egretta caerulea*		T
Roseate Spoonbill	*Ajaja*		T
Southeastern American Kestrel	*Falco sparverius paulus*		T
Tricolored Heron	*Egretta tricolor*		T
Wood Stork	*Mycteria americana*	T	

TABLE 5.3-2
FEDERAL AND STATE LISTED WILDLIFE SPECIES IN THE VICINITY OF PIE

Common Name	Scientific Name	USFWS Listing	FFWCC Listing
Black Skimmer	*Rynchops niger*		T
Mammals			
West Indian Manatee	*Trichechus manatus*	T	
Sherman's Fox Squirrel	*Sciurus niger shermani*		SSC

This information is provided as a guide to project planning, and is not a substitute for site-specific surveys. Such surveys may be needed to assess species' presence or absence, as well as the extent of project effects on listed species and/or designated critical habitat.

USFWS = U.S. Fish and Wildlife Service
FFWCC = Florida Fish and Wildlife Conservation Commission
E = Endangered
T = Threatened
SC/SSC = Species of Special Concern
C = Candidate for list at the Federal Level by USFWS
T(S/A) = Threatened (Similarity of Appearance) to American crocodile - *Crocodylus acutus*
* = Protected under the BGEPA (16 U.S.C. 668-668d), as amended, and the MBTA (16 U.S.C.703-712)

SOURCE: USFWS, FFWCC, Florida Natural Areas Inventory (FNAI)

NOTE: Candidate species receive no statutory protection under the Endangered Species Act (ESA). The FWS encourages cooperative conservation efforts for these species because they are, by definition, species that may warrant future protection under the ESA.

More specifically, federal and state listed wildlife species that may be impacted by activities at PIE include: American alligator, Eastern indigo snake, gopher tortoise, bald eagle, Florida burrowing owl, little blue heron, reddish egret, Florida sandhill crane, limpkin, little blue heron, roseate spoonbill, tricolored heron and wood stork. Specific species survey, monitoring, and permitting guidelines are established by FFWCC and/or USFWS, and those activities would be required prior to or during the permitting process for airport development if there is a potential for impacts to any of these species. Due to the location of the airport, and the diversity of listed wading bird species, it is recommended that a rookery survey be conducted prior to any development actions at PIE. Further, it should be noted that any construction projects that require clearing of large areas should be stabilized as quickly (avoid leaving large cleared areas for extended duration) to prevent attracting nesting shorebirds.

Essential Fish Habitat

The *Magnuson-Stevens Fishery Conservation and Management Act* (16 U.S.C. 1801, et seq.) reflects the Secretary of Commerce and Fishery Management Council's authority and responsibilities for the protection of essential fishery habitat. The Act specifies that each Federal agency shall consult with the Secretary with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency that may adversely affect any Essential Fish Habitat (EFH) identified under this Act. EFH is defined by the Act as "…those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fishes and may include areas historically used by fishes. Substrate includes sediment, hard bottom, structures underlying the waters, and any associated biological communities. Necessary means the habitat required to support a sustainable fishery and the managed species contribution to a healthy ecosystem. Spawning, breeding, feeding, or growth to maturity covers all habitat types used by a species throughout its life cycle. Only species managed under a Federal Fishery Management Plan (FMP) are covered (50 CFR 600).

The National Oceanic and Atmospheric Administration (NOAA) Fisheries, known as NOAA Fisheries or the National Marine Fisheries Service (NMFS), reviews potential impacts to marine listed species (such as smalltooth sawfish) and also coordinates for projects that may affect to EFH. There are four required components of an EFH consultation. These include: 1) Notification, 2) EFH Assessment, 3) NMFS EFH Conservation Recommendations, and 4) Agency (ACOE) Response. PIE is located within the Southeast Regional Office of the NMFS. Typically, EFH assessments are conducted where projects have the potential to affect identified resources, mostly in-water activities or activities that would affect coastal vegetation or substrate. For PIE, EFH consultation may be required for projects that discharge into the adjacent bay or impact the shoreline or waters of Tampa Bay. This would include development where stormwater improvements require alteration of conveyances or structures within, or connected to, Tampa Bay or major drainage channels.

5.4 Department of Transportation Act: Section 4(f) and Other Environmentally Sensitive Public Lands

Section 4(f) of the *Department of Transportation Act of 1966* (re-codified and renumbered as Section 303(c) of 49 U.S. Code) states that the Secretary of Transportation will not approve any program or project that requires the use of publicly-owned land of a public park or 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 officials having jurisdiction thereof, unless:

1. There is no feasible and prudent alternative to use of such land and such program, 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.

There are no Section 4(f) resources located on or within the immediate vicinity of PIE property. A review of an U.S. Park Service data shows there are no historic resources listed on the National Register of Historic Places located at PIE or within one-half mile of the airport, nor are there any wildlife and waterfowl refuges located on or in the immediate vicinity of PIE.

5.5 Hazardous Materials and Waste Management

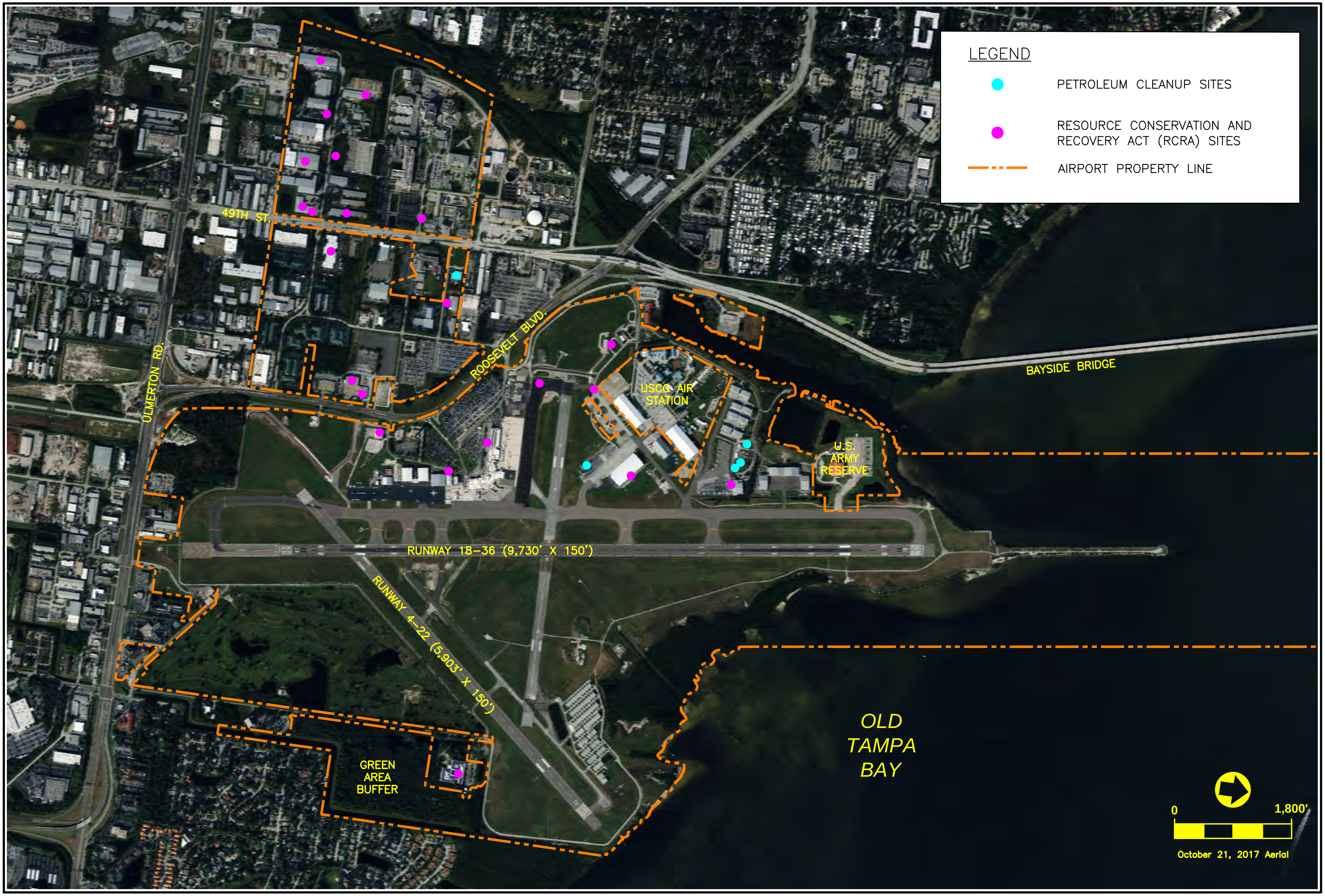
5.5.1 Hazardous Materials

Federal, state, and local laws regulate hazardous materials use, storage, transport, or disposal. Major laws and issue areas include:

- Resource Conservation and Recovery Act (RCRA) - hazardous waste management.
- Hazardous and Solid Waste Amendments Act - hazardous waste management.
- Comprehensive Environmental Response, Compensation, and Liability Act - cleanup of contamination.
- Superfund Amendments and Reauthorization Act (SARA) - cleanup of contamination.
- Emergency Planning and Community Right-to-Know (SARA Title 111) - business inventories and emergency response planning.

According to the FDEP Contamination Locator Map (CLM), there are five petroleum cleanup sites on-airport property, which are shown on **Figure 5.5-1.** Four of the sites are active cleanup sites while the remaining site is listed as pending. These sites were contaminated by discharges of petroleum and petroleum products from above ground and underground storage systems. All five of these sites are located on the west side of the airport property. It should also be noted that the site located between Roosevelt Boulevard and 49th Street North is an active cleanup site associated with the Pinellas County Sheriff's Office. No other hazardous cleanup sites are located on-airport property.

The RCRA on-line database lists facilities that store, generate, transport, treat, and dispose of hazardous wastes (typically waste oils, paint solvents, and other hazardous materials). It should be noted that sites included in this database do not necessarily involve contamination. Multiple RCRA sites are located on PIE property and are summarized in **Table 5.5-1** and also shown on **Figure 5.5-1**.



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Source: NEPAssist Resource Mapping Tool, USEPA and Resource Conservation and Recovery Act On-Line Database 2019.

FIGURE 5.5-1

RCRA AND PETROLEUM CLEANUP SITES

National Priority List (NPL) sites, also referred to as "Superfund" sites, are considered by EPA to have the most significant public health and environmental risks to neighboring areas. A review of EPA on-line databases did not reveal any NPL sites or facilities on or in the vicinity of PIE.

TABLE 5.5-1
RESOURCE CONSERVATION AND RECOVERY ACT SITES

Handler ID	Name	Generator Type	Compliance/ Enforcement Issues[1]
FLR000225524	Allegiant Air	Small Quantity Generator	None
FLR000017426	National Aviation Academy	Small Quantity Generator	None
FLR000108233	St. Petersburg – Clearwater International Airport	Conditionally Exempt Small Quantity Generator	None
FLR000172692	Clearwater 48th WMDCST	Conditionally Exempt Small Quantity Generator	None
FLD981864184	Pinellas County Sheriff Office	Conditionally Exempt Small Quantity Generator	None
FLR000030502	United Parcel Service	Conditionally Exempt Small Quantity Generator	None
FL8690330735	Clearwater USCG Air Station	Small Quantity Generator	None
FLR000127506	Avantair	Conditionally Exempt Small Quantity Generator	None
FLD099346629	Pemco Nacelle Services, Inc.	Not Available	None
FLD984237784	Sheltair Aviation Services	Conditionally Exempt Small Quantity Generator	None
FLD982154726	Moog, Inc.	Not Available	None
FLT020070256	Pinellas County Sheriff Property & Evidence Section	Conditionally Exempt Small Quantity Generator	None
FLR000184812	Pinellas County Jail	Conditionally Exempt Small Quantity Generator	None
FLD047108485	Smiths Industries Aerospace & Defense Systems	Small Quantity Generator	None
FL0000448084	Pinellas County Purchasing Dept.	Small Quantity Generator	None
FLD981867328	International Technology Corp.	Not Available	None
FLD984180612	Dynamet, Inc.	Conditionally Exempt Small Quantity Generator	None
FLD982085342	Combined Communication Service	Not Available	None
FLR000071803	Pinellas Press	Not Available	None
FLD982172538	Spectra Metal Sales, Inc.	Small Quantity Generator	None
FLT100081660	GE Water & Process Technologies	Conditionally Exempt Small Quantity Generator	None
FLD035261049	Technology Research Corp.	Small Quantity Generator	None
FLR000063503	GSP Marketing Technologies Inc.	Conditionally Exempt Small Quantity Generator	None
FLD982167660	Golf Car Systems Inc.	Conditionally Exempt Small Quantity Generator	None

1. Compliance and enforcement information available in the EPA ECHO report only available for previous 5-year period.

SOURCE: EPA, 2019.

5.5.2 Waste Management

The *FAA Modernization and Reform Act of 2012* included a new requirement for airport master plans to address recycling by:

- Assessing the feasibility of solid waste recycling at the airport;
- Minimizing the generation of waste at the airport;
- Identifying operations and maintenance requirements;
- Reviewing waste management contracts; and
- Identifying the potential for cost savings or generation of revenue.

The PIE Recycling, Reuse, and Waste Reduction Plan (RRWRP) includes a review of the airport's waste management and recycling throughout the passenger terminal facilities and airfield, as well as a review of tenant practices. The RRWRP prepared as part of this master plan is included in **Appendix F**.

5.6 Historical, Archaeological, and Cultural Resources

Several laws and regulations require that possible effects on historic, archaeological, and cultural resources be considered during the planning and execution of federally-funded projects. The primary laws that pertain to the treatment of historic, architectural, archaeological, and cultural resources during environmental analyses are the *National Historic Preservation Act* (NHPA), the *Archaeological Resources Protection Act*, and the *Native Graves Protection and Repatriation Act*. Historic, architectural, archaeological, and cultural resources may include archaeological sites, buildings, structures, objects, districts, works of art, architecture, and natural features that were important in past human events. They may consist of physical remains, but also may include areas where significant human events occurred, even though evidence of the events no longer exists.

A review of the EPA's NEPAssist database and the NRHP shows no NHRP-listed historical properties located at PIE or within one-half mile of the airport boundary. Additionally, while prior studies at PIE did not indicate the presence of any historical, archeological, or cultural resources on or within the immediate vicinity of PIE, the aforementioned documentation regarding the Green Area Buffer on the east side of the airport does note the presence of an area of archeological significance within that boundary. This site is officially known as the Yat Kitischee site (#P101753) and is approximately six acres in size. This area, has been protected in perpetuity since it was categorized to have historical and cultural significance.

5.7 Energy Supply and Natural Resources

Duke Energy is the electric power supplier to PIE and has a network capable of serving existing and prospective tenants at the airport. The proposed airport improvements projects would require lighting; power for specialized equipment, tools, and processes; office equipment; and air conditioning. Local power utility requirements would primarily include electric service. In fact, Duke Energy participated in a 2016 evaluation for the redevelopment of the Airco Parcel. In that study, both power and water utilities in the area were documented as having more than adequate capacity to serve the planned redevelopment of the 131 acre airport site. Overall, there is sufficient capacity to accommodate the projects envisioned in this master plan. Additionally, no substantial energy-related impacts or issues regarding the ability to supply energy to PIE were noted during any recent development projects.

5.8 Noise and Compatible Land Use

In order to assess the potential noise impacts that would result from the projected aircraft activity levels over the course of the 20-year planning period, noise contours were developed. The contours were generated using the FAA's Aviation Environmental Design Tool (AEDT) for the base year (2017) and future conditions (2023, 2028, and 2038). The base year noise contours, provided on **Figure 5.8-1**, reflect the existing airfield configuration with the actual aircraft operational fleet mix that occurred in 2017.

The contours developed for the short-, intermediate-, and long-term planning horizons (**Figures 5.8-2** through **5.8-4**) were based on the annual aircraft activity levels and expected operational fleet mix from the approved aviation activity forecasts. For each of these future years, the contours were developed based on Runway 4-22 having a useable length of 6,003 feet. The 2028 and 2038 contours also assumed that the new parallel general aviation runway would be established to segregate the small and large aircraft currently using Runway 18-36. A full description of the new parallel general aviation runway is included as part of the alternatives chapter.

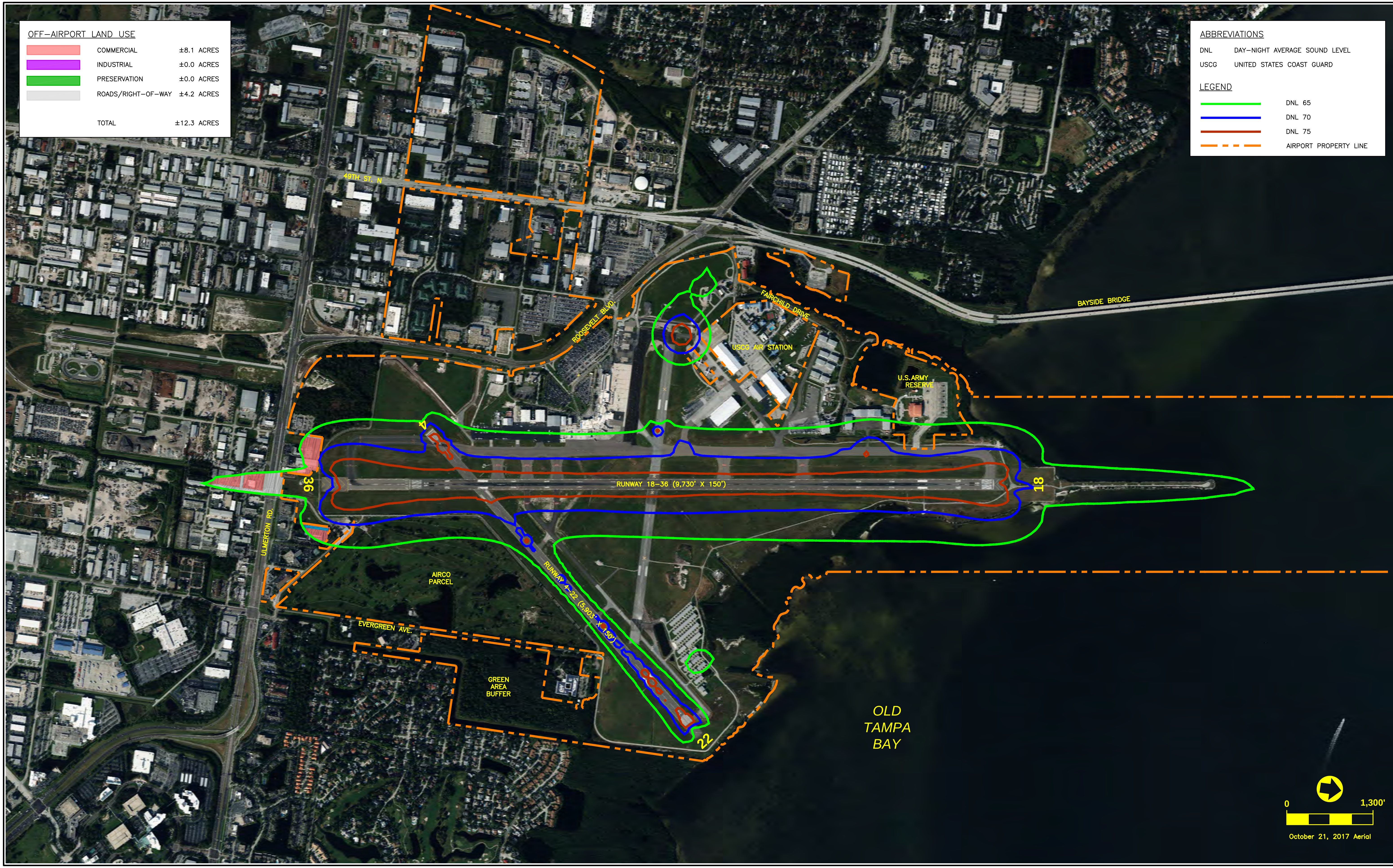
Even though the noise contours created were not part of an official 14 CFR Part 150 Noise and Land Use Compatibility Study, they were developed utilizing the same Day-Night Average Sound Level (DNL) 65, 70, and 75 decibel contours evaluated in a full noise study. As shown on the figures, the DNL 75 contour remains on airport property under the base year and future year scenarios. The DNL 70 contour also remains within the airport property under the base year; however, a small portion of this contour extends beyond the property line south of Runway 18-36, in each of the future year scenarios. As shown on **Figures 5.8-2** through **5.8-4**, the DNL 70 contour encompasses a portion of the commercial parcels adjacent to the airport property. A ditch area is also encompassed by the DNL 70 contour in 2038. These commercial land uses and the ditch are compatible with the DNL 70 contour.

For the base year and each of the future years, the DNL 65 contour extends beyond the airport property on the south side of the airfield. In all four models the DNL 65 contour encompasses predominantly commercial and industrial uses as well as some roads, their associated right-of-ways, and some ditch areas. In the future, the DNL 65 contour also overlaps a small area with a preservation land use code. The preservation designation is over a man-made canal that runs through the different commercial and industrial land use areas south of Ulmerton Road. This canal, which is identified on **Figures 5.8-2** through **5.8-4**, is considered compatible with the DNL 65 contour.

Based on the noise contours created for the base year and future scenarios generated for this master plan study, none of the DNL 65, 70, or 75 contours encompass any non-compatible uses. Therefore, based on current compatibility criteria and future operational assumptions, the FAA would not likely support or fund a 14 CFR Part 150 noise study for PIE. Complete on-airport and off-airport land uses mapping is included as part of the full Airport Layout Plan (ALP) drawing set.

5.9 Water Resources

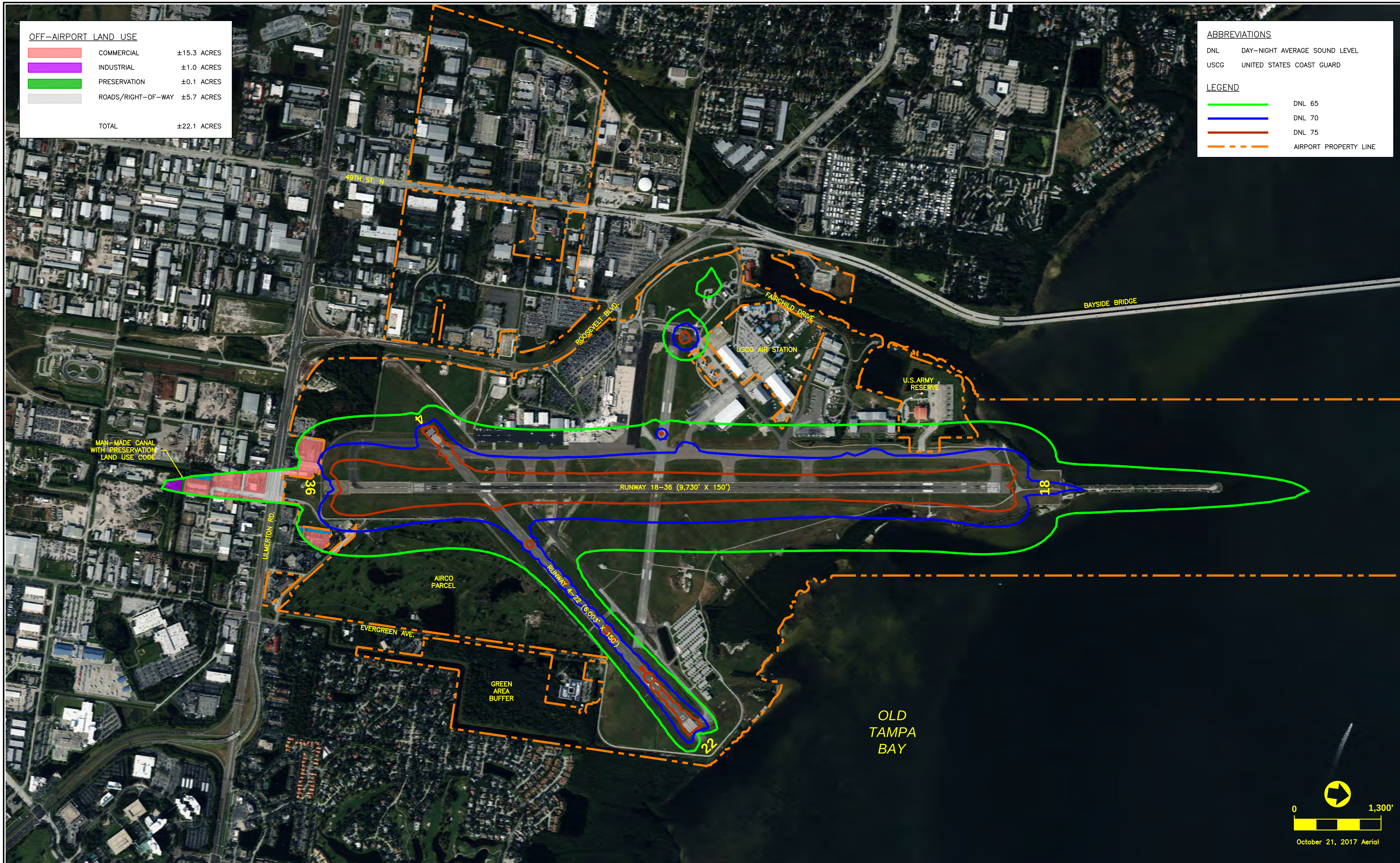
Prior environmental studies, permit actions, reports, GIS data, and other available information was reviewed to determine the extent of wetlands and other water resources on airport property. The most recent FLUCCS data, combined with onsite review by wetland scientists, was utilized to approximate the limits of wetlands and other surface waters where no previously delineated wetland mapping data was available. The U.S. Army Corps of Engineers (USACE), the Florida Department of Environmental Protection (FDEP), and the State of Florida’s Water Management Districts have jurisdiction over and regulate activities that impact wetlands, surface waters, and/or stormwater management systems in Florida. For wetland impacts that occur at PIE, the Southwest Florida Water Management District (SWFWMD) and USACE have jurisdiction over these resources.



Source: ESA, 2019.

FIGURE 5.8-1

2017 DAY-NIGHT AVERAGE SOUND LEVEL (DNL) CONTOURS

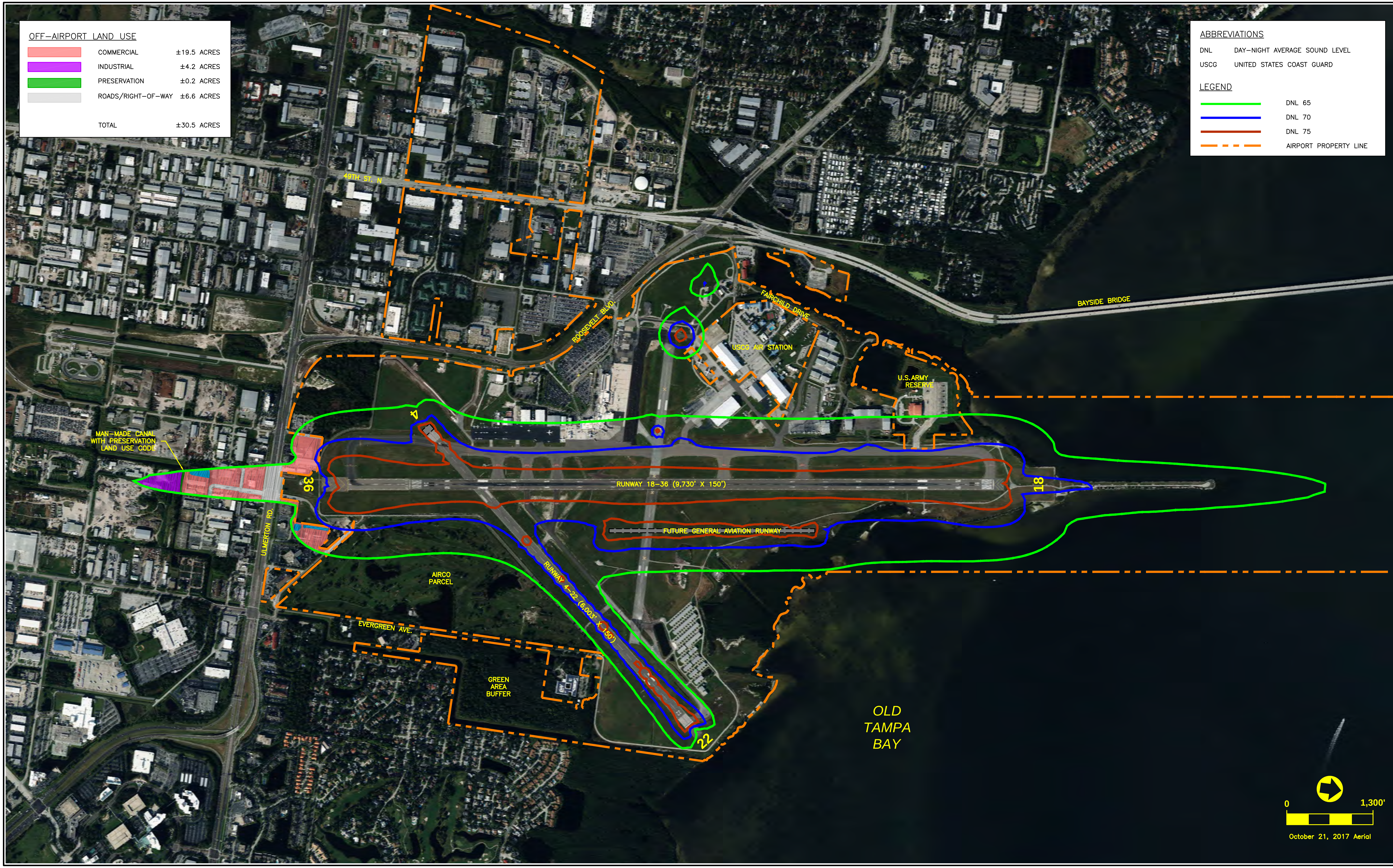


Source: ESA 2019.

St. Pete-Clearwater International Airport Master Plan

FIGURE 5.8-2

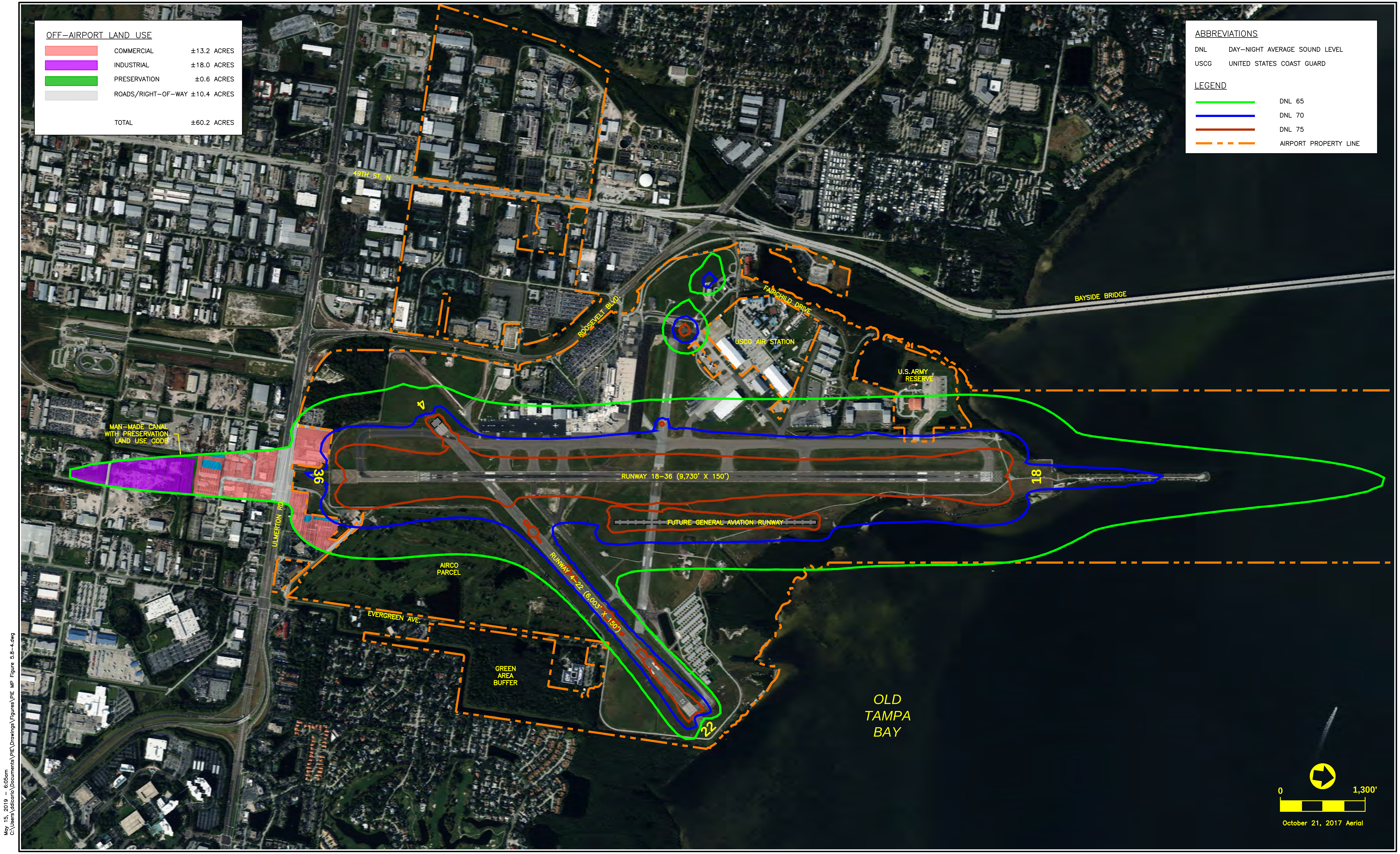
2023 DAY-NIGHT AVERAGE SOUND LEVEL (DNL) CONTOURS



Source: ESA, 2019.

FIGURE 5.8-3

2028 DAY-NIGHT AVERAGE SOUND LEVEL (DNL) CONTOURS



Source: ESA, 2019.

FIGURE 5.8-4

2038 DAY-NIGHT AVERAGE SOUND LEVEL (DNL) CONTOURS

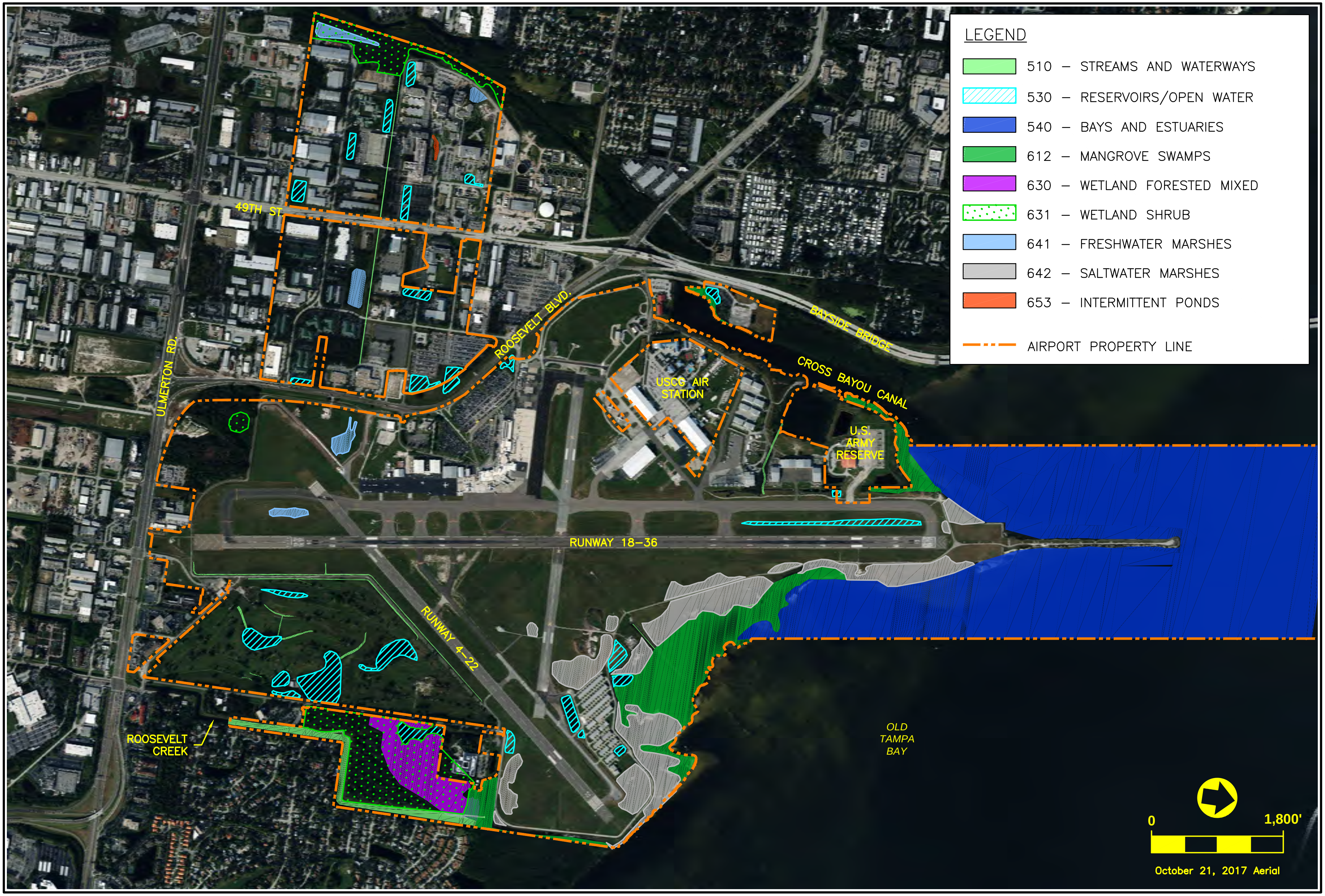
5.9.1 Wetlands

In addition to review through the NEPA process, the wetlands at PIE are subject to two levels of regulatory jurisdiction: state (SWFWMD) and federal (USACE/EPA). Even though the agencies have similar missions, the criteria for delineation, permitting, and mitigation of wetlands varies between them. While not all of the wetland areas on the airport have been field reviewed or delineated, the mapping in this document represents the best combination of previous wetland delineations, various database GIS information, aerial photo interpretation, and available field reconnaissance. A wetland jurisdictional determination and wetland delineation should be conducted and followed by coordination with SWFWMD and/or the USACE for new development projects that have the potential to impact wetland and surface water areas in order to determine whether permitting will be necessary.

When permits are required (wetlands impacted in excess of the minimum allowances), the permitting process is completed through independent coordination with each of the agencies for which jurisdictional impacts occur. The USACE would require a permit for impacts under their jurisdiction, *Waters of the United States* under the *Clean Water Act of 1972*, as amended. The Section 404(b)(1) Clean Water Act (CWA) permitting process is typically completed concurrently with state permitting, though the two processes are separate. The USACE permit requires a State Water Quality Certificate which is accomplished through the Statewide Environmental Resource Permit (SWERP) process. SWERP combines state jurisdictional wetland regulatory review with the water quality and water quantity (stormwater) review. The resultant agency permit action includes regulatory approval for wetland impacts, state water quality certification, and proprietary authorization to use Sovereign Submerged Lands (if required).

Where impacts are significant, wetland mitigation may be required and would be determined on a case by case basis. During the permitting process the permittee must first show that steps have been taken to avoid/minimize impacts to wetlands and other aquatic resources and that compensatory mitigation will be provided for unavoidable impacts to wetland and waterbody resources.

As depicted in **Figure 5.9-1,** the airport property contains numerous wetlands and surface waters (ponds and ditches) that will require some level of NEPA review and permitting. The airport contains both freshwater and estuarine/marine wetland systems and a variety of habitats ranging from wetland forested and shrub mixed systems to mangrove and open water components of Old Tampa Bay. PIE is connected to two watersheds (Cross Bayou Canal on the west side and Roosevelt Creek on the east side). Should potential impacts to jurisdictional wetlands occur, mitigation may be available at one of two mitigation banks with service areas covering PIE. These banks include the Tampa Bay Mitigation Bank which provides freshwater wetland credits and the Mangrove Point Mitigation Bank that provides estuarine credits. Mitigation through a bank is consistent with the hierarchy of mitigation preference established by the USACE in their 2008 Mitigation Rule, and it is compatible with the airport and FAA's goal of reducing wildlife hazards at the airport.



Source: Southwest Florida Water Management District. U.S. Fish and Wildlife Service - National Wetland Inventory and ESA, 2019.

FIGURE 5.9-1
WETLANDS AND OTHER SURFACE WATERS

5.9.2 Other Surface Waters

PIE maintains a network of upland cut ditches and stormwater ponds associated with the airport's drainage system, some of which maintain connections to other surface waters and waterbodies. Both the Cross Bayou Canal, located to the west of airport property and Old Tampa Bay, which borders PIE on the north end, are listed as impaired by the EPA. According to 2012 reports, the Cross Bayou Canal is listed as impaired for dissolved oxygen, fecal coliform, total coliform, and nutrients. Old Tampa Bay is listed as impaired by Chlorophyll-A, fecal coliform, and mercury in fish tissue.

The airport operates under stormwater management permits and implements pollution prevention plans and best management practices. PIE has a network of drainage ditches and ponds used for stormwater conveyance and storage, some of which maintain connections to other surface waters and waterbodies. Permitting will be required should a proposed project at PIE be determined to impact such facilities. National Pollutant Discharge Elimination System (NPDES) regulations also serve to protect water quality. In Florida, the NPDES permit program is administered by the FDEP. An NPDES Generic Permit for construction will be required for projects at PIE that disturb more than 0.5 acre.

5.9.3 Floodplains

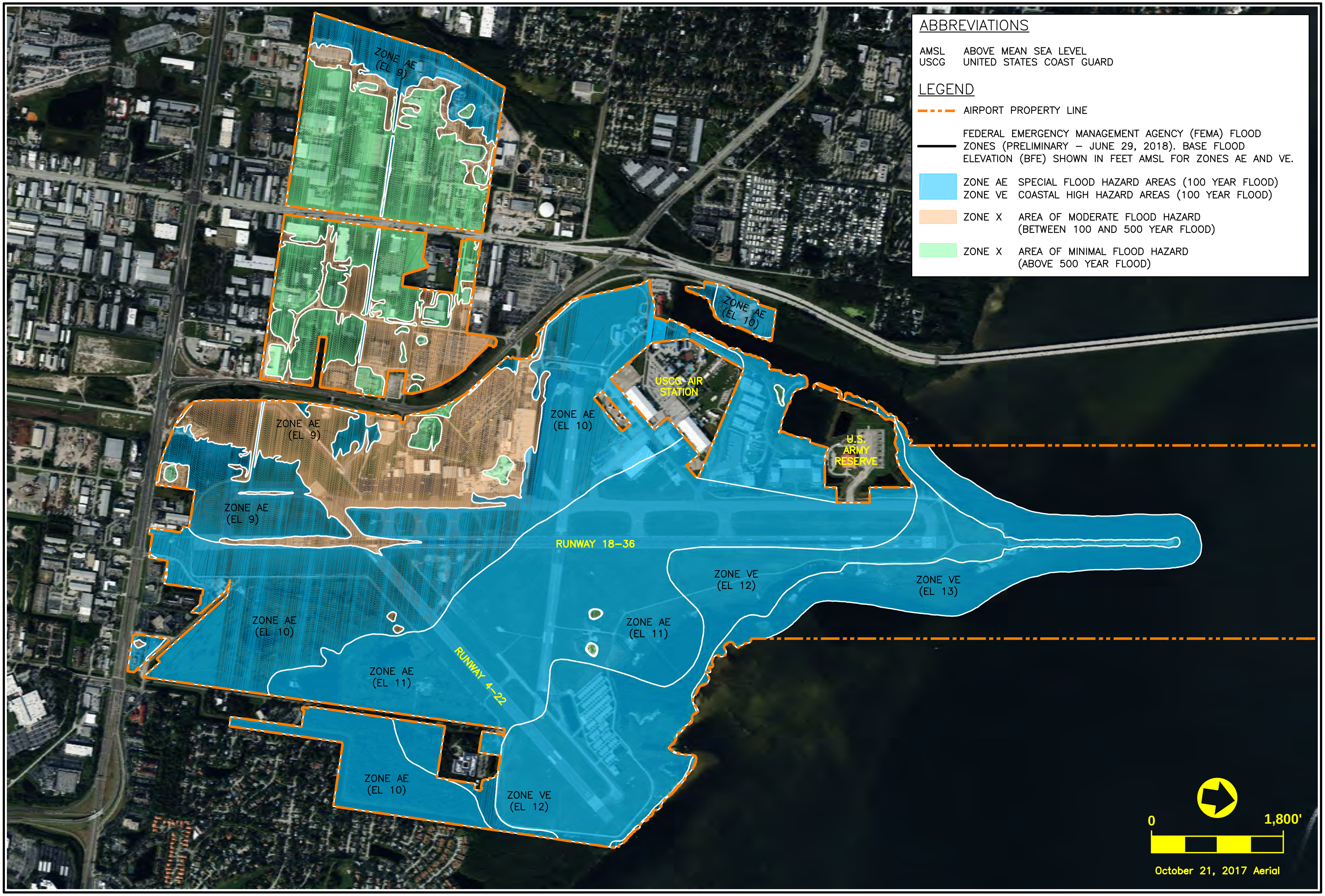
Executive Order 11988, *Floodplain Management*, directs federal agencies "to take actions to reduce the risk of flood loss, minimize the impact of floods on human safety, health, and welfare, and restore and preserve the natural and beneficial values served by the flood plains." Department of Transportation Order 5650.2, *Floodplain Management and Protection*, and FAA Orders 5050.4B and 1050.1F contain policies and procedures for implementing the Executive Order and evaluating potential floodplain impacts. Agencies are required to make a finding that there is no practicable alternative before taking action that would encroach on a floodplain based on a 100-year flood (7 CFR 650.25).

The Federal Emergency Management Agency (FEMA) identifies flood hazard areas that are depicted on Flood Insurance Rate Maps (FIRMs). A floodplain is defined as the lowlands and relatively flat areas adjoining inland and coastal waters including flood prone areas of offshore islands that are, at a minimum, prone to the 100-year flood. The 100-year floodplain is considered the base floodplain. Preliminary Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) were issued on June 29, 2018 and are expected to be adopted in 2019, replacing the 2003 versions. **Figure 5.9-2** depicts the updated FIRMs for the area surrounding PIE.

For the airport property, the areas identified as AE are Special Flood Hazard Areas (SFHA) while those as VE are Coastal High Hazard Areas (CHHA). Each have a one percent probability of flooding every year (also known as the 100-year floodplain). Federal floodplain management regulations and mandatory flood insurance purchase requirements apply in these zones and each are assigned a base flood elevation (BFE). The airport also has areas of moderate or minimal hazard are zones that could be flooded by severe, concentrated rainfall coupled with inadequate local drainage systems. Local stormwater drainage systems are not normally considered in a community's flood insurance study. The failure of a local drainage system can create areas of high flood risk within these zones. On the FEMA maps these are shown as either shaded or unshaded Zone X areas. Shaded Zone X areas have a 0.2 percent probability of flooding every year (also known as the 500-year floodplain) while the unshaded Zone X areas have a minimal risk as they are above the 500-year floodplain. No BFEs or base flood depths are shown within these zones and flood insurance is not required by regulation in these zones.

5.10 Construction Impacts

Construction impacts are generally short-term in nature and would vary depending on which projects are implemented. The construction required for any improvement or proposed developments could have the potential to impact air quality, surface transportation, water quality, and noise through the use of heavy equipment and vehicle trips generated from construction workers traveling to and from the project sites. For water quality, each project will have to adhere to the applicable Stormwater Pollution Prevention Plan maintained by PIE. Projects would also require notification or permitting through the FDEP in compliance with the NPDES program. In Florida, this program is delegated to the state and does not require additional authorization through the EPA. This process includes development of, and adherence to, Best Management Practices (BMPs) for preventing or reducing the release of pollutants from a construction site. For those projects where construction could take place in proximity to residential areas; this construction would be subject to local noise ordinances. Major roadways border PIE; therefore, it is likely that construction traffic would avoid residential areas. Construction impacts would be evaluated as part of any NEPA analysis required, prior to constructing any of the proposed development projects.



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Source: FEMA PRELIMINARY FLOOD INSURANCE RATE MAPS, 2018 AND ESA, 2019.

FIGURE 5.9-2
FEMA FLOOD ZONES

5.11 Types of Environmental Reviews

5.11.1 Federal Reviews

This chapter provides a desktop review of publically available and known environmental resources that should be considered during the identification and evaluation of development alternatives in this study. The environmental resources discussed in this chapter include many of the categories delineated in FAA Order 5050.4B, FAA Order 1050.1F, and the President's Council on Environmental Quality (CEQ) Regulations Title 40 CFR, *CEQ Regulations for Implementing the Procedural Provisions of NEPA*, however this overview is not intended to meet the NEPA requirements for any proposed project(s). This environmental overview does not constitute NEPA or regulatory level resource review; instead, it provides a compilation of readily available data to help screen alternatives and provide an environmental basis to identify where additional investigation or studies may be required. The FAA is responsible for ensuring compliance with NEPA with respect to actions at federally-obligated airports.

The processing of Airport Improvement Program (AIP) grant applications and ALP approvals are two types of "federal actions" commonly undertaken by the FAA in support of airport development projects which require environmental review under NEPA. While NEPA requires varying levels of interagency coordination, development of environmental documents under NEPA does not exempt airport development projects from compliance with other federal environmental laws (e.g., *Endangered Species Act*) or state and local environmental regulations.

For those projects that involve a federal action and therefore trigger environmental review under NEPA, the three types of documentation that are be used are summarized in **Table 5.11-1**. Categorical Exclusions (CatEx) and Environmental Assessments (EA) are usually prepared by the Airport Sponsor and, if the documentation meets FAA requirements, they are accepted by the FAA and become federal documents. Environmental Impact Statements (EIS) are prepared by the FAA. Every future development project recommended as part of this master plan is subject to the appropriate level of environmental review at such time that a specific project is considered ready for implementation. It should be acknowledged that most airport development actions require some level of NEPA review and a project does not need to be federally funded to require NEPA compliance.

TABLE 5.11-1
TYPES OF FAA NEPA REVIEW DOCUMENTATION

Categorical Exclusion	The FAA has identified certain actions that may be categorically excluded from a more detailed environmental review. However, extraordinary circumstances, such as wetland impacts, may preclude Categorical Exclusion (CATEX). A CATEX requires a review of impacts and completion of forms provided by the FAA. In some cases, documentation and agency coordination may be necessary to address extraordinary circumstances (see FAA ARP SOP No. 5.00). CATEXs that may apply to future airport development projects at PIE are summarized below (emphasis added). See FAA Orders 1050.1F and 5050.4B for a more detailed description of these and other categorically excluded actions that may apply to development projects at PIE. 1. Access and service road construction that does not reduce the level of service on local traffic systems below acceptable levels. 2. Construction, repair, reconstruction, resurfacing, extending, strengthening, or widening of a taxiway, apron, loading ramp, or runway safety area; or the reconstruction, resurfacing, extension, strengthening, or widening of an existing runway – *provided the action would not result in significant erosion or sedimentation and will not result in a significant noise increase over noise sensitive areas or result in significant impacts on air quality*. 3. Construction or limited expansion of accessory on-site structures, including storage buildings, garages, hangars, T-hangars, small parking areas, signs, fences, and other essentially similar minor development items. 4. Construction or expansion of facilities – such as terminal passenger handling and parking facilities or cargo buildings, or facilities for non-aeronautical uses that *do not substantially expand those facilities*. 5. Demolition and removal of FAA or non-FAA on-airport buildings and structures, *provided no hazardous substances or contaminated equipment are present on the site of the existing facility*. Does not apply to historic structures. 6. Placing fill into previously excavated land with material compatible with the natural features of the site, *provided the land is not delineated as a wetland*; or minor dredging or filling of wetlands or navigable waters for any categorically excluded action, *provided the fill is of material compatible with the natural features of the site and the dredging and filling qualifies for an U.S. Army Corps of Engineers nationwide or a regional general permit*. 7. Grading of land, removal of obstructions to air navigation, or erosion control measures, *provided those activities occur on and only affect airport property*. 8. Topping or trimming trees to meet 14 CFR Part 77 standards for removing obstructions which can adversely affect navigable airspace.
Environmental Assessment	An Environmental Assessment (EA) is prepared for proposed actions with expected minor or uncertain environmental impact potential. An EA requires analysis and documentation similar to that of an EIS, but with somewhat less detail and coordination. The FAA will review the EA and decide to either issue a Finding of No Significant Impact (FONSI) or prepare an Environmental Impact Statement (EIS). Future airport development projects and actions at PIE that may require an EA are summarized below (emphasis added). See FAA Orders 1050.1F and 5050.4B for more information. 1. Runway extensions due to possible wetland impacts, potential off-airport impacts related to aircraft noise, and potential impacts to affect listed species habitat. 2. Taxiway construction due to possible wetland impacts and potential to affect listed species habitat. 3. Aircraft parking apron; hangar and structures; and/or access road projects that may not qualify for a CATEX due to extraordinary circumstances (e.g., wetland impacts may not qualify for a nationwide or regional general permit). 4. Approval of operations specifications or amendments that may significantly change the character of the operational environment of an airport. 5. New air traffic control procedures (e.g., instrument approach procedures, departure procedures, en route procedures) and modifications to currently approved procedures that routinely route aircraft over noise sensitive areas at less than 3,000 feet above ground level.
Environmental Impact Statement	An EIS is prepared for major federal actions, which are expected or known to significantly affecting the quality of the human environment. At this time, no future airport development projects at PIE are expected to require the preparation of an EIS.

Compiled by ESA, 2019.

5.11.2 State Reviews

In addition to compliance with NEPA, all recommended airport development must be consistent with other federal regulatory guidance, Florida Statutes, growth management, and concurrency requirements, as well as regional and state transportation plans. For projects that require NEPA compliance, state environmental reviews typically initiate with the Florida State Clearinghouse which is administered by the FDEP. A primary function of the Florida State Clearinghouse is to serve as the state's single point of contact for the receipt of federal activities that require interagency review, which includes activities subject to consistency review under the Florida Coastal Management Program. Upon completion of their review, the Clearinghouse will typically issue a letter summarizing any potential concerns or inconsistencies regarding the proposed activity. The clearance letter will also include information on obtaining necessary state permits and will inform the applicant if there is a need to submit additional information to a specific state agency for review. In cases where NEPA compliance is not required, direct coordination with the relevant federal and state regulatory agencies may still be required. Information related to the specific agencies and coordination and/or permits required, is discussed in the individual resources categories in this chapter.

CHAPTER 6

Alternatives for Airport Development

CHAPTER 6
Alternatives for Airport Development

6.1 Introduction

This chapter evaluates potential improvements to provide the required facilities identified for St. Pete-Clearwater International Airport (PIE) over the 20-year planning period. The identification and evaluation of development concepts and subsequent recommended alternatives were facilitated through meetings and discussions with airport users and tenants, airport management, and local government agencies. A public workshop was also conducted to allow airport users, members of the community, and local government representatives the opportunity to review the conceptual development alternatives and provide comments.

While a number of projects to maintain and improve the airport will be conducted in the future, only the most significant are presented in this chapter. These improvements, most of which have the potential to impact existing facilities, the environment, or surrounding community, are categorized as follows:

- Runway System
- Taxiway System
- Passenger Terminal Facilities
- Landside Facilities
- Aviation Related Development
- Non-Aeronautical Development

The primary intent of the alternatives analysis is to evaluate the viability of meeting the identified needs and how best to undertake the selected improvements. As such, the evaluations include factors related to the operational effects, potential environmental impacts, cost considerations, and implementation issues. While there are inherent difficulties in expressing certain factors in comparable terms, at a minimum, each development option must meet the applicable Federal Aviation Administration (FAA) and Florida Department of Transportation (FDOT) standards for safety.

6.2 Airfield Constraints Analysis

An analysis of the operational, physical, and environmental constraints of the airfield was made prior to defining any airport alternatives. This effort ensured that the development strategy for the airport considered factors that could impact project feasibility, the community, the environment, and the long-term viability of the airport. Among the constraints considered, airfield design standards, surfaces, and setbacks associated with safety were of utmost importance. **Figure 6.2-1** reflects the most critical of these, as well as other features which may affect development options, including wetland boundaries, flood zones, and the existing leases with airside tenants.

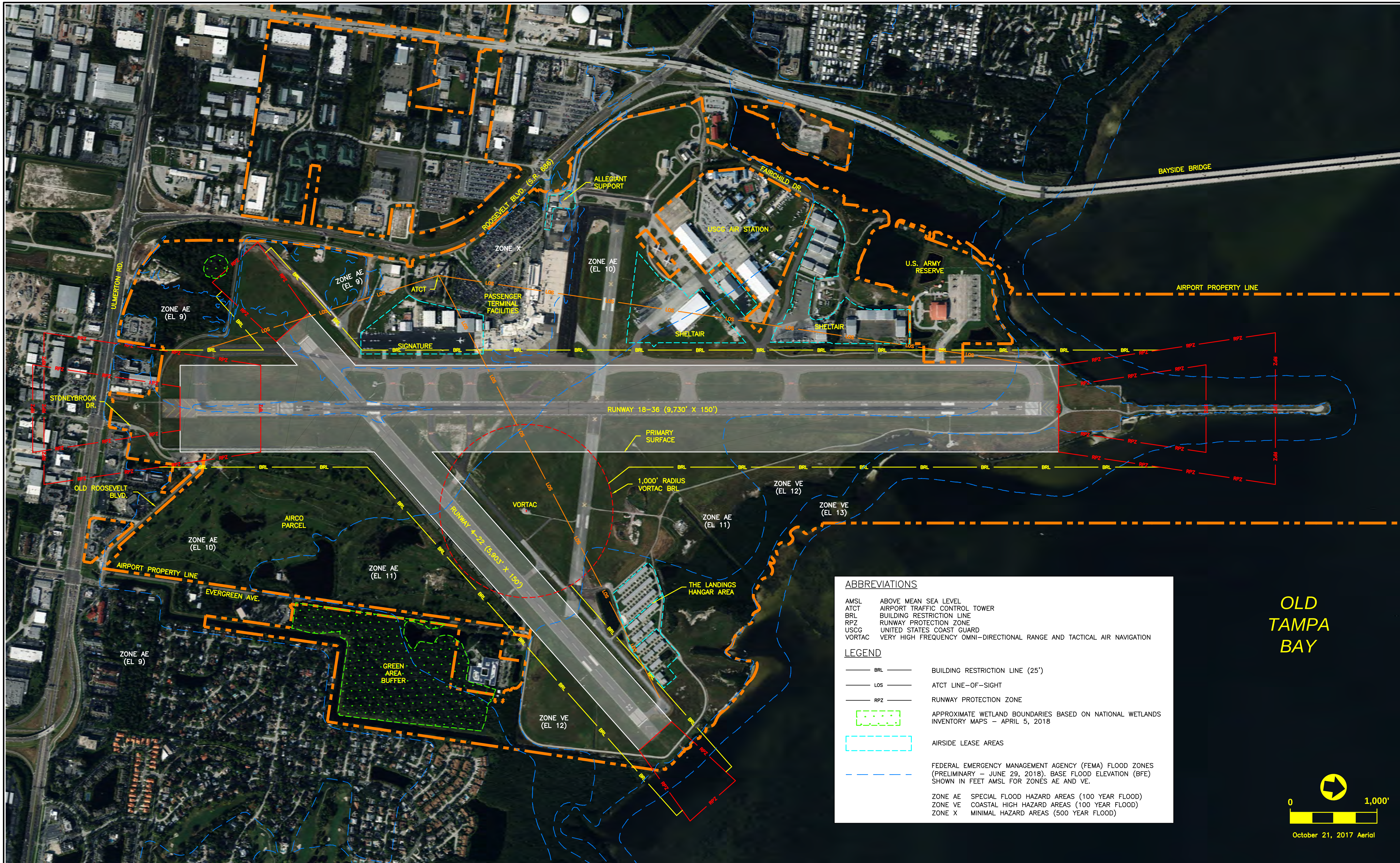
6.2.1 Airspace Surfaces

Title 14 Code of Federal Regulations (CFR) Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace* defines airspace surfaces for the purpose of identifying obstructions at or in the vicinity of an airport. Some obstructions may be considered a hazard to air navigation. **Figure 6.2-1** depicts the Primary Surface associated with PIE's two current runways. The rectangular Primary Surfaces follow the same elevation as the elevation of the nearest point of the respective runway centerline. Because the Primary Surfaces at PIE are essentially at ground level, only those objects essential to air navigation or the movement of aircraft should be located within the Primary Surfaces. The Primary Surfaces also encompass the Runway Safety Areas (RSA) and Runway Object Free Areas (ROFA) associated with each runway. The Primary Surfaces shown on **Figure 6.2-1** are based on the existing runway configuration. The extent and size of a Primary Surface would change if the runway endpoints or types of instrument approach procedures are different in the future.

Fixed and moveable objects are also considered obstructions if they penetrate any of the Approach or Transitional Surfaces that extend upward and outward from each Primary Surface. However, these surfaces are not shown as they vary in height depending on their proximity to the Primary Surface. In lieu of depicting each of the different airspace surfaces, a Building Restriction Line (BRL) is shown which delineates where structures approximately 25 feet in height could be located in the vicinity of the runways and not penetrate the 14 CFR Part 77 surfaces. The BRL typically follows the Transitional Surface with the same limiting elevation, when there are no other more restrictive surfaces or setbacks. While it is possible to plan and construct facilities inside the 25 foot BRL (such as shorter T-hangar, maintenance facility, or airfield lighting vault type structures), this line defines areas that are not suitable for taller structures and even parking aprons for aircraft with tail heights greater than 25 feet.

6.2.2 ATCT Line-of-Sight

The existing PIE airport traffic control tower (ATCT) line-of-sight must be considered so that the controllers have an unobstructed view of all aircraft movement areas. The line-of-sight lines depicted on **Figure 6.2-1** are the most critical based on the existing airfield configuration. The evaluation of conceptual development alternatives will consider how the line-of-sight limits may shift in response to potential airfield changes or if line-of-sight would be obstructed by proposed development. While the overall ATCT height is 172 feet above mean sea level (AMSL), effects on ATCT line-of-sight were based on the established eye height for the ATCT cab, which is 145 feet AMSL.



Source: ESA, 2019.

St. Pete-Clearwater International Airport Master Plan

FIGURE 6.2-1

PRIMARY AIRFIELD CONSTRAINTS

6.2.3 Runway Protection Zones

Existing Runway Protection Zones (RPZ) at PIE are shown on **Figure 6.2-1** while the current FAA guidance on land use compatibility within their limits is addressed in a following section. For the purpose of identifying constraints, new development within an existing or future RPZ was not considered compatible with airport operations. As with the 14 CFR Part 77 surfaces, the location and dimensions of a RPZ could change if the runway endpoints or types of instrument approach procedures change.

6.2.4 VHF Omnidirectional Range

The VHF Omnidirectional Range (VOR) facility at PIE is actually a VORTAC system, which combines the civilian VOR with the military tactical air navigation system. As noted previously, the facility currently has unusable portions (beyond a certain point) to the northeast and southwest. During a site visit, a FAA Air Traffic Organization (ATO) specialist observed that the relatively low elevation of the VOR antennae could be creating a scalloping of certain radials as a result of reflecting off some of the surrounding features. This is being investigated since the unusable radials to the northeast (025-054 degrees) are directly in line with structures in the Landings Hangar Area and those to the southwest (233-250 degrees) with the passenger terminal building and other structures to the south of the terminal.

Since a detailed analysis has yet to be conducted, only the standard VOR setbacks of FAA Order 6820.10, *VOR, VOR/DME, AND VORTAC SITING CRITERIA*, which are also summarized in FAA Advisory Circular (AC) 150/5300-13A, Change 1, *Airport Design*, have been utilized in the development of airfield alternatives. **Figure 6.2-1** includes the 1,000 foot radius BRL (where no permanent obstructions are allowed), while other setbacks are addressed in different sections of this chapter.

6.2.5 Wetlands and Floodplains

Wetlands and floodplains depicted on **Figure 6.2-1** were identified as environmental constraints based on these resources having regulatory protection. As documented in the environmental overview chapter, modifications to wetland areas may require federal and state permits. In general, the permit process requires the applicant to first demonstrate avoidance and minimization of impact. After these two steps have been satisfied, mitigation is required to offset the unavoidable impacts.

Similarly, the environmental chapter documented that potential impacts to any established 100-year floodplain will require a review for permitting. Likewise, floodplain impacts also need to be in compliance with the local flood protection ordinances. Preliminary Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) were issued on June 29, 2018 and are expected to be adopted by late 2019, replacing the 2003 versions. For PIE, the areas identified as AE are Special Flood Hazard Areas (SFHA) while those as VE are Coastal High Hazard Areas (CHHA). Each have a one percent probability of flooding every year (also known as the 100-year floodplain). Federal floodplain management regulations and mandatory flood insurance purchase requirements apply in these zones and each are assigned a base flood elevation

(BFE). This is the computed elevation to which floodwater is anticipated to rise during a base flood. The BFE is the regulatory requirement for the elevation or flood proofing of structures. As shown in **Figure 6.2-1**, a majority of the airport's property surrounding and including the airfield, is located within the 100-year floodplain. This results in limited opportunities to develop new, modify, or even relocate facilities to create sustainable and resilient airport infrastructure for the future. As part of this study, an assessment of the airport's baseline sustainability was conducted and future goals and objectives set to improve the overall infrastructure moving forward. These sustainability elements are included in **Appendix G**. Similarly, a vulnerability assessment of the airport's facilities was also conducted in an effort to identify key elements to incorporate resiliency into the planning of airport improvement projects. The vulnerability assessment and resulting evaluation of potential impacts are documented in **Appendix H**.

The airport also has areas of moderate or minimal hazard are zones that could be flooded by severe, concentrated rainfall coupled with inadequate local drainage systems. Local stormwater drainage systems are not normally considered in a community's flood insurance study. The failure of a local drainage system can create areas of high flood risk within these zones. On the FEMA maps these are shown as either shaded or unshaded Zone X areas. Shaded Zone X areas have a 0.2 percent probability of flooding every year (also known as the 500-year floodplain) while the unshaded Zone X areas have a minimal risk as they are above the 500-year floodplain. No BFEs or base flood depths are shown within these zones and flood insurance is not required by regulation in these zones.

6.2.6 Leased Airside Parcels

Identifying the land available for future aviation related development requires determining what undeveloped areas may have been leased or have a lease option with existing tenants. Discussions with airport management confirmed that only the undeveloped areas within the existing airside leases (shown on **Figure 6.2-1**) are not available for the development of future airport facilities.

6.2.7 Physical Constraints

The evaluation of constraints also included the airport's physical setting within the surrounding developed area. The identification of possible airport development alternatives considered, in general terms, the potential complexity, cost, and social impacts of potentially acquiring land, relocating residences, impacting businesses, or moving roads.

As shown on **Figure 6.2-1**, PIE's airfield is bounded by Old Tampa Bay to the north and northeast; Ulmerton Road and light industrial, development to the south; residential and commercial development to the east; and Roosevelt Boulevard and the commercial development to the west. Ulmerton Road and Roosevelt Boulevard are all multi-lane arterial roads.

The initial findings of the constraints analysis indicated that the potential costs and impacts related to expanding into the bay or relocating/re-aligning any of the surrounding roads (and associated business and residential relocations) would only be justified under extraordinary circumstances and that the identification of alternatives would first evaluate meeting future development needs on existing airport property.

PIE and land surrounding the airport is generally flat and contains a network of ditches and drainage canals. Substantial impacts or modifications to the existing PIE stormwater management system and/or issues related to long-term management of stormwater at each potential development site was also viewed as a constraint to the various alternatives.

6.3 Runway System

The facility requirements chapter identified the need to explore the extension of Runway 18-36 for the future critical aircraft and a new parallel general aviation (GA) runway for airfield capacity. While not calculated as a runway length requirement, an increase in the useable length of Runway 4-22 was also documented as an enabling project for the rehabilitation of Runway 18-36. Each of these are addressed in the following sections.

6.3.1 Runway 18-36

A runway length of 10,800 feet was identified in the facility requirements chapter, per the FAA methodology, for Runway 18-36 to support the largest international charter aircraft expected to operate at PIE during the planning period. While the aircraft requiring this length do not presently conduct the minimum 500 annual operations required to justify an extension, the ability for the primary instrument runway to accommodate this activity in the future needs to be evaluated.

Figure 6.2-1 illustrates that the current Runway 18-36 alignment is immediately bounded by Old Tampa Bay to the north and Ulmerton Road to the south. These physical constraints make any extension of the runway pavement, parallel taxiway system, the related safety areas, associated RPZs, and navigational aids a very substantial project, especially with respect to costs.

The 10,800 feet was predicated on the Boeing 787-800 at the aircraft's maximum certificated takeoff weight (MTOW) of 502,500 pounds. This aircraft was identified in the facility requirements as the representative aircraft for the long-haul international flights. While it is fairly certain this size aircraft will eventually operate at PIE on a regular basis, it is not certain as to whether or not it would do so at MTOW on a regular basis. For this reason, FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*, stipulates that the length of haul or range flown by the critical aircraft on a regular basis must also be considered when evaluating takeoff lengths. This is done by utilizing the payload-range charts from the aircraft's airport planning manual to determine the operating takeoff weight for specific flight distances in nautical miles (NM). For longer haul routes, this operating distance would equal the MTOW with less useable payload allowed as the trip length (fuel required) increases. For the shorter trip lengths, the maximum payload (passengers or cargo) is allowed, since the lower fuel requirement typically keeps the aircraft below MTOW.

Using the charts in Boeing's Airport Planning Manual for the Boeing 787-800, it was determined that the existing 9,730 feet available for takeoffs on Runway 18-36 would allow the aircraft to operate at nearly 96 percent of its MTOW. Therefore, given the current runway length, the Boeing

787-800 would either have to sacrifice some range or some payload capability, but only on the hottest days of the year, which is not expected to be a regular occurrence. When this is combined with the physical limitations for any potential extension of the runway, no additional length to Runway 18-36 is recommended nor is it considered justified. Therefore, no changes to the length of Runway 18-36 will be included on the Airport Layout Plan (ALP) or as part final recommended development plan.

6.3.2 Runway 4-22

While it was determined in the facility requirements that the current 5,903 feet of Runway 4-22 was adequate for the 20-year planning period, a modification to the runway is planned as part of the project to rehabilitate and overlay Runway 18-36. Due to the condition of the pavement, Runway 18-36 will be closed throughout the 10 to 12 month rehabilitation project. During the runway closure, all commercial and GA aircraft that use Runway 18-36 exclusively will be required to temporarily use Runway 4-22. Because of the runway’s shorter length, large aircraft operators would be subject to weight restrictions (for both takeoffs and landings) and other operational limitations. Weight restrictions may include reducing the number of passengers and/or the amount of fuel that can be loaded on the airplane. Operational limitations are those related to individual aircraft operator safety-based requirements, which may be imposed by the different airline operational specifications, internal corporate operating policies, and/or insurance provisions.

Airport management has discussed the Runway 18-36 rehabilitation project with key stakeholders and regular airport users, including the FAA, passenger airlines, ATCT management, the U.S. Coast Guard, fixed base operators, and tenants. The commercial aircraft operators stated that a useable runway length of 6,000 feet was needed to allow uninterrupted commercial service at PIE. This useable length would still impose restrictions not currently experienced at PIE when Runway 18-36 is available, but at levels considered acceptable during the temporary closure of the primary runway. Therefore, the Runway 18-36 rehabilitation project also includes modifying the southwest end of Runway 4-22 to provide a usable runway length of 6,000 feet.

Environmental Determination of Runway 4-22 Improvements

This enabling portion of the Runway 18-36 rehabilitation project was evaluated as part of the Documented Categorical Exclusion (CatEx) completed in 2017. Because of the proximity of Old Tampa Bay, there is no prudent or feasible alternative to change the northeast end of Runway 4-22. Therefore, it was agreed the southwest end of the runway would be modified. The overall improvements to Runway 4-22 evaluated in the Documented CatEx included:

- Construct 100 feet of runway pavement at the approach end of Runway 4 to provide a useable runway length of 6,003 feet.
- Install runway edge lights for the new pavement section.
- Relocate and/or adjust existing Runway 4 threshold lights, Runway End Identifier Lights (REILs), and Precision Approach Path Indicator Lights (PAPIs).
- Extend the Runway 4 Safety Area, as needed, to meet airport design requirements

- Design and publish new and/or modified Air Traffic Control Procedures for aircraft below 3,000 feet.

Prior to the environmental evaluation, the FAA Orlando Airports District Office (ADO) re-iterated that the use of Runway 4-22 by the commercial aircraft would be limited to only the period when Runway 18-36 was unavailable during rehabilitation. The environmental review process included a public presentation of the study at the regular PIE Noise Abatement Task Force meeting held on July 19, 2017. The Documented CatEx resulted in no further National Environmental Policy Act (NEPA) review being required and was signed by the FAA on August 4, 2017.

Potential to Improve Existing Instrument Approach Procedures

Currently Runway 4-22 has limited instrument approach capability. As documented in the existing conditions chapter, a straight-in non-precision approach to Runway 4 exists based on the VHF omnidirectional range (VOR) portion of the on-airfield VORTAC. This approach provides visibility minimums of one mile and a minimum descent altitude (MDA) of 480 feet AMSL. These minimums are for aircraft with an Aircraft Approach Category (AAC) of A or B. For aircraft with an AAC of C or D, the visibility minimums increase to 1³/₈ mile. Both ends of the runway also have circling non-precision approach minimums using area navigation (RNAV) procedures based on Global Positioning System (GPS). For AAC A and B aircraft, the circling procedures provide one mile visibility minimums with a MDA of 520 feet. The visibility minimums increase to 1½ and two miles for aircraft in AAC C and D, respectively.

The current ALP reflects a future approach procedure with vertical guidance (APV) to Runway 4. No changes to Runway 22 have been planned due to the proximity and conflict most procedures would have with Tampa International Airport's traffic. The future Runway 4 APV on the current ALP is shown to be a precision area navigation procedure where the Wide Area Augmentation System (WAAS) would be utilized to improve the GPS approach capability. These are referred to as LPV approaches (localizer performance with vertical guidance) and can provide significantly lower minimums. In fact, on the current 2018 ALP, the Runway 4 approach is proposed to have a decision altitude (measured in feet above the runway) of 200 feet and visibility minimums of ¾ of a mile. However, there are some significant issues that need to be evaluated if such an approach were to be established.

Change in Guidance for Runway Protection Zones

With a Runway Design Code (RDC) of B-II, the current RPZ for Runway 4 would significantly increase in size if the visibility minimums were reduced from the existing not lower than one mile to a future not lower than ¾ mile. The proposed RNAV(GPS) LPV approach with ¾ mile visibility minimums was added to the ALP in December of 2013. Prior to that addition, the FAA issued their *Interim Guidance on Land Uses Within a Runway Protection Zone* in September of 2012. Under the 2012 guidance, certain land uses within the limits of a new or modified RPZ will need to be coordinated and a determination made by the FAA as to whether or not the land use is compatible. A note was added to the ALP in 2013 that states, "All future RPZs extending beyond existing property boundaries to be covered by avigation easements or fee simple ownership." While both the 2013 and current 2018 ALP include this note and have been signed by the FAA, it does not mean that the FAA will not require an alternatives analysis as outlined in the interim guidance.

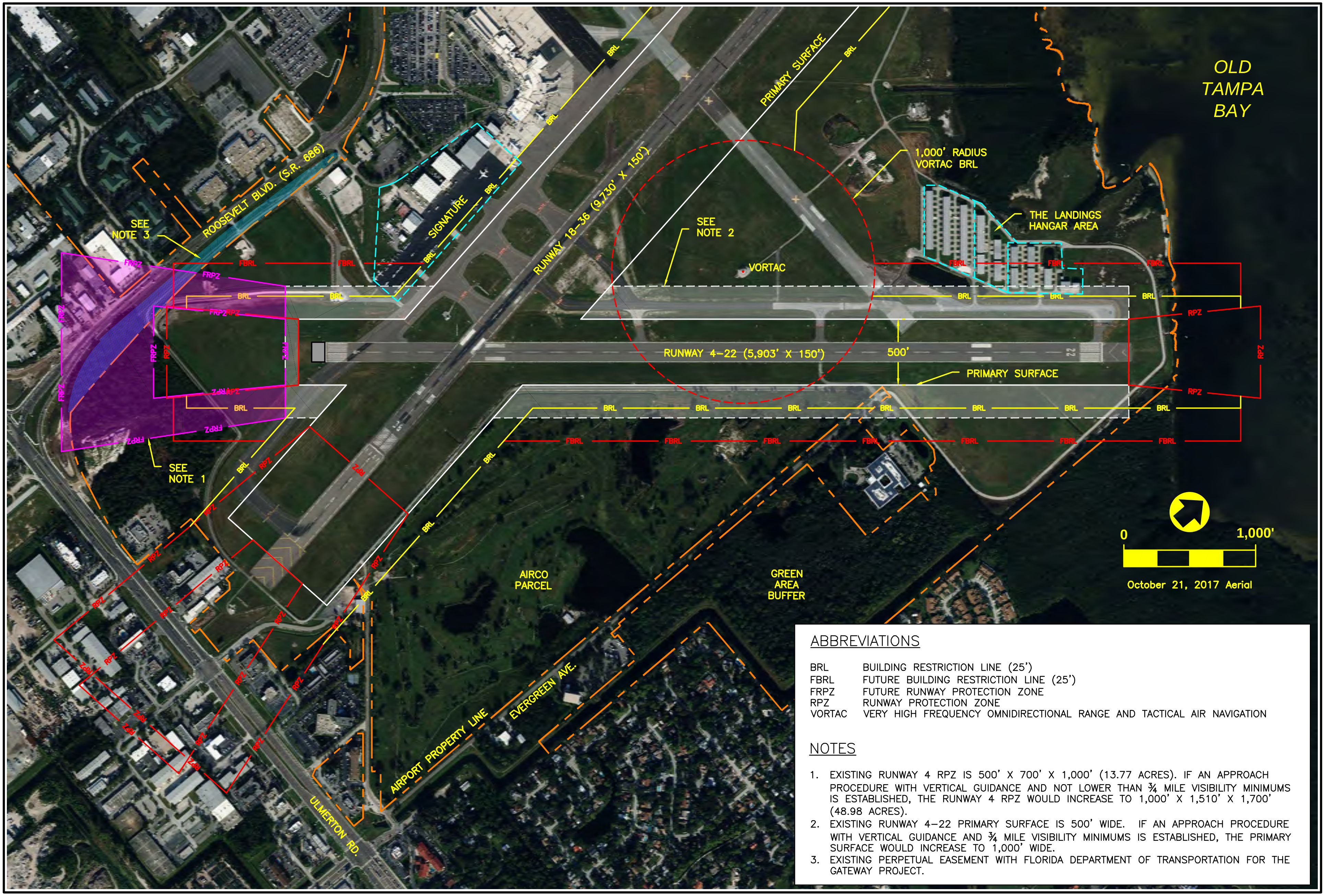
It is important to note that the much larger RPZ (covering an area of 48.98 versus 13.77 acres) on both the 2013 and current 2018 ALPs were shown to a planned 465 foot extension of Runway 4 to the southwest. Even though this extension is no longer proposed, **Figure 6.3-1** illustrates that the larger RPZ required for a ¾ mile visibility minimum approach would still extend off-airport property. Since the FAA's interim policy applies to any changes in the size or location of an airport's existing RPZs, this must be considered as part of any proposed changes to the Runway 4 Approach RPZ. This is especially true since there are a number of current land uses (both on- and off-airport property) that would be encompassed in the larger RPZ, including existing public roadways and the future FDOT Gateway Express Project (Gateway Project) improvements that would have to be evaluated in the context of the current guidance.

Impacts Associated with 14 CFR Part 77 Imaginary Surfaces

The required 14 CFR Part 77 imaginary surfaces would also create another significant change if the Runway 4 approach visibility minimums were reduced from one mile to ¾ mile. The existing 500 foot wide Primary Surface would need to increase to 1,000 feet wide for any approaches with visibility minimums as low as ¾ mile. This increase was not addressed in the 2004 Airport Master Plan Update and it was not reflected on the 14 CFR Part 77 Airspace Drawing of the full ALP drawing set.

As shown on **Figure 6.3-1**, a 1,000 foot wide Primary Surface would impact a number of existing facilities and features around Runway 4-22. On the northwest side portions of Signature Flight Support's aircraft parking apron and five hangars in the Landings Hangars Area fall within the larger Primary Surface. Additionally, hangars for both of those leaseholds would also become obstructions to the 14 CFR Part 77 Transitional Surfaces. Trees would likely have to be cleared around the northeast end of the runway, potentially including some of the mangroves just outside of airport property. For the Airco Parcel, the wider Primary Surface would shift the allowable heights along the entire flightline for both parked aircraft and future development by 250 feet.

As a crosscheck, a U.S. Standard for Terminal Instrument Procedures (TERPS) analysis was also conducted for a proposed RNAV(GPS) LPV approach to Runway 4 with visibility minimums not lower than ¾ of a mile. None of the existing structures at the airport would impact the TERPS surfaces associated with such an approach. Regardless, due to the impacts to the required 14 CFR Part 77 Primary Surface and limitations that would be imposed on future development opportunities, it is not considered feasible to establish lower approach minimums to Runway 4. Therefore, the future RNAV(GPS) LPV approach to Runway 4 shown on the current 2018 ALP will be removed as a result of this study. In its place, a future straight-in RNAV(GPS) non-precision approach with visibility minimums not lower than one mile should be planned to supplement or even improve the current straight-in VOR approach to Runway 4.



ABBREVIATIONS

BRL	BUILDING RESTRICTION LINE (25')
FBRL	FUTURE BUILDING RESTRICTION LINE (25')
FRPZ	FUTURE RUNWAY PROTECTION ZONE
RPZ	RUNWAY PROTECTION ZONE
VORTAC	VERY HIGH FREQUENCY OMNIDIRECTIONAL RANGE AND TACTICAL AIR NAVIGATION

NOTES

1. EXISTING RUNWAY 4 RPZ IS 500' X 700' X 1,000' (13.77 ACRES). IF AN APPROACH PROCEDURE WITH VERTICAL GUIDANCE AND NOT LOWER THAN ¾ MILE VISIBILITY MINIMUMS IS ESTABLISHED, THE RUNWAY 4 RPZ WOULD INCREASE TO 1,000' X 1,510' X 1,700' (48.98 ACRES).
2. EXISTING RUNWAY 4-22 PRIMARY SURFACE IS 500' WIDE. IF AN APPROACH PROCEDURE WITH VERTICAL GUIDANCE AND ¾ MILE VISIBILITY MINIMUMS IS ESTABLISHED, THE PRIMARY SURFACE WOULD INCREASE TO 1,000' WIDE.
3. EXISTING PERPETUAL EASEMENT WITH FLORIDA DEPARTMENT OF TRANSPORTATION FOR THE GATEWAY PROJECT.

Source: ESA, 2019.

FIGURE 6.3-1
IMPACT OF RUNWAY 4 APPROACH PROCEDURE WITH VERTICAL GUIDANCE

Circling Approach Procedure

Given the reduced service history of the PIE VOR, there is concern that the only straight-in non-precision approach to the Runway 4-22 (VOR Runway 4) may not always be available during the period the runway will be utilized by all aircraft during the rehabilitation of Runway 18-36. Unfortunately, it will not be possible to develop a comparable straight-in non-precision approach using GPS before the Runway 18-36 rehabilitation project begins. However, the airport's RNAV(GPS)-A circling approach procedure does provide some alternate instrument approach capability to both ends of Runway 4-22.

The circling approach maneuver allows pilots to align their aircraft with a runway when straight-in approach procedures are not available. The circling maneuver must be authorized by ATCT and the pilot must be able to not only establish, but maintain visual reference to the airport. Therefore, it is possible for a circling approach maneuver to be utilized during a straight-in approach to a different runway (such as the precision or non-precision approaches to Runway 18-36), followed by a low altitude transition, which would then allow landing on another approved runway end. In other words, if made available during the Runway 18-36 rehabilitation project, the precision or non-precision approach procedures to Runway 18-36 can be used to land on Runway 4-22.

However, circling to land is considered more difficult and certainly not as advantageous as a specific straight-in approach, especially under instrument meteorological conditions. This is simply due to the fact that the aircraft must execute the maneuver at a low altitude and remain within a close proximity to the airport to assure obstacle clearance. As stated previously, the pilot must maintain visual contact with the airport at all times, otherwise a missed approach will need to be executed. The ability to utilize this type of approach procedure during the rehabilitation of Runway 18-36 will require close coordination between the airport, ATCT, and users of the airfield, especially the operators of the larger, commercial aircraft.

6.3.3 New Parallel General Aviation Runway

Development of a new parallel GA runway is a significant undertaking as it must take a number of factors into consideration. Additionally, the parallel GA runway alternative needs to be firmly established since it will affect the location of other airport facilities. The following sections describe the elements evaluated to develop the recommended parallel GA runway alternative.

Project History

The analysis of a new parallel GA runway at PIE is not a new concept. The long-term need for a permanent parallel GA runway was identified and evaluated as part of the 2004 Airport Master Plan Update. At that time, the north half of Taxiway A was utilized as both a parallel taxiway and parallel GA runway (designated as Runway 17R-35L at that time). While it did help to segregate different types of operations, it could not truly provide any improvements to the overall airfield capacity. This was due to the 500 foot centerline separation with Runway 18-36 which could not support simultaneous operations. Additionally, the larger aircraft needed Taxiway A on a frequent basis to access the north end of Runway 18-36.

The 2004 master plan included a new parallel GA runway on the east side of Runway 18-36 to eliminate the need to utilize Taxiway A as a runway. The required environmental assessment (EA) was programmed to occur as one of the first projects in the short-term planning period of the 2004 study, with the final phase of construction set for 2007. The program also included the decommissioning of Runway 9-27.

The parallel GA runway project was never initiated due to the leveling off of GA operations right after the 2004 study was completed. This was soon followed by double digit losses in overall aircraft activity at PIE as a result of the Great Recession. Since that time, both Runway 9-27 and the parallel GA runway designation along Taxiway A have been officially decommissioned, leaving PIE with its current two runway configuration.

Basic Design Standards

The basic design standards for the future parallel GA runway were documented in the facility requirements chapter. For the small aircraft (less than 12,500 pounds) the runway will serve, a minimum pavement width of 60 feet is required. The FAA criteria resulted in a runway length range of 3,100 to 3,650 feet with a 120 foot wide RSA and 250 foot wide ROFA, both extending 240 feet beyond each runway end. In order to support simultaneous operations under visual flight rules (VFR), the new parallel must have a minimum centerline offset with Runway 18-36 of 700 feet.

The facility requirements chapter noted that even though simultaneous instrument operations are not required (and could not be accommodated), the new parallel GA runway should have the capability for establishing instrument approach procedures to both runway ends. This instrument capability would be limited to either a RNAV(GPS) or VOR approach with not lower than one mile visibility minimums. These approaches require the same size RPZ and 14 CFR Part 77 Approach Surface slope (20:1) as if the runway only had visual approaches; however, the Approach Surface outer edge would be slightly wider than that required for just a visual utility runway.

Critical Issues Related to Runway Siting

The following sections describe the critical issues related to establishing the thresholds of the new parallel GA runway. In addition to the basic design criteria, these include the runway threshold siting criteria, required setbacks from the on-airport VORTAC, physical property limitations, and environmental considerations.

Threshold Siting Criteria

For new runways, the approach and departure thresholds should be collocated with the physical runway ends (i.e. no displaced thresholds). As such, the required airport design approach and departure surfaces to these thresholds are an important consideration in determining the runway ends. It should be noted that the approach surfaces for this purpose are those defined in FAA AC 150/5300-13A, Change 1 (and updated in September 2018 by Engineering Brief 99), which are not the same as those defined in 14 CFR Part 77. Regardless, these surfaces (which are categorized by a Runway Type number) still need to be clear of obstacles and due to their size, extend beyond the limits of an airport's property boundary. Conversely, for any runway improvements, both the RSA and ROFA must be on-airport property in order to meet the respective FAA airport design standards related to safety of aircraft, pilots, and passengers.

The future parallel GA runway will be designated as Type 4 runway, which means it will be able to support instrument night operations (as well as daytime) for the intended RDC of A-I-5000. The Type 4 approach threshold siting surface has an inner width of 400 feet, which extends out 10,000 feet to an outer width of 3,400 feet. This surface has a 20:1 obstacle clearance surface which extends up and out from each end of the runway, beginning at a point 200 feet prior to the landing threshold. This threshold siting surface, which is shown off each end of the runway in **Figure 6.3-2**, cannot have any obstacle penetrations. The standard 40:1 departure surface will not be required since neither end will be designated as an instrument departure runway.

VORTAC Setbacks

When a VORTAC facility is on an airfield, there are setbacks required for both runways and taxiways in order to prevent the facility from being an obstruction to aircraft. These simply mean that the VORTAC should not be located closer than 500 feet to any runway centerline or 250 feet to any taxiway centerline. Given the proximity of the VORTAC on the east side of Runway 18-36, the required setbacks from the VORTAC limit the siting on the south side of the parallel GA runway alignment. Both the runway and taxiway setbacks from the VORTAC are depicted on **Figure 6.3-2**.

Physical Limitations and Environmental Considerations

Not only does Old Tampa Bay form the northern boundary of the airport, but most of the shoreline just north of the potential parallel GA runway location (700 feet east of Runway 18-36) has either suffered from significant erosion or is covered with mangroves. As documented in the environmental overview chapter, the Florida Land Use, Cover and Forms Classification System documents this area as having both mangrove swamps and saltwater marshes (**Figure 5.3-1**).

The proximity of the shoreline, mangrove areas, and saltwater marshes is critical to consider for the siting of the new parallel GA runway given the potential need for fill materials and the resulting environmental impacts. This is true not only for the physical runway pavement, but also for the associated RSA and ROFA. As noted in the facility requirements chapter, the RSA needs to be cleared and graded in order to support the occasional passage of aircraft. The ROFA only needs to be cleared of all ground objects protruding above the RSA edge elevation.

Recommended Location for New Parallel General Aviation Runway

Given the basic design and runway siting issues described above, there are very few alternatives with respect to locating a new parallel GA runway east of Runway 18-36. The south end of the future parallel taxiway is controlled by the minimum 500 foot separation between the VORTAC and the new runway centerline. The new parallel GA runway must also have a minimum offset of 700 feet from the Runway 18-36 centerline. While this offset could certainly be increased, the proximity of the 500 foot VORTAC radius requires that the new runway would have to shift north with every shift east (see **Figure 6.3-2**). This in turn pushes the north end of the new parallel GA runway closer to the mangrove areas along the airport's northern shoreline boundary.

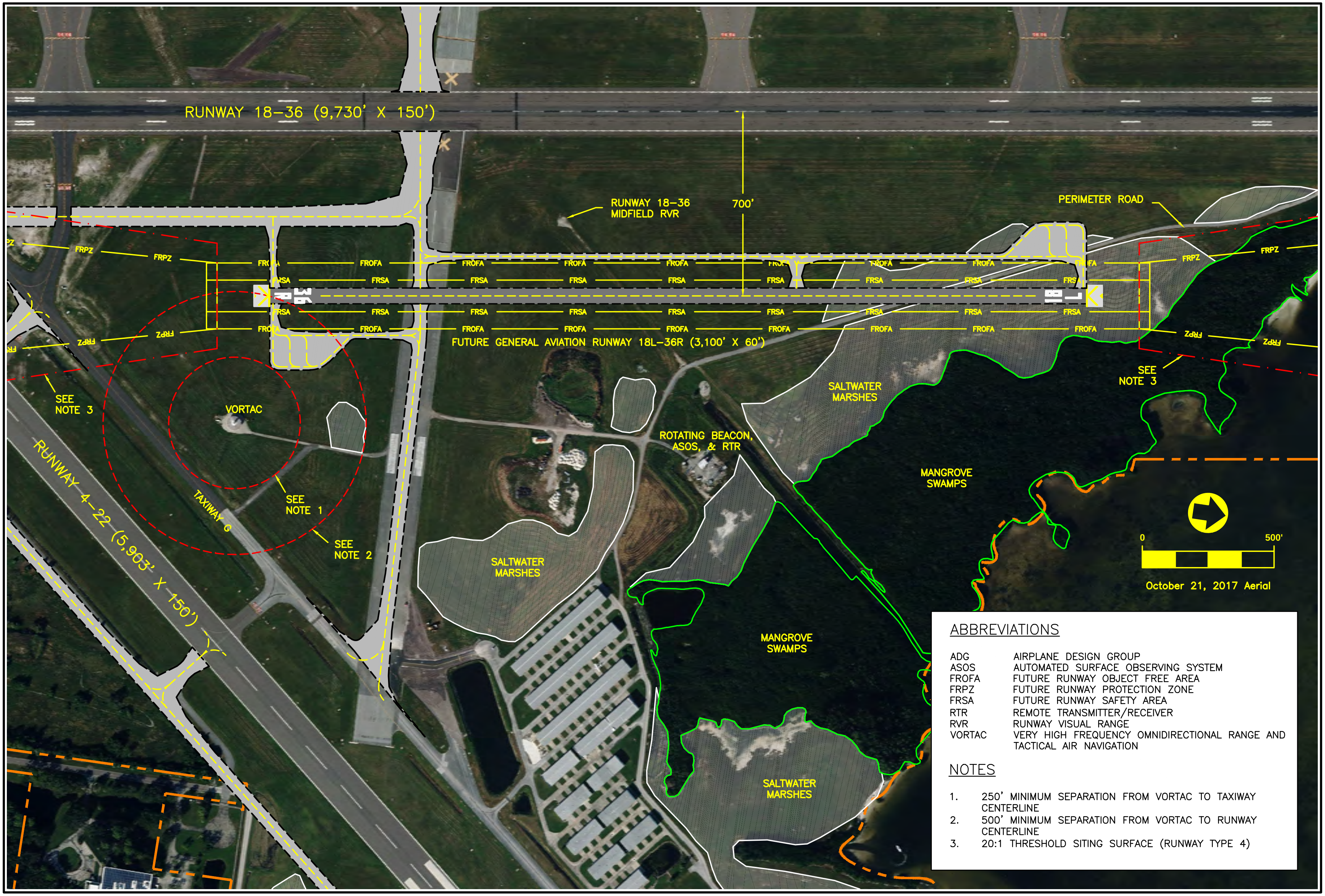
The FAA's methodology to establish the required length of the new parallel GA runway ranged from a minimum of 3,100 feet to a maximum of 3,650 feet. Similar to the description above, with each additional increase in the proposed length over 3,100 feet, the north end of the new parallel GA runway will be closer and in most cases well within the mangrove areas to the north. When combined with the required RSA and ROFA, any combination of shifting the new parallel GA runway centerline beyond 700 feet or extending it beyond the minimum 3,100 feet would impact the mangrove areas to the north.

As such, the future parallel GA runway centerline will be 700 feet east of the Runway 18-36 centerline and oriented as far south to where the centerline of the parallel GA runway's south threshold will maintain the 500 foot offset from the VORTAC. Then, at 3,100 feet long, the north end of the new parallel GA runway, as well as the required RSA and ROFA, would not impact the adjacent mangrove area. There would likely be some minor trimming of the mangroves in order to maintain the required 20:1 threshold siting surface. While a runway length less than 3,100 feet could avoid the need to trim some mangroves, any reduction would not meet the minimum runway length established in the facility requirements chapter. Under every scenario, some of the area designated as saltwater marshes will likely be impacted.

This recommended configuration, shown in **Figure 6.3-2**, meets all of the facility requirements and creates the least impacts to the environment. It will however, interrupt the existing airport perimeter road. Regardless, it will be utilized in the evaluation of all other potential airport improvements and included as part of the new ALP drawing set presented in the following chapter. With this alignment, the primary instrument runway will become Runway 18R-36L and the new parallel GA Runway 18L-36R as shown on **Figure 6.4-4**, at the end of the taxiway system section.

Elevations for the new parallel GA runway endpoints were derived using the Airports Geographic Information Systems (AGIS) data obtained as part of this study. The elevation of the decommissioned Runway 9-27 pavement where the south end of the new parallel GA runway will cross averages 8 feet AMSL while the ground surrounding the pavement averages 6 feet AMSL. Therefore, the future Runway 36R end should be established at approximately 8 feet AMSL. Moving north, the ground elevation slopes downward to an average of 4 feet AMSL at the north end of the new parallel GA runway. As noted above, this end of the runway, and its corresponding RSA and ROFA, will be located just south of the existing shoreline. Even though it will certainly increase construction costs, the Runway 18L end should be established at approximately 7 feet AMSL. Absent specific geotechnical information, the additional fill above the existing grade would ensure the proper resistance of the pavement structure and its supporting subgrade to the water table given the future Runway 18L end's proximity to Old Tampa Bay. Consideration should also be given for the long-term shoreline protection to increase the sustainability and resiliency of the new parallel GA runway. Shoreline protection is addressed further in the next section.

As noted in the facility requirements chapter, the FAA will require that an EA for the new parallel GA runway be conducted. Information obtained during the EA process may result in an adjustment to the endpoint elevations established for the new parallel GA runway in this study. Even still, it will not be until the new runway is actually designed that the final endpoint elevations can be formally determined.



May 15, 2019 – 8:46am C:\Users\ddicorlo\Documents\PIE\Drawings\Figures\PIE MP Figure 6.3-2.dwg

Source: ESA, 2019.

FIGURE 6.3-2

NEW PARALLEL GENERAL AVIATION RUNWAY (18L-36R) THRESHOLD SITING

6.3.4 Erosion and Shoreline Protection

The facility requirements chapter documented the significant erosion that has occurred to the man-made peninsula which extends into Old Tampa Bay at the north end of Runway 18-36. This peninsula supports the Medium-intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) owned and maintained by the FAA for the precision approaches to Runway 18. When the man-made peninsula was built, its overall length included 300 feet prior to the MALSR to accommodate the Runway 18 Instrument Landing System (ILS) Middle Marker beacon (navigational aid). The middle marker beacon has since been removed. As noted in the facility requirements, the FAA initiated a design-build shoreline stabilization project in 2007 to repair the erosion and improve the associated seawalls. Unfortunately, the project was abandoned in 2008 due to the economy and never revisited.

While a request has been made to the FAA ATO to re-initiate the project, it was also suggested that the FAA should conduct a study to determine the best alternative to address the erosion. The study is necessary given that over a decade has passed since the original FAA project to repair the seawalls was initiated. Since that time, not only has the erosion continued to damage the man-made peninsula, but the associated regulations and permitting have also changed. Given the severity of erosion, including some areas which have collapsed completely, and more recent projections of sea level rise in the Tampa Bay region, reconstructing the existing seawalls may no longer be the best alternative. In addition to evaluating the potential removal of the last 300 feet of the man-made peninsula, the study should explore other options such as removing the man-made peninsula entirely and installing the MALSR fixtures on individual pilings connected with an elevated walkway for maintenance purposes.

Removing some or all of the man-made peninsula may result in significant environmental and/or financial benefits. For example, restoring previously filled bay bottom is a very high level mitigation strategy that may also offset potential impacts associated with future airport improvement projects. Given the above, the study (or perhaps a joint study with Pinellas County) could also determine what, if any, positive results might result for the adjacent Cross Bayou Canal. As documented in the environmental overview chapter, the Cross Bayou Canal is listed as an impaired surface water. Removing some or all of the man-made peninsula has the potential to improve tidal flushing and water quality in this area and promote seagrass growth.

From an airport management standpoint, the study, or a segment of it, could analyze the option of beneficial re-use of the existing man-made peninsula material to protect other portions of the airport property's shoreline. At the north end of Runway 18-36, the east facing shoreline has experienced significant erosion over time. This shoreline is also just north and east of the recommended location for the new parallel GA runway. If it is determined that some or all of the man-made peninsula will be removed, the fill material could be relocated to harden the airport's shoreline, making it more resilient, increasing protection to the airfield from wave-induced erosion, major storm events, and sea level rise. This however, requires a separate and more detailed analysis of how to protect the most vulnerable portions of the airport's shoreline.

A feasibility study focusing on shoreline stabilization for the airport would look at potential options to increase resiliency to include more detailed design, permitting, mitigation, and construction costs. If the existing seawalls have reached the end of their usable life, new walls with a higher crest height could be installed immediately in front of the existing wall with new tie-backs (**Figure 6.3-1**), but other options may prove to be more beneficial given site specific conditions.

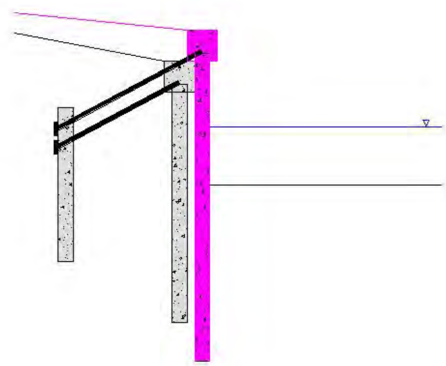


Figure 6.3-1 – Installation of a new, taller seawall (pink) in front of the existing seawall (grey).

For example, material generated from the removal of the man-made peninsula could be strategically re-used in the construction of several shoreline stabilization options. These options can incorporate a combination of broken concrete and armor stone immediately in front of existing seawalls for erosion protection (**Figure 6.3-2**). An earthen berm could be constructed landward of existing or future seawall locations for added flood protection. Increasing the height of seawalls or creating upland earthen berms may address the flooding from the bayside but can also create challenges for stormwater management. Therefore, flap gates or inline check valves may have to be added to the existing stormwater infrastructure to maintain adequate conveyance of flow during high water periods.

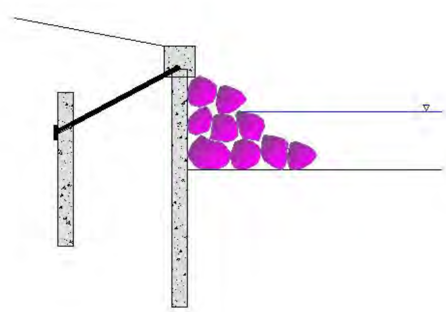


Figure 6.3-2 – Broken concrete or rubble rip rap (pink) placed in front of the existing seawall (grey) to add stability and dissipate wave energy.

Alternatively, breakwater features could be constructed offshore to dissipate wave energy (**Figure 6.3-3**), coupled with a natural, gradually sloped bank or revetment, that can be planted to create a living shoreline. Reusable material from the man-made peninsula could also fill in historic dredge holes immediately offshore, reducing nearshore wave heights and providing seagrass restoration areas that can be used as mitigation for other future airport improvement projects. Seagrass restoration and offshore breakwaters may also provide the habitat creation/mitigation requirements necessary without increasing wildlife or bird strike issues for airport operations.

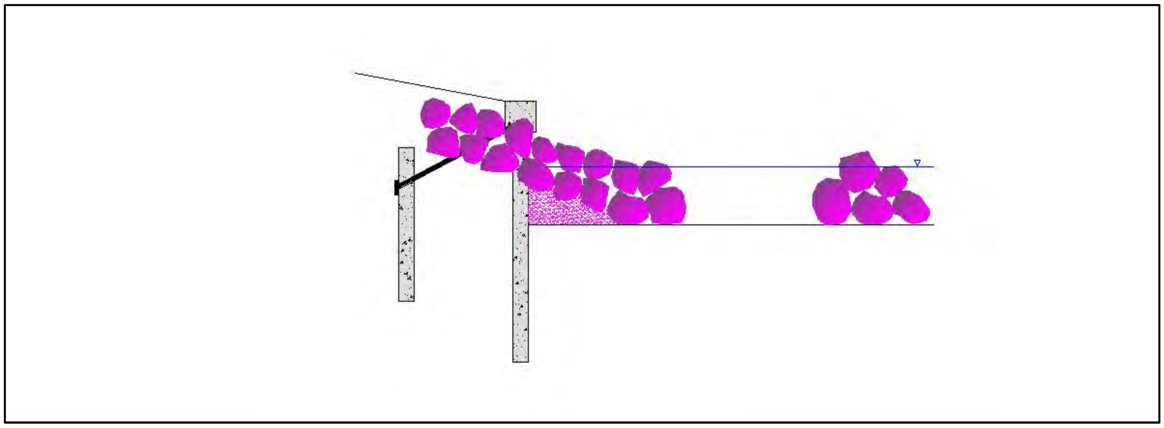


Figure 6.3-3 – Removal of the existing seawall (grey) and installation of a rubble rip rap breakwater and revetment (pink) to protect the shoreline and create habitat.

Alternatives including rubble rip rap, seawalls, earthen berms, and breakwaters can be used in different combinations for certain segments of the shoreline depending on wave conditions, water depths, and habitat creation considerations. A shoreline stabilization feasibility study will be included in the airport development program.

6.4 Taxiway System

The following sections address different improvements recommended for the ultimate configuration of the airport's taxiway system. This includes both new and re-aligned taxiways to serve the future runway system as well as to address those areas requiring modification to meet the current FAA taxiway standards. Other improvements to accommodate the expected demand are included in subsequent sections, since many depend on the final recommended alternatives for different airfield uses.

6.4.1 Taxiway D

As noted in the facility requirements chapter, the existing Taxiway D alignment will be removed in the near future. Depending on the phasing of the preferred passenger terminal development alternative, this short connector taxiway will eventually be eliminated and the area incorporated into the future passenger terminal apron area.

6.4.2 Taxiway G

With an angle of 78 degrees to Runway 4-22, connector Taxiway G3 does not meet the current FAA taxiway design standard for 90 degree intersections with a runway. The re-alignment of this connector taxiway should be considered as part of the project to provide a parallel taxiway on the southeast side of Runway 4-22. This proper alignment is depicted on **Figure 6.4-4** at the end of this section.

6.4.3 New Taxiways

A number of new taxiways will be required to support the current airfield operations, future parallel GA runway, Airco Parcel redevelopment, passenger terminal apron expansion, and future aircraft activity. These improvements and the options that exist to provide them are described in the following sections. It should be noted that the order in which they are presented does not have any relation to the priority or phasing of such projects.

Parallel Taxiway East of Runway 18-36

At a minimum, a parallel taxiway on the east side of Runway 18-36 is required to provide airfield access to south half of the Airco Parcel. The current airport plan for future taxiway designations identifies the future parallel taxiway east of Runway 18-36 as Taxiway D. As noted previously, the current short connector Taxiway D will be removed.

Partial Parallel Taxiway D for Airco Parcel

Only a partial parallel Taxiway D is needed between the south end of Runway 18-36 and Taxiway G to provide access to the Airco Parcel. This 75 foot wide Airplane Design Group V (ADG V) taxiway, to support aircraft with a Taxiway Design Group (TDG) 5 designation, requires a minimum runway centerline to taxiway centerline separation of 400 feet. However, the current ALP shows the future parallel taxiway east of the runway with a 580 foot centerline offset for the portion south of the 930 foot displaced threshold to Runway 36. This offset allows unrestricted taxi operations by all ADG III (without penetrating the overlying TERPS surfaces) along the portion of the taxiway south of the Runway 36 displaced threshold. The 580 foot offset will remain unchanged for the future Taxiway D configuration. While the future Taxiway D alignment is included on **Figure 6.4-4** at the end of this section, it should be noted that the required paved shoulders for this taxiway are not illustrated; hence the difference in appearance when compared to Taxiway A. Additionally, ADG V taxiway geometry is not shown at the Runway 4-22 or Taxiway J intersections since the larger aircraft would not access these pavements from Taxiway D. As noted in the facility requirements chapter, the partial parallel taxiway east of Runway 18-36 was included as part of the *EA for the Redevelopment of the Airco Parcel*.

In order to construct this taxiway, a portion of the Old Roosevelt Boulevard right-of-way will need to be modified. This modification would be for the end that terminates at the facility used by the airport to store maintenance equipment (former Airco golf cart shed). As shown on **Figure 6.4-4**, a small portion of the proposed taxiway alignment would overlap the right-of-way at the northwest end of Old Roosevelt Boulevard and a portion of the existing airport perimeter road. While not illustrated, this is also true for the associated future Taxiway Object Free Area (TOFA). Regardless, this modification is not anticipated to pose a problem with Pinellas County given that this portion of the right-of-way only serves property owned by the airport and will be truncated at Stoneybrook Drive once the Airco Parcel is developed. It is also assumed that a new alignment for the perimeter road could be achieved in this area as well as for the other portions directly impacted by the Taxiway J alignment. Finally, the airport maintenance facility will also need to be removed, once the new facility on the west side of the airfield, adjacent to the Aircraft Rescue and Fire Fighting (ARFF) station, is completed.

Full Length Parallel Taxiway D Limitations

Since it is anticipated that a majority of the future ADG V aircraft will operate to and from the west side of the airfield (international passenger charter aircraft), a full length parallel taxiway east of Runway 18-36 is not required. In fact, any full length taxiway would not be considered feasible on the east side of the primary runway given the limited airport property and sensitive shoreline to the northeast of Runway 18-36. Extending a full length parallel taxiway all the way to the north end of the runway would impact the shoreline even more given the need to go around the existing Category II ILS glideslope critical area on that end of the runway.

Options to Support Large Aircraft (ADG V) Movements

An extension to the partial parallel Taxiway D may be needed to provide unrestricted ground movements of ADG V aircraft. This will ultimately depend on the configuration of the future passenger terminal facilities immediately adjacent to Taxiway A. Currently Taxiway A can only support ADG IV along its entire length. The existing vehicle service road (VSR) serving the five aircraft parking positions along the east side of the passenger terminal, as well as the easternmost edge of Signature's aircraft parking apron, do not currently allow the setback required for an ADG V TOFA along this portion of Taxiway A. If these facilities are the same as they are today when the airport begins to support regular ADG V aircraft operations, another taxi route will be needed to support aircraft ground movements to and from the south end of Runway 18-36. Three options to support the unrestricted movement of ADG V aircraft to the south end of Runway 18-36 are illustrated on **Figure 6.4-1**. Unfortunately for each, the ADG V aircraft will have to cross the primary runway.

Option 1

Option 1 details how the partial parallel Taxiway D for access to the Airco Parcel (described above) could support ADG IV movements today, but not ADG V. As illustrated, the connection of the ADG V taxiway across Runway 18-36 would tie into Taxiway A5. The future ADG V TOFA for Taxiway A tying into Taxiway A5 would impact the current passenger terminal apron VSR and portions of Signature's apron area. If the future VSR moves and the Signature apron impacts are mitigated, this would be the preferred route for future ADG V aircraft as it would not require an extension of Taxiway D beyond what is required to access the Airco Parcel.

Option 2

Option 2 is based on the assumption that the existing passenger terminal apron VSR does not move and the Signature apron is not impacted. This option also maintains adequate taxiway centerline to taxiway centerline spacing with the future Taxiway K alignment (described in a following section) and could be adjusted as needed to prevent direct access from any future passenger terminal apron edge taxiways onto Runway 18-36. As depicted, Option 2 would require an extension of approximately 2,000 linear feet of ADG V taxiway.

Option 3

Option 3 would extend the first phase of Taxiway D approximately 2,400 feet overall, combining it with the proposed Taxiway K alignment. As described in a later section, the future Taxiway K alignment only needs to support ADG III aircraft. Therefore, under Option 3, the Taxiway K pavement between Taxiway A and future Taxiway D (approximately 700 linear feet) would need to be significantly increased over the ADG III standards, especially since the required paved shoulders are not depicted for any of the options on **Figure 6.4-1**.

Recommended Option

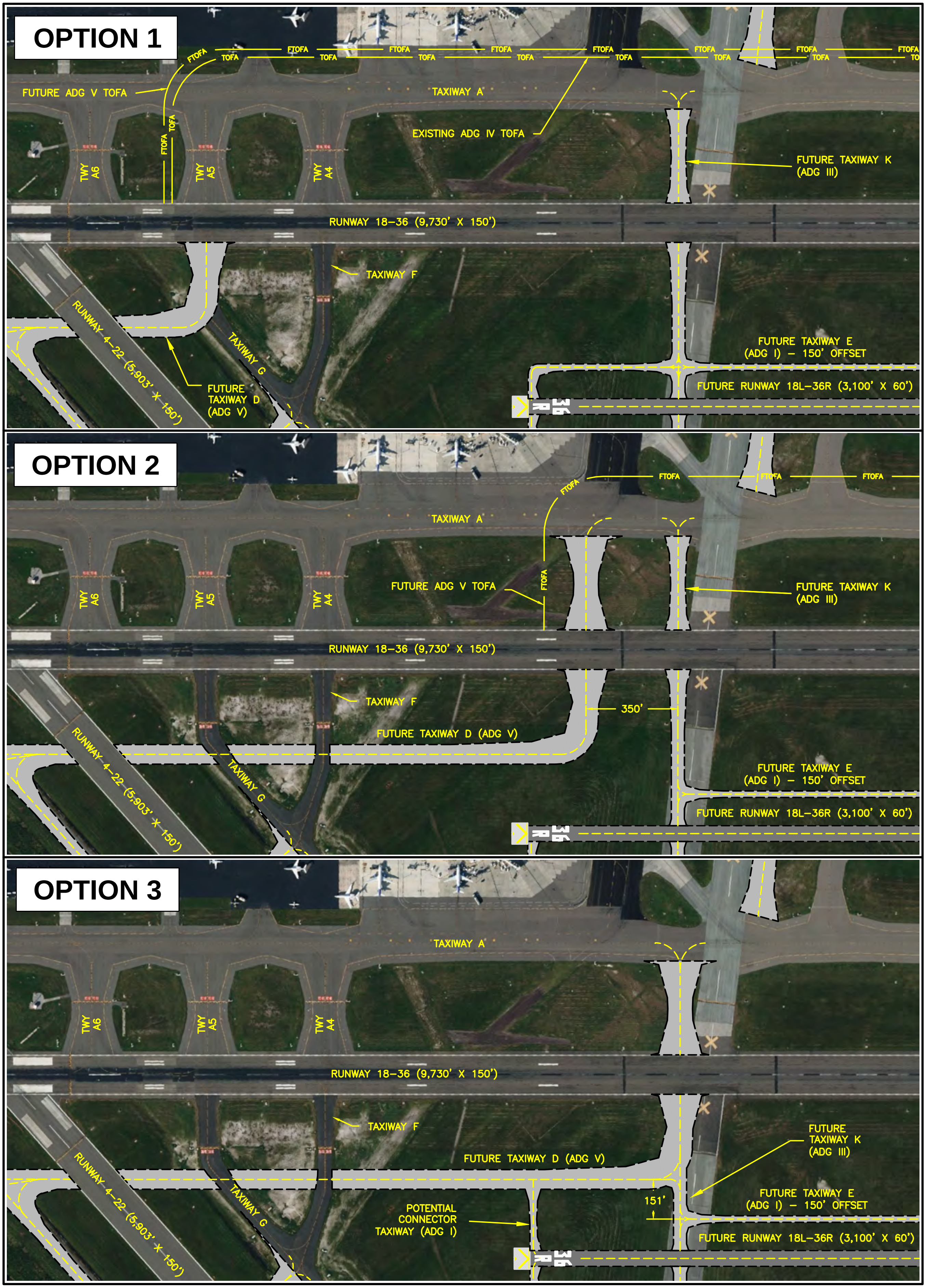
Option 1 would be the preferred alternative from an airfield geometry and cost perspective, if it did not impact any existing facilities. Given the recent investment to expand the outbound baggage makeup area at the south end of the existing passenger terminal building, the existing VSR to this portion of the terminal is required. Therefore, from a passenger terminal perspective, Option 1 could only be achieved if the five aircraft parking positions along the east side of the passenger terminal are either reconfigured, limited to smaller aircraft, or eliminated altogether. Similarly, Signature's already small aircraft parking apron would have to be modified and the leasehold space impacted somehow mitigated in another location. Therefore, while preferred, Option 1 is not considered feasible at this time.

Options 2 and 3 both provide the ability to support future unrestricted ADG V movements for the south end of Runway 18-36 without impacting the current passenger terminal facilities or

Signature's aircraft parking apron. Apart from an approximate 400 linear foot difference in required ADG V taxiway construction (more is required under Option 3), the biggest difference between these is that Option 2 creates two new taxiway connectors across Runway 18-36. It was stated in the facility requirements chapter that at least one additional connector within the optimal exit range is needed to decrease the future runway occupancy time. Discussions with ATCT management also included a request for an additional exit taxiway to be considered between Taxiways A3 and A4, as the distance between these two connectors (just over 2,500 feet) required many of the larger aircraft to continue their roll out along the runway if the first of the two were missed. The runway occupancy time is significantly increased when aircraft have to roll out on this nearly half mile stretch (at speeds just above taxiing) between connector taxiways.

Under Option 2, the two new connectors with Runway 18-36 have the proper taxiway to taxiway centerline spacing and could serve to segregate the larger aircraft operations with those of the smaller ones. The ADG V connector with Runway 18-36 in Option 2 is also within the optimal exit range for aircraft landing on Runway 36 in Option 2, but just short of the optimal range for aircraft landing on Runway 18. In Option 3, the ADG V connector is within the optimal exit range for landings on both runway ends and is nearly centered between the existing Taxiway A3 and Taxiway A4 connectors.

For these reasons, Option 3 will be planned for the improvement of the future Taxiway D alignment beyond the initial phase required for the Airco Parcel. Though, it should be noted that the future crossfield Taxiway K for up to ADG III aircraft is needed as soon as possible, where the demand for regular ADG V access to the south end of Runway 18-36 is not anticipated until the intermediate-term planning period. Therefore, as described in a later section and illustrated on **Figure 6.4-2**, the first phase of this new connector taxiway with Runway 18-36 will only be constructed to ADG III standards during the short-term planning horizon. Later, once the actual design of the future passenger terminal facilities is established and the need for ADG V access to the south end of Runway 18-36 justified, the requirement to extend Taxiway D beyond Taxiway A5 can be updated. In addition, since this portion of the taxiway was not included in the *EA for the Redevelopment of the Airco Parcel*, the environmental representative from the FAA Orlando ADO should be contacted at least a year prior to the project to determine the proper environmental review at that time.



Source: ESA, 2019.

FIGURE 6.4-1
OPTIONS TO SUPPORT AIRPLANE DESIGN GROUP (ADG) V MOVEMENTS

Parallel Taxiway Southeast of Runway 4-22

A parallel taxiway on the southeast side of Runway 4-22 is required to provide airfield access to the north half of the Airco Parcel. The current airport plan for future taxiway designations identifies the future parallel taxiway southeast of Runway 4-22 as Taxiway J.

Initially, for the Airco Parcel access, only a partial parallel is needed from the southeast end of Runway 4-22, up to the point where it would tie into the runway opposite of Taxiway G2. This 50 wide ADG III taxiway, to support aircraft with a TDG 3 designation, is planned for a runway centerline to taxiway centerline separation of 300 feet. As noted in the facility requirements, while this exceeds the 240 foot runway centerline to taxiway centerline separation required for Runway 4-22's design aircraft, FAA AC 150/5300-13A, Change 1 states that if a taxiway serves larger aircraft, the runway to taxiway separation distance should be based on the ADG of the larger aircraft. This is why the current 2018 ALP shows a 300 foot separation for the future parallel taxiway on the southeast side of Runway 4-22.

The current 2018 ALP still shows the portion of future Taxiway J between the southeast end of Runway 4-22 and future parallel Taxiway D with an offset of 350 feet. It appears this dates back to the ALP drawing set that was included as part of the 2004 Airport Master Plan Update when the overall future Taxiway J centerline offset was based on the existing offset of 350 feet for most of Taxiway G. Prior to the more recent ALP updates, a 2011 letter to the FAA from the airport's consultant states that there was no way to justify the need for the 350 foot offset at this end of the runway. As such, the future Taxiway J alignment as shown on **Figure 6.4-4** has a consistent offset of 300 feet with Runway 4-22. As noted in the facility requirements chapter, the partial parallel taxiway southeast of Runway 4-22 has been included as part of the *EA for the Redevelopment of the Airco Parcel*.

It should be noted that there may be occasional limitations and/or the need to obtain prior approval from the ATCT for the simultaneous movement of any C-III and D-III aircraft along any of the parallel taxiways to Runway 4-22, during instrument conditions. For unrestricted movements of C-III and D-III aircraft next to Runway 4-22, the parallel taxiways would require a minimum 400 foot offset to the runway centerline. Not only is a future parallel taxiway offset greater than 300 feet not justified; it would also have a significant impact on both existing and future airport facilities.

In order to construct the ultimate phase of this taxiway (between the connector opposite of Taxiway G2 and the northeast end of the runway), a portion of the Evergreen Avenue right-of-way will need to be modified. This modification would be for the end that terminates at the airport property. As shown on **Figure 6.4-4** the proposed taxiway alignment would overlap the right-of-way at the north end of Evergreen Avenue and a portion of the existing airport perimeter road. While not illustrated, this is also true for the associated future TOFA. Regardless, it is not anticipated to be a problem to modify with Pinellas County given that this portion of the right-of-way only serves property owned by the airport and can therefore be truncated at the entrance to the private business located just south of the airport's property line. It is also assumed that a new alignment for the perimeter road could be achieved in this area as well as for the other portions directly impacted by the Taxiway J alignment.

Parallel Taxiways for New Parallel General Aviation Runway

Ideally, full length parallel taxiways would be provided to both sides of the new parallel GA runway, especially given its centralized location with respect to the existing runway system and aviation related facilities. However, it is not feasible nor is it necessary for either future taxiway to be a full length parallel. The current airport plan for future taxiway designations identifies any future west parallel taxiway as Taxiway E and any on the east side as Taxiway M.

On the west side, a partial parallel Taxiway E between Taxiway K and the north end of the new parallel GA runway is recommended (see **Figure 6.3-2**). The portion of the parallel taxiway that would connect to the south end of the runway cannot be constructed with the ultimate plan to extend Taxiway D. As depicted on Option 3 of **Figure 6.4-1**, the future Taxiway D centerline to future Taxiway E centerline separation is 151 feet. Given Taxiways D and E would serve ADG V and I aircraft respectively, the minimum centerline offset between the two must be at least 168.5 feet. Under Option 3 for Taxiway D, a connector taxiway between Taxiway D and the south end of the new parallel GA runway is possible and could be considered an option. However, as described below, small aircraft originating from the west side of the airfield could take Taxiway K to Taxiway M in order to depart from the south end of the parallel GA runway when the airport is in a north flow.

To the east of the new parallel GA runway, the Taxiway M alignment is only recommended between Taxiway K and the south end of the runway (see **Figure 6.3-2**). North of Taxiway K, the future Taxiway M alignment would work well until the last 500 feet at the north end. This portion of the taxiway would impact the shoreline and mangrove areas on this side of the airfield, requiring the need for additional fill material and the potential for environmental mitigation. Therefore, it is not considered necessary, and while not ideal, small aircraft originating from the east side of the airfield could take Taxiway K to Taxiway E in order to depart from the north end of the parallel GA runway, when the airport is in a south flow.

It should be noted that the inability to provide full parallel taxiways on either side of the new parallel GA runway is not considered a limitation. Since the new parallel GA runway's primary purpose is to provide additional capacity for small aircraft training, full parallel taxiways are not necessary. In fact, it is not uncommon for airports with heavy training activity and different types of aircraft operations to have the training aircraft depart from the primary runway and then shift over to the smaller parallel GA runway to conduct touch and go operations. Four examples of Florida airports with significant flight training where this occurs on a regular basis include the Daytona Beach International, Orlando-Melbourne International, Orlando-Sanford International, and Vero Beach Regional Airports.

In addition to Taxiway K, the end connector for Taxiway E, and the end connector for Taxiway M, one additional connector taxiway on the west side of the new parallel GA runway is recommended. The facility requirements chapter described the optimal ranges for taxiway exits. For the new parallel GA runway, the optimal range is 2,000 to 4,000 feet from the landing threshold. For aircraft landing to the south on the new parallel GA runway, both Taxiway K and the end connector for Taxiway M lie within the optimal range. For landings to the north, only the end connector for Taxiway E would be in the optimal range. Therefore, an additional connector to Taxiway E should be established at least 2,000 feet beyond the threshold for aircraft landing to the north on the new parallel GA runway. The recommended taxiway system for the new parallel GA runway is reflected on both **Figure 6.3-2** and **Figure 6.4-4**. These taxiways will be included as part of the required EA for the new parallel GA runway.

Crossfield Taxiway

Discussions with ATCT management and a number of the aircraft operators at PIE have underlined the need for an efficient east/west connector across the airfield. In fact, ATCT management indicated having a crossfield taxiway to assist in the ground movement of aircraft was one of their highest priorities. As noted in the facility requirements chapter, the decommissioned Runway 9-27 pavement currently serves this purpose, but on a limited basis, as there are no official taxiway markings, signage, or lighting for this pavement.

The decommissioned Runway 9-27 pavement provides an ideal crossfield taxiway alignment connecting Taxiway B to Taxiway G, crossing Taxiway A, Runway 18-36, the future parallel GA runway, and Taxiway Q. Since this alignment does not impact any existing facilities or future development areas, it would be a relatively simple project to convert the previous 150 foot wide runway pavement into a new 50 foot wide ADG III taxiway, along most of the same centerline. The current airport plan for future taxiway designations identifies the portion of a crossfield taxiway east of Runway 18-36 as future Taxiway K.

The June 2015 FDOT pavement evaluation provided an area weighted Pavement Condition Index (PCI) of 44 (poor) for the Runway 9-27 pavement before it was decommissioned. The report also identified that portions of the pavement would either need to be reconstructed or rehabilitated. In addition to any pavement maintenance needed, adjustments in the traverse grade of the decommissioned pavement may also be required to ensure it does not exceed the limits required for a taxiway. Also, while not required to be paved for an ADG III taxiway, the existing decommissioned runway pavement width could also be used to provide the required 20 foot taxiway shoulders. Then the outer 30 feet on each side, for most of the new taxiway, could also be removed to obtain stormwater credits for future airfield projects.

It is noted above that not all of the decommissioned runway (along the existing centerline) could be used for the new Taxiway K alignment. This is because the decommissioned runway centerline crosses the Runway 18-36 centerline at an 83 degree angle. The same will be true with the new parallel GA runway centerline. FAA AC 150/5300-13A, Change 1 states that, "FAA studies indicate the risk of a runway incursion increases exponentially on angled (less than or greater than 90 degrees) taxiways used for crossing the runway." Therefore, the portion of Taxiway K between Taxiway A on the west side and future Taxiway M on the east side should be re-aligned 7 degrees to meet the FAA standard. Clearly the cost for this re-aligned portion would be more than if the decommissioned runway alignment and pavement section could be utilized. A comparison of the two alignments is included on **Figure 6.4-2**. An informal request was made with the FAA Orlando ADO as to whether or not the 83 degree intersection between future Taxiway K with the runways would be acceptable. The preliminary determination was that it was possible; however, such a request will ultimately need to be coordinated through the FAA Southern Region during design.

Therefore, the future Taxiway K alignment will be shown as deviating from the decommissioned runway pavement centerline from future Taxiway M, east, to meet the FAA standard. In addition, since the future Taxiway K would primarily coincide with and potentially replace a portion of the decommission Runway 9-27 pavement, it is anticipated that the project could be categorically excluded. The environmental representative from the FAA Orlando ADO should be contacted at least a year prior to the project to determine the proper environmental review at that time.

Passenger Terminal Apron Edge Taxiway

The facility requirements chapter documented the need for dedicated apron edge taxiways or taxilanes to serve the future passenger terminal facilities. The alternatives for these are dependent upon the final configuration of the passenger terminal concourse, aircraft parking positions, and remain overnight (RON) aircraft parking locations. While there could be different combinations of apron edge taxiways and taxilanes, uninterrupted access into and through the passenger terminal area must be established, especially during the different construction phases to expand the passenger terminal concourse and aircraft parking areas.

During the initial development of airport alternatives, airport and ATCT management agreed that the ability to preserve the United States Coast Guard's (USCG) taxiway access to their "front door" was a priority. This is currently provided for their Lockheed HC-130 Hercules (C-IV) via Taxiway T and Taxiway B. However, once construction begins to expand the current passenger terminal, the use of Taxiway T will be impacted by every passenger terminal alternative addressed in the following section. As noted previously, the decommissioned Runway 9-27 pavement could be utilized for this access, but it is also envisioned this pavement will be needed for RON during the terminal construction period. Therefore, a permanent taxiway route needs to be established prior to the first phase of passenger terminal improvements.

Given the limited space north of the passenger terminal area, the only option would be to construct a permanent 75 foot wide ADG IV taxiway as far north in this area as possible, so as to allow as much space for the eventual passenger terminal expansion. ATCT management also expressed the desire to maintain this permanent taxiway as a movement area, therefore, it would require the full ADG IV taxiway offsets and not those of a taxilane. **Figure 6.4-3** depicts the alignment of a future apron edge taxiway (designated by the airport as Taxiway C) on the northernmost edge of the passenger terminal area. As illustrated, the required ADG IV TOFA coincides with the southernmost leasehold boundary for Sheltair Aviation. Given the nature of this taxiway project, it is anticipated that it could be categorically excluded. As such, the environmental representative from the FAA Orlando ADO should be contacted at least a year prior to the project to determine the proper environmental review at that time.

May 15, 2019 – 8:54am
C:\Users\ddicarlo\Documents\PIE\Drawings\Figures\PIE MP Figure 6.4–2.dwg

Source: ESA, 2019.

FIGURE 6.4-2

COMPARISON OF FUTURE TAXIWAY K ALIGNMENTS

ABBREVIATIONS

ADG	AIRPLANE DESIGN GROUP
AMSL	ABOVE MEAN SEA LEVEL
APRL	AIRCRAFT PARKING RESTRICTION LINE
ATCT	AIRPORT TRAFFIC CONTROL TOWER
FBO	FIXED BASE OPERATOR
FLOS	FUTURE LINE-OF-SIGHT
FTOFA	FUTURE TAXIWAY OBJECT FREE AREA
TOFA	TAXIWAY OBJECT FREE AREA
USCG	UNITED STATES COAST GUARD

NOTES

1. CRITICAL AIRCRAFT WITH THEIR ASSOCIATED DESIGN CODE AND TAIL HEIGHTS:

AIRBUS A320	C-III	40'
BOEING 787	D-V	56'
USCG HC-130	C-IV	39'

2. SHELTAIR AND SIGNATURE FBO AREAS DEPICTED ARE NOT BASED ON OFFICIAL SURVEY DATA.

Source: ESA, 2019.

FIGURE 6.4-3

FUTURE TAXIWAY C ALIGNMENT TO ENABLE PASSENGER TERMINAL EXPANSION

As an enabling project for the expansion of the passenger terminal facilities, the future apron edge Taxiway C alignment would provide uninterrupted access for the USCG throughout any future terminal construction phases. The recommended alignment of Taxiway C avoids providing direct access onto Runway 18-36 from the future passenger terminal apron. It also does not impact Taxilane H which is required to access the south half of Sheltair's leasehold, including their plans for additional large aircraft hangar development as shown. **Figure 6.4-3** demonstrates the closest centerline to centerline separation between future Taxiway C and Taxilane H is 247 feet, which exceeds the minimum 183.5 feet required between the future ADG IV taxiway and existing ADG III taxilane.

Figure 6.4-3 also provides the most critical (shortest distance) ATCT line-of-sight elevations over the passenger terminal facilities that must be respected in order for Taxiway C to remain a movement area. One of the shortest line-of-sights with its associated elevations is also included for Taxiway A. Once construction to expand the passenger terminal facilities begins, Taxiway B and the western half of Taxiway T can be utilized to provide both short- and long-term access to the aircraft parking positions and/or RON locations on the west side of the future terminal concourse. Finally, the recommended Taxiway C alignment also provides the ability to maintain Taxiway B throughout most of the planning period. This is important since the USCG heavily utilizes the north half of Taxiway B for their Sikorsky HH-60 Jayhawk arrival and departure procedures.

6.4.4 Aircraft Run-up Areas

As documented in the facility requirements chapter, the FAA recommends dedicated aircraft run-up areas and/or bypass taxiway capability when a runway reaches 30 operations per hour. In 2017, the airport's two runway system handled 39 operations per hour. Due to the mix of small and large aircraft using Runway 18-36, the ability to provide run-up areas at the north and south ends of Taxiway A have been evaluated. In addition, run-up areas should also be planned for the taxiways serving the future parallel GA runway. For planning purposes, each run-up area considered has been sized to accommodate a mix of three small GA (single-engine or light multi-engine) ADG I aircraft.

North End of Taxiway A

Any run-up area off Taxiway A must be set back enough to accommodate a future ADG V TOFA. The required TOFA offset, run-up area size, and physical limitations at the north end of Taxiway A severely impact the ability to develop an optimal run-up area at this location. To the north are the equipment buildings for the Runway 18 MALSR, to the south the U.S. Army Reserve property, and to the west, mangrove areas along the shoreline. This site is also traversed by a portion of the existing airport perimeter road.

Other factors included the ability for the ATCT to have a clear line-of-sight with the area and jet blast considerations from the larger aircraft operating along Taxiway A. Both of these factors would be improved the further south the run-up area is established. Unfortunately, given the depth required for the setbacks and the U.S. Army Reserve property, this is not possible. Moving the run-up area as far northwest of Taxiway A1 could also improve the line-of-sight and jet blast potential, unfortunately this is not possible due to the MALSR equipment buildings.

Both the ATCT line-of-sight to the entire run-up area and jet blast from the larger aircraft turning onto Taxiway A1 from Taxiway A are significant concerns. However, no other configuration at this end of Taxiway A is possible. In an attempt to alleviate both concerns, a run-up area located inside of Taxiway A was considered, but would not work given the various taxiway and runway setbacks required. Similarly, a new bypass connector taxiway just south of Taxiway A1 is not a realistic alternative since it could only serve one aircraft run-up at a time. A hybrid bypass connector was then evaluated where a 95 foot wide pavement would allow for parallel ADG I taxiway access between Taxiway A and Runway 18-36. However, this was also deemed unrealistic given it would likely create a confusing configuration for both pilots to utilize and ATCT to manage.

Additional concerns include the potential impacts of constructing the run-up area along the shoreline and mangrove areas just west of Taxiway A. It is anticipated that the associated costs for both fill material and environmental mitigation would be significant. Given these concerns, it is not recommended to develop a run-up area on the north end of Taxiway A, especially since it would only be needed until the new parallel GA runway is established.

South End of Taxiway A

A run-up area at the south end of Taxiway A must also be set back enough to accommodate the future Taxiway A ADG V TOFA. While it is planned for Taxiway D to provide the unrestricted ADG V access to the south end of Runway 18-36, the additional 30.5 foot offset (over ADG IV) to accommodate ADG V movements along this portion of Taxiway A can be easily accommodated.

While the run-up area should be located as close as possible to the entry point of the runway for departure, the only potential site at the south end Taxiway A is between the Runway 36 ILS and Runway 4 holding position markings. This is the only location that would not impact any of the required runway or taxiway surfaces, while also avoiding any impacts to the airport perimeter road. Given the proximity of the various surfaces and setback associated with both Runway 18-36 and Runway 4-22, no other options exist for a run-up area at the south end of Taxiway A.

Due to the less than optimal location for this run-up area, as well as the costs associated with its development, it is not recommended to develop a run-up area on the south end of Taxiway A, especially since it would only be needed until the new parallel GA runway is established.

Ends of New Parallel General Aviation Runway

Since the future parallel GA runway will only serve small aircraft, the run-up areas only need to provide bypass capability on the adjacent taxiway for ADG I aircraft. Also, given the recommended taxiway system for the new parallel GA runway, there is no need to look at alternative locations for the recommended run-up area locations at the ends of the taxiways.

A run-up area at the north end of Taxiway E would serve departures off the new parallel GA runway when the airfield is in a south flow. A second run-up area at the south end of Taxiway M would serve departures when the airfield is in a north flow. As shown in **Figure 6.3-2**, the run-up area off Taxiway M will remain outside of the 250 foot required VORTAC setback.

As with the associated taxiways, the proposed run-up areas will be included as part of the required EA for the new parallel GA runway.

Source: ESA, 2019.

St. Pete-Clearwater International Airport Master Plan

FIGURE 6.4-4

FUTURE AIRFIELD IMPROVEMENTS

6.5 Passenger Terminal Facilities

The facility requirements analysis concluded that the existing terminal is undersized in many areas. Specifically, outbound baggage makeup, passenger security screening, holdrooms, concessions, inbound baggage makeup, and restrooms are not adequate to accommodate projected demand by the end of the planning period. Many areas are also not capable of accommodating the existing demand, even with the improvements the airport is currently implementing. Additional aircraft parking positions, active and remote, are also needed by planning activity level (PAL) 2 for the passenger enplanements expected.

Beyond the facility requirements for major processing areas, there are infrastructure and adjacency issues that were discussed with airport management and tenants of the passenger terminal. All three of the key tenants, Allegiant Air, the Transportation Security Administration (TSA), and the main concessionaire, expressed the need to consolidate major functional areas such as check-in, outbound baggage screening and makeup, passenger security screening, and holdroom areas. Much of the terminal was constructed over time, in a piece-by-piece approach, leading to duplication of major functional areas. Many of the utility and systems infrastructure also need updating and expanding, which was outlined in the Terminal Building Conditions Assessment (**Appendix C**). The conclusions from the Terminal Building Conditions Assessment and the facility requirements chapter served as the basis for the development of alternatives.

6.5.1 Terminal Development Area

At approximately 50 acres, the terminal development area is constrained by surrounding facilities, multiple aeronautical uses, and various airfield and airspace standards. Just east of the site is Runway 18-36 and Taxiway A. The east side of the site is constrained by the Taxiway A TOFA and building heights are limited by the airfield's 14 CFR Part 77 surfaces. Since Runway 9-27 was decommissioned, the north side of the area is constrained by the southern boundary of the Sheltair fixed base operator (FBO) leasehold and the USCG's property.

Limitations to the west primarily include the new Allegiant support facility. There is also Taxiway B, a portion of the airport perimeter road, and Interim Economy/Remote Lot #3. To the south, development is limited by the landside roadway system, automobile parking areas, and Signature FBO leasehold. Based on the landside demand/capacity analysis, there is also a need for more curbside and parking areas, including a parking garage. A diagram of the general terminal development area is depicted in **Figure 6.5-1**.

In addition to physical surrounding of the terminal development area, there are new facilities within the passenger terminal that need to be taken into consideration. The airport has recently made or is currently completing improvements to the Federal Inspection Service (FIS) area, the Ticketing A baggage screening and makeup areas, and the Gates 7-11 holdrooms areas. Because of the significant investment for these areas, they should not be moved or changed within at least the next five years.

Figure 6.5-1: Terminal Development Area

Figure 6.5-1: Terminal Development Area

6.5.2 Process

The process to select a preferred terminal alternative was a collaborative approach that included multiple workshops with airport management. The process included the following steps: develop sketches of high-level initial concept families, create a shortlist of alternatives, refine alternatives to final alternatives, evaluate based on comprehensive criteria, and define the preferred alternative. Between each set of alternatives, a screening process with airport management occurred to focus on alternatives that were the most realistic and provided the most value. The process is depicted on **Figure 6.5-2**.

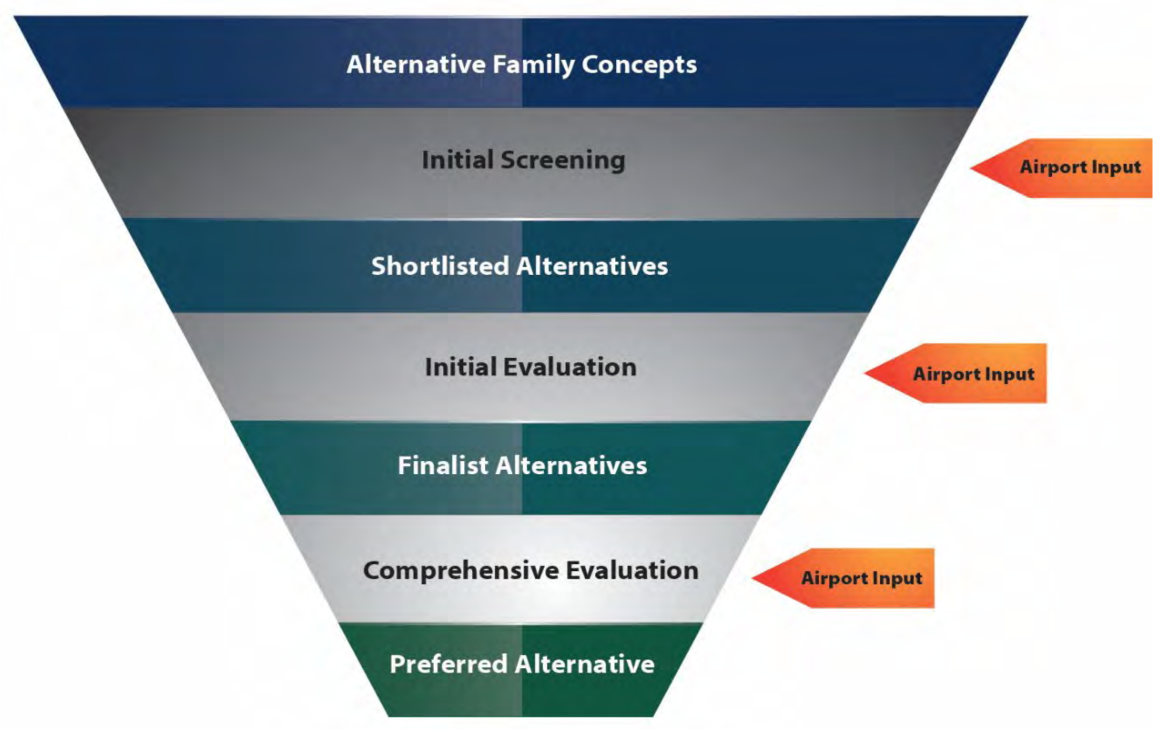


Figure 6.5-2: Evaluation Process Sketch

6.5.3 Initial Concept Families

At the outset of the alternatives process, the consultant team and airport management generated "big ideas" to trigger the development of the initial concept families. Through this collaborative process, the consultant team initiated the development of alternatives with an evaluation of the four areas of PIE depicted on **Figure 6.5-3**.

It was quickly apparent that Areas 2 and 3 were the most realistic for development. Area 1 was not ideal because of the landside access and potential issues associated with the flood zones, shoreline impacts, and erosion. Area 4 was not ideal because of existing development, leases, infrastructure, and landside access issues. Area 2 offered the only true "greenfield" site; however, given the cost to replicate every element of the passenger terminal facilities (landside access, automobile parking, terminal building, aircraft parking apron, and airfield access), Area 2 was considered unrealistic unless the projected requirements could not be accommodated within Area 3. Therefore, the initial concept families were developed based on these conclusions.

Figure 6.5-3: Potential Terminal Development Areas

Concept Family A

Concept Family A alternatives enable incremental expansion, initiated with a minimally disruptive concourse extension, adjacent to the existing international arrivals facility. Fundamentally, the idea behind this concept family is to maximize gate positions while constructing a concourse expansion that has minimal disruption to the existing operation, and maintains current infrastructure investment such as the FIS or expanded Ticketing A baggage processing areas. The first phase of each Family A alternative is a concourse extension to the north. The subsequent phases are accomplished in three different scenarios which include a concourse expansion to the west (Option 1), a parallel pier concourse to the west (Option 2), or a new terminal processing building and concourse extension to the south (Option 3). These options for Concept Family A are depicted on **Figures 6.5-4** and **6.5-5**.

Concept Family B

Concept Family B alternatives expand both airside and landside terminal facilities to the south. In part, the development theme for this concept family is to maximize the use of the airside and landside. Conceptually, it could be easier to work outside the current terminal building footprint for phasing purposes, in order to limit the disruption to existing operations, and to change the ad hoc approach to development. In both versions, terminal processing functions such as check-in, security screening, and baggage claim functions move from the existing building to a new passenger processing building somewhere within the existing landside parking areas. The first scenario (Option 4) eliminates the existing terminal building, replacing it with a new concourse to maximize the use of the existing airside. The second scenario (Option 5) combines a concourse expansion and a passenger processor reconfiguration for more post-security holdrooms and concessions areas. In either scenario, the existing loop roadway is reconfigured. These options for Concept Family B are depicted on **Figure 6.5-6**.

Concept Family C

Concept Family C is an option for a “greenfield” development in the southeast portion of the airport property, also known as the Airco Parcel. The theme of this concept family is to determine one option for maximizing the Airco Parcel for terminal and related infrastructure development. At a minimum, the airside would need two parallel taxiways, while the landside would need a new entrance and a terminal loop road system. The terminal could be developed incrementally, but the initial build on the site would have to include the airside and landside infrastructure. This site would only be chosen if it were determined that the projected requirements could not be accommodated in the existing terminal area quadrant. The option for Concept Family C is depicted on **Figure 6.5-6**.

Group A, Option 1, Phase 1

Group A, Option 1, Phase 2

Group A, Option 1, Phase 3

Figure 6.5-4: Concept Family A

Group A, Option 2, Phase 1

Group A, Option 2, Phase 2

Group A, Option 3, Phase 1

Group A, Option 3, Phase 2

Figure 6.5-5: Concept Family A

Group B, Option 4, Phase 1

Group B, Option 4, Phase 2

Group B, Option 5, Phase 1

Group B, Option 5, Phase 2

Group C, Option 6, Phase 1

Figure 6.5-6: Concept Families B and C

Concept Family D

Concept Family D is an alternative which revives a layout from a previous terminal expansion study and develops it based on the earlier concepts. The Concept Family D theme is a remote concourse, parallel to the existing terminal building, in a location further north towards the decommissioned Runway 9-27 pavement. The alternative from the previous terminal expansion study depicts an incrementally constructed, remote concourse linked to the existing terminal building by a secure connector (Option 7). Presumably, the passenger security checkpoint was designed in the connector. The idea of this concept was to expand post security functions like holdrooms and concessions in a remote concourse, while redeveloping the existing terminal building as expanded passenger processing functions such as check-in, baggage make-up, or baggage claim. During subsequent phases, the existing terminal building is eventually removed and a new passenger and baggage processor constructed adjacent to and connected to the remote concourse. This also allows for a new, expanded curbside, as well as additional space for landside parking and rental car areas. The option for Concept Family D is depicted on **Figure 6.5-7**.

Concept Family E

Concept Family E alternatives are a modest approach to terminal development in order to meet the requirements and improve the facilities, while minimizing capital costs. Like Concept Family D, one option is revived from the previous terminal expansion study and the other a variation of the same theme. The first (Option 8) is a new concourse connected to the existing terminal building where the current passenger security screening is located. Moving holdrooms and concessions to the new concourse allows for centralized and enlarged check-in and security screening; while the existing Ticketing A and security screening would be converted to holdrooms and concessions. This option includes moving the FIS. Because of recent infrastructure investment in the FIS and Ticketing A, this option was not considered viable. Option 9 is similar in that a new concourse is constructed in the initial phase; however, the existing FIS, Ticketing A, and security screening remain the same with no consolidation or centralization of these functions. It is not until subsequent phases of the option that the FIS would move and major passenger processing functions consolidated. These options for Concept Family E are depicted on **Figure 6.5-7**.

Group D, Option 7, Phase 1

Group D, Option 7, Phase 2

Group E, Option 8, Phase 1

Group E, Option 8, Phase 2

Group E, Option 9, Phase 1

Group E, Option 9, Phase 2

Figure 6.5-7: Concept Family Group D and E

6.5.4 Shortlisted Alternatives

The Concept Families represent the "big ideas" that the consultant team and airport management jointly developed through the various workshops. Each were screened using initial criteria related to the realistic implementation, integration into existing and planned infrastructure, and financial feasibility. This initial evaluation also concluded that the facility requirements projected can be accommodated within the existing terminal area envelope; therefore, the Airco Parcel would not be considered any further. This also made sense from a sustainability standpoint since all of the Airco Parcel is within the 100-year floodplain, while most of the existing terminal area is not (see **Figure 5.9-2**). The result of the initial screening yielded five shortlisted alternatives. The following sections briefly describes each.

Alternative A1

Alternative A1, from Concept Family A, is a compact terminal development option that constructs a new concourse; maintains the existing check-in, FIS, and baggage claim; consolidates the passenger security checkpoint; and creates a centralized post-security concessions zone that all passengers pass through for maximum exposure. In the first phase, the concourse is built around and above the existing FIS and connects down to the expanded Gates 7-11 holdroom area. Subsequent phases extend the concourse to the west, adding the required gates, holdrooms, and concessions for PAL 4 demand. It also moves the FIS to the west to allow for a larger security checkpoint and expanded concessions area.

To access the new interior gates, dual ADG III taxilanes and a single ADG IV taxilane are constructed on the north and western sides of the concourse. Existing Taxiway A remains in place. Aircraft parking positions to the west remain as they exist today. New RON aircraft positions are constructed to the south of the decommissioned Runway 9-27 pavement.

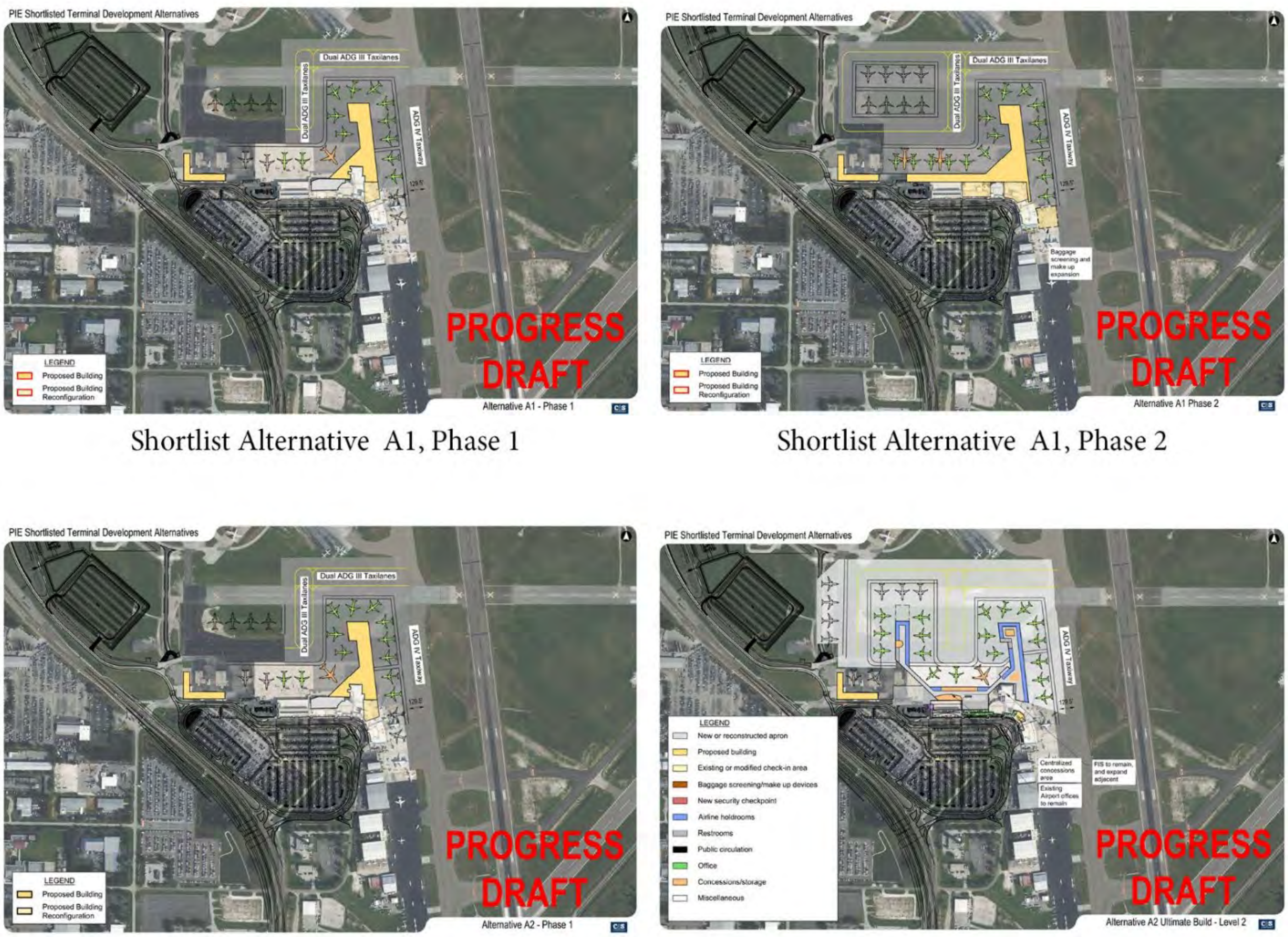
The benefits of this alternative are centralized security screening, a centralized post-security concessions area, expanded gates and holdroom areas, and existing infrastructure like the FIS, Gates 7-11 holdrooms, and the new Ticketing A baggage processing areas remain. The disadvantage of this alternative is eight aircraft parking positions pushback directly onto Taxiway A, which will cause congestion during peak departure periods. Shortlisted Alternative A1 is depicted on **Figure 6.5-8**.

Alternative A2

Alternative A2 is similar to Alternative A1; in fact, the first phase is the same with a concourse extension to the north with consolidated passenger screening and a centralized concessions area. However, subsequent phases add a parallel concourse and relocate the security checkpoint and centralized concessions node to the central area between the two concourses. The current FIS, Ticketing A, and the baggage claim areas remain.

The apron area and taxilanes for the first phase are also the same as Alternative A1. Under subsequent phases, dual ADG III taxilanes and a single ADG V taxilane are shown between the concourses. Only a single ADG III taxilane is shown to the west of the second concourse since there are only three contact gates.

The benefits of this alternative are centralized security screening, a centralized post-security concessions area, expanded gates and holdroom areas, and existing infrastructure including the FIS, and Ticketing A baggage processing areas remain. In the long-term, this alternative provides the most gates of any other shortlisted alternative. Similar to Alternative A1, the biggest disadvantage are that six to seven aircraft parking positions would pushback directly onto Taxiway A. Shortlisted Alternative A2 is depicted on **Figure 6.5-8**.



Shortlist Alternative A1, Phase 1

Shortlist Alternative A1, Phase 2

Shortlist Alternative A2, Phase 1

Shortlist Alternative A2, Phase 2

Figure 6.5-8: Shortlisted Alternatives A1 and A2

Alternative B3

Alternative B3, from Concept Family B, is similar to Alternative A2 with the first phase including a concourse extension to the north and subsequent phases providing a second concourse to the west. However, the location of passenger processing functions in Alternative B3 are different. Under this option passenger processing functions such as check-in and security screening are consolidated in a new terminal processing building in the location of the existing short-term parking lot. All departing passengers check in in the new building and proceed up and over the existing roadway, then descend back down into the existing terminal building which has been reconfigured completely to a post-security concourse. The exception is the current FIS and the non-secure corridor along the front of the building that connects to baggage claim, both of which remain the same. Arriving passengers exit the concourse as they do today and proceed directly to the curbside for pickup or walk down the non-secure corridor to the existing baggage claim. In subsequent phases existing Ticketing A is removed to create an area for more gates and concourse space. In the ultimate buildout, there are two parallel concourses with the surrounding apron area and taxilanes similar to those in Alternative A2.

The benefit of this alternative is significantly newer facilities for most functional areas. In fact, the FIS and baggage claim areas are the only ones that do not change. Like Alternative A2, this maximizes the terminal development envelope. It is also beneficial for landside development since it creates an entirely new departure curbside area and separates the departure and arrival curbs. From a technical perspective, the disadvantage of this alternative is the eight to nine gates that pushback directly onto Taxiway A. From a feasibility perspective, the ultimate buildout may be too large and costly, and there are not many viable incremental phases to accomplish for the ultimate configuration. Moving passenger processing functions outside the existing terminal building should only occur when the existing facility can no longer accommodate the project demand, which is outside the 20-year planning horizon. Shortlisted Alternative B3 is depicted on **Figure 6.5-9**.

Alternative D4

Alternative D4, from Concept Family D, is completely different than the other alternatives as it eliminates all of the existing facilities. This alternative is considered a "greenfield" option within the existing terminal area site. The primary reason for this alternative is to examine a way to rebuild the entire facility if the airport believes that the existing building is too difficult and costly to be reconfigured to meet the goals. This option is shown in two general phases where the remote concourse is constructed first, then the new passenger processing facility would be built before removing the existing terminal.

The benefit of this alternative is a completely new facility, which could be developed in a minimal number of construction phases. The negative of this alternative is the airport has to be committed to the plan immediately because there is no incremental phasing. Also, while the phasing is straight forward, the cost to build completely new and remove the existing facility will likely outweigh the benefits of the alternative. Shortlisted Alternative D4 is depicted on **Figure 6.5-9**.

Alternative E5

Alternative E5, from Concept Family E, is a minimal build concept that adds some value, but does not achieve all of the airport's goals. However, it is likely the most financially feasible. In the first phase a new concourse would be constructed to the north of the existing baggage claim and Gates 7-11 holdroom. This would expand gates, holdrooms, and concession areas, but it would not consolidate other functional areas such as check-in, baggage screening, or passenger screening. Subsequent phases would move the FIS to the west, allowing for the existing location to be reconstructed for a centralized check-in and passenger screening areas. The only airfield improvements are new RON parking positions north of the terminal and an apron expansion to the south.

The passenger benefits of this alternative are primarily in the ultimate build, which can achieve most of the airport's goals. While the first phase is an improvement for the western part of the terminal, it only creates minimal improvements to the east half of the terminal. Overall, the cost of this option is lower than the others which makes it more financially feasible. The negative aspect is that there are no significant improvements until the ultimate build and the terminal is under a perpetual state of construction which inconveniences the passengers, tenants, and airport employees. To meet the PAL 4 gate count, aircraft parking positions must occupy some of the existing FBO apron area to the south. Shortlisted Alternative E5 is depicted on **Figure 6.5-9**.

Shortlist Alternative B3, Phase 1

Shortlist Alternative B3, Phase 2

Shortlist Alternative D4, Phase 1

Shortlist Alternative D4, Phase 2

Shortlist Alternative E5, Phase 1

Shortlist Alternative E5, Phase 2

Figure 6.5-9: Shortlisted Alternatives B3, D4, and E5

6.5.5 Final Alternatives

The shortlisted alternatives were vetted through a second evaluation using previous criteria and multiple workshops with airport management. From this secondary process, Alternative B3 was eliminated from the alternatives due to cost and the unnecessary relocation of some passenger processing functions out of the existing terminal building. This alternative could however be applied to an ultimate buildout scenario, beyond the 20-year planning horizon, if the existing processing functions could not accommodate future demand levels. Below is a brief description of the final alternatives refined from the shortlisted alternatives.

Alternative A1

The major refinement to this alternative is that the concourse is repositioned to the west approximately three hundred feet. The benefits of this move are that a pushback zone or taxilane is created between the aircraft gate areas and Taxiway A. This change eliminates most of the aircraft pushbacks onto the parallel taxiway to Runway 18-36. The exceptions being the two positions that exist today. The shift also allows for the FIS area and Gate 4 to remain unchanged, while the passenger security checkpoint is located and expanded in the area of the existing Terminal B checkpoint. This allows for less reconfiguration of existing space and a central entrance to the concourse for maximum concessions exposure. The surrounding apron area and taxilanes have not changed. The ground and 2nd levels of both the initial and ultimate build concepts are depicted on **Figures 6.5-10** through **6.5-13**.

Alternative A2

There are no significant modifications between the shortlisted and final Alternative A2. More interior details and construction phasing were developed during the additional analysis. The ground and 2nd levels of both the initial and ultimate build concepts are depicted on **Figures 6.5-14** through **6.5-17**.

Alternative D4

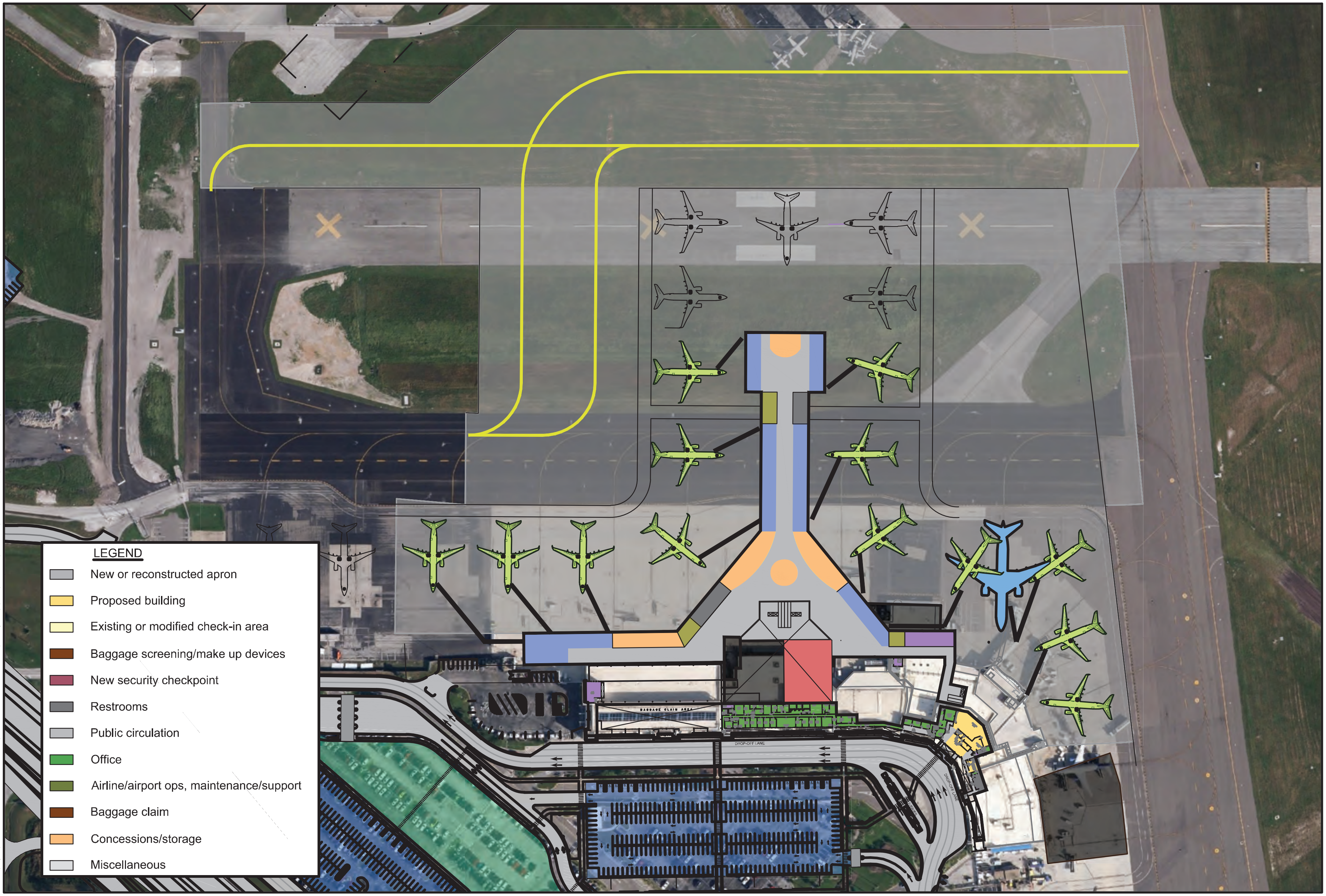
There are no significant modifications between the shortlisted and final Alternative D4. More interior details and construction phasing were developed during the additional analysis. An alternative initial build was developed that constructs a remote concourse but leaves the existing passenger processing functions in the existing building; the two are connected by an enclosed walkway. This was suggested as a way to minimize the initial build capital costs. The ground and 2nd levels of both the initial and ultimate build concepts are depicted on **Figures 6.5-18** through **6.5-21**.

Alternative E5

There are no significant modifications between the shortlisted and final Alternative E5. More interior details and construction phasing were developed during the additional analysis. The ground and 2nd levels of both the initial and ultimate build concepts are depicted on **Figures 6.5-22** through **6.5-25**.

Source: C&S Companies, 2019

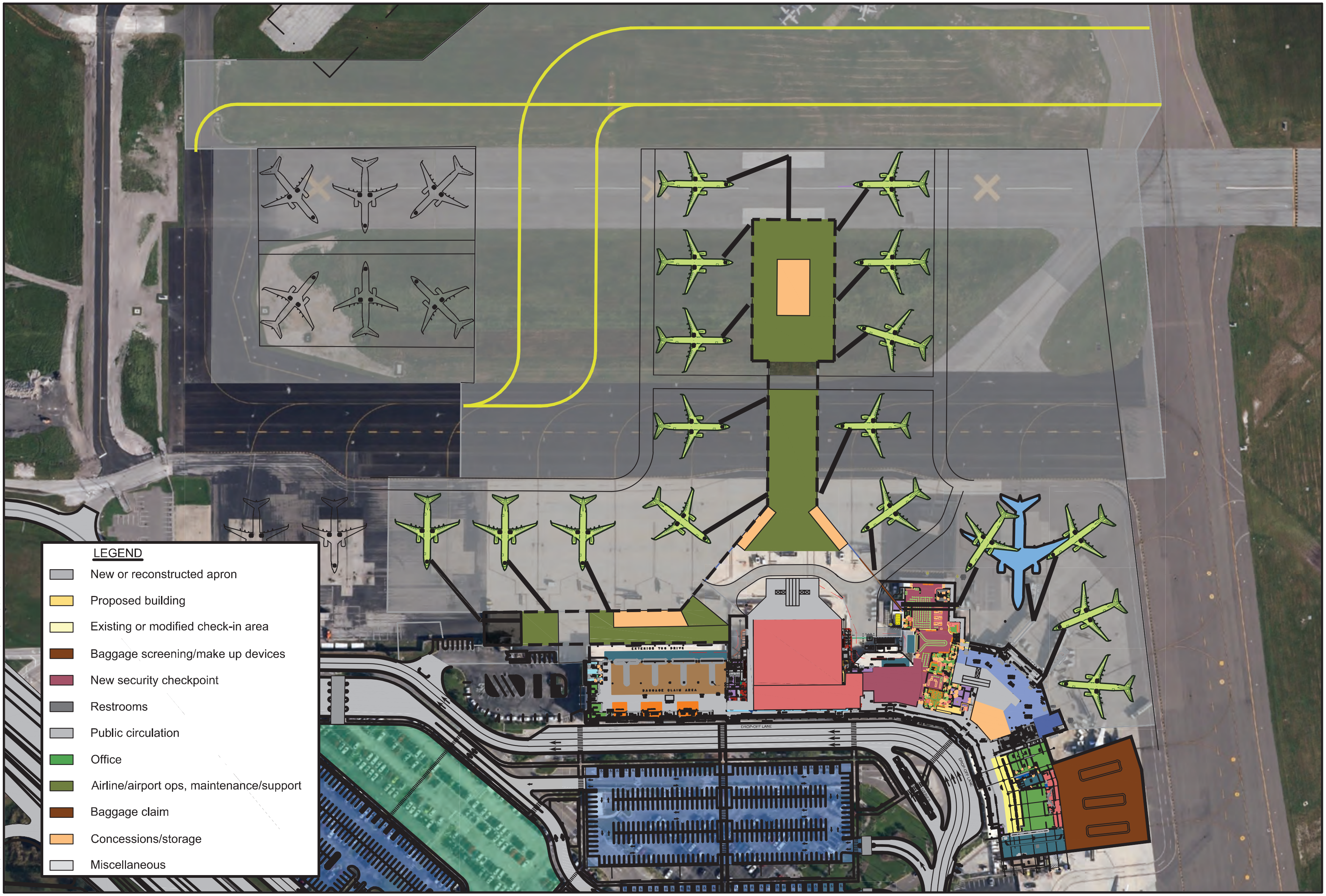
Figure 6.5-10
Alternative A1 Initial Build Concept - Ground Level



Source: C&S Companies, 2019

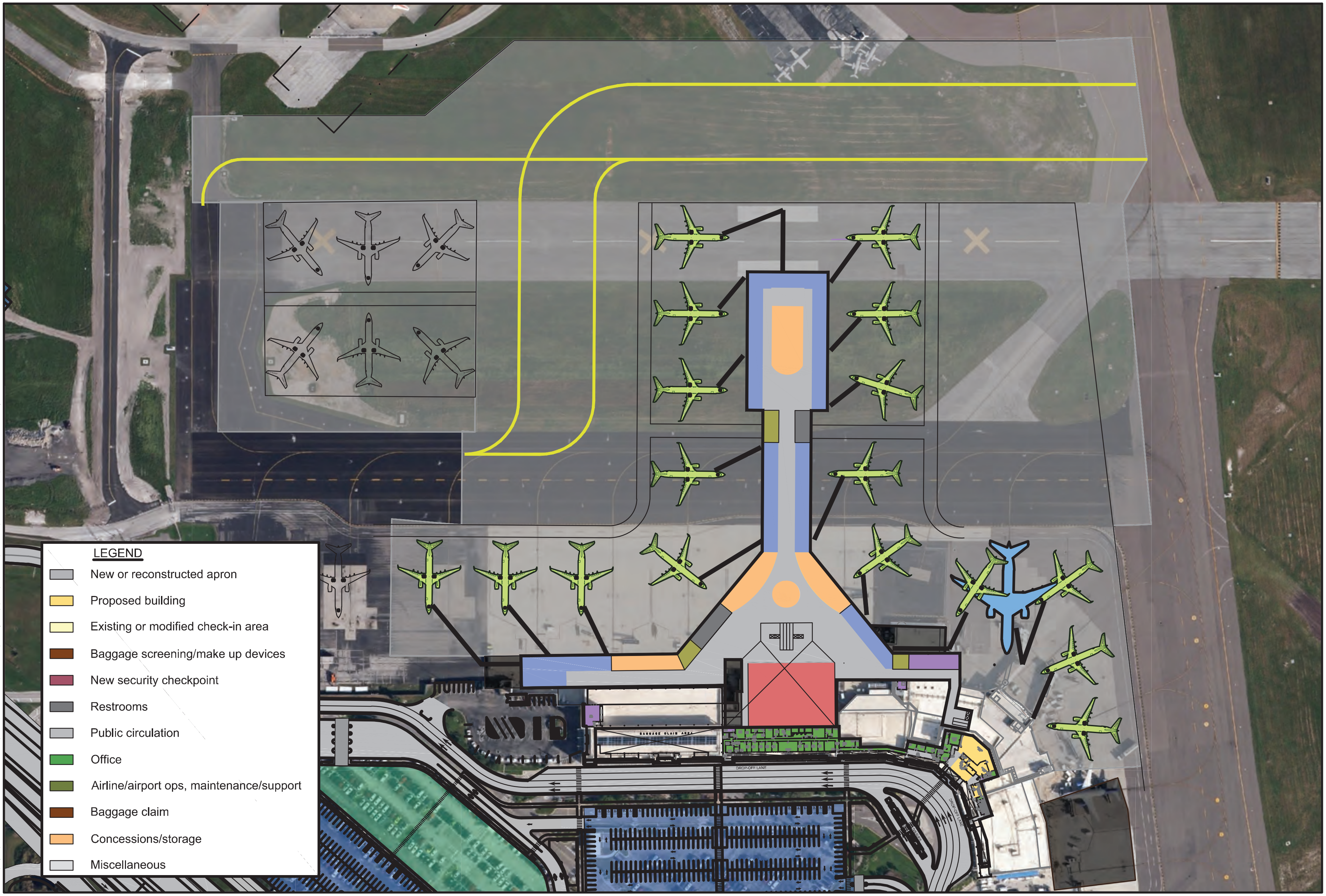
Figure 6.5-11

Alternative A1 Initial Build Concept - 2nd Level



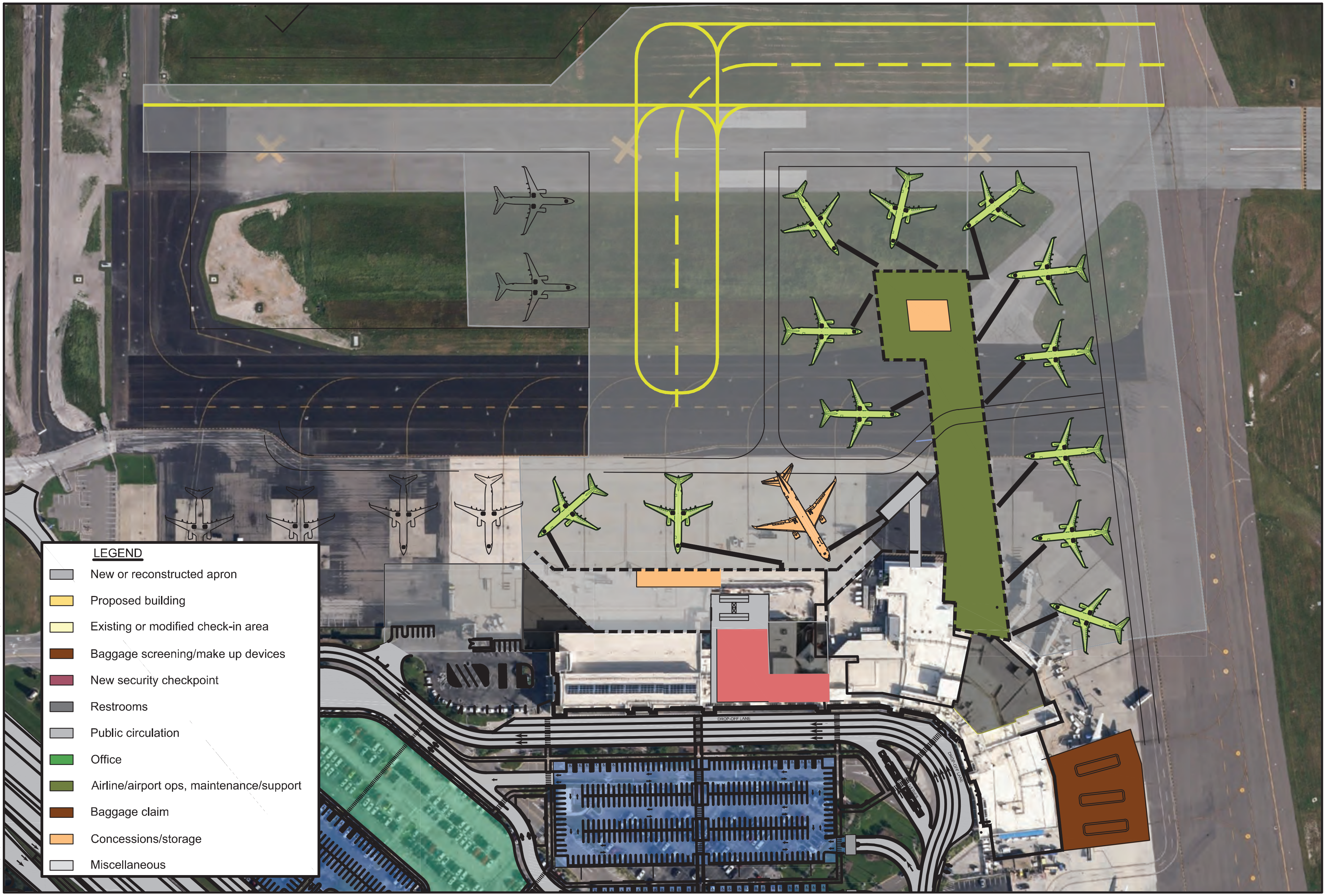
Source: C&S Companies, 2019

Figure 6.5-12
Alternative A1 Ultimate Build Concept - Ground Level



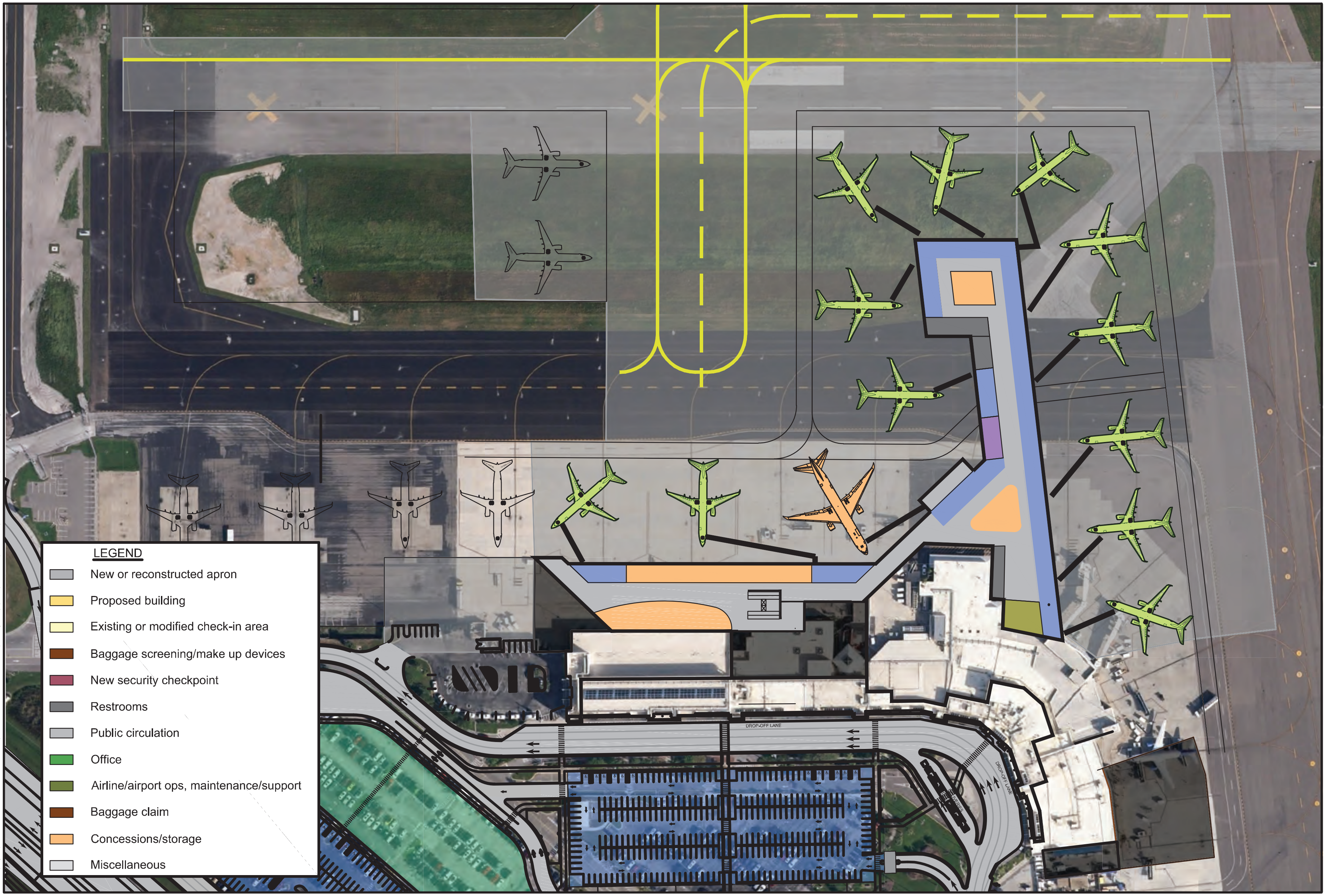
Source: C&S Companies, 2019

Figure 6.5-13
Alternative A1 Ultimate Build Concept - 2nd Level



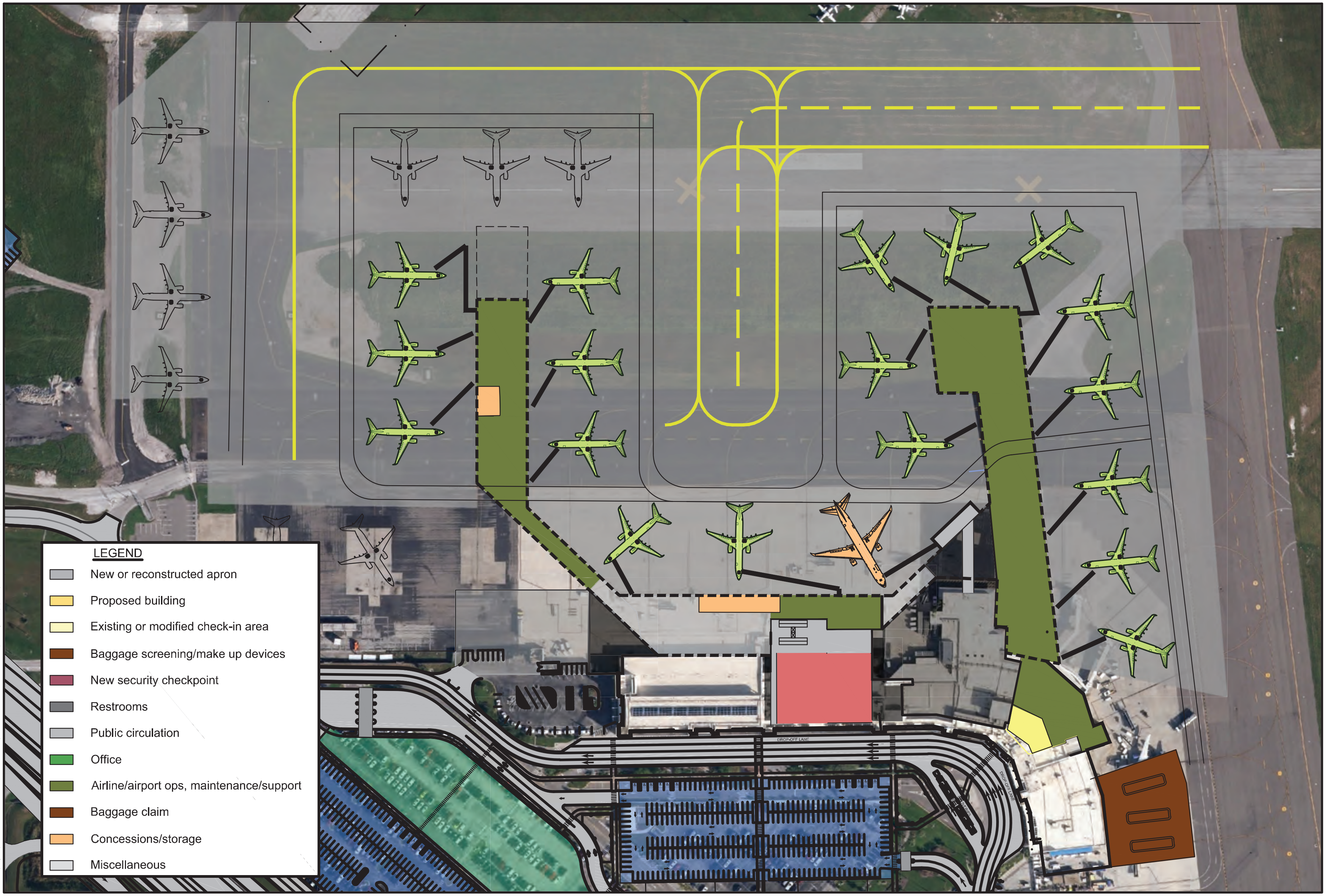
Source: C&S Companies, 2019

Figure 6.5-14
Alternative A2 Initial Build Concept - Ground Level



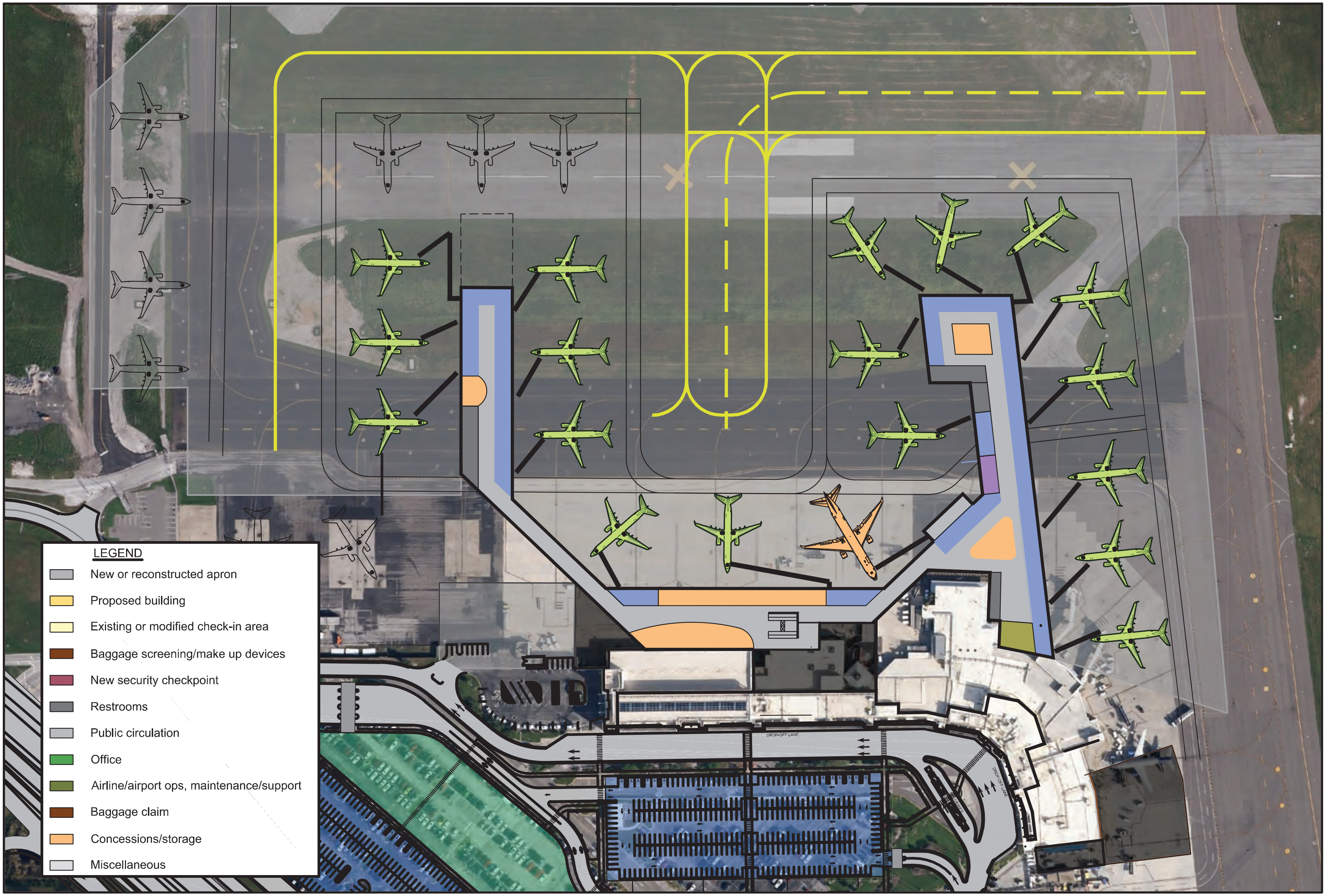
Source: C&S Companies, 2019

Figure 6.5-15
Alternative A2 Initial Build Concept - 2nd Level



Source: C&S Companies, 2019

Figure 6.5-16
Alternative A2 Ultimate Build Concept - Ground Level



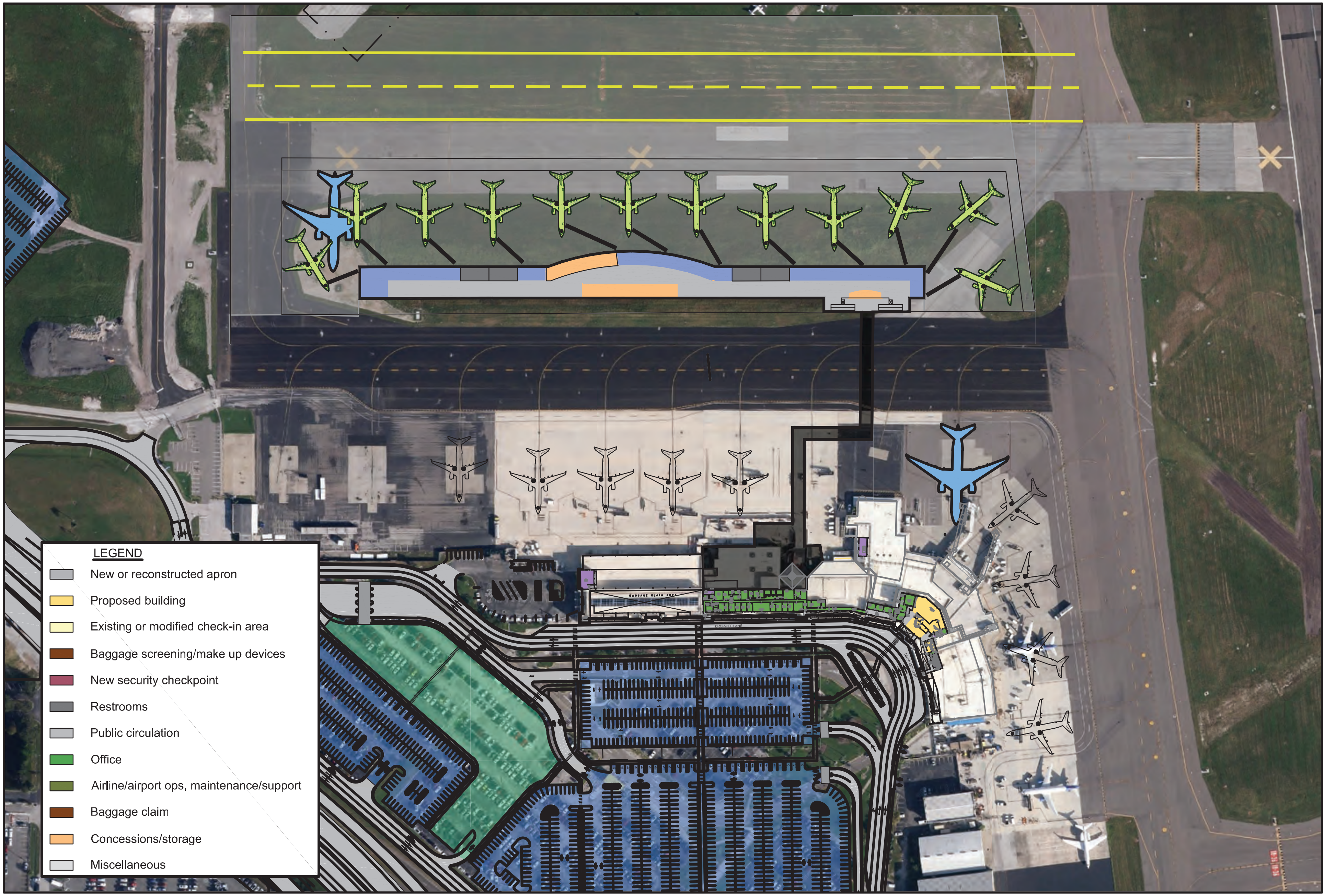
St. Pete-Clearwater International Airport Master Plan

Source: C&S Companies, 2019

Figure 6.5-17
Alternative A2 Ultimate Build Concept - 2nd Level

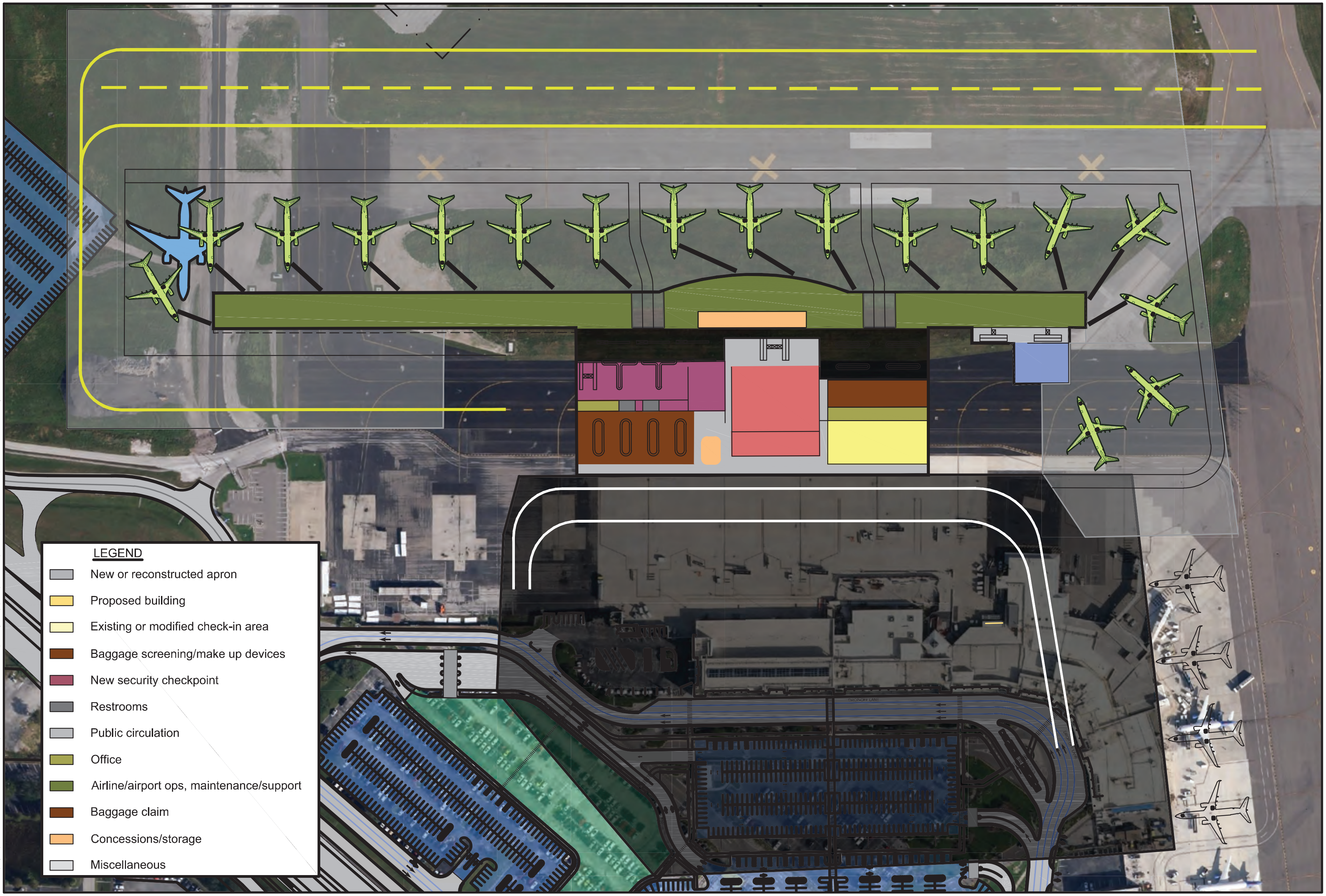
Source: C&S Companies, 2019

Figure 6.5-18
Alternative D4 Initial Build Concept - Ground Level



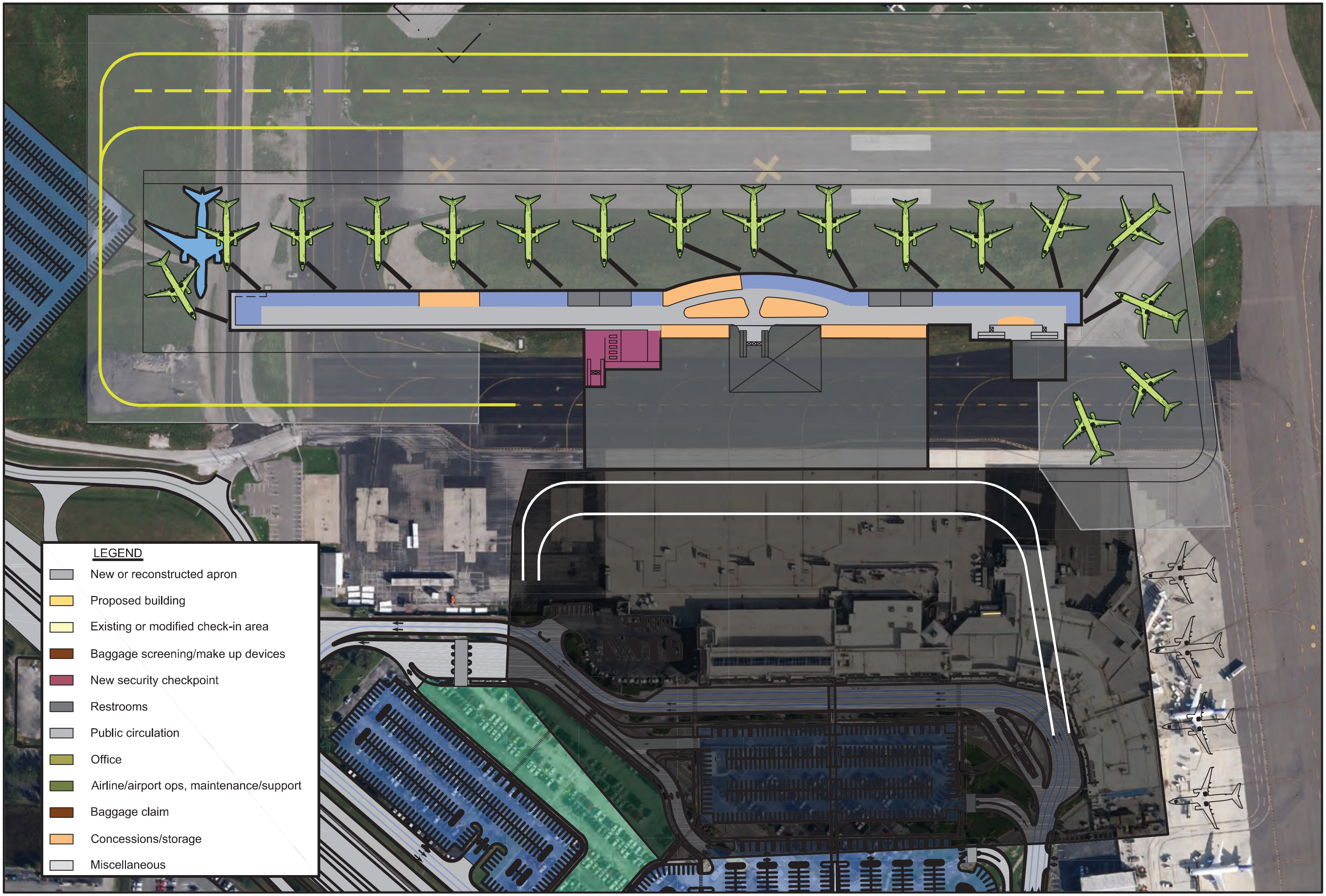
Source: C&S Companies, 2019

Figure 6.5-19
Alternative D4 Initial Build Concept - 2nd Level



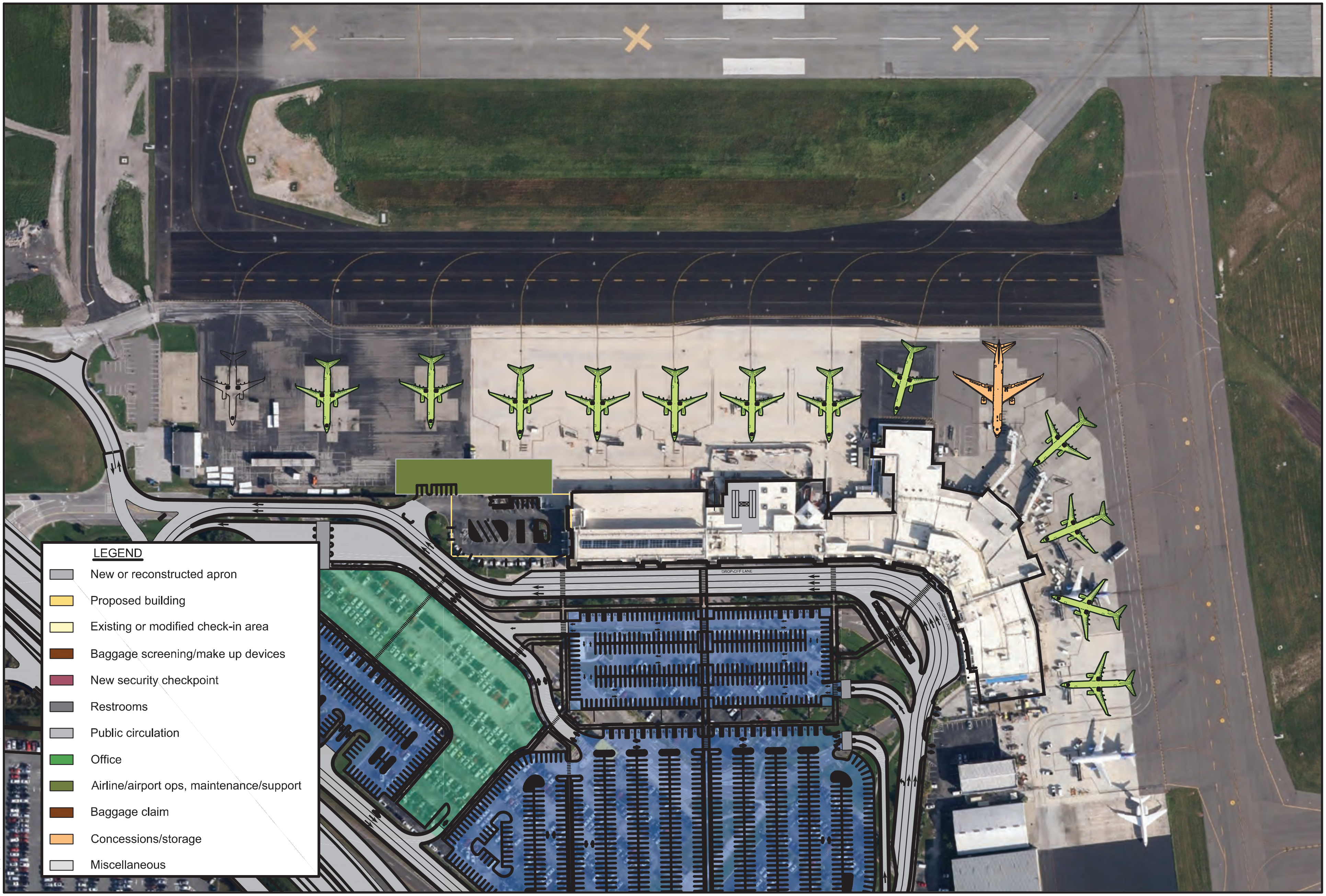
Source: C&S Companies, 2019

Figure 6.5-20
Alternative D4 Ultimate Build Concept - Ground Level



Source: C&S Companies, 2019

Figure 6.5-21
Alternative D4 Ultimate Build Concept – 2nd Level



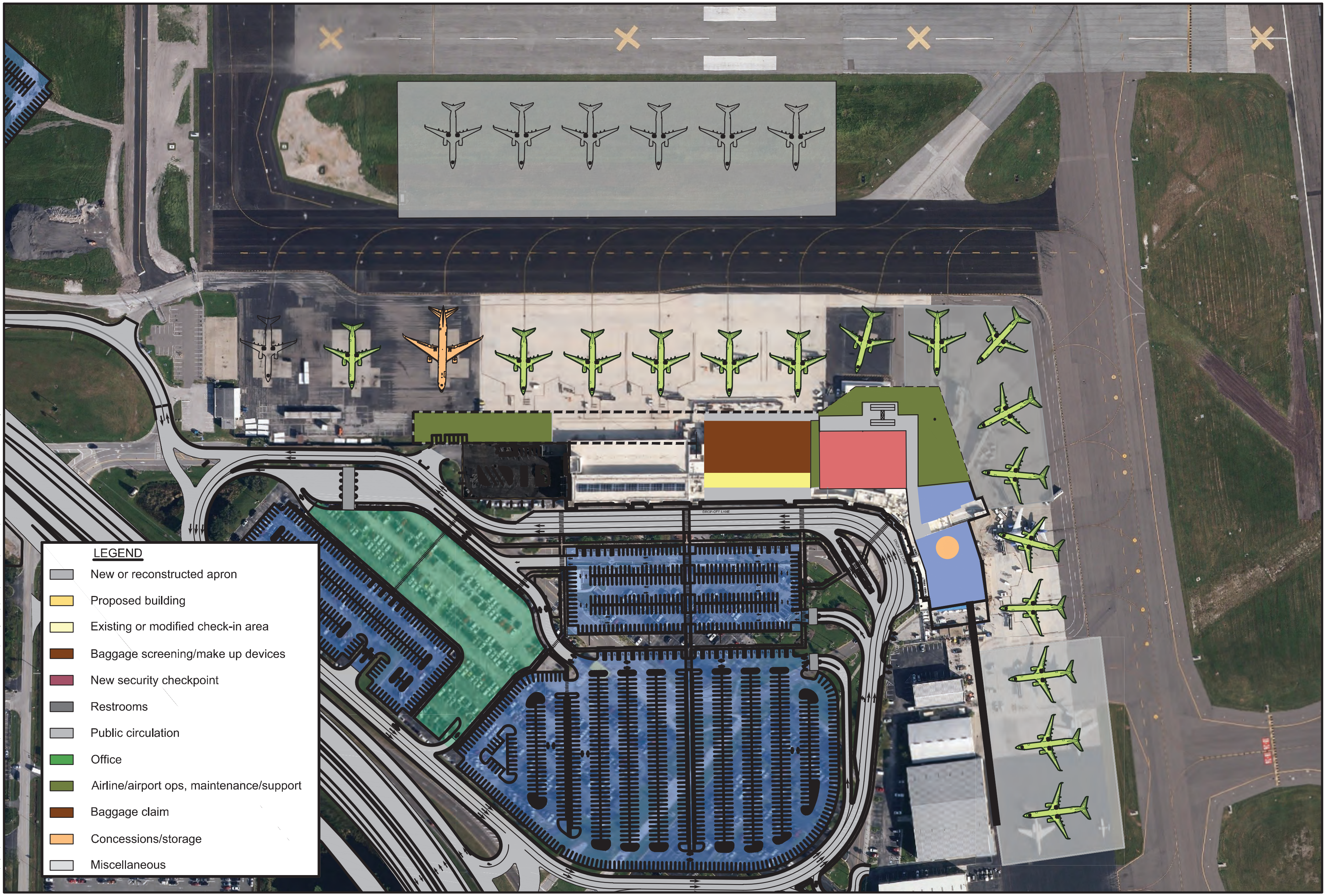
Source: C&S Companies, 2019

Figure 6.5-22
Alternative E5 Initial Build Concept – Ground Level

Source: C&S Companies, 2019

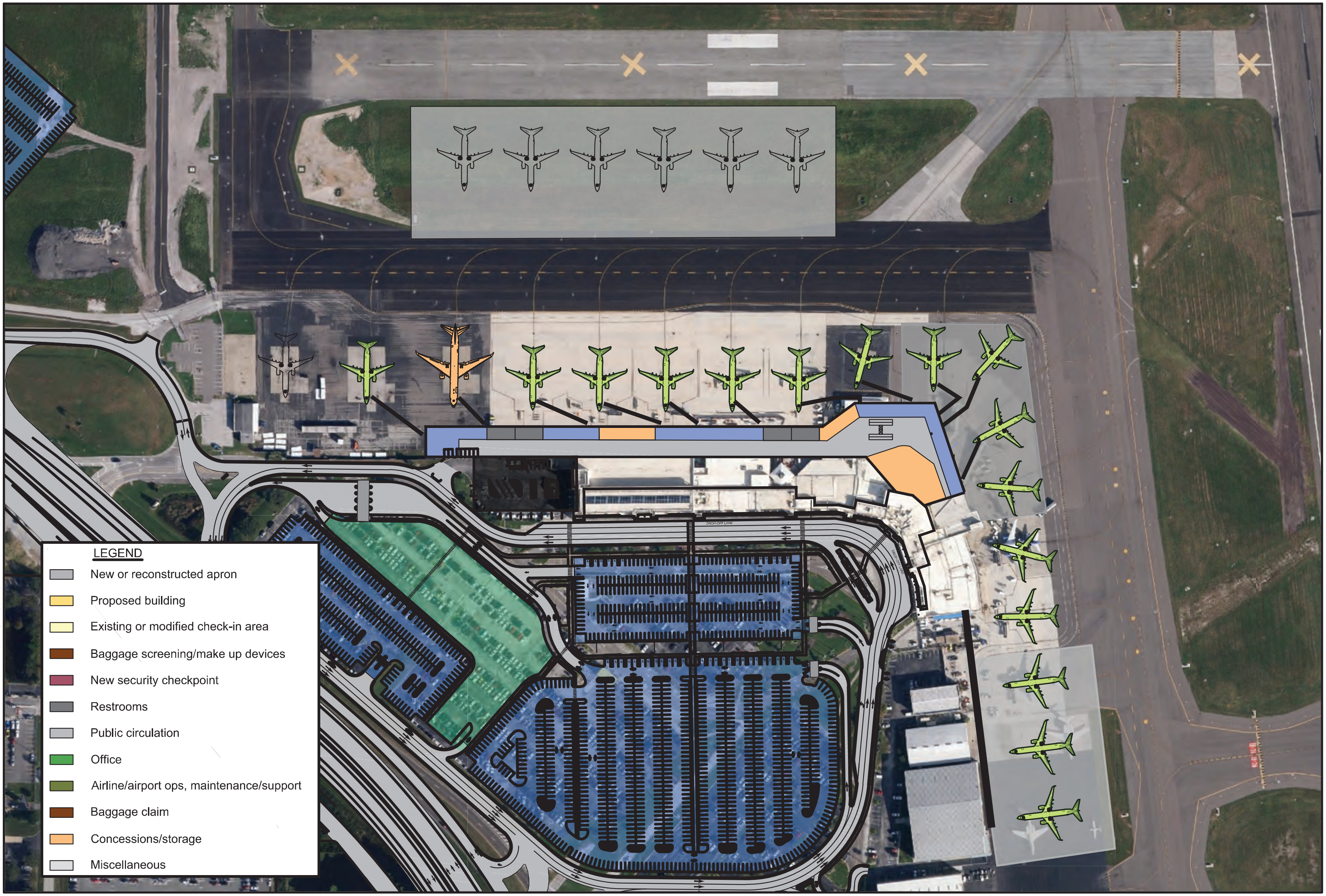
St. Pete-Clearwater International Airport Master Plan

Figure 6.5-23
Alternative E5 Initial Build Concept – 2nd Level



Source: C&S Companies, 2019

Figure 6.5-24
Alternative E5 Ultimate Build Concept - Ground Level



Source: C&S Companies, 2019

Figure 6.5-25

Alternative E5 Ultimate Build Concept - 2nd level

6.5.6 Phasing

High-level construction phasing was developed to inform the final evaluation. The construction phasing was used to depict one way each alternative could realistically be constructed (with minimal disruption to the passengers, tenants, and airport employees) in developing the preliminary cost estimates. Each alternative had six to eight major phases, with other sub-phases to be developed as part of the design process. Each alternative was determined to be operationally feasible though some, more than others, had a higher impact on building activity and airside operations. This phasing analysis was completed as a part of the evaluation, but final construction phasing will need to be further refined during the actual design phase.

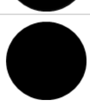
6.5.7 Evaluation

The final alternatives were evaluated through a comparative analysis process using criteria developed by the consultant team and airport management. The top-level criteria used to determine the preferred alternative were passenger experience, flexibility, operational efficiency, ease of implementation/phasing, sustainability, financial feasibility, and compatibility with other airport projects. Based on initial discussions with airport management, the consultant team developed a robust evaluation matrix for an alternatives workshop. During the workshop, the consultant team collaborated with airport management to develop second-level criterion related to each of the top-level criteria. For each top-level criterion, five or more second-level criterion were created to ensure a diverse and thorough alternatives evaluation. The criteria of this initial evaluation are included in **Figure 6.5-26**. When applied to each alternative the second-tier criteria were ranked on a scale of one to three. This simplified, non-weighted score is explained on **Figure 6.5-27**.

To prioritize the airport's most important criterion, each were assigned a weighed value. Certain criterion such as financial feasibility and operational efficiency were more important to the airport than items like ease of implementation or compatibility with other airport projects. Using the weighted criteria developed, airport management ranked their priorities resulting in the final alternatives evaluation depicted in **Figure 6.5-28**.

Passenger Experience	**Sustainability**
Concessions	Reuses the existing facilities to the extent practical
Minimize walking distances	Use of existing infrastructure vs. new construction
Minimize wait/processing times	Stormwater management
Intuitive wayfinding	Consistent with airport's resiliency initiatives
Passenger amenities	Promotes natural light / sense of space
Maintain simplicity of the facility	Opportunities to create landscaped areas / spaces
Easy connectivity to parking	Promotes positive economic feedback
Minimize exposure to the elements	
Flexibility	**Financial Feasibility**
Adaptable to industry changes	Capital investment required
Adaptable to evolving technology	Allows for incremental development
Adaptable to security protocols	Increases non-airline revenue
Irregular operations	Reduces operating and maintenance costs
Supports future growth	
Opportunities to repurpose space	
Operational Efficiency	**Compatibility with other Airport Projects**
Enhances operations and maintenance	Aligns with Master Plan objectives
Improves airport efficiency	Coordinates with other ongoing planning efforts
Minimizes ramp operation disruption	Integrates with recent projects
Improves airline efficiency	Ability to incorporate public transportation
Meets program requirements	Enhances ability to connect to the Port
Implementing / Phasing	
Limits the complexity of construction	
Minimizes the impact to passengers	
Minimizes the impact to operations	
Allows for incremental construction phases	

Figure 6.5-26: Initial Terminal Alternative Evaluation Criteria

Rating	Evaluation of Impact	Score
	1	Good – positive improvements meet minimum requirements
	2	Better – enhanced improvements to meet and in some cases exceed the requirements
	3	Best – the most valuable improvements to exceed the requirements

SOURCE: C&S Companies, 2019.

Figure 6.5-27: Alternative Evaluation Scoring and Rating Standards

Criteria	Weight	Alternative A-1	Alternative A-2	Alternative D-4	Alternative E-5
Passenger Experience	15	3	3	1.5	1.5
Flexibility	10	3	3	1	1
Operational Efficiency	20	6	2	2	2
Implementation/Phasing	5	0.5	0.5	1.5	1
Sustainability	10	2	2	1	3
Financial Feasibility	35	3.5	3.5	3.5	10.5
Compatibility with other Airport Projects	5	1.5	1	0.5	0.5
Total	100	19.5	15	11	19.5

(yellow)	Primary
(green)	Secondary
(blue)	Tertiary

Figure 6.5-28: Final Terminal Alternative Evaluation Matrix

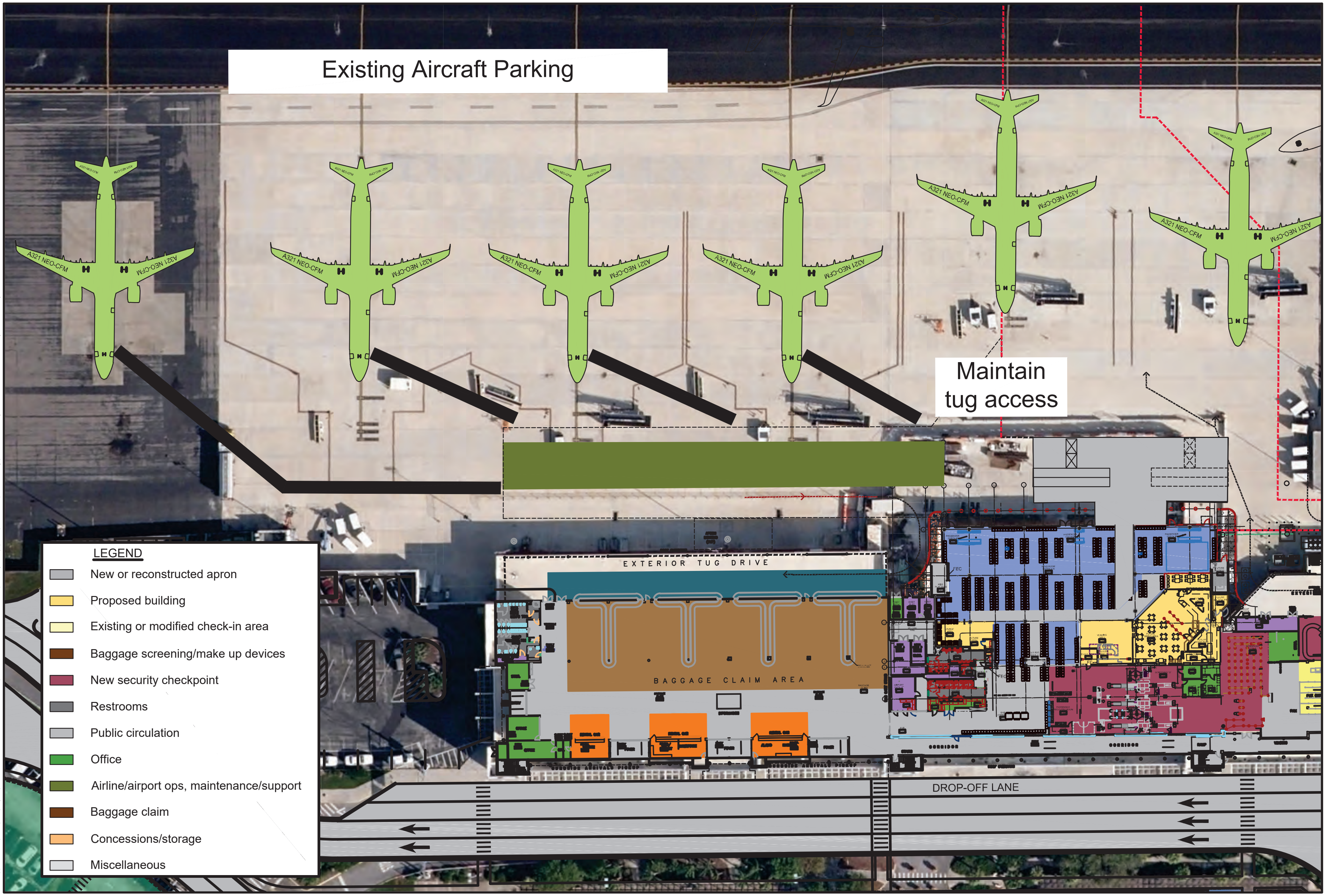
As shown, both Alternatives A1 and E5 ranked the same and highest overall. During discussions with airport management, it was stated that of the two, Alternative A1 was the recommended alternative for the airport's vision; however, there was concern about the financial feasibility, particularly in the initial build phases. To respond to the airport's concerns, the consultant team reduced the overall terminal program, and re-evaluated Alternatives A1 and E5. The team created additional options for development and added more phases to the program to refine the recommended alternative in an effort to make it more financially feasible.

6.5.8 Preferred Alternative

Despite the changes to the recommended alternative, airport management was still concerned about the overall cost, financial feasibility, and operational impact; particularly as it related to the first phases of construction. Therefore, the initial build recommended under Alternative A1 was reduced in size and modified to accommodate the shorter term passenger demand, minimize impact to operations, and create a more financially feasible terminal expansion program. The ground and 2nd levels of the Preferred Alternative Initial Build (Phase 1) are depicted in **Figures 6.5-29** and **6.5-30**.

Phasing Option for Initial Build

During the workshops focused on the initial expansion of the passenger terminal facilities, a number of phasing scenarios were considered. Given the limited level of detail in a master planning effort, an option for the subphases to follow Phase 1 of the initial build was conceptualized. In total, five subphases (depicted in **Figure 6.5-31**) were created to balance the primary goals of expanding facilities for the shorter term passenger demand, minimize impact to existing operations and facilities, and to spread the overall costs over a longer timeframe. The ground and 2nd levels of the Preferred Alternative Initial Build (Phases 1-5) are depicted in **Figures 6.5-32** and **6.5-33**.



Source: C&S Companies, 2019

Figure 6.5-29
Preferred Alternative Initial Build (Phase 1) – Ground Level

Source: C&S Companies, 2019

Figure 6.5-30
Preferred Alternative Initial Build (Phase 1) - 2nd Level

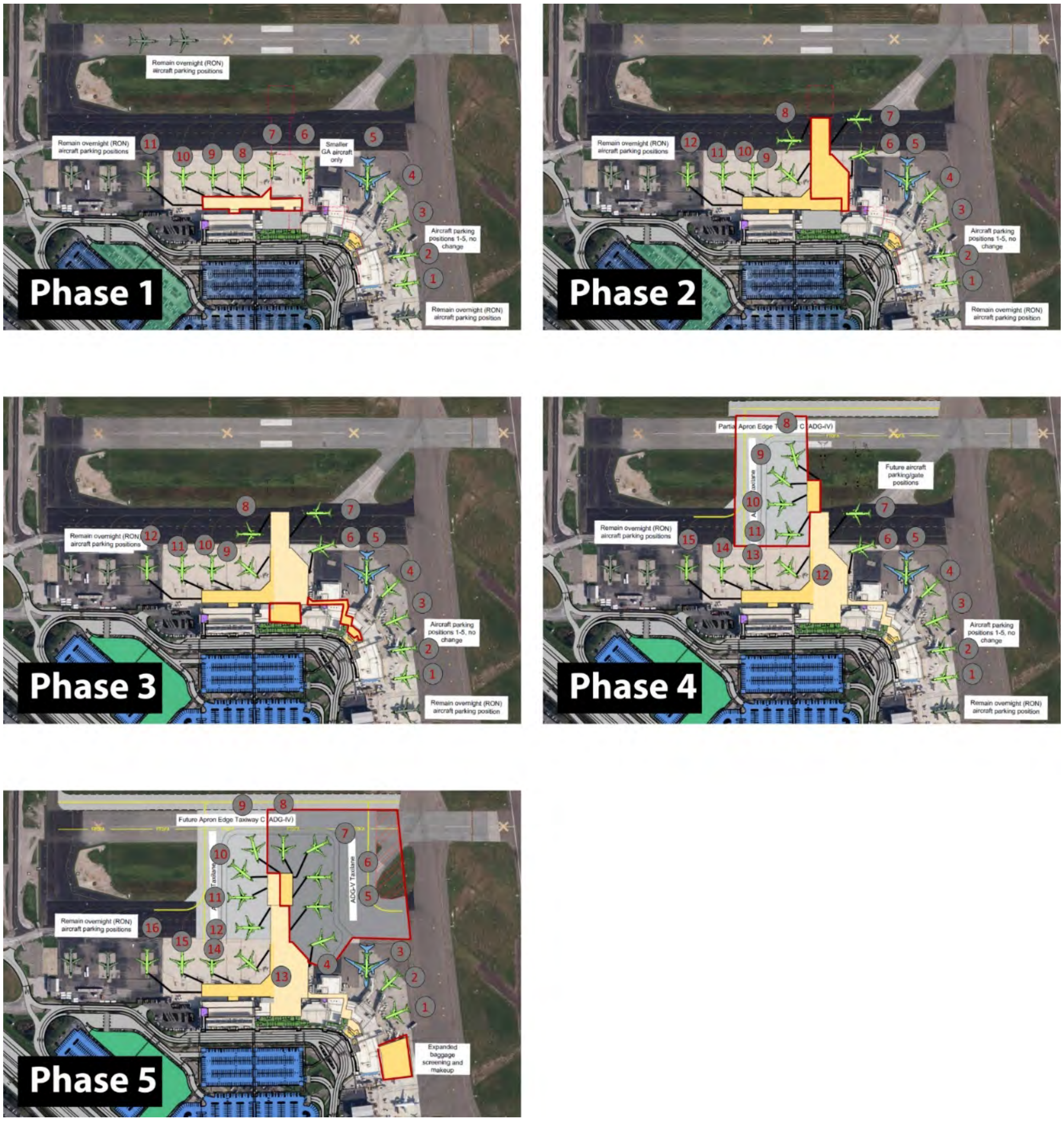
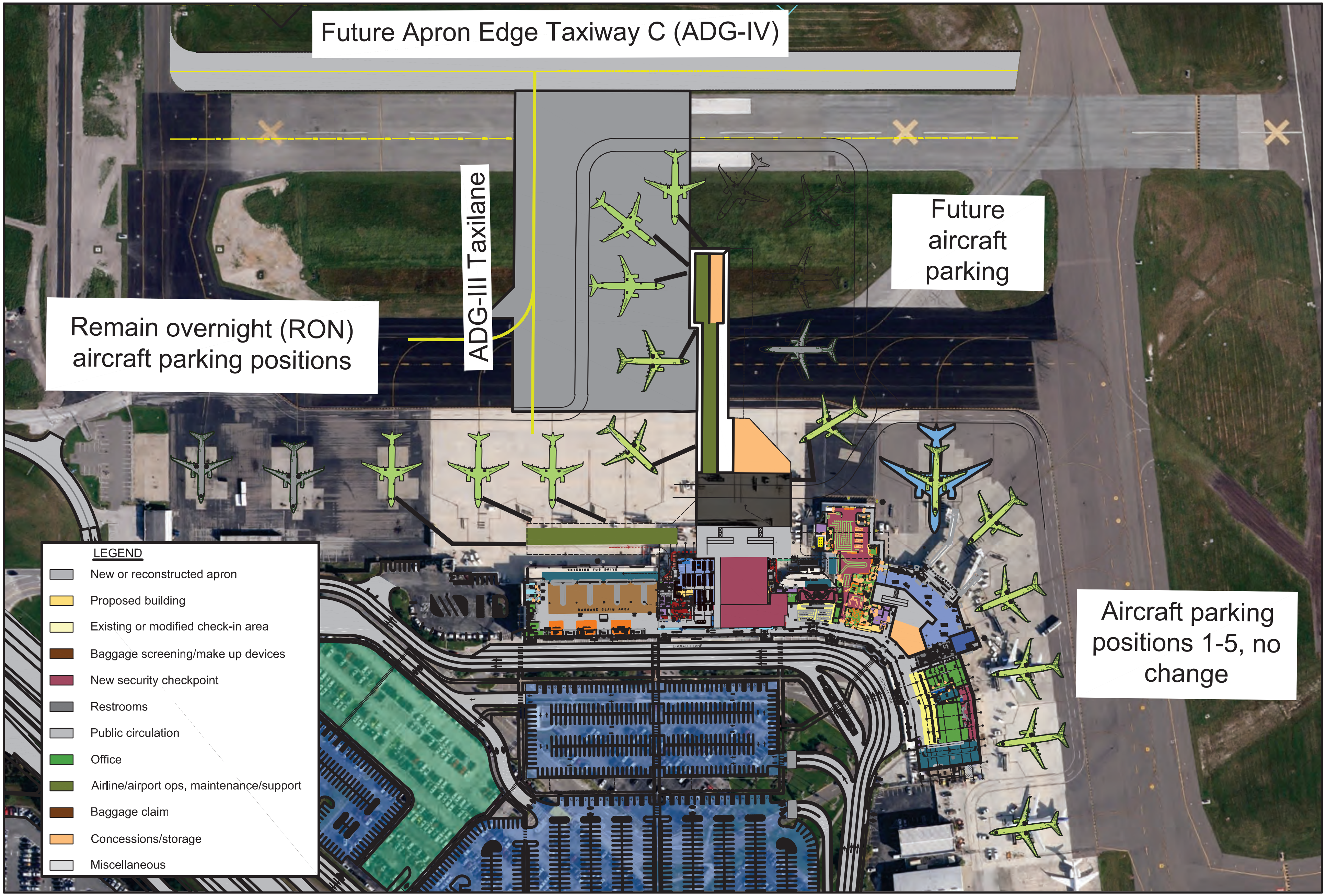


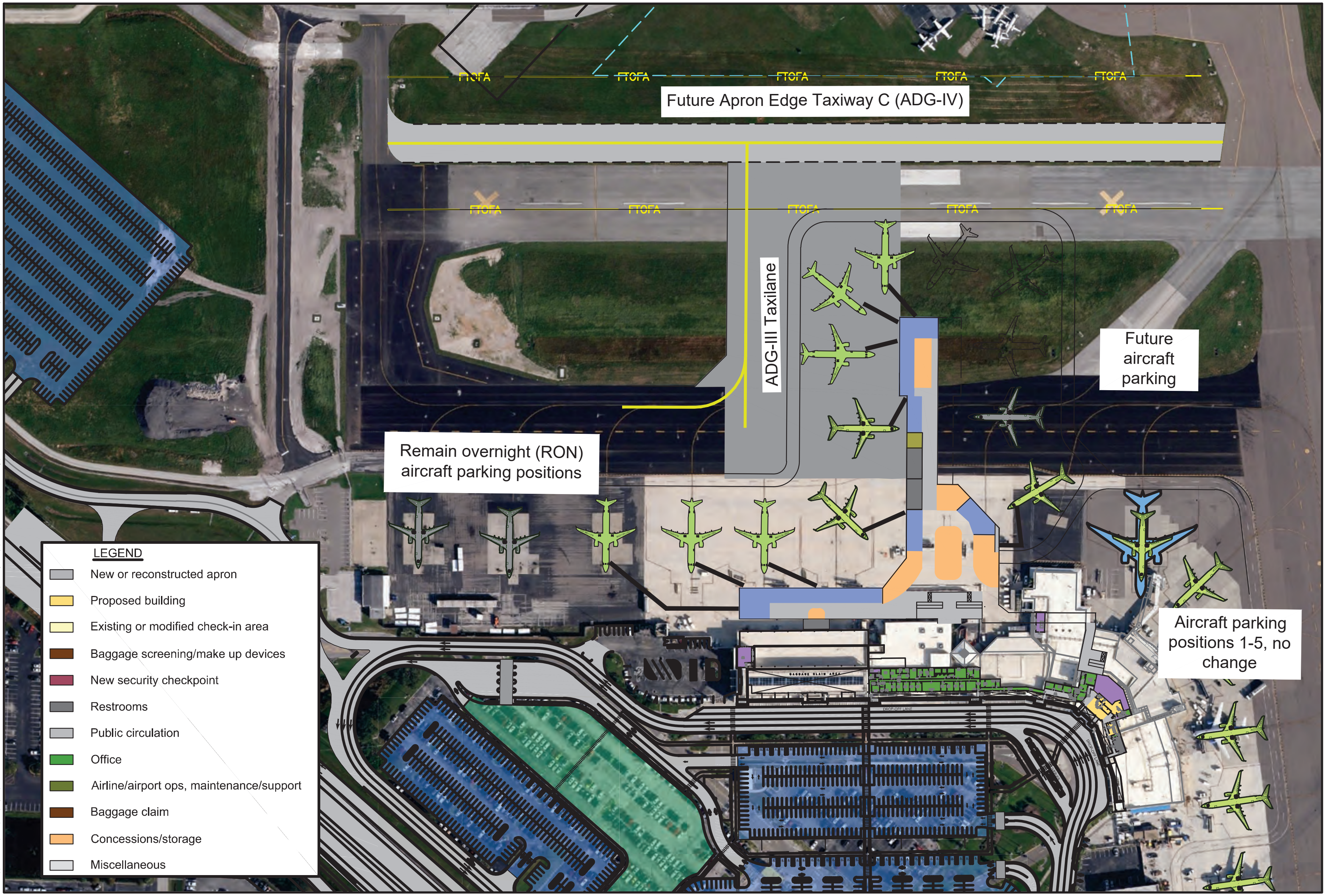
Figure 6.5-31: Phasing Options 1-5 for Initial Build of Preferred Alternative

The ultimate build of the preferred alternative is depicted on **Figure 6.5-34**. It should be noted that the ultimate build was not developed in detail as it is expected to occur beyond the 20-year planning horizon. Additionally, it is anticipated that there will be a number of industry changes before a second concourse would be needed at PIE. Regardless, the long range concept has been developed at a high level to be included as a placeholder in new ALP drawing set.



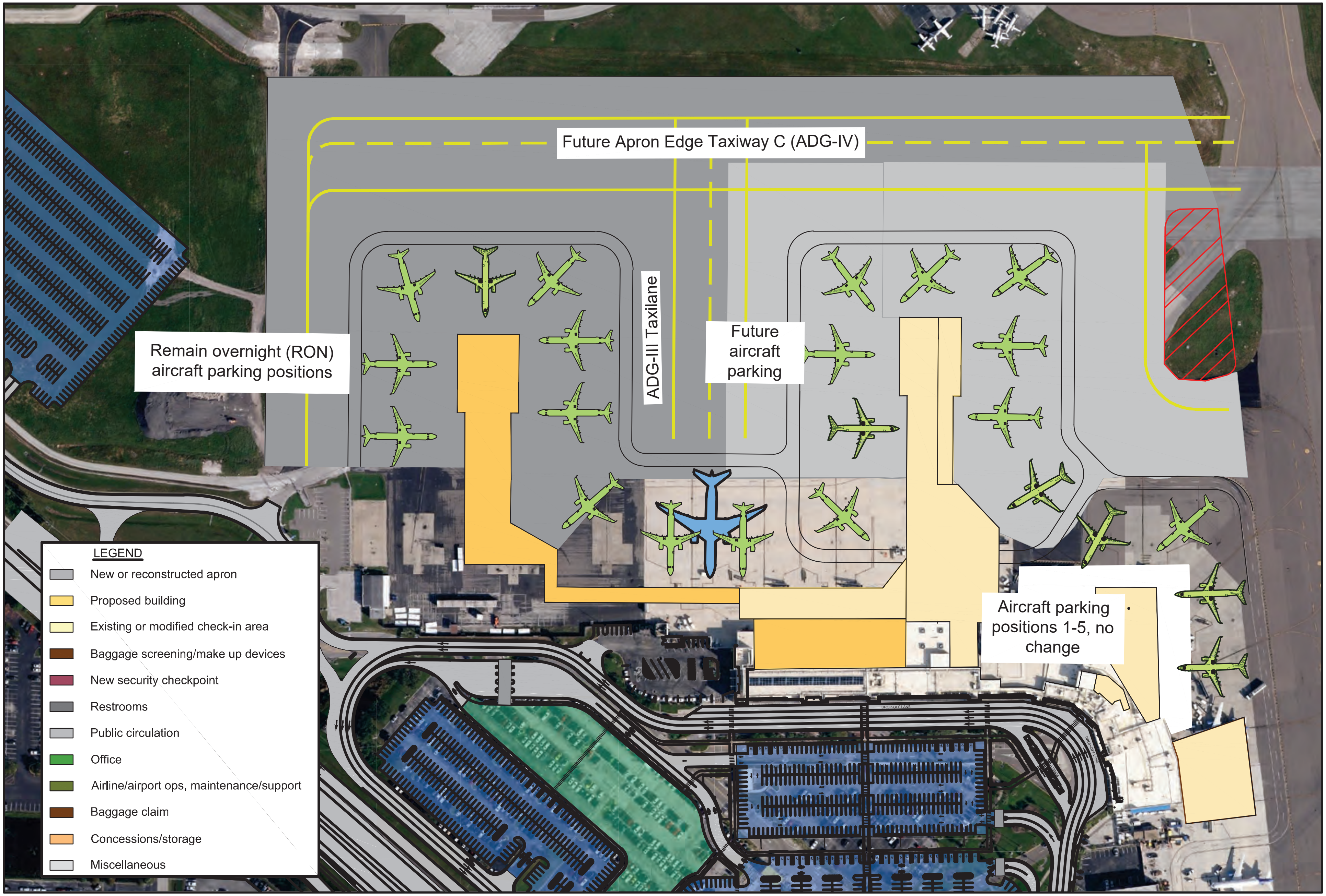
Source: C&S Companies, 2019

Figure 6.5-32
Preferred Alternative Initial Build (Phases 1-5) - Ground Level



Source: C&S Companies, 2019

Figure 6.5-33
Preferred Alternative Initial Build (Phases 1-5) – 2nd Level



Source: C&S Companies, 2019

Figure 6.5-34
Preferred Alternative Ultimate Build

6.5.9 Next Steps

The previous sections summarized the preferred alternative and direction by which the passenger terminal facilities can be expanded and improved to meet the projected demand. However, there are many details to be programmed, designed, and coordinated with the key stakeholders of the facility. Some of the key issues that need to be addressed in future elements of the passenger terminal program include:

- Required amount of apron pavement to be removed for stormwater credit.
- Apron area and taxilanes to be reused, overlaid, and/or reconstructed.
- Loading dock layout to the west of the baggage claim area.
- Post-security route for delivery goods and removal of trash from the public concessions areas.
- Integration of proposed and existing structural systems.
- Integration of proposed and existing mechanical, electrical, and plumbing (MEP) systems.
- FIS expansion within the existing area.
- Additional coordination with airport management and key passenger terminal tenants.

To answer these questions, and many others, these follow-on tasks are suggested to advance the implementation of the preferred plan. These tasks include:

<u>Identify near-term implementation project elements</u>: At a concept level of planning, the master plan process has identified key areas such as the security checkpoints, check-in lobby, concessions areas, etc. that should be redeveloped. There are many parallel airport terminal projects that are either being designed or implemented. Further study is needed to define exactly what the near-term project elements are and how they can be integrated with other airport projects.

<u>Develop short-term program through the project definition process</u>: As a master planning level concept, the passenger terminal elements reviewed historic airport activity, projected future activity, identified facility requirements, developed a range of alternatives, evaluated the alternatives, and established concepts for both initial and ultimate terminal building improvements. Now that a preferred alternative has been selected, the next logical step would be to develop a project definition document which would provide the detailed program, schedule, and refined cost estimates that could then be utilized by an architectural team to implement.

<u>Coordinate project definition process with on-going airport projects</u>: It is understood that there are other terminal improvements currently designed or being implemented. To ensure that all projects are working towards the same goal, there needs to be regular communication between major project teams and the airport's implementation staff. The project definition process is a workshop based approach in order to facilitate the communication necessary for such an effort.

6.6 Landside Facilities

Passenger terminal landside systems typically consist of a variety of facilities, including roadway, curbside, and parking facilities. Each landside element performs a unique function and is dependent on the others properly functioning. With appropriate planning and design, the airport landside elements operate efficiently to serve airport customers, both as stand-alone components and as part of a cohesive landside system.

Airport landside facilities are experiencing a period of rapid change due to emerging technologies and the increasing customer behavioral adjustments that are reshaping the ways customers access and egress the airport. Therefore, a critical component of landside system planning is to maintain flexibility within the individual facilities to accommodate capacity growth and future landside uses not realized today.

PIE is currently in the process of upgrading the roadway facilities at the airport in conjunction with the FDOT Gateway Expressway Project (Gateway Project). The PIE landside improvement project is schedule to be completed in 2020. The Gateway Project, anticipated to be complete in 2021, will include new and reconstructed access to the passenger terminal side of the airport to meet current and projected demand. While this section addresses additional enhancements to the terminal access, it primarily focuses on improving the curbside and parking facilities with the ongoing Gateway Project improvements.

6.6.1 Terminal Area Roadways

The primary terminal area roadways were determined to have sufficient capacity with an acceptable level of service (LOS) throughout the planning period. Configuration enhancements for the terminal access intersection along Roosevelt Boulevard and the recirculation road are options to improve lane balancing and accommodate inbound vehicular flow. The configuration for the intersection and recirculation road upon completion of the Gateway Project (**Figure 6.6-1**) is projected to accommodate short-term demands. However, a reconfiguration of the airport entry, as summarized below, may improve intersection operations and accommodate demands through the 20-year planning horizon.

Short-Term Configuration

The configuration illustrated in **Figure 6.6-2** is anticipated to accommodate short-term growth through improved lane balancing. The short-term reconfiguration consists of the following:

- Maintain a single inbound lane to Terminal Boulevard from the eastbound Roosevelt Boulevard frontage road (location 1).
- Reduce the recirculation road between the egress and access points to a single lane instead of two lanes (location 2).
- Convert the yield-controlled right-turn from the westbound Roosevelt Boulevard frontage road to free-flow with its own receiving lane (location 3).

- Three through lanes remain: one from recirculation, one from underneath the Roosevelt Boulevard bridge (from the eastbound frontage road), and one from the westbound frontage road (location 4).

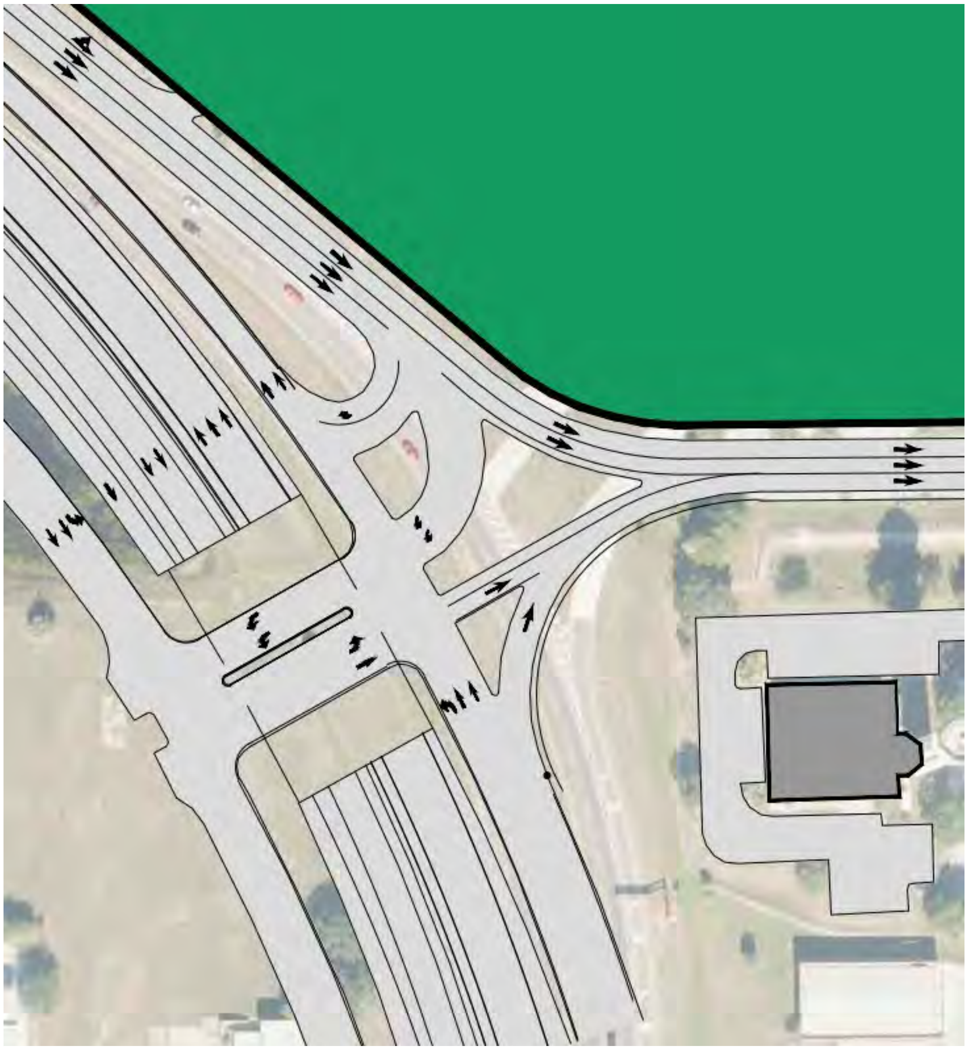


Figure 6.6-1: Terminal Area Roadways (per Gateway Project)

SOURCE: Kimley-Horn and Associates, Inc., 2019.

Long-Term Configuration

The configuration illustrated in **Figure 6.6-3** is anticipated to accommodate projected growth through the planning horizon by increasing left-turn capacity from the eastbound frontage road. The long-term reconfiguration assumes the short-term configuration (described above) is in-place and consists of the following:

- Provide dual left-turn lanes from the eastbound Roosevelt Boulevard frontage road (location 1). This may be feasible by converting the middle through lane to be a shared through/left-turn lane (location 1).

- Provide two inbound lanes to Terminal Boulevard from the eastbound Roosevelt Boulevard frontage road (location 2). This may be feasible by converting the left-turn lane to be a shared through/left-turn lane (location 3). This would require converting the free-flow right-turn from the westbound Roosevelt Boulevard frontage road to be yield-controlled (location 4).

- Three through lanes remain: one from recirculation and two from the Roosevelt Boulevard frontage roads (location 5).

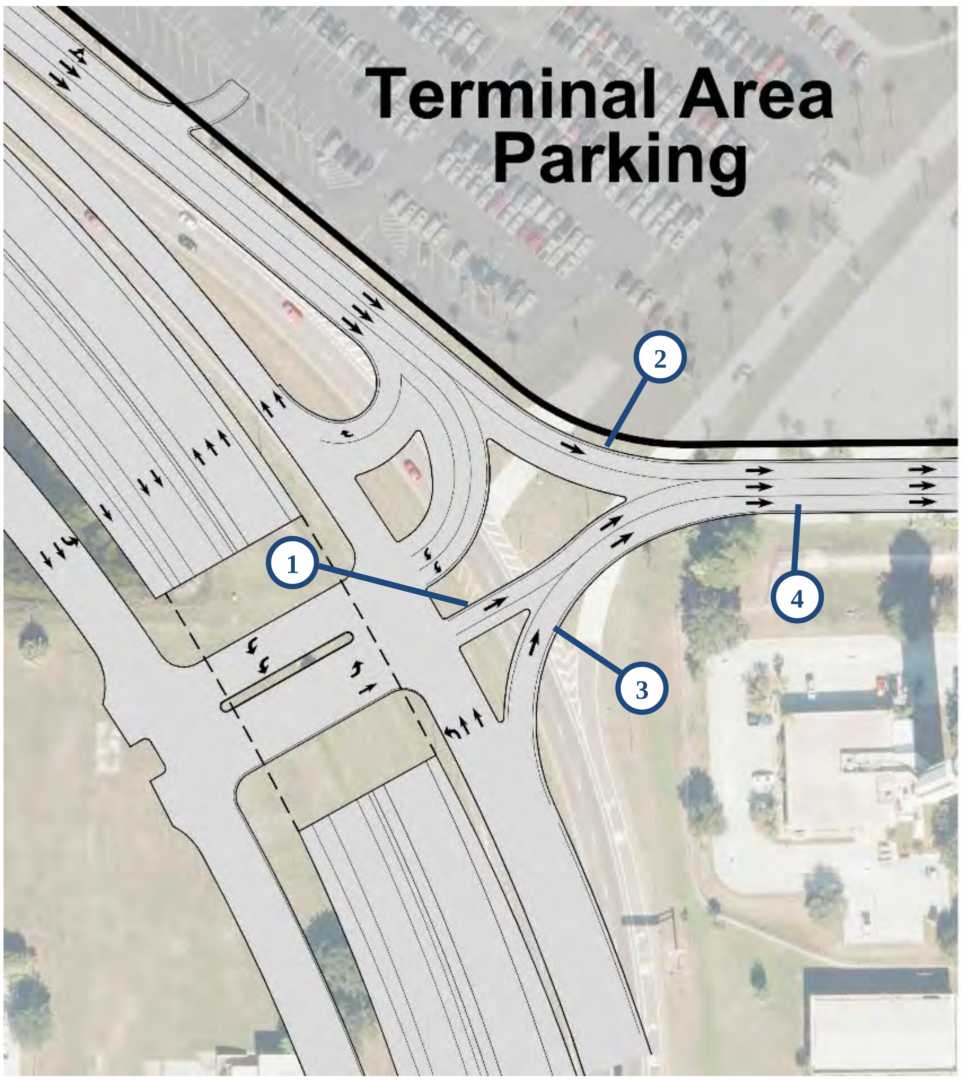


Figure 6.6-2: Terminal Area Roadways (Short-Term)

SOURCE: Kimley-Horn and Associates, Inc., 2019.

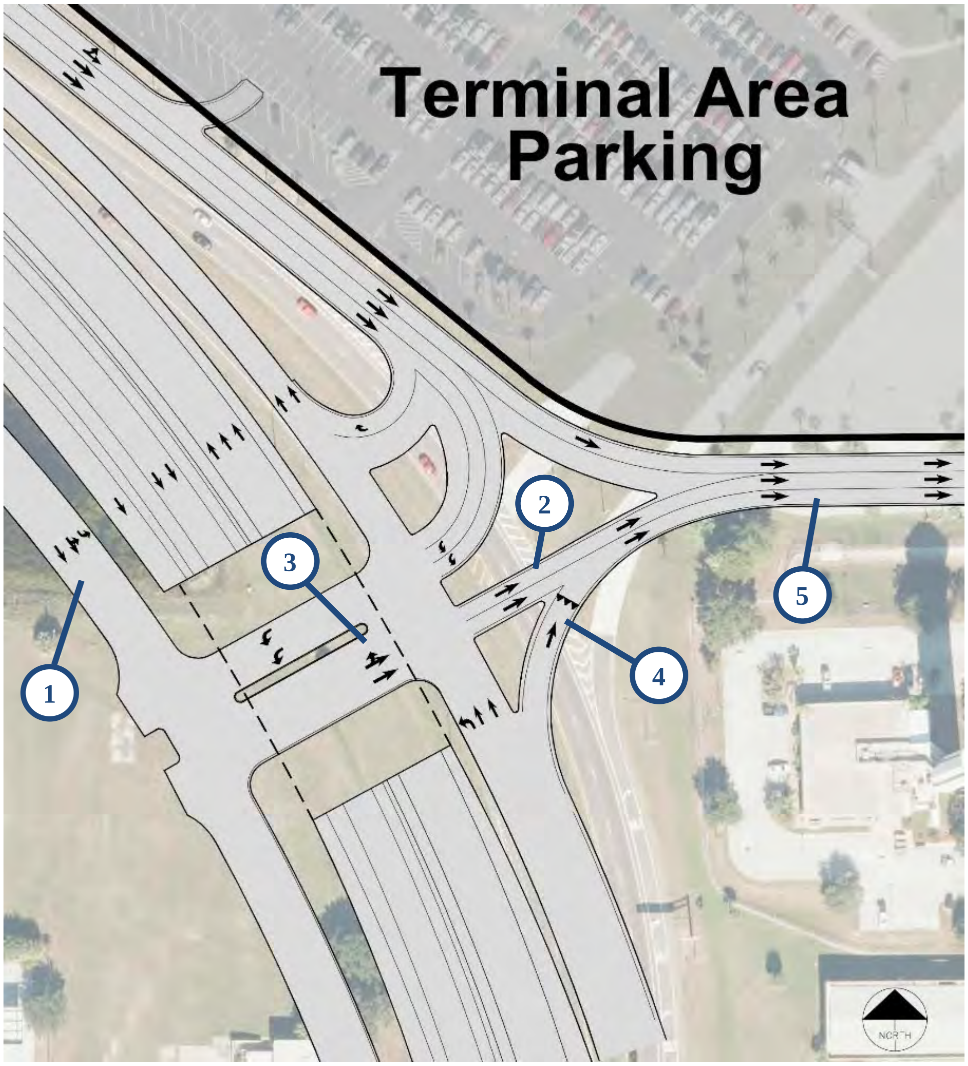


Figure 6.6-3: Terminal Area Roadways (Long-Term)

SOURCE: Kimley-Horn and Associates, Inc., 2019.

6.6.2 Terminal Curbfronts

As documented in the facility requirements chapter, a demand-to-capacity analysis was performed for the existing terminal curbfront facilities in accordance with methodologies defined by the Airport Cooperative Research Program (ACRP). For the purposes of evaluating curbfront development alternatives, the existing LOS and future curbfront requirements are summarized in the following sections.

Curbfront Level-of Service

The existing curbfront LOS shown in **Table 6.6-1** was generated in the facility requirements chapter assuming the following:

- Based on the available curbfront lengths at the preferred terminal alternative.
- Completion of the landside improvement project.
- Use of a Ground Transportation Area (GTA) will be separate from the terminal curbfront for taxis, shuttles, and courtesy vehicles.

TABLE 6.6-1
EXISTING TERMINAL CURBFRONT LEVEL OF SERVICE

Curb Zone	Planning Activity Level			
	PAL-1	PAL-2	PAL-3[a]	PAL-4[a]
Ticketing A	D	D	E	F
Ticketing B	D	D	E	F
Unassigned	B	B	B	C
Bag Claim	C	D	D	E

[a] LOS E or F is considered unacceptable for existing facilities per ACRP.

SOURCE: Kimley-Horn and Associates, Inc., 2019.

Curbfront Requirements

The curbfront requirements summarized in **Table 6.6-2** consider the additional curbing frontage (length of available curb for vehicles to load/unload passengers) that will be required to meet the forecasted needs. The "Curbfront Length" denotes the end-to-end length of the existing curbing zone, which is half the available curbing length when double-parking is taken into consideration. The "Required Curbfront Length" denotes the end-to-end curbfront length required for a given zone to accommodate peak curbing demands.

TABLE 6.6-2
TERMINAL CURBFRONT REQUIREMENTS

Curb Zone	Curbfront Length	Required Curbfront Length	Curbfront Length Increase
Ticketing A	140'	225'	85'
Ticketing B	140'	225'	85'
Unassigned	250'	<250'	-
Bag Claim	250'	225'	25'

SOURCE: Kimley-Horn and Associates, Inc., 2019.

Based on the projected demands, an additional 195 feet of curbing frontage will be necessary to accommodate projected curbfront demands through the 20-year planning horizon. The additional required curbing length may be reduced with improved utilization of the current unassigned area and implementation of operational strategies.

Potential Curbfront Enhancements

Potential curbfront enhancements were developed for each of the four terminal alternatives to meet the identified requirements and improve the airport's landside conditions. Infrastructure and operational enhancements for each terminal alternative are summarized in the following sections.

Some infrastructure modifications can be attributed to multiple terminal alternatives. For example, the use of a secondary curbfront roadway may be necessary to meet the curbfront requirements. The proposed secondary curbfront roadway would be parallel to the primary curbfront roadway adjacent to the terminal. For Alternatives A1, A2, and E5, the secondary curbfront is proposed at the ground level of a future parking structure. This would require proper vehicle clearances within the parking structure to accommodate commercial, delivery, and emergency vehicles. In addition to infrastructure modifications, operational strategies such as curbside signage placement and commercial vehicle reassignments may increase utilization of the existing curbfront and may benefit multiple terminal alternatives. Alternative D4 would have an entirely new curbfront configuration.

Terminal Alternative A1

Terminal Alternative A1 (**Figures 6.5-10 through 6.5-13**) modifies the terminal functions and processing within the terminal footprint and allows for an improved distribution along the curbfront. Curbfront enhancements associated with Alternative A1 will help meet future requirements and a desirable LOS. This terminal alternative allows for a secondary curbfront, expanded curbside facilities, and updated signage for passengers and motorists.

<u>Infrastructure Enhancements</u>

- Provide a secondary curbfront roadway within the new parking structure.
- Install curbside check-in facilities.
- Distribute curbfront activity along terminal frontage.
- Implement strategic curbfront and airline signage to distribute curbfront utilization.

<u>Operational Enhancements</u>

- Maintain active curbfront enforcement to reduce excessive dwelling or parking.
- Assign deliveries, police parking, and commercial vehicle pickup to the secondary curbfront or GTA.
- Consider designating the unassigned curb for a designated use.

Terminal Alternative A2

Terminal Alternative A2 (**Figures 6.5-14 through 6.5-17**) modifies the terminal functions and processing within the terminal footprint and provides the potential for an improved distribution along the curbfront. To meet future requirements and achieve a desirable LOS, a secondary curbfront, new curbside facilities, and updated signage for passengers and motorists may be required.

Infrastructure Enhancements

- Provide a secondary curbfront roadway within the new parking structure.
- Install curbside check-in facilities.
- Distribute curbfront activity along terminal frontage.
- Implement strategic curbfront and airline signage to distribute curbfront utilization.

Operational Enhancements

- Maintain active curbfront enforcement to reduce excessive dwelling or parking.
- Assign deliveries, police parking, and commercial vehicles pickup to the secondary curbfront or GTA.
- Consider designating the unassigned curb for a designated use.

Terminal Alternative D4

Terminal Alternative D4 (**Figures 6.5-18 through 6.5-21**) provides a new terminal facility with a new curbfront roadway, maximizing the ability distribute the curbfront efficiently. With a new terminal facility, this alternative can incorporate a secondary curbfront, new curbside facilities, and include signage for passengers and motorists. A proposed curbfront configuration demonstrating the new curbside facilities is provided in **Figure 6.6-4**.

Infrastructure Enhancements

- Provide a secondary curbfront roadway.
- Install curbside check-in facilities.
- Implement strategic curbfront and airline signage to distribute curbfront utilization.

Operational Enhancements

- Maintain active curbfront enforcement to reduce excessive dwelling or parking.
- Assign deliveries, police parking, and commercial vehicles pickup to the secondary curbfront or GTA.

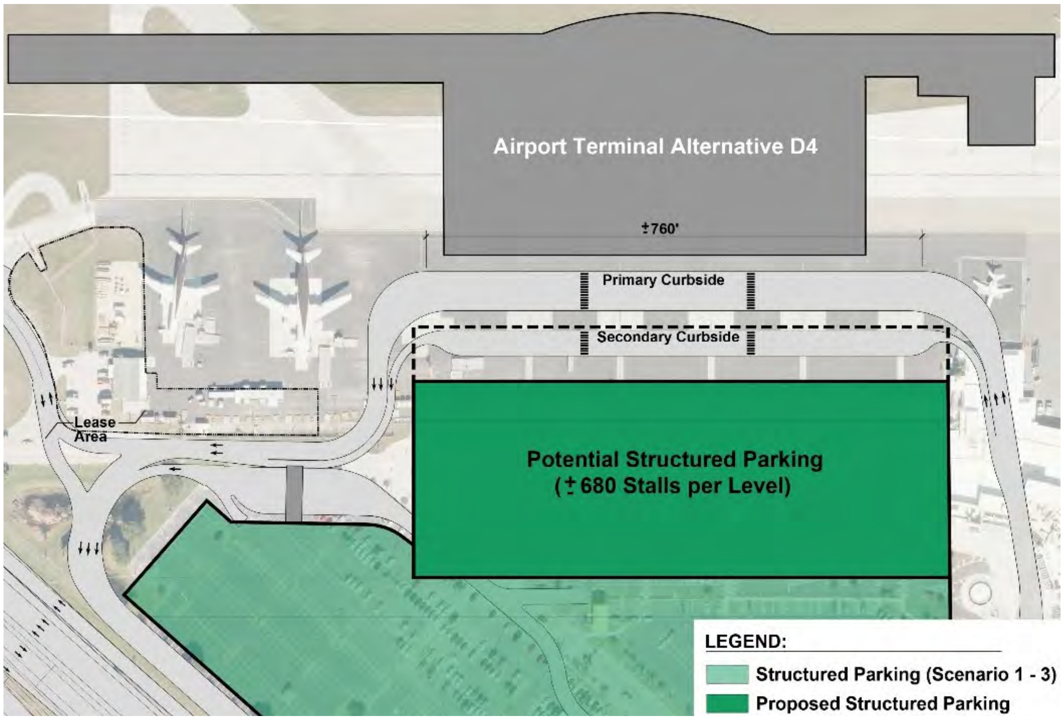


Figure 6.6-4: Terminal Alternative D4

SOURCE: Kimley-Horn and Associates, Inc., 2019.

Terminal Alternative E5

Terminal Alternative E5 (**Figures 6.5-22 through 6.5-25**) modifies the terminal functions and processing within the terminal footprint and provides opportunity to distribute traffic along the terminal curbfront. To meet future requirements and achieve a desirable LOS a secondary curbfront, new curbside facilities, and updated signage for passengers and motorists may be required.

<u>Infrastructure Enhancements</u>

- Provide a secondary curbfront roadway within the new parking structure.
- Install curbside check-in facilities.
- Implement strategic curbfront and airline signage to distribute curbfront utilization.

<u>Operational Enhancements</u>

- Maintain active curbfront enforcement to reduce excessive dwelling or parking.
- Assign deliveries, police parking, and commercial vehicles pickup to the secondary curbfront or GTA.

6.6.3 Parking and Rental Car Facilities

Parking and rental car facilities are important elements of the overall customer experience. The parking and rental car operations are also significant contributors to the operating revenue of the airport. These customer facilities provide choices that satisfy the needs of the user groups, including meters/greeters, business travelers, and leisure travelers.

Planning Parameters

Facility planning begins with a comparison of existing parking supply to the parking demand to serve future airport growth. In the context of this document, existing parking supply will refer to the sum of all the public, employee, and rental car ready and return spaces at PIE. Existing parking supply is based on the 3,901 total parking stalls that will be in place at the completion of the landside improvement project. These include:

TABLE 6.6-3
EXISTING PARKING SUPPLY

Public Parking Total	**3,460**
Short Term Lot	270
Long Term Lot	886
Economy/Remote Economy #1	1,054
Overflow	480
Interim Economy/Remote Lot #3	770
Rental Car Ready and return Total	**166**
Employee Parking Total	**275**

SOURCE: Kimley-Horn and Associates, Inc., 2019.

To develop the alternative scenarios, existing conditions were compared against two separate demands for future parking for each PAL (design day and absolute peak day). The “design day” represents a high occupancy day, typically the 95th percentile (20th busiest day). On this day, the airport should be able to accommodate parkers in the facility of the customers’ choosing. The “absolute peak day” demand represents the day of the year with the highest occupancy. On this day, the airport should be able to accommodate parkers, but options may be limited. **Tables 6.6-4** through **Table 6.6-7** combine these parking demands from the facility requirements chapter to reflect the overall number of stalls required for each PAL. In each table, a surplus of existing stalls in comparison to future required stalls is represented as a positive number, and a deficit of existing stalls in comparison to future required stalls is represented as a negative number.

TABLE 6.6-4
PUBLIC PARKING STALL DEMAND VS EXISTING SUPPLY

	Effective Supply*	Design Day Parking Demand	Surplus / Deficit	Peak Day Parking Demand*	Surplus / Deficit
PAL 1	*3,096*	*2,238*	*858*	*3,300*	*-190*
PAL 2	*3,096*	*3,133*	*-37*	*4,620*	*-1,642*
PAL 3	*3,096*	*4,028*	*-932*	*5,940*	*-3,094*
PAL 4	*3,096*	*4,923*	*-1,827*	*7,260*	*-4,546*

*Public parking effective supply is equal to approx. 90% of the existing to account for vehicle circulation and vehicles occupying multiple stalls
SOURCE: Kimley-Horn and Associates, Inc., 2019.

TABLE 6.6-5
RENTAL CAR READY AND RETURN STALL DEMAND VS EXISTING SUPPLY

	Existing Supply	Design Day Parking Demand	Surplus / Deficit
PAL 1	*166*	*392*	*-226*
PAL 2	*166*	*549*	*-383*
PAL 3	*166*	*705*	*-539*
PAL 4	*166*	*862*	*-696*

SOURCE: Kimley-Horn and Associates, Inc., 2019.

TABLE 6.6-6
EMPLOYEE PARKING STALL DEMAND VS EXISTING SUPPLY

	Existing Supply	Design Day Parking Demand	Surplus / Deficit
PAL 1	*275*	*293*	*-18*
PAL 2	*275*	*322*	*-47*
PAL 3	*275*	*355*	*-80*
PAL 4	*275*	*389*	*-114*

SOURCE: Kimley-Horn and Associates, Inc., 2019.

TABLE 6.6-7
TOTAL STALL DEMAND VS EXISTING SUPPLY

	Existing Supply*	Design Day Parking Demand^	Surplus / Deficit
PAL 1	*3,537*	2,923	*614*
PAL 2	*3,537*	*4,004*	*-467*
PAL 3	*3,537*	*5,088*	*-1,551*
PAL 4	*3,537*	*6,174*	*-2,637*

*Effective public stalls and total employee and rental car stalls
^Public parking, employee parking, and rental car ready and return
SOURCE: Kimley-Horn and Associates, Inc., 2019.

Development Scenarios

The parking facility parameters provide the framework for the development of future scenarios. Three development scenarios for public parking, employee parking, and rental car ready and return configurations were presented during a workshop with airport management. The purpose of this presentation was to gain feedback regarding constraints and priorities for the development of future parking alternatives.

Scenario 1

Scenario 1 accommodates "design day" public, employee, and rental car ready and return parking demand in a combination of structured and surface parking lots within walking distance of the passenger terminal. This scenario accommodates "absolute peak day" public parking demand in economy/remote surface lots. A driving force behind this scenario is the reduction of parking shuttle costs that are only incurred on the few days where demand exceeds the design day.

Scenario 2

Scenario 2 accommodates public ("design day" and "absolute peak day") and employee parking in a combination of structured and surface parking lots within walking distance of the terminal. Rental car ready and return operations are accommodated in a remote lot. A driving force behind this scenario is removing a user group from the terminal area operation that can be shuttled to the terminal.

Scenario 3

Scenario 3 brings all parking into one or more structures within walking distance of the passenger terminal. In this scenario, all of the economy/remote surface lots are eliminated. A driving force behind this scenario is the elimination of all shuttling costs.

Development Preferences and Constraints

A list of development preferences and constraints were developed during the workshop based on the scenarios presented. The development alternatives will be prepared based on the following:

- Structured parking should be developed within walking distance of the terminal to capitalize on the demand and alleviate shuttling requirements on off-peak periods.
- Structured parking should be flexible to accommodate multiple operations throughout the life of the facility.
- Initial development of structured parking is limited based on available funding. Multiple phases of structured parking development will be required to accommodate future demand.
- Accommodating "absolute peak day" parking demand in structured parking facilities within walking distance of the terminal is not desired. Shuttling customers on these days are acceptable due to the high cost of developing structured parking when this will occur on an extremely limited number of days.
- Alternatives should be developed that include rental car ready and return within walking distance of the terminal as well as in a remote lot.
- The area west of the passenger terminal facilities, between Taxiway B and Roosevelt Boulevard, should be considered for long-term parking development.
- Elimination of the existing Economy/Remote #2 Lot long-term is preferred due to the limited size, distance from the terminal, and lack of shuttle route connectivity with other airport economy/remote lots.

6.6.4 Refined Landside Development Alternatives

Refined landside development alternatives were developed based on the feedback received at the workshop. Afterwards, two alternatives were developed and then reviewed at another workshop to gain feedback regarding the preferred development plan. For alternative development, the following common characteristics were used:

- The existing terminal curbfront remains.
- The existing GTA remains to serve commercial vehicle pick-up activity.
- The existing cell phone lot will remain in the current location adjacent to the ATCT.
- The existing Economy/Remote #2 Lot located north of the intersection of Fairchild Drive and Rescue Way will be closed.
- The roadway system developed as part of the ongoing landside improvement project remains unchanged.
- The Interim Economy/Remote #3 Lot located northwest of the terminal along Fairchild Drive constructed as part of the landside improvement project is converted to a permanent parking lot, which could be used for public, rental car, or even employee parking.

The Gateway Project is modifying the access to the economy/remote parking lots and shuttle routing. These modifications will make access to the existing Economy/Remote Lot #1 south of Roosevelt Boulevard more challenging. Converting the Interim Economy/Remote #3 Lot along Fairchild Drive to a permanent parking lot provides permanent parking in closer proximity to the terminal with convenient access to Terminal Boulevard. Shuttle lots closer to the terminal reduce route travel time and improve customer service while potentially reducing the cost of shuttling operations.

The existing Economy/Remote #2 Lot located north of the intersection of Fairchild Drive and Rescue Way is being closed at the request of airport management. Based on feedback from airport management, this site has wayfinding challenges for customer access and is expensive to serve with a shuttle.

Landside Alternative 1

This alternative focused on accommodating the majority of customer activity close the terminal, as shown in **Figure 6.6-5**. Landside Alternative 1 has the following characteristics:

- Public parking is accommodated in a combination of structured parking (within walking distance of the terminal developed in phases) and economy/remote shuttle lots.
- Rental car ready and return operations are within walking distance of the terminal throughout the 20-year planning horizon.
- Employee parking is accommodated in a remote shuttle lot throughout the 20-year planning horizon.

Advantages associated with this alternative include:

- Flexibility to grow or shrink public parking and rental car operations (in a combined facility) in response to changes in customer demands.
- Consistent customer experience for visitors renting a vehicle and residents parking a vehicle.
- Development of a multi-modal structured parking facility increased potential funding sources.
- Over the long-term, parking within walking distance of the terminal is sized to serve design day demand, with economy/remote lots serving peak demand.

Challenges associated with this alternative include:

- High operating costs and low customer service associated with remote employee parking.
- Traffic for the multiple user groups is focused on Terminal Boulevard, which could impact roadway performance over the 20-year planning horizon.

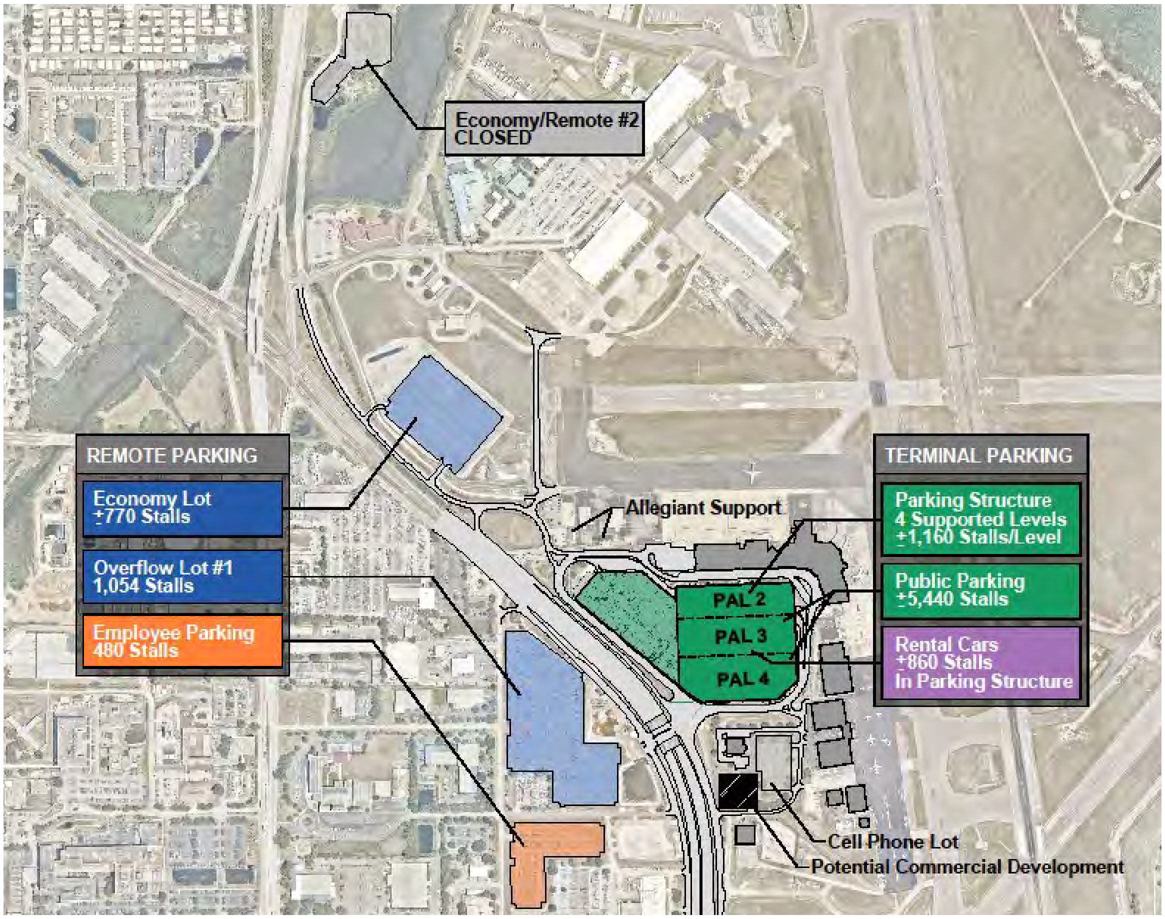


Figure 6.6-5: Landside Alternative 1, PAL 4

SOURCE: Kimley-Horn and Associates, Inc., 2019.

Landside Alternative 2

This alternative has a focus on accommodating the majority of customer parking activity close to the terminal, as shown in **Figure 6.6-6**. Landside Alternative 2 has the following characteristics:

- Public parking is accommodated in a combination of structured parking (within walking distance of the terminal developed in phases) and economy/remote shuttle lots.
- Employee parking is accommodated within walking distance of the terminal in either surface or structured parking throughout the 20-year planning horizon.
- Rental car ready and return operations are relocated to a remote shuttle facility at a to be determined point during the 20-year planning horizon.

Advantages associated with this alternative include:

- Reduced operating costs for airport parking shuttles over the long-term by consolidating parking within walking distance of the terminal.

- Enhanced parking experience, particularly during busy periods when lots are relatively full and customers are diverted from their preferred parking location.
- A dedicated funding source for rental car shuttling operations through customer facility charge or other negotiations with the rental car agencies.
- Potential reduction of traffic in front of the terminal by relocating rental car traffic to a remote facility over the long-term.

Challenges associated with this alternative include:

- Reduced long-term operational flexibility due to fully independent facilities provided for parking and rental car ready and return operations.
- Coordination required with the rental car agencies to approve a remote shuttle facility.
- Funding the development of independent rental car ready and return and structured parking facilities.
- Placement of employee parking in high demand lots within walking distance of the terminal may reduce potential revenue
- The last structured parking constructed to meet PAL 4 demand may be used minimally to meet absolute peak activity.

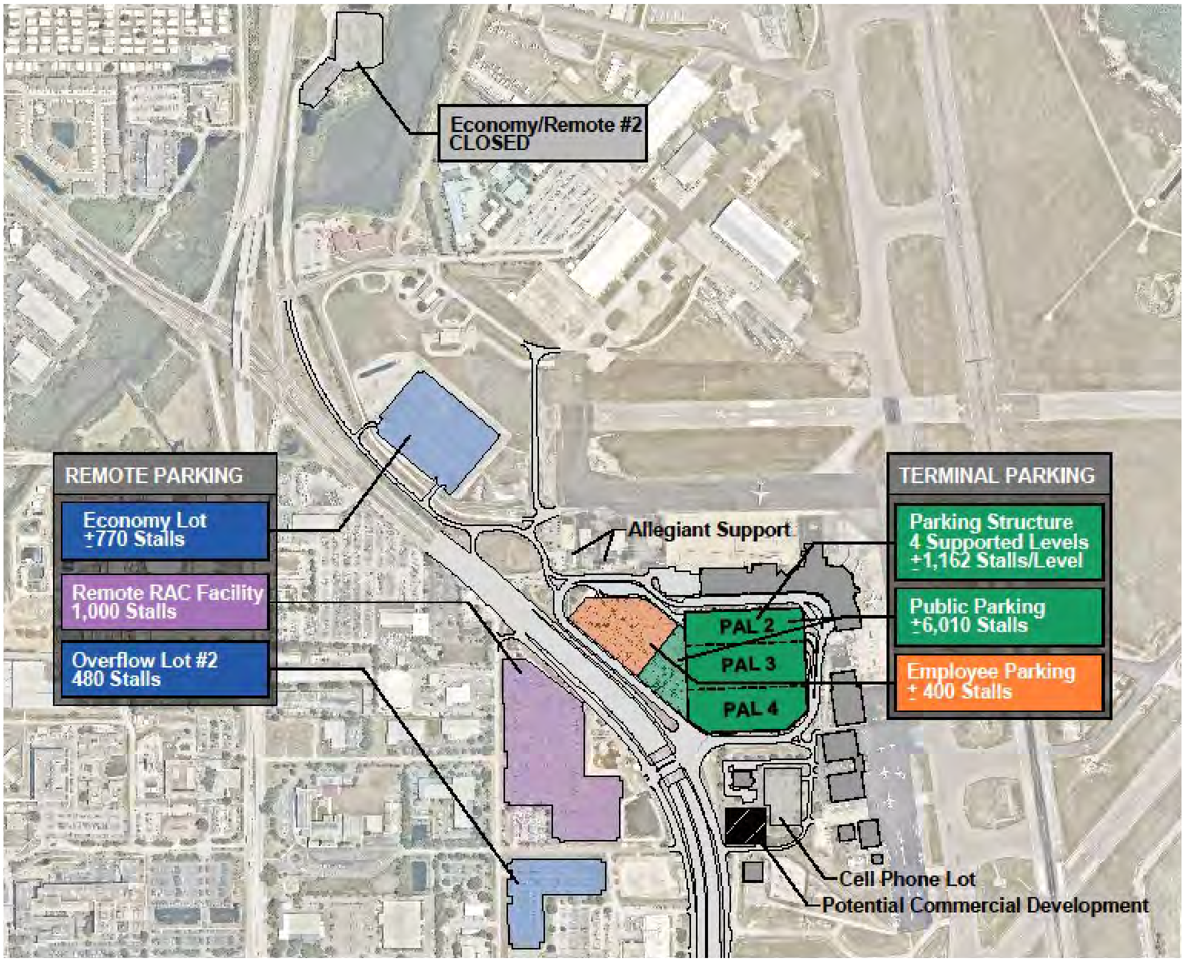


Figure 6.6-6: Landside Alternative 2, PAL 4

SOURCE: Kimley-Horn and Associates, Inc., 2019.

6.6.5 Preferred Landside Development

After refinements, Landside Alternative 2 was selected by airport management as the preferred long-term development alternative. The primary justifications for selecting this alternative include:

- Under existing operations, customers that want to park in public lots during peak periods get redirected from full lots to other lots with available capacity that may be served by a shuttle. When customers get redirected to the shuttle lots, this adds substantial time to the accessing trip which the customer may not have planned. This causes issues with customer service which could impact the customer's future choice of PIE. Focusing parking within walking distance of the terminal helps to address these concerns.

- Removing rental car ready and return operations from the terminal area has the potential to reduce the traffic volumes in front of the terminal, which would benefit customer experience and pedestrian safety. Therefore, relocating rental car operations to one of the remote lots should be considered.

- Rental car customers that rent a vehicle from a remote facility can more easily plan for the additional time required to return a vehicle to a remote facility and then take a shuttle to the terminal.

- Employee parking is operationally preferred within walking distance of the terminal to eliminate the ongoing operational cost of shuttling employees. Airport management did not support an operational concept that had employees using the same shuttle as customers to reduce operating costs.

When discussing the development plan, airport management emphasized their concerns with whether, or how quickly, parking demand will return following the current landside reconstruction program. Construction operations have caused impacts to numerous parking lots which have resulted in decreased parking transactions and increased use of other transportation modes. PIE was particularly successful with using an advertising campaign during the 2018 holiday season encouraging customers to plan for alternatives to parking at the airport due to the construction and the parking lots did not approach capacity. After the landside reconstruction program and FDOT's Gateway project are complete, a new landside parking study will be necessary to update the various parking demands, revalidate the preferred landside development plan, and re-evaluate the timeline for proposed improvements.

Additionally, the terminal area roadways, terminal curbfronts, and GTA will be unaffected by the terminal development (following completion of the Gateway Project). The proposed configuration of the terminal development program limits the ability to provide any significant modifications or expansions to the terminal area roadways, terminal curbfronts, and GTA; however, these facilities will remain open to serve airport customers throughout development of the preferred parking and rental car program. Considering the curbfront LOS results documented in **Table 6.6-1**, the required curbfront lengths documented in **Table 6.6-2**, and the inability to provide additional curbing frontage along the primary terminal curbfront, the enhancements discussed in this section are recommended to help accommodate projected curbfront demands through PAL 4.

PAL 1

The proposed work to meet PAL 1 demand is limited to converting the Interim Economy/Remote #3 Lot north of the terminal on Fairchild Road to a permanent economy parking lot as shown in **Figure 6.6-7**. This change provides adequate parking supply to meet the design day demand. The absolute peak day demand may be exceeded depending on how quickly demand returns or whether airport management continues to pursue a strategy of encouraging the use of alternate modes during peak operations to postpone the need for developing structured parking.

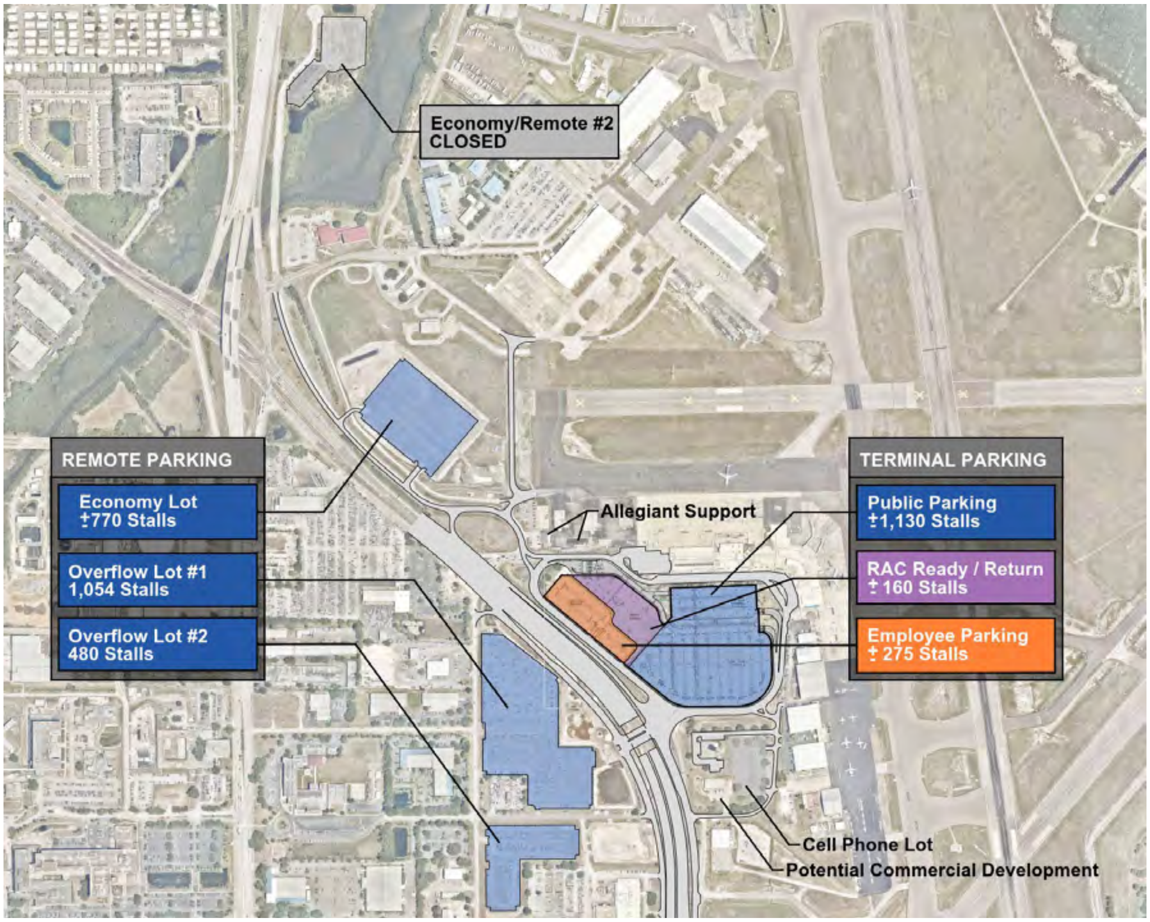


Figure 6.6-7 Preferred Landside Alternative, PAL 1

SOURCE: Kimley-Horn and Associates, Inc., 2019.

Under this development scenario, demand for employee parking is within 10 percent of the existing supply. Monitoring the employee parking utilization following the opening of the landside reconstruction project is recommended to validate that the current lot under construction provides adequate supply, particularly during shift changes. Should the demand exceed the capacity of the new lot, use of the existing Overflow Lot for employee parking operations should be explored until parking supply can be increased with structured parking.

Under this development plan, rental car ready and return stall supply is below projected demand. Further coordination with the rental car agencies is recommended to understand their operating constraints and operational needs.

PAL 2

The proposed work to meet PAL 2 demand is limited to development of structured parking within walking distance of the terminal. In 2019, the budget for a parking structure was planned by airport management at $20 million, which allows for the development of approximately 800 to 1,000 stalls, including at-grade stalls beneath the structure. Parking structure recommendations include:

- Four levels of structured parking should be considered to allow for facility expansion to meet projected parking demand beyond PAL 2.

- Structured parking development is proposed within walking distance of the terminal.

  - Operators can charge a higher fee for stalls within walking distance of the terminal than remote shuttle stalls, which increases the potential revenue.

  - Stalls within walking distance of the terminal do not require shuttling operations, which reduces the operating cost.

- The distance from the ground level to the first structured level should provide higher vertical clearance to allow for flexible use of this space over time, such as a supplemental curb or GTA.

Developing 800 to 1,000 parking stalls in a structured parking facility will add between 650 and 750 additional parking stalls. This is adequate to serve the design day needs for public parking, rental car ready and return, and employee parking at PAL 2. This does not provide adequate stalls to meet the peak period demands.

An additional study to further analyze the development of a proposed parking structure was conducted and is included in **Appendix I**. It should be noted that the concepts developed included parking structures with a maximum of five levels (one ground and four supported levels). Each also incorporates a higher floor to ceiling between the ground level and the first structured level. As such, the tallest proposed parking structure concepts were estimated to have an overall height of 64 feet above ground level (AGL). Given the general site elevation of 11 feet AMSL and the proximity to the ATCT, the concepts for the proposed structure (at 75 feet AMSL) will not impact the line of sight from the ATCT to the airfield movement areas (reference **Figure 6.4-3**). The proposed parking structures will impact the line of sight to a portion of the existing and future passenger terminal apron area and aircraft parking positions. This however was discussed with both airport and ATCT management and determined not to be a significant concern since there are a number of ways to manage the aircraft operations in these non-movement areas.

PAL 3 / PAL 4

The proposed work associated with PAL 3 and PAL 4 includes:

- Construct additional structured parking as required to meet customer demand

  - PAL 3 – approximately 1,500 additional stalls

  - PAL 4 – approximately 1,100 additional stalls

- Relocate rental car ready and return operations to a remote facility

Developing the structured parking program outlined above provides adequate supply to meet both design day and peak day demand for parking.

Airport management noted the timing for the move of rental car ready and return operations needs to be further refined. Key factors in this timing include the source of funding used for the project development and the coordination required with project stakeholders, including the rental car agencies.

At PAL 4, portions of the curbfront experience LOS F. Curbfront infrastructure enhancements such as providing a secondary curbfront roadway within the parking structure, curbside check-in facilities, and new signage that optimizes space used at the curbfront by enhancing airline wayfinding are recommended. Assigning commercial ground transportation vehicles, police parking, and deliveries to the secondary curbfront would remove a portion of the forecast curbing demand from the primary curbfront. Depending on future trends in vehicular mode choice, some private vehicles may also be able to take advantage of the secondary curbfront through implementation of strategic signage and curbside facilities. Strategic demand assignments to the secondary curbfront could provide additional space for passenger drop-off and pick-up on the primary curbfront, potentially improving vehicular level of service and the overall customer experience. Further improvements could be achieved through active curbfront enforcement to reduce excessive dwelling or parking.

6.7 Aviation Related Facilities

In addition to the airfield and passenger terminal area improvements, decisions are needed to support the future development of air cargo, large aircraft, and T-hangar facilities, as well as the airfield electrical vault. The sites available at PIE for aviation related development are described, then their ability to accommodate different types of activity evaluated. This process identifies the most realistic and compatible development concepts for inclusion in the recommended airfield development plan.

6.7.1 Sites Available for Aviation Related Development

As a result of the various airfield constraints illustrated in **Figure 6.2-1**, there are five areas available on-airport property for aviation related development. These areas, which have the ability to support those aviation uses not directly tied to the passenger terminal facilities are identified in **Figure 6.7-1**.

As noted in the airfield constraints section, the preliminary Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) issued on June 29, 2018 are expected to be adopted in 2019, replacing the 2003 versions. The base flood elevations (BFE) in the newer maps have been utilized to determine the minimum finished floor elevation (FFE) that needs to be considered for buildings proposed at each of the development sites. The minimum FFE required at each site is based on the most critical BFE for the site, plus one foot.

The minimum FFE is a key consideration as it will require significant fill to develop buildings at each of the sites. In addition, the FAA has specific centerline longitudinal gradient standards for both taxiways and taxilanes. Likewise, there are maximum allowable surface grades for aircraft parking aprons required to ease both aircraft taxiing and towing operations. The required surface gradients are outlined in **Table 6.7-1**.

TABLE 6.7-1
MAXIMUM ALLOWABLE SURFACE GRADIENTS

Facilities Serving Aircraft Approach Category (AAC)	Taxiways and Taxilanes (longitudinal)	Aircraft Parking Aprons (any direction)
A and B	2.0%	2.0%
C and D	1.5%	1.0%

SOURCE: FAA AC 150/5300-13A, Change 1, *Airport Design*.

The longitudinal and surface gradient standards combined with the minimum FFE for each development site determines the offset needed between any proposed buildings and the existing airfield pavements. These taxiway, taxilane, and apron offsets, which are necessary to properly tie into the existing airfield, are included where applicable for the different development sites.

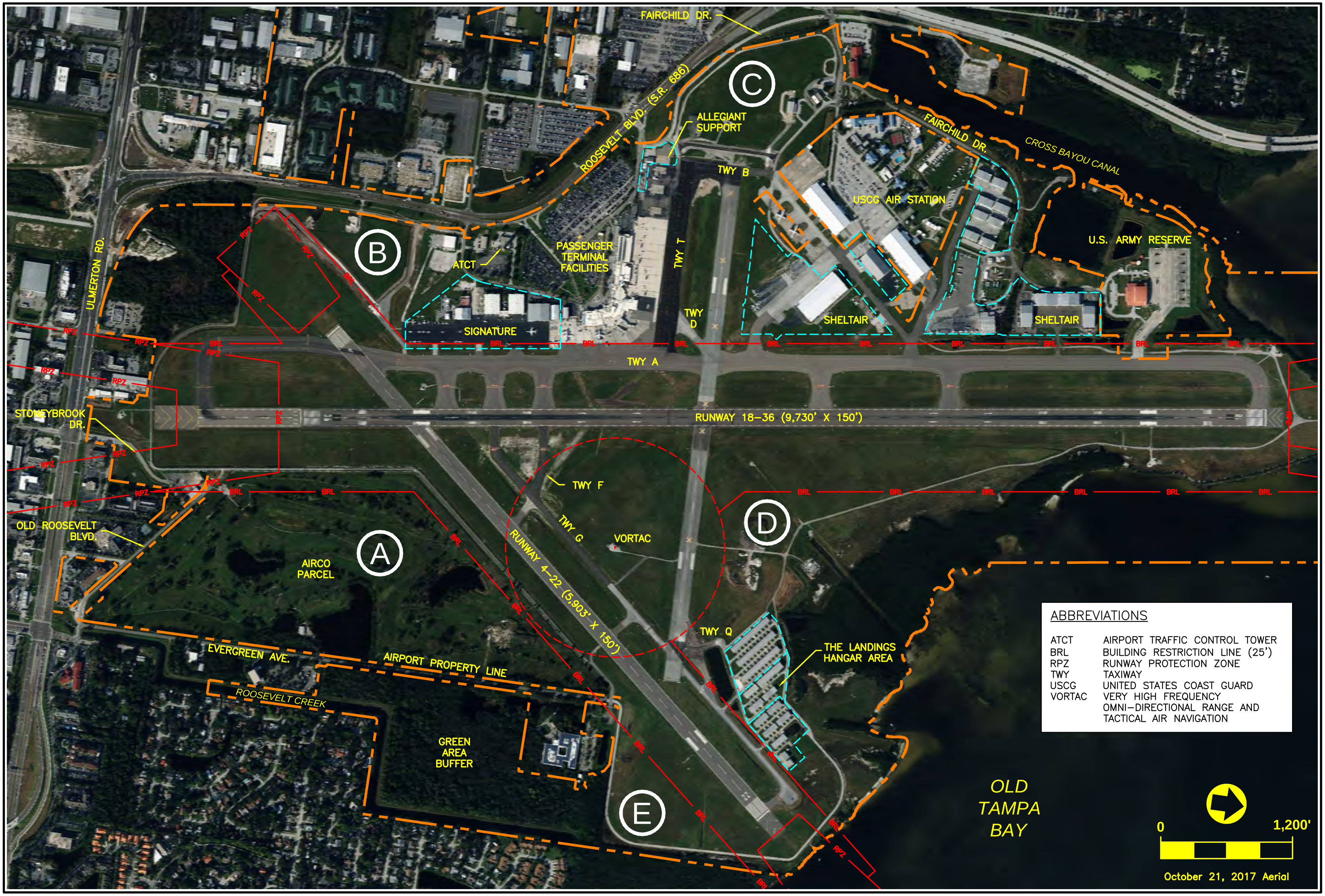
Site A – Airco Parcel

Site A represents the single largest portion of airport property available for aviation related development. The 131 acre parcel of land was formerly leased and operated as the Airco municipal golf course. Since the closure of the course in 2011, the land has sat idle. The County is finalizing the required environmental assessment (EA) to redevelop the Airco Parcel for both aviation related and non-aeronautical development. The conceptual development plan in the EA provides approximately 80.1 acres for aviation-related development and 45.4 acres for compatible non-aeronautical uses. The remaining 5.5 acres, would be dedicated for access road right-of-way, utility right-of-way, and stormwater management system improvements.

The Airco Parcel is bounded by Runway 18-36 to the west and Runway 4-22 to the north. As described previously, partial parallel taxiways to the east of Runway 18-36 and southeast of Runway 4-22 are required to provide airfield access for the site. The south side of the Airco Parcel is framed by Old Roosevelt Boulevard while the east side borders Evergreen Avenue (see **Figure 6.7-1**). The conceptual development plan in the EA shows how these two roads, along with Stoneybrook Drive off of Ulmerton Road, would be utilized to provide the future landside access into the redeveloped Airco Parcel. Future airfield and landside access for Site A will be included with the concepts developed for this parcel. The BFE is 11 feet AMSL on the northeast half of the site and 10 feet AMSL on the south and west sides. Therefore, the minimum FFE for facilities will be either 12 or 11 feet AMSL depending on the location within the site. With average site elevation ranging between 6 and 8 feet AMSL, any new building would require approximately 3 to 6 feet of fill material, depending on the location within Site A.

Site B – Southwest Parcel

Site B represents a triangular area of just under 11 acres on the southwest side of the airfield. The area is bounded by the National Aviation Academy (NAA) and Signature leaseholds to the north; a portion of the existing airport perimeter road to the southeast; and Roosevelt Boulevard to the west. Between Site B and Roosevelt Boulevard, there is a perpetual easement with FDOT that is part of the Gateway Project improvements. Future airside access would come off the west side of Taxiway A and could tie into the southwest end of Runway 4-22. Landside access would come south off of Airport Parkway as the Gateway Project will preclude direct access to/from Roosevelt Boulevard. Future airfield and landside access for Site A will be included with the concepts developed for this parcel. While the BFE is 9 feet AMSL on the north part of this Site B, there is no BFE established on the south side of the area, given its Zone X designation on the newer FEMA maps. Regardless, a FFE 10 feet AMSL should be considered for any proposed buildings on this parcel. Because the site has an average elevation of 10 feet AMSL, no significant fill material should be required for any new building in Site B.



Source: ESA, 2019.

FIGURE 6.7-1

SITES AVAILABLE FOR AVIATION RELATED DEVELOPMENT

Site C – West Parcel

The area identified as Site C on **Figure 6.7-1**, represents approximately 15 acres of open space. Much of the parcel, from the south, around the west side, and to the north, is bounded by Fairchild Drive. To the north there is also the ARFF station and the Pinellas County Sheriff's Office (PCSO) hangar, both of which have plans for ultimately replacing their existing facilities at the same location. The east side of the property is bounded by the recently relocated portion of the airport perimeter road, which lies just west of Taxiway B.

While this site appears relatively undeveloped in **Figure 6.7-1**, since the October 21, 2017 AGIS aerial used in the figure, the airport has constructed a temporary gravel automobile parking lot (Interim Economy/Remote Lot #3) on a majority of the site, to the south of the PCSO hangar. Also not shown within the site is the future airport maintenance facility which will be due west of the PCSO hangar. Regardless, most of Site C is consider available for the development of future facilities given that the parking lot is considered temporary. The entire west parcel has a BFE of 10 feet AMSL; therefore, the minimum FFE for any proposed facilities will be 11 feet AMSL. With an average site elevation of 8 feet AMSL, any new building would require approximately 3 feet of fill material in Site C.

Site D – Infield Area

Site D is bounded by Old Tampa Bay to the north, decommissioned Runway 9-27 (future Taxiway K) to the south, the Landings Hangar Area to the east, and Runway 18-36 to the west. While it appears there is a large amount of developable space in this portion of the airfield, there are many limitations that must be considered. These include the setbacks associated with the VORTAC, two Automated Surface Observing Systems (ASOS), and a Remote Transmitter/Receiver (RTR) facility which are addressed in a later section. Despite the fact that the recommended future parallel GA runway and its related taxiway system are not shown on **Figure 6.7-1**, the imaginary surfaces associated with these future facilities must also be taken into consideration.

Landside access for the site remains its biggest drawback given the area's location within the secure side of the airfield. Only the airport perimeter road provides limited vehicle access off of Evergreen Avenue to Site D. The BFE is 11 feet AMSL for most of the site, with only a small portion at 12 feet AMSL. Given the area within the 12 foot BFE is not likely to be developed, a FFE of 12 feet AMSL will be evaluated for any new buildings in the infield area. With an average site elevation of 6 feet AMSL, any new building would require approximately 6 feet of fill material in Site D.

Site E – East Parcel

Site E has the potential to provide approximately 14 acres of space for the development of aviation related facilities. While not shown on **Figure 6.7-1**, this space considers the setback required for the future Taxiway J TOFA. In fact, this portion of the proposed parallel taxiway will need to be constructed in order for Site E to have airfield access.

As with Site D, landside access is only available via the airport perimeter road off Evergreen Avenue, given the east parcel's location within the secure side of the airfield. The BFE is 12 feet

AMSL for the entire site; therefore, a FFE of 13 feet AMSL will be evaluated for any new buildings proposed at Site E. With an average site elevation of 4 feet AMSL, any new building would require approximately 9 feet of fill material in Site E.

6.7.2 Attributes Evaluated for Proposed Facilities

The following describes the six primary attributes utilized to evaluate the different facility concepts. As noted in the individual tables, these attributes are ranked between one and five for each of the sites considered, with five being the best. Therefore, when comparing different development options, the one with the highest total is considered to be the most advantageous.

Airside Access

For any aviation related development, an important element to consider is how each site could tie into the ultimate airfield configuration for aircraft operations. This includes the ability to support the movement and parking requirements of the specific aircraft the facility is intended to serve. Different concepts are not rated lower if they require new airside access since most of the sites are currently undeveloped. However, they would rank lower if the access requires unnecessary replication of airside facilities that already exist or are planned at another location.

Options typically rate higher if the concept provides the ability for more than one taxiway into and out of the area. Depending on the size of the facility being evaluated, such dual access may be a minimum requirement to support activity during peak times as well as the rare occasions when one access point might be temporarily unavailable due to maintenance or an operational issue.

Landside Access

Dedicated landside access for the tenants, users, and customers of an aviation facility is mandatory. While in some cases landside access may be acceptable via roads on the secure side of the airfield, and in rare cases across non-movement areas, no landside access can be allowed across an active movement area. For public facilities, the airside access must be provided outside of the secured airfield perimeter. As with airfield pavements, an option is not penalized if it requires new landside access; however, alternatives will rank lower if they require significant alterations to established roads or traffic patterns.

Compatibility with Adjacent Uses

For aviation related development, a new option's compatibility with adjacent uses will have a direct impact on the operational efficiency of both facilities. Due to the variety of aviation operators at PIE, some sites are more advantageous than others for the activity the facility is intended to serve. Ratings for compatibility are predominantly based on how a proposed facility might positively or negatively impact the overall airfield operation. Compatibility is also determined based on whether or not an option would impact existing facilities.

Flexibility of Facility Configuration

The ability to accommodate not only the anticipated demand, but additional facilities in the future will make one site more valuable than another. A site can obtain the highest rating if the facility requirements for the 20-year planning period are accommodated; however, those with the space to provide different layouts or concepts are considered more advantageous. This is especially true since most of the facilities being evaluated will be developed by private entities leasing land from the airport.

Potential Environmental Impact

It is important to determine whether any of the proposed concepts might have an impact on the surrounding environmental features such as wetlands, endangered species, etc. The potential impact of each concept was rated based on the information documented in the environmental overview chapter. Additionally, the environmental ratings are also influenced in those instances where the options being compared have stormwater outfalls into different area watersheds.

Construction Phasing

The final attribute includes evaluating whether the construction of a proposed option would create any impacts to existing facilities or airfield operations. Most construction will include temporary impacts but may also create permanent changes to the surrounding environment. For some, construction may result in improvements to the area, which would certainly increase the rating of the corresponding option.

6.7.3 Air Cargo Facilities

The facility requirements chapter identified the need for approximately 14,000 square yards (126,000 square feet) of aircraft parking apron to support up to two Boeing 747-400F (ADG V) cargo aircraft. In addition to ADG V taxiway access, the required aircraft parking area also needs to be setback enough to accommodate ADG V aircraft tail heights of up to 66 feet. No size was given for the air cargo facility since this could vary significantly depending on the actual operator(s) using the building. Therefore, a 37,500 square foot building with adequate landside access for both vehicles and truck loading docks is considered for the air cargo facilities.

Only Sites A and C could accommodate the future air cargo facility requirements. Sites B and E are not realistic due to the impact that the 66 foot ADG V aircraft parking restriction line (APRL) would have on the space available. The APRL is identical to the BRL in that it is primarily based on the 14 CFR Part 77 Transitional Surface and as the name implies, delineates where a parked aircraft (or portions such as the higher tail section) cannot be due to the protective runway surfaces. For Sites B and E, the aircraft parking setback would not leave enough space for the cargo facility or landside access. Site D could accommodate the 66 foot APRL but was not considered further given the poor landside access and requirement to develop additional ADG V taxiway access to Runway 18-36. Therefore, **Table 6.7-2** only reflects the evaluation of Sites A and C based on the primary attributes described previously.

TABLE 6.7-2
POTENTIAL AIR CARGO FACILITY SITES

Attributes for Proposed Facility	Site A	Site B	Site C	Site D	Site E
Airside Access (for ADG V aircraft)	5	n/a	3	n/a	n/a
Landside Access	4	n/a	3	n/a	n/a
Compatibility with Adjacent Uses	5	n/a	3	n/a	n/a
Flexibility of Facility Configuration	4	n/a	4	n/a	n/a
Potential Environmental Impact	5	n/a	4	n/a	n/a
Construction Phasing	5	n/a	4	n/a	n/a
Total	**28**	**n/a**	**21**	**n/a**	**n/a**

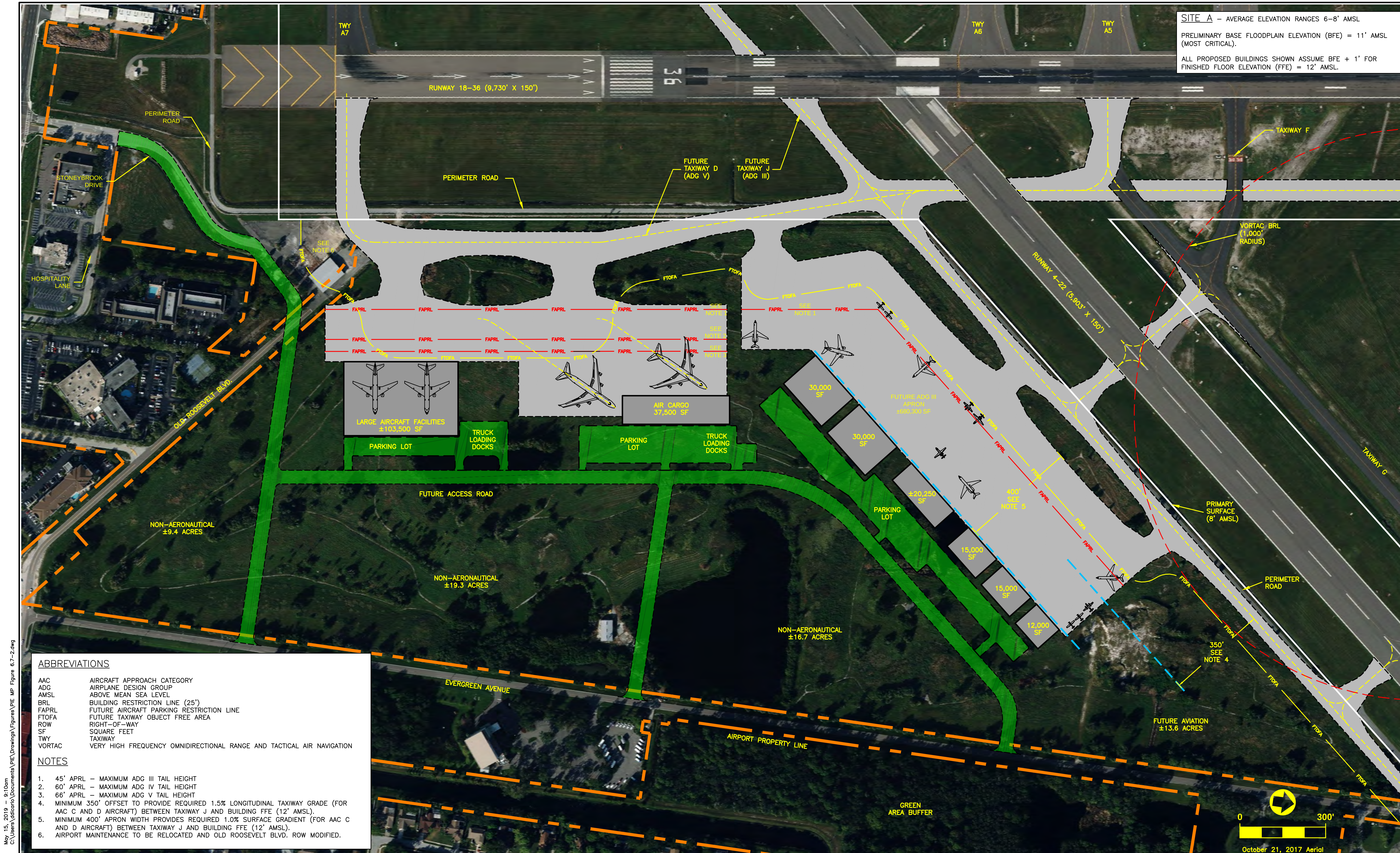
NOTE: Attributes for each site individually ranked 1-5 with 5 being the best.

SOURCE: ESA, 2019.

As shown, Site A ranked higher than Site C with airfield access and compatibility with adjacent uses being the biggest differentiators. Airfield access for Site A will be provided by the first phase of the new Taxiway D, which was included as part of the *EA for the Redevelopment of the Airco Parcel*. For Site C, ADG V access could only be provided by extending the future apron edge Taxiway C and increase the proposed ADG IV TOFA to ADG V standards. In order not to impact the Sheltair leasehold (shown on **Figure 6.4-3**), this would require the proposed Taxiway C centerline to shift south. Along with the wider ADG V TOFA, the result is that 61 feet of developable space for the future passenger terminal facilities would be lost. Development of Site C would also impact the ability for the airport to utilize the Interim Economy/Remote #3 Lot constructed in 2018.

Any form of additional non-impervious facilities (buildings or pavement) at Site C also creates the potential for environmental concerns with respect to stormwater management. As noted in the environmental overview chapter, the west half of the airfield (including Site C) is part of the Cross Bayou Canal watershed, while the east half (including Site A) is within the Roosevelt Creek watershed. Because Cross Bayou Canal is an impaired water of the State, if there is an option to develop a facility on the east versus west side of the airport, the east side is considered more advantageous from a stormwater perspective.

Even though Site A requires the first portion of Taxiway D and some landside improvements to be constructed, it is the preferred site for the development of future air cargo facilities. A concept for future air cargo facilities at Site A is included as part of **Figure 6.7-2**. Air cargo facilities at Site C would be similar to what is shown on the current 2018 ALP, but envisioned as shifting south to avoid impacting the current PCSO hangar. It should be noted, that proposed air cargo facilities on the south half of the Airco Parcel would have a minimum FFE of 11 feet AMSL. Given the average elevation of 8 feet AMSL for this portion of the site, any new buildings on the south half of Site A would require approximately 3 feet of fill material. This is the same as that required for any building proposed at Site C.



Source: ESA, 2019.

FIGURE 6.7-2

SITE A - AIR CARGO AND LARGE AIRCRAFT DEVELOPMENT CONCEPT

6.7.4 Large Aircraft Facilities

By the end of the 20-year planning period, it was calculated that an additional 112,000 square yards (1,008,000 square feet) of aircraft parking apron space would be required to support the growth in GA at PIE. A mix of both large and small clearspan hangars was also identified to accommodate the based GA aircraft demand for multi-engine, jet, and rotorcraft space. While much of this apron and hangar space would likely be described as fixed base operator (FBO) type facilities, capable of serving and providing storage for a range of aircraft types, they will also accommodate specific services related to the maintenance, retrofit, or even manufacturing of aircraft, as well as private corporate facilities. Thus a key element in developing concepts for such facilities is flexibility and the ability to support the larger ADG III aircraft expected in the operational fleet mix.

Large aircraft facilities typically include a number of services to the flying public. Due to the proximity of the various Runway 4-22 surfaces and Old Tampa Bay, a secure public access road to Site D cannot be provided. While it is possible to develop secure public access to Site E; the minimum ADG III taxiway and aircraft parking setbacks would not leave enough space to develop any structures or automobile parking at this site. Therefore, **Table 6.7-3** only reflects the evaluation of Sites A, B, and C.

TABLE 6.7-3
POTENTIAL SITES FOR LARGE AIRCRAFT FACILITIES

Attributes for Proposed Facility	Site A	Site B	Site C	Site D	Site E
Airside Access (for ADG III aircraft)	5	3	3	n/a	n/a
Landside Access	4	5	4	n/a	n/a
Compatibility with Adjacent Uses	5	5	2	n/a	n/a
Flexibility of Facility Configuration	5	4	4	n/a	n/a
Potential Environmental Impact	5	4	4	n/a	n/a
Construction Phasing	5	5	4	n/a	n/a
Total	**29**	**26**	**21**	**n/a**	**n/a**

NOTE: Attributes for each site individually ranked 1-5 with 5 being the best.

SOURCE: ESA, 2019.

Sites A and B ranked the highest while Site C suffered from some of the same issues as the option to locate air cargo facilities at this site. Large aircraft activity at Site C would impact the ability to utilize Interim Economy/Remote Lot #3 and limit the options to expand the passenger terminal facilities. GA development at Site C is also considered a non-compatible use given it would mix private aircraft operations with the commercial passenger airlines, USCG HC-130 aircraft, and rotorcraft operations. Therefore, Site C was not considered further for the development of large aircraft facilities.

Concepts depicting different sized facilities to support large aircraft operations were developed for Site A (**Figure 6.7-2**) and Site B (**Figure 6.7-3**). While both certainly included the need to provide the required taxiway/taxilane longitudinal and aircraft parking apron gradient requirements for the larger AAC C and D aircraft, this is only dimensioned on the figure for Site A. The setbacks required for Site B did not extend back to where the proposed buildings or apron areas would be located. Combined, the two sites would provide most of the apron and clearspan hangar space required by the end of the 20-year planning period. However, additional apron space and hangar facilities beyond what is required will also be provided via the future improvements of both Sheltair and Signature.

Depending on which type of facilities are needed and when, it is recommended that both Sites A and B be reserved for the development of large aircraft facilities. Site B can be developed immediately while the availability of space at Site A provides more flexibility and the ability to accommodate a significant maintenance or manufacturing complex. As noted previously, Site A will require varying levels of fill material for any future buildings while Site B will not. Regardless, Site A is still needed to meet the large aircraft facility requirement for the 20-year planning period. The combined air cargo and large aircraft facilities shown on **Figure 6.7-2** for the Airco Parcel also delineate those areas that are not contiguous to the airfield and better suited for future non-aeronautical uses.

It should be noted that even though both sites provide ADG III taxiway access, there may be occasional limitations and/or the need to obtain prior approval from the ATCT for the movement of any C-III and D-III aircraft along the parallel taxiways to Runway 4-22 during instrument conditions. For unrestricted movements of C-III and D-III aircraft next to Runway 4-22, the parallel taxiways would require a minimum 400 foot offset to the runway centerline. However, as noted previously, parallel taxiway offsets greater than 300 feet for Runway 4-22 cannot be justified, especially given the impact it would have on both existing and future airport facilities.

Source: ESA, 2019.

FIGURE 6.7-3

SITE B - DEVELOPMENT CONCEPT LARGE AIRCRAFT HANGARS

6.7.5 T-Hangar Facilities

The demand for T-hangars at PIE is expected to continue with an additional 65 units required by the end of the 20-year planning period. The areas identified for the potential development of new T-hangars units include Sites A, D, and E. Site B was not considered since it is the airport's only location that can be quickly developed for additional large aircraft facilities. Site C was also eliminated from consideration as it would create a non-compatible use with smaller GA aircraft utilizing the same movement areas as the commercial passenger airlines and USCG HC-130 aircraft. Site C would also place the smaller aircraft in close proximity to the daily rotorcraft operations by both the USCG and PCSO. As such, **Table 6.7-3** only reflects the evaluation of Sites A, D, and E using the primary attributes described previously.

TABLE 6.7-3
POTENTIAL T-HANGAR DEVELOPMENT SITES

Attributes for Proposed Facility	Site A	Site B	Site C	Site D	Site E
Airside Access	5	n/a	n/a	5	5
Landside Access	4	n/a	n/a	3	4
Compatibility with Adjacent Uses	4	n/a	n/a	4	5
Flexibility of Facility Configuration	3	n/a	n/a	3	3
Potential Environmental Impact	5	n/a	n/a	4	3
Construction Phasing	5	n/a	n/a	4	4
Total	**26**	**n/a**	**n/a**	**23**	**24**

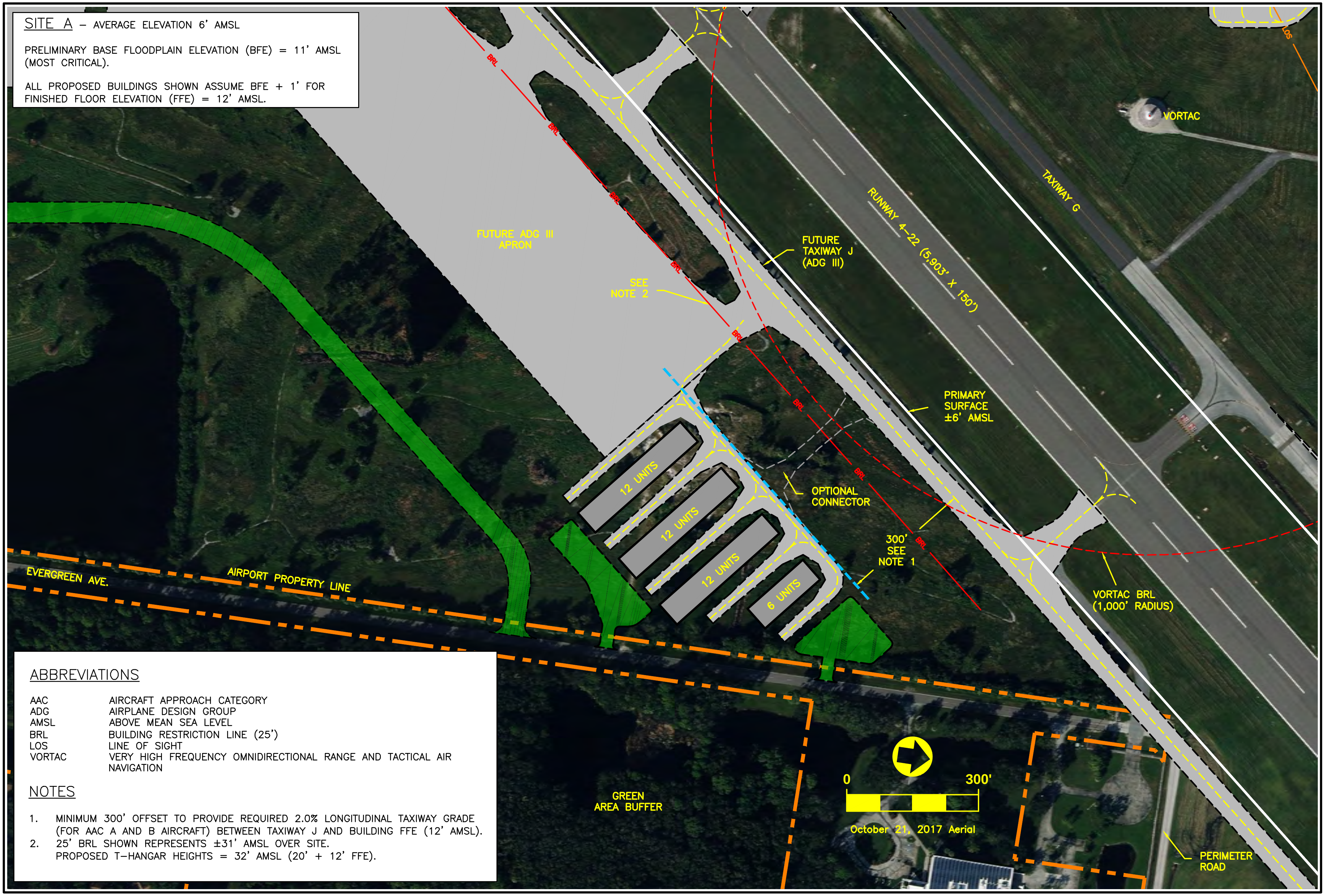
NOTE: Attributes for each site individually ranked 1-5 with 5 being the best.

SOURCE: ESA, 2019.

As shown, Site A ranked the highest, but both Sites D and E also ranked very well. The issue is that none of the sites can accommodate the 65 T-hangars required given the specific constraints for each. These are described following the common elements incorporated into each concept.

Common Elements of T-hangar Sites

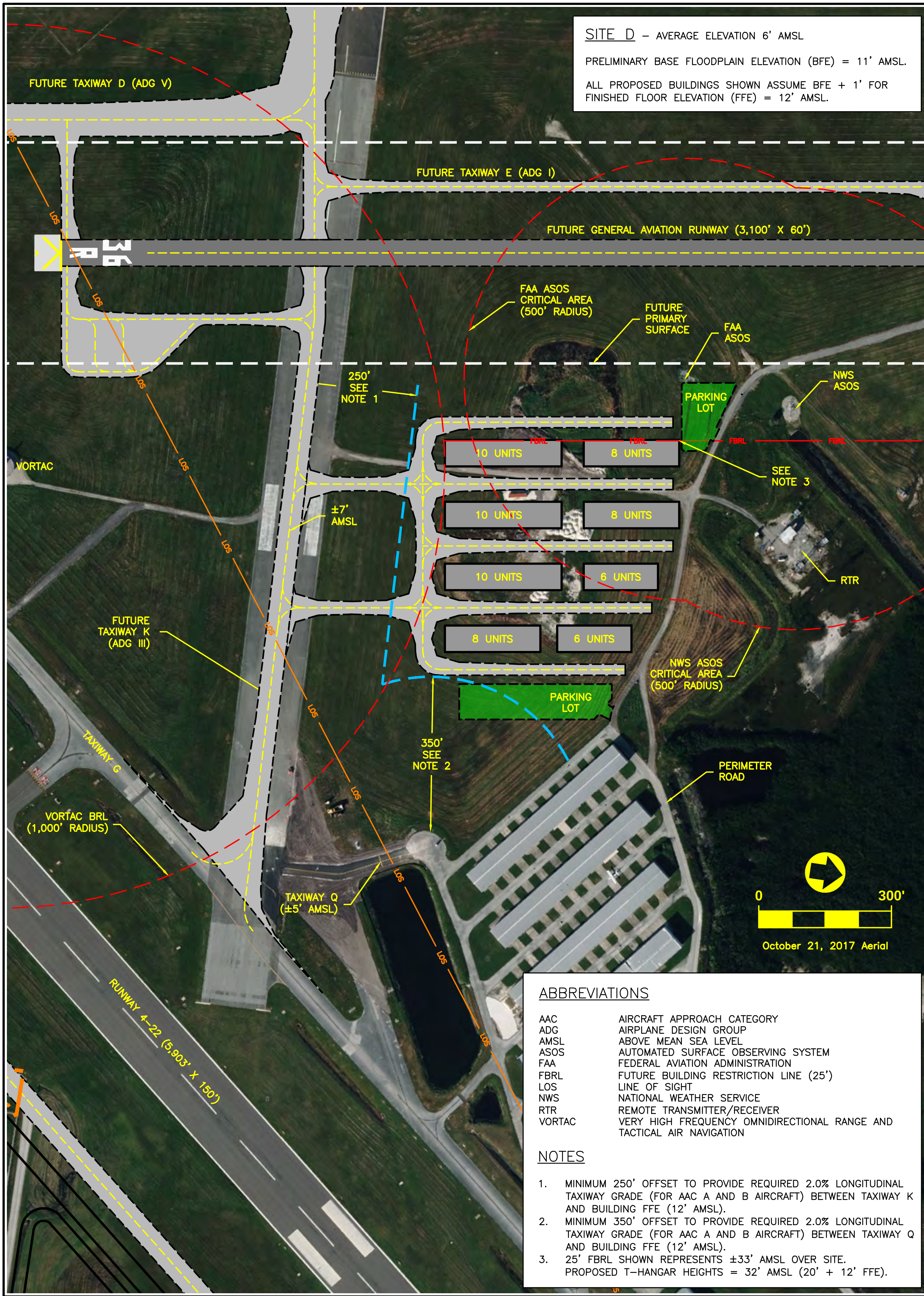
Concepts for the layout of T-hangars were created for Site A (**Figure 6.7-4**), Site D (**Figure 6.7-5**), and Site E (**Figure 6.7-6**). For each, the T-hangar buildings shown are based on the Erect-A-Tube N60-48 nested T-hangar building which is 60 feet wide by 264 feet long for a 10 unit building. This is nearly identical in size to Fulfab's LK48 fully nested T-hangar building, both of which have an overall height just under 20 feet. These popular units can fit a single aircraft with a wingspan up to 47.5 feet and tail height of 14 feet. T-hangars of this size have been planned since they can accommodate a number of the most common single-engine and light multi-engine (piston and turboprop) GA aircraft. Taxiway and taxiway access to the T-hangars all provide ADG I standards and each concept also depicts the associated landside access and automobile parking.



Source: ESA, 2019.

FIGURE 6.7-4

SITE A - T-HANGAR DEVELOPMENT CONCEPT



ABBREVIATIONS

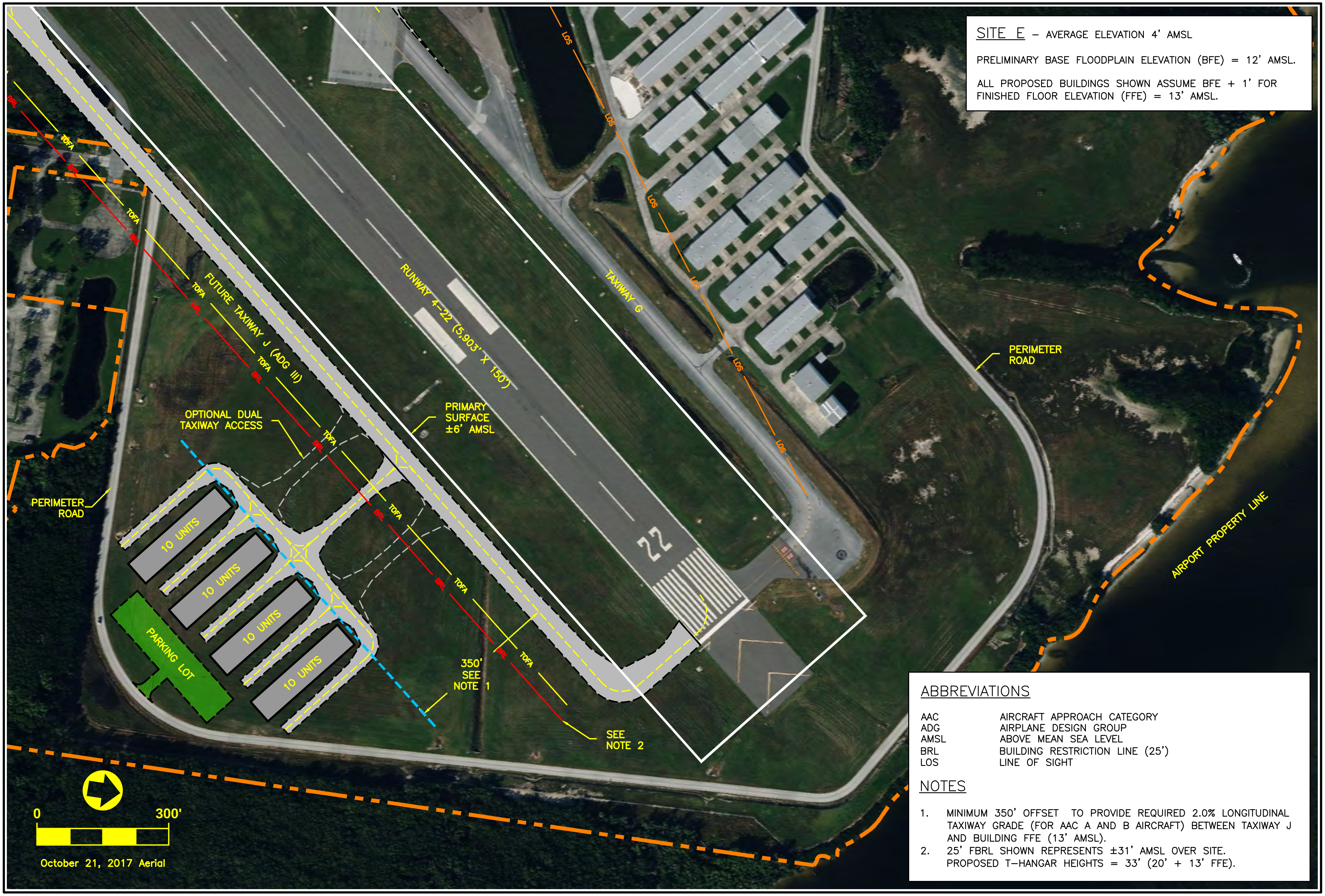
AAC	AIRCRAFT APPROACH CATEGORY
ADG	AIRPLANE DESIGN GROUP
AMSL	ABOVE MEAN SEA LEVEL
ASOS	AUTOMATED SURFACE OBSERVING SYSTEM
FAA	FEDERAL AVIATION ADMINISTRATION
FBRL	FUTURE BUILDING RESTRICTION LINE (25')
LOS	LINE OF SIGHT
NWS	NATIONAL WEATHER SERVICE
RTR	REMOTE TRANSMITTER/RECEIVER
VORTAC	VERY HIGH FREQUENCY OMNIDIRECTIONAL RANGE AND TACTICAL AIR NAVIGATION

NOTES

1. MINIMUM 250' OFFSET TO PROVIDE REQUIRED 2.0% LONGITUDINAL TAXIWAY GRADE (FOR AAC A AND B AIRCRAFT) BETWEEN TAXIWAY K AND BUILDING FFE (12' AMSL).
2. MINIMUM 350' OFFSET TO PROVIDE REQUIRED 2.0% LONGITUDINAL TAXIWAY GRADE (FOR AAC A AND B AIRCRAFT) BETWEEN TAXIWAY Q AND BUILDING FFE (12' AMSL).
3. 25' FBRL SHOWN REPRESENTS ±33' AMSL OVER SITE. PROPOSED T–HANGAR HEIGHTS = 32' AMSL (20' + 12' FFE).

Source: ESA, 2019.

FIGURE 6.7-5
SITE D - T-HANGAR DEVELOPMENT CONCEPT



Source: ESA, 2018.

FIGURE 6.7-6
SITE E - T-HANGAR DEVELOPMENT CONCEPT

The layouts incorporate the required taxiway/taxilane longitudinal grade requirements for AAC A and B aircraft (maximum of 2.0 percent). These longitudinal grades are a significant limitation on the ability to develop each of the three sites as they are much more restrictive than other surfaces such as the 25 foot BRL or object free areas. This is due to the fact that each site requires a minimum FFE that is higher than the elevation of the adjacent runways and taxiways. For Site A the FFE is 6 feet above the future Taxiway J elevation, at Site D it is 5 feet above the future Taxiway K elevation, and for Site E it is 7 feet above the future Taxiway J elevation. The BFE and corresponding FFE for each site is based on the preliminary 2018 FEMA FIRMs expected to be adopted in 2019. It also assumes the worst case scenario that a portion of each T-hangar building, such as the end units, might be considered occupied space (restrooms, pilot lounge, office, etc.) and therefore require a FFE that is one foot above the applicable BFE. Future taxiway elevations and the average elevation for each of the development sites were derived from the adjacent airfield elevations provided in the AGIS data.

Limitations at Site A

Much of Site A (the Airco Parcel) is required to support the 20-year demand for aircraft facilities other than T-hangars. The remaining aviation related space could support the development of 42 T-hangars units as shown on **Figure 6.7-4**. This is largely due to the setback required in order to provide the proper taxiway longitudinal grade between the T-hangars and Taxiway J. Given the average site elevation of 6 feet AMSL, any buildings in this portion of the Airco Parcel will require approximately 6 feet of fill to obtain the minimum FFE of 12 feet AMSL. This will certainly increase the cost to construct T-hangars significantly; so much so that they may not be economically viable during the course of the 20-year planning period.

An optional connector taxiway to the future Taxiway J is shown. This has been illustrated to demonstrate the airfield access that may be required if the large aircraft apron has not been constructed. It could also provide bypass capability to the airside access provided via the apron edge taxiway.

Limitations at Site D

It was previously noted that Site D appears to have a large amount of developable space, but there are many limitations specific to this site. The concept on **Figure 6.7-5** depicts 66 T-hangar units; however, not all of them can be constructed as shown. As with the other T-hangar sites, the proper taxiway longitudinal grades must be considered. For Site D, this includes a setback from Taxiway Q and one from future Taxiway K. However, as shown on the figure, the 1,000 foot radius VORTAC BRL creates a greater setback than that required for the proper taxiway longitudinal grade with Taxiway K. For the north side of the site, the T-hangars were configured so as not to impact the existing airport perimeter road.

The more significant limitation to Site D are the critical areas associated with the two different wind sensors of the FAA ASOS and National Weather Service (NWS) ASOS. These wind sensors are placed on individual poles located just northwest of Site D (see **Figure 6.7-5**). Also shown on the figure is the 500 foot radius critical area around each wind sensor. Any structures or vegetation within 500 feet of the wind sensors must be at least 15 feet below the wind sensor. Based on the AGIS data, the wind sensors are on towers that are 39 feet AMSL. As noted, the proposed T-hangar structures are just under 20 feet and when added to the minimum FFE of 12 feet AMSL for Site D, will have an overall height of 32 feet AMSL. At this elevation, the proposed T-hangar buildings within 500 feet of either ASOS tower would be considered a sheltering obstruction and impact the measurements of the wind sensors. Between 500 and 1,000 feet from the towers, the federal standards state that if practical, any obstructions be at least 10 feet below the wind sensors. Given the proposed T-hangar structures would be 7 feet below the wind sensors, only three of the buildings on the southeast side of the site could be constructed. Combined, the three T-hangar buildings would provide 24 units. It is also possible to configure two 12 unit T-hangar buildings in this area to minimize the taxilanes required.

The airport's RTR facility is located immediately north of Site D. Line-of-sight between the three communication towers of this facility with both aircraft and the ATCT is critical. Based on the AGIS data, two of the three towers are at 37 feet AMSL and the other at 44 feet AMSL. Given the proximity just north of the proposed T-hangar site, it is not expected that the three buildings that could be constructed would have any impact on the RTR activity.

With an average elevation of 6 feet AMSL, Site D would require significant fill to attain the minimum FFE of 12 foot AMSL required for any buildings in this area. Similar to the other sites, this will increase the development costs to a point where the construction of any buildings in this area may not be economically viable over the 20-year planning horizon.

Limitations at Site E

Due to physical constraints, Site E is the smallest of the future T-hangar areas considered. Combined with the setback required for the proper taxiway longitudinal grade between the T-hangars and Taxiway J, this limits the site to only 40 T-hangar units (see **Figure 6.7-6**). With an average elevation of 4 feet AMSL, Site E would require the most fill to attain the minimum FFE of 13 foot AMSL required for any buildings in this area. This would create the highest construction cost per T-hangar unit of the three sites evaluated.

An option to provide two connector taxiways with Taxiway J is shown. The dual taxiway access may be desired in place of just one in order to provide bypass capability between the T-hangar units and Taxiway J.

Recommended T-Hangar Plan

Each of the three sites considered for the development of future T-hangar units will have a significant cost related to the amount of fill required at each area. This would be the case for any building constructed in this area due to the new BFEs. Conversations with both Sheltair and Signature made it clear neither had any intent to develop T-hangars as part of their future expansion plans. When this is coupled with the fact that none of the sites can provide the 65 T-hangars required over the course of the planning period, it is recommended that the T-hangar facilities be planned for both Sites A and D. Combined these sites could provide up to 66 T-hangar units. Site E was excluded as the need for up to 9 feet of fill material makes the development of this site the most unrealistic.

Planning T-hangars at both Sites A and D creates an option in the areas PIE can offer for lease to future developers of T-hangar facilities. As noted previously the cost required to bring these sites up to the newer floodplain requirements may delay the development of these sites beyond the planning horizon of this study; perhaps to a time when no other areas are available for aviation related development at PIE.

6.7.6 Airfield Electrical Vault

The current airfield electrical vault needs additional space and the site it is located at is prone to flooding. Given these conditions, a project to relocate the airfield electrical vault needs to occur as soon as possible. The primary alternatives would be to relocate the airfield electrical vault in close proximity to the current site or relocate the vault to a new site on the other side of the airfield. In either case, the existing electrical homeruns will have a major impact on the cost and/or feasibility of the future site.

It is possible during the short-term planning period that the current vault could be relocated just south of the existing site. Once Allegiant completes their new support facility on the west side of the passenger terminal apron, they will abandon the current facility they use just south of the existing electrical vault (immediately north of Signature's hangar facilities). The current building utilized by Allegiant on this adjacent site could be removed and the parking area reconfigured to include a new electrical vault facility. The existing homeruns would then only require minor realignments and extensions into the new vault site.

The other option would be to construct a new airfield electrical vault in the infield area at Site D. The current vault is 12 feet high. Given the minimum FFE of 12 feet AMSL at Site D, the overall height of a vault in this area would be approximately 24 feet AMSL. This would place the structure 15 feet below the two ASOS wind sensors (at 39 feet AMSL) described in the T-hangar section.

After discussions with airport management, it was agreed that a site close to the existing airfield electrical vault would be the most feasible. However, given the immediate need to relocate the facility, a site further south of the existing vault has been reserved. The site is an area framed by Airport Parkway Drive South, the Signature FBO leasehold, and the NAA facilities. This site could be utilized for a new airfield electrical vault without having to remove the building currently utilized by Allegiant.

6.8 Non-Aeronautical Development

Non-aeronautical parcels were depicted as part of the evaluation of Site A (see **Figure 6.7-2**). These reflect a significant amount of area within the Airco Parcel that have been deemed not needed for future aeronautical uses. Other non-aeronautical parcels not identified as part of the alternatives analysis, but within the primary airport parcel, include the large parcel of land to the southwest of Runway 4-22 and Economy/Remote #2 Lot site at the end of Turtle Lane on the northeast side of the airport property. Each of these areas will be identified as future non-aeronautical uses in the overall airport development plan and depicted on the appropriate sheets of the new ALP drawing set.

6.9 Summary of Development Alternatives

The preceding sections have identified and analyzed a number of issues related to the future development alternatives for PIE. The concepts considered for future aviation related facilities focused on meeting the 20-year requirements while maintaining the airfield's operational efficiency and safety. The various facility improvements and preferred concepts were combined, along with the proposed stormwater management features, to create the overall recommended airfield development plan shown as **Figure 6.9-1**. This plan will be utilized as the basis for the development of the new ALP drawing set and development program described in the following chapters.

Source: ESA, 2019.

FIGURE 6.9-1

RECOMMENDED AIRFIELD DEVELOPMENT PLAN

CHAPTER 7

Airport Layout Plan Drawing Set

CHAPTER 7
Airport Layout Plan Drawing Set

7.1 General

This chapter describes the Airport Layout Plan (ALP) drawing set developed as part of the master plan. These plans identify areas of the St. Pete-Clearwater International Airport (PIE) needed for aviation related development during and beyond the 20-year planning horizon, as well as the additional land available for future non-aviation revenue support. These plans also serve as a reference for airport management and the Pinellas County Board of County Commissioners to evaluate existing and future obstruction disposition in conjunction with the Federal Aviation Administration (FAA) criteria. The ALP drawing set presented may be amended over time to reflect changes in the airfield environment or the demand affecting future facilities.

7.2 Drawing Set

The ALP set consists of 23 separate drawings, which have been prepared using AutoCAD software to graphically depict the recommended airfield improvements, imaginary safety surfaces, and layout of future facilities. The sheets of the ALP drawing set meet the criteria established in FAA Advisory Circular (AC) 150/5070-6B, Change 2, *Airport Master Plans*; FAA ARP Standard Operating Procedure 2.0, *Standard Procedure for FAA Review and Approval of Airport Layout Plans (ALPs)*, the Florida Department of Transportation (FDOT) *2019 Guidebook for Airport Master Planning*, and FAA AC 150/5300-13A, Change 1, *Airport Design*.

The drawings are based on the airport survey, mapping, and imagery collected at the outset of this study as part of the FAA Airports Geographic Information System (AGIS) requirements. This digital data was collected in October 2017, has been conditioned for compliance with the FAA AGIS program standards, and was submitted, reviewed, and accepted by both the National Geodetic Survey (NGS) and FAA.

This drawing set includes:

- Title Sheet
- Airport Data Sheet
- Airport Layout Plan
- Terminal Area Drawing
- Airport Airspace Drawings (3 sheets)
- Inner Approach: Plan and Profile Drawings (4 sheets)
- Runway Centerline Profiles
- Obstruction Data Tables (5 sheets)

- Land Use and Noise Contour Drawings (2 sheets)
- Exhibit A - Airport Property Inventory Maps (4 sheets)

The recommended development addresses the needs first identified in the assessment of the facility requirements, which were then analyzed further to arrive at a flexible plan meeting long-term airport goals. A full size version of the ALP drawing set is on file at the airport management offices as well as with both the FAA and FDOT.

7.2.1 Airport Layout Plan

The ALP graphically presents the existing and future airfield layout, key design standards, critical surfaces, and buildings, as well as the orientation of roads, structures, and other features in the immediate vicinity of the airport. Due to the various airfield facilities, including the two existing and third potential runway alignments, a separate Airport Data Sheet precedes and accompanies the ALP to document the different attributes and required standards. The ALP becomes the official guidance for airport management, once approved by the FAA and the FDOT, to make decisions on the funding of airfield improvements or other requests for development on or adjacent to airport property. The airport should update this drawing, including the associated Airport Data Sheet, as needed to ensure that FAA and FDOT always have an ALP reflective of current conditions.

Most of the information presented on the ALP has been analyzed in preceding chapters, justifying the need for recommended development. This includes the need to potentially provide an additional general aviation runway parallel to Runway 18-36 as demand increases, as well as the recent modification to the end of Runway 4 (completed during the review process of this study) to provide a full 6,000 feet of useable pavement. Improvements to the airfield's taxiway system are also reflected to provide the necessary connectivity to the future runway improvements, correct the remaining areas that do not meet the newer FAA taxiway standards, and to provide aircraft access into future development areas.

Additional features include the expansion of the passenger terminal facilities, additional aircraft parking apron, and hangar areas. The apron and hangar areas have been configured to have the ability to accommodate large aircraft operations for potential air cargo, aircraft maintenance, or even an additional fixed base operator (FBO) facilities. In addition, some features beyond the 20-year planning horizon have been included to ensure their viability. These primarily include the build out of additional small general aviation aircraft hangar facilities on the east side of the airport.

As indicated above, the build out shown reflects more facilities than what is required over the 20-year planning period. These additional layouts offer flexibility in the airport's continued improvement to the airport facilities. It will also decrease the need to update the ALP for individual projects. Regardless, none of the improvements shown will be constructed without approval from airport management nor will any be allowed to create any offsite impacts with respect to drainage or water quality. Before construction, each project will also require an individual airspace analysis to protect the operational capability of the airfield. This will ensure that none of the future structures or aircraft parking areas will impact the imaginary surfaces required for the runway and taxiway system.

7.2.2 Terminal Area Drawing

The Terminal Area Drawing depicts the same development configuration shown on the ALP drawing around the commercial passenger terminal at a larger scale so that additional features and greater detail of the proposed facilities can be discerned. The plan reflects the ultimate build out of the passenger terminal building and related aircraft parking positions; additional large aircraft parking; the relocation of the existing apron edge taxiway located adjacent to the passenger terminal area; and the improvement of various landside facilities. It is important to note that the ultimate build out of the passenger terminal shown represents development beyond the 20-year horizon of this master plan.

The initial passenger terminal improvements include constructing a new concourse; maintaining the existing check-in, Federal Inspection Services (FIS), and baggage claim areas; consolidating the passenger security checkpoint; and creating a centralized post-security concessions area. In the first phase, the concourse is built around and above the existing FIS and connects down to the expanded Gates 7-11 holdroom area. Subsequent phases extend the concourse to the west, adding the required gates, holdrooms, and concessions for expected passenger demand. It also moves the FIS to the west to allow for a larger security checkpoint and expanded concessions area. The configuration of future landside facilities around the commercial terminal are also reflected on the drawing. These include the reconfigured main surface lots, surrounding circulation roads, economy parking lot, and the potential for a future parking structure should demand require.

7.2.3 Airport Airspace Drawings

The future airspace surfaces were developed utilizing the criteria of Title 14 Code of Federal Regulations (CFR) Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*. In order to protect the airspace and approaches to each runway from hazards that could affect the safe and efficient operation of the airport, the full extent of all airport development is utilized. The 14 CFR Part 77 criterion has been established for use by local planning and land use jurisdictions to control the height of objects in the vicinity of the airport.

The specific imaginary surfaces, which shall be protected from obstructions, include the Primary, Horizontal, Conical, Approach, and Transitional Surfaces. Descriptions and the corresponding dimensions for each surface were included in the facility requirements chapter. The future 14 CFR Part 77 airspace surfaces must be used in conjunction with the most recent land development codes in order for Pinellas County staff to help airport management in determining if the construction of a proposed structure will penetrate any of the protective surfaces for the airport. The height restrictions and compatible land use zoning for the area surrounding the airport are included in *Chapter 142 – Airport Zoning* of the *Pinellas County Land Development Code*.

Chapter 142, which was updated and became effective on January 1, 2019, provides zoning regulations to protect the PIE Airport Hazard Area. This area is based upon the outermost shape, size, and periphery of PIE's 14 CFR Part 77 airspace surfaces which includes unincorporated Pinellas County and the political subdivisions of Dunedin, Oldsmar, Clearwater, Safety Harbor, Largo, Pinellas Park, St. Petersburg, and Gulfport. Administration and enforcement of these regulations between local jurisdictions is facilitated through one or more interlocal agreements between Pinellas County and the affected political subdivisions.

Critical structures and obstructions documented in the various data tables of the drawing sheets area based on the FAA AGIS data obtained in October 2017.

7.2.4 Inner Approach: Plan and Profile Drawings

The Inner Approach: Plan and Profile drawings illustrate in detail the critical surfaces within the approach area to each existing and future runway end. Federally obligated airports like PIE are subject to Grant Assurances 20 and 21 which require the protection of the approach surfaces. The FAA reviews all published instrument approach procedures on a periodic basis (approximately every two years). Obstacles found within the associated approach surfaces will likely result in higher minima, loss of approaches, and/or loss of night operation capability.

In addition to the applicable approach surfaces, these drawings reflect the Runway Safety Areas, Runway Object Free Areas, Runway Obstacle Free Zones, Runway Protection Zones, and Threshold Siting Surfaces, as well as the 14 CFR Part 77 Primary and Approach Surfaces off each runway end. Details are provided for objects that penetrate the criteria of these surfaces with existing and potential obstructions listed in the tables for each runway end. The Approach Surfaces extend out to a height of 100 feet above the respective runway threshold, as per FAA guidance for this type of drawing.

Each of these sheets also depict the location of any roadways, structures, ground elevations, and other man-made or natural features within the limits of the various imaginary surfaces. Essentially, all of the areas within these imaginary surfaces should be kept free of obstacles that could constitute a hazard to aircraft approaching or departing the airport. The obstacle locations and heights were obtained from the FAA AGIS data.

Following the FAA ALP checklist for developing the Inner Portion of the Approach Surface Drawings, a Runway Centerline Profiles sheet has also been included. This drawing depicts the full length of each runway centerline along with the associated Runway Safety Areas. Details include the elevations, gradients, vertical curves, and lines representing the five foot runway line-of-sight requirement.

Also shown on these drawings are the Departure Surfaces for each of the four runway ends. Federally obligated airports like PIE are subject to Grant Assurances 20 and 21 which require the protection of the any departure surfaces established. The FAA reviews all published instrument procedures on a periodic basis (approximately every two years). Obstacles found within the associated departure surfaces will likely result in higher minima or loss of the published instrument departure procedure affected.

Details are provided for objects that penetrate these surfaces with existing and potential obstructions listed for both the existing and future surfaces in the tables on the following sheets. The drawing also depicts the location of any roadways, structures, ground elevations, and other man-made or natural features within the limits of the surfaces. The obstacle locations and heights were obtained from the FAA AGIS data.

7.2.5 Land Use and Noise Contour Drawings

Land Use and Noise Contour drawings have been prepared for the existing (2017) and future (2023) conditions. These drawings depict both on-airport and off-airport land uses. On-airport uses have been limited to aeronautical and non-aeronautical, which serve to ensure that the airport property required for aviation is not utilized for other purposes that would limit the ability of the facility to accommodate the expected demand. The off-airport portions reflect the existing and future land use designations surrounding the airport property boundary. These were obtained from the Pinellas county eGIS website (www.new-pinellas-egis.opendata.arcgis.com).

Superimposed over the airport and surrounding area are the Day-Night Average Sound Level (DNL) noise contours created as part of the environmental overview of this study. Even though the noise contours created were not part of an official 14 CFR Part 150 Noise and Land Use Compatibility Study, they were developed utilizing the same 65, 70, and 75 DNL contours evaluated in a full noise study. As noted previously in the environmental overview chapter, approximately 22 acres of predominantly commercial and industrial uses, as well as some roads, their associated right-of-ways, and some ditch areas south of the airport are encompassed within the future 65 DNL contour. These land uses are considered to be compatible within this contour area. The compatible land use and development standards around the airport are defined in *Chapter 142 Airport Zoning of the Pinellas County Land Development Code*.

7.2.6 Exhibit A - Airport Property Inventory Maps

The four sheets of the Exhibit A - Airport Property Inventory Maps accurately depict the current airport property line, including original parcels that were released, parcels that have been acquired, easements within the property limits, etc. These sheets document the various legal descriptions and provide additional property details. They also meet the criteria established in FAA AC 150/5100-17, Change 6, *Land Acquisition and Relocation Assistance for Airport Improvement Program (AIP) Assisted Projects*. Specifically, the ARP SOP No. 3.00 Appendix B, *Exhibit "A" Review Checklist*.

These sheets were based on the full boundary survey and title search conducted as part of this study by Northwest Surveying, Inc. and American Government Services Corporation. A full size copy of the approved Exhibit A – Airport Property Inventory Map drawing set is on file with airport management.

CHAPTER 8

Airport Development Program – Financial Feasibility Analysis

CHAPTER 8

Airport Development Program – Financial Feasibility Analysis

8.1 General

The analyses conducted in the previous chapters evaluated airport development needs based upon current and forecast aviation activity, as well as the opportunities that will exist after new areas of the airfield are available for development. Once the needs of the airport are well defined and the alternatives have been vetted, the next step in the master planning process is to identify and prioritize the individual elements into a cohesive capital development program. This involves the application of strategic programming and financial management rationale to each development item so that a responsible and effective implementation process can be assured. St. Pete-Clearwater International Airport (PIE) is operated and managed as an independent department within the Pinellas County government. Given airport management continues to operate PIE with no debt, the 20-year airport development program is based on the ability to continue to fund the capital projects using only revenues generated by the airport and available grant funding.

8.2 Proposed Capital Improvements

The initial step in establishing an airport development program is to determine the cost of each proposed improvement. Cost data used in this study was collected from a variety of sources, including actual project estimates, published engineering indices, government agencies, and similar airport construction projects in the Tampa Bay area. In addition, consideration was given to reflect costs related to testing, survey, inspection, and other unknown contingencies. The initial cost estimates were based on 2019 dollars. The Capital Improvement Program (CIP) is divided into the short-term (2019 - 2023), intermediate-term (2024 - 2028), and long-term (2029 - 2038) planning horizons. In addition to the recommended improvements for each period, the projects that are currently underway or have been funded prior to 2019 are also included in the CIP. These are illustrated on **Figures 8.2-1** to **8.2-3** at the end of this chapter.

8.3 Financial Analysis Objectives

The primary objective of the Financial Feasibility Analysis is to evaluate airport management's capability to fund the CIP and to finance airport operations. The analysis includes development of a detailed Financial Feasibility Plan. Objectives for developing the Financial Feasibility Plan include presenting the results of the implementation evaluation and providing practical guidelines for matching an appropriate amount and timing of financial sources with the planned use of funds. The overall approach for conducting the Financial Feasibility Analysis included the following steps:

- Gathering and reviewing key airport management documents related to historical financial results, capital improvement plans, operating budgets, regulatory requirements, Pinellas County policies, airport policies, airline agreements, and other operating agreements with airport users.
- Interviewing airport management to gain an understanding of the existing operating and financial environment, relationships with the airlines, and overall management philosophy.
- Reviewing the aviation activity forecast developed as part of this study and the most recent Terminal Area Forecast (TAF) developed by the Federal Aviation Administration (FAA).
- Reviewing the CIP project cost estimates and development schedules anticipated for the 20-year planning horizon and projecting the overall financial requirements of the program.
- Determining and analyzing the sources and timing of capital funds available to meet the financial requirements for operating PIE and financing the CIP.
- Analyzing historical operations and maintenance expenses; developing operations and maintenance expense growth assumptions; reviewing assumptions with airport management; and projecting future operations and maintenance expenses for the 20-year planning period.
- Analyzing historical revenue sources, developing revenue growth assumptions, reviewing assumptions with airport management, and projecting future airline and non-airline revenues for the planning period.
- Completing results of the review in a Financial Analysis Summary that evaluates the financial reasonableness of the CIP.

Additionally, the financial analysis approach included a revised forecast of passenger enplanement growth. The forecasts of passenger enplanements approved by the FAA for this study reflected an average annual growth rate of 4.9 percent for the 20-year planning period. Over the past two years, conditions have changed which warrant, for the purposes of the Financial Feasibility Analysis only, a more conservative estimate of forecasted passenger enplanement growth at PIE. Therefore, this Financial Feasibility Analysis utilized the forecasted passenger enplanements for PIE from the FAA's 2019 TAF (issued in January of 2020) for the purpose of projecting various capital funding sources in this analysis including Airport Improvement Program (AIP) entitlement grants, Passenger Facility Charge (PFC) collections, and Customer Facility Charge collections, as well as projections of various operating revenues. The 2019 TAF forecasted enplanement growth rates through 2038 ranging from 1.4 to 1.8 percent.

8.4 Capital Funding Sources

In the past, PIE has used a combination of FAA AIP entitlement and discretionary grants, Florida Department of Transportation (FDOT) grants, PFCs, and cash reserves/net operating revenues to fund capital improvements. These funding sources, as well as additional sources of capital funding, will continue to be important to finance the airport's CIP over the next 20-year period.

8.4.1 Airport Improvement Grants

The airport receives grants from the FAA to finance the eligible costs of certain capital improvements. These federal grants are allocated to commercial passenger service airports through the AIP. AIP grants include passenger entitlement grants, which are allocated among airports by a formula that is based on passenger enplanements and discretionary grants which are awarded in accordance with FAA guidelines. After several years of continuing budget resolutions and other short-term legislative measures implemented by Congress, the FAA Reauthorization Act of 2018 was enacted on October 5, 2018. This authorized funding for the AIP through September 30, 2023.

Under current AIP authorization legislation, eligible projects are funded on a 90 percent AIP grant and 10 percent local match basis for small and non-hub airports. Under this authorization, PIE received entitlements of about $4.1 million in 2019 and future annual grants are projected to grow to $4.5 million by 2038, the end of the planning period. Small hub airports (those with annual enplanements between approximately 450,000 passengers and 2,250,000 passengers) can accumulate and carryover up to three years of unspent entitlements plus the current year before the awards are revoked. The feasibility analysis assumes the application of annual AIP passenger entitlement funds will be about $24.0 million during the short-term planning period, $21.2 million during the intermediate-term, and $48.6 million during the long-term.

The approval of AIP discretionary funding is based on a project eligibility ranking method the FAA uses to award grants, at their discretion, based on a project's priority and importance to the national air transportation system. In 2014, 2015, 2016, and 2019, the airport received discretionary funding to support various airfield improvement projects. It is reasonable to assume that the airport will receive additional discretionary funding during the planning period for higher priority, eligible projects, such as runway projects. The feasibility analysis assumes that $11.6 million of AIP discretionary funds will be required during the short-term for the rehabilitation of Runway 18-36. This discretionary grant was awarded to PIE in September 2019. No discretionary funds are assumed to be required for the intermediate-term period. Since the future availability of AIP discretionary grants is not certain until an actual grant is awarded, it should be noted that any CIP projects which have discretionary funds indicated as a funding source in the Financial Feasibility Analysis plan may need to be delayed until such funds actually become available.

The analysis further assumes that the current AIP program will continue to be extended through 2038 and that future program authorizations will provide similar funding levels as it currently does and as it has historically provided since the program was established in 1982.

8.4.2 Florida Department of Transportation Grants

The FDOT Aviation Office provides aviation grants for airport projects from a portion of the state sales tax collected on aviation fuel. The grants fall under one of six programs. The type of airport and type of project typically determine which program provides funding. Grants are approved for projects identified as eligible according to the Catalog of Eligible Projects. Eligibility generally includes those projects that are AIP eligible as well as many which are typically not AIP eligible including parking facilities, hangar construction, and certain types of equipment. For commercial service airports, when a project is funded by the FAA through the AIP program, FDOT will fund up to 50 percent of an airport's local match requirement. When a project is not funded by the FAA but meets FDOT eligibility, state grant awards are allowed for up to 50 percent of the total project costs. The CIP includes several projects during the planning period that are assumed to be partially funded from FDOT grants - $5.5 million in the short-term, $8.4 million in the intermediate-term, and $11.9 million in the long-term.

In 2003, the Florida Legislature and Governor established the Strategic Intermodal System (SIS) to enhance Florida's transportation facilities, including the state's largest and most significant airports, spaceports, deep water seaports, freight rail terminals, passenger rail terminal, intercity bus terminals, rail connectors, waterways, and highways. These facilities represent the state's primary means for moving people and freight between Florida's diverse regions, as well as between other states and nations. The SIS is Florida's highest statewide priority for transportation capacity improvements.

FDOT has committed $4.5 million through the SIS program toward PIE's cargo apron rehabilitation and Runway 9-27 conversion project in the short-term planning period. Additionally, the feasibility analysis assumes an additional $31.4 million of SIS funds will be provided in the intermediate-term for the first two phases of the passenger terminal expansion project. Similar to AIP discretionary funding, the future availability of SIS grants is not certain until an actual grant is awarded. CIP projects which have SIS funds indicated as a funding source in the Financial Feasibility Analysis may need to be delayed until such funds actually become available.

8.4.3 Passenger Facility Charges

The Aviation Safety and Capacity Expansion Act of 1990 established the authority for commercial service airports to apply to the FAA for imposing and using a PFC of up to $3.00 per eligible enplaned passenger. With the passage of AIR-21 in June 2000, airports could apply for an increase in the PFC collection amount from $3.00 per eligible enplaned passenger to $4.50. The proceeds from PFCs are eligible to be used for the local share of AIP eligible projects and for certain additional projects that preserve or enhance capacity, safety, or security; mitigate the effects of aircraft noise; or enhance airline competition. PFCs may also be used to pay debt service on bonds (including principal, interest, and issue costs) and other indebtedness incurred to carry out eligible projects. In addition to funding future planned projects, the legislation permits airports to collect PFCs to reimburse the eligible costs of projects that began on or after November 5, 1990.

PIE currently collects PFC revenues in an approved open application at the $4.50 collection level. Within its authority, airport management plans to submit a new application for additional PFC eligible capital projects identified in this study to continue collection without interruption. Current collections at the $4.50 collection level are approximately $4.5 million per year. The feasibility analysis assumes that PIE will submit additional PFC applications and amendments, as required, to ensure that the collection of PFC revenues continues beyond the authorized expiration date through the end of the 20-year planning period. The analysis further assumes that PFCs will be used on a pay-as-you-go basis to fund approximately $30.9 million in eligible project costs during the short-term, $25.3 million in the intermediate-term, and $57.4 million in the long-term.

8.4.4 Other Capital Contributions

Certain on-airport development projects may be funded through other capital contributions. This could include other non-FAA or FDOT governmental grants, economic development funding, County funding or private third-party funding. The analysis assumes other capital contributions in the short-term of approximately $9.8 million. The majority of these funds are from a Transportation Security Administration (TSA) Other Transaction Agreement (OTA) for the airport's inline baggage handling system project. During the intermediate-term, the feasibility analysis assumes other capital contributions will be required to fund the design and construction of access roads to the redeveloped Airco Parcel. These funds would likely come from an economic development source or private third-party funding. If these other capital contributions do not materialize in the timeframe needed, the associated project may have to be modified, delayed, or cancelled until such funding is committed.

8.4.5 Other Unidentified Funding

The amount and timing of the traditional airport capital funding sources described in the preceding paragraphs are insufficient to finance two projects planned for implementation during the long-term of the planning period. These projects include a new parallel general aviation Runway 18L-36R and its associated parallel taxiways; however, these projects will not be necessary unless the airfield capacity over several years warrants these improvements. Consequently, non-traditional funding sources will be needed to finance the cost of projects totaling about $12.0 million during the long-term planning period. The source of this "other" funding has not yet been determined and represents a shortfall for the capital project Financial Feasibility Analysis. This other funding could include sources such as future private third-party funding, federal economic stimulus grants, local economic development funding, state funding, and other sources that are not certain at this time. If other funding sources cannot be identified and obtained in time to fund the projects, the associated projects will have to be modified, delayed, or cancelled until such funding can be identified. Consequently, this source of capital funding has been referenced in the Financial Feasibility Analysis as "Other Unidentified Funding."

8.4.6 Cash Reserves/Airport Net Operating Revenue

At the beginning of 2019, PIE had accumulated about $37.6 million in unrestricted cash reserves available for operations and capital project funding. The analysis assumes that airport cash reserves/net operating cash flow will be used throughout the planning period to fund about $98.3 million in project costs. This will include local grant match requirements, project components ineligible for federal funding, or projects which federal and/or state funding may not be available. The feasibility analysis assumes $28.3 million during the short-term, $34.7 million in the intermediate-term, and $35.3 million in the long-term.

8.5 Financial Analysis and Feasibility Plan Program

This analysis, along with **Schedules 8-1** to **8-5** presented at the end of this chapter, provides the results of evaluating the financial reasonableness of implementing the CIP from 2019 through 2038.

8.5.1 Estimated Project Costs and Development Schedule

The estimated project costs and development schedule is derived from the previous analyses of this study. The CIP for capital improvements is projected on an annual basis for the short-term planning period from 2019 through 2023, in total for the intermediate-term planning period from 2024 through 2028, and in total for the long-term planning period from 2029 through 2038. For each of these planning periods, **Schedule 8-1** presents the CIP including estimated costs and anticipated development schedule for the identified projects.

As shown in **Schedule 8-1**, the total estimated cost of projects is $328,629,657 in 2019 dollars. The estimated costs for projects scheduled during the period 2019 through 2038 are adjusted by an assumed 3.0 percent rate of annual inflation. The resulting total project costs escalated for inflation are $412,473,665. **Table 8-1** presents a summary of the schedule and provides a comparison of 2019 base year costs with escalated costs adjusted for inflation for each of the planning periods.

TABLE 8-1
SUMMARY OF 2019 BASE YEAR AND TOTAL ESCALATED COSTS

Planning Periods	2019 Base Year Costs	Total Escalated Costs
Short-Term (2019 – 2023)	$110,805,757	$114,607,529
Intermediate-Term (2024 – 2028)	$105,107,600	$127,372,619
Long-Term (2029 – 2038)	$112,716,300	$170,493,517
Total	**$328,629,657**	**$412,473,665**

NOTE: Addition errors are due to rounding of calculated amounts.

SOURCE: Leibowitz & Horton AMC analysis, 2020.

8.5.2 Sources and Uses of Capital Funding

Funding sources for the CIP depend on many factors, including AIP and PFC project eligibility; the ultimate type and use of facilities to be developed; airport management's current and desired levels of the airline cost per enplaned passenger; the availability of other financing sources; and the priorities for scheduling project completion. For planning purposes, assumptions were made related to the funding source of each capital improvement.

Schedule 8-2 lists each of the CIP projects, their estimated costs (escalated annually for inflation), and the assumed funding sources and amounts. During the 20-year planning period, it was assumed that AIP entitlement grants would partially fund runway/taxiway rehabilitation and new construction; terminal improvements including security system improvements and improvements to U.S. Customs and Border Protection processing facilities; passenger terminal improvements and expansion (over five phases); a new ARFF station and vehicles; and an airport master plan. It was assumed that AIP discretionary grants would partially fund the rehabilitation of Runway 18-36 as well as the rehabilitation of Runway 4-22, and the new ARFF station. It was assumed that FDOT aviation grants would provide a portion of the funding for AIP eligible projects as well as funding for the inline baggage handling system, airport maintenance facility, environmental work for the redevelopment of the Airco Parcel, passenger exit lane technology, and passenger parking facilities. FDOT SIS funding is anticipated for the cargo apron and Runway 9-27 conversion project as well as to provide significant funding for the five phases of passenger terminal building improvements and expansion. PFC pay-as-you-go revenues were assumed to fund a portion of the local share for AIP eligible projects as well as the short-term passenger terminal improvement projects including the inline baggage handling system, terminal roadway improvements, relocation of the airfield electrical vault, cargo apron improvements, and drainage improvements for the Airco Parcel redevelopment. Other Capital Contributions have been programmed for the inline baggage handling system and shoreline stabilization feasibility study, as well as the development of the access roads to the redeveloped Airco Parcel. Other Unidentified Funding has been programmed for a new parallel general aviation Runway 18L-36R and its associated parallel taxiways. Available cash reserves were assumed to fund the ineligible costs associated with AIP and PFC projects and projects ineligible for AIP, FDOT, or PFC funding. These include projects such as automobile parking improvements, a consolidated rental car facility, and other terminal or airport related improvements. A summary of the sources of capital funding by type and uses of capital funding by planning period for the CIP is presented in **Table 8-2**.

TABLE 8-2
SUMMARY OF SOURCES AND USES OF CAPITAL FUNDING

Sources of Capital Funding	Short-Term (2019 – 2023)	Intermediate-Term (2024 – 2028)	Long-Term (2029 – 2038)	Totals
AIP Entitlement Grants	$23,960,232	$21,159,410	$48,629,384	$93,749,026
AIP Discretionary Grants	$11,584,528	$0	$5,294,422	$16,878,950
FDOT Aviation Grants	$5,478,429	$8,369,967	$11,939,480	$25,787,876
FDOT SIS Grants	$4,500,000	$31,400,000	$0	$35,900,000
Passenger Facility Charges	$30,907,239	$25,265,604	$57,426,627	$113,599,470
Other Capital Contribution	$9,848,223	$6,437,972	$0	$16,286,195
Other Unidentified Funding	$0	$0	$11,952,181	$11,952,181
Cash Reserves/Net Ops Cash Flow	$28,328,878	$34,739,666	$35,251,422	$98,319,965

Total Sources of Capital Funding	**$114,607,529**	**$127,372,619**	**$170,493,517**	**$412,473,665**
Uses of Capital Funding				
Runway/Taxiway Improvements	$33,576,553	$6,016,740	$36,372,186	$75,965,479
Terminal Apron Improvements	$10,665,393	$0	$0	$10,665,393
Terminal Building	$29,053,302	$111,367,244	$89,242,794	$229,663,340
Terminal Roadway and Parking Improvements	$12,035,133	$2,581,199	$28,996,345	$43,612,677
General Aviation Facility Improvements	$6,038,121	$6,437,972	$0	$12,476,093
ARFF Equipment and Facilities	$2,185,454	$969,465	$13,613,308	$16,768,226
Other airport Facility Buildings	$13,274,417	$0	$0	$13,274,417
Other Improvements	$7,779,156	$0	$2,268,885	$10,048,040
Total Uses of Capital Funding	**$114,607,529**	**$127,372,619**	**$170,493,517**	**$412,473,665**

NOTE: Addition errors are due to rounding of calculated amounts.

SOURCE: Leibowitz & Horton AMC analysis, 2020.

8.5.3 Projected Operations and Maintenance Expenses

Operations and maintenance expense projections for the short-, intermediate-, and long-term planning periods are based on the airport's 2019 actual expenses, the airport's 2020 budget, the anticipated impacts of inflation, aviation traffic increases, facility improvements, and the recent experience of other airports with similar levels of aviation activity.

Operations and Maintenance Expense Projection Assumptions

Operations and maintenance expense growth assumptions, as reflected in **Schedule 8-3**, were developed to project the airport's operating expenses during the planning period. Actual amounts for 2016 through 2019, and budgeted amounts for 2020 provide a comparison with expenses that are projected for the period 2021 through 2038. For each of the following expense categories listed below, projections are based on 2020 budgeted amounts with an assumed 3.0 percent annual rate of inflation beginning in 2021.

- Personal Services - Salaries/Wages
- Personal Services - Taxes/Benefits

- Professional Services and Legal
- Accounting and Auditing
- Other Contractual Services
- Travel
- Communication Services
- Freight/Postage
- Utility Services
- Rentals and Leases
- Repairs and Maintenance
- Printing and Binding
- Promotional Activities
- Other Charges and Obligations
- Intergovernmental Services
- Office Supplies
- Operational Supplies
- Subscriptions and Memberships
- Training and Education

Projection of Operations and Maintenance Expenses

The projection of operations and maintenance expenses is provided in **Schedule 8-3**. As shown, total expenses are expected to grow from $13,172,993 in 2019 to $15,869,412 in 2023 reflecting an overall growth rate of 5.2 percent per year and a total of $73,930,804 during the short-term planning period. Intermediate-term expenses are projected to total $86,780,449 reflecting a 3.0 percent annual growth rate for the five-year period 2024 to 2028 and long-term expenses are projected to total $217,227,992 reflecting a 3.0 percent annual growth rate for the ten-year period 2029 to 2038.

Projection of Operating Expenses Per Enplaned Passenger

Schedule 8-3 also provides a comparison of the airport's total operating expenses per enplaned passenger versus small hub airports with similar levels of aviation activity. The airport's operating expenses per enplaned passenger are projected to increase from $11.53 for 2019 to an average of $14.97 during the long-term planning period. According to the *Small Hub Airports, FAA Operating and Financial Summary Report #127* and *FAA Air Carrier Activity Information System Enplanement Database*, the overall small hub industry average grows from $19.67 in 2019 to $21.29 during the same long-term planning period. These comparisons show that budgeted and projected operating expenses at PIE are lower than other small hub airports of similar size during all three periods of the 20-year planning horizon. This implies that the PIE currently manages operations and controls expenses in a manner that is more cost efficient than other comparable small hub airports.

8.5.4 Projected Operating Revenues

Operating revenue projections for the short-, intermediate-, and long-term planning periods are based on the airport's 2019 actual expenses, the airport's 2020 budget, current rates and charges methodology, current leasing practices, the anticipated impacts of inflation, aviation traffic increases, facility expansions, and the recent experience of other airports with similar levels of aviation activity.

Operating Revenue Projection Assumptions

Operating revenue growth assumptions, as reflected in **Schedule 8-4**, were developed to project the airport's operating revenues during the planning period. Actual amounts for 2016 through 2019, and budgeted amounts for 2020 provide a comparison with revenues that are projected for the period 2021 through 2038. This analysis organizes revenues into categories for airline revenues, non-airline revenues, and non-operating revenues. Annual revenue growth assumptions for the period 2021 through 2038 are provided in the following sections.

Airline Revenues

Airline landing fee projections beginning in 2021 are based on the airport's 2020 budget with growth thereafter at a 3.0 percent annual rate of inflation plus increases in aircraft landed weight assuming one half the annual growth rate of forecasted passenger enplanements. This reflects the airlines' practice of managing increased load factors before additional flights are provided.

At PIE, air carriers pay rent and fees for various spaces and uses of the terminal building. Projections for air carrier fees and rents beginning in 2021 are based on the 2020 budget with growth thereafter at a 3.0 percent annual rate of inflation.

Non-Airline Revenues

Non-airline revenue projections beginning in 2021 for the following categories are based on the airport's 2020 budget with growth thereafter at a 3.0 percent annual rate of inflation plus increases in aircraft landed weight assuming one half the annual growth rate of forecasted passenger enplanements:

- Airline Fuel Flowage Fee
- General Aviation Fuel Flowage Fee

Non-airline revenue projections beginning in 2021 for the following categories are based on the airport's 2020 budget with growth at a 3.0 percent annual inflation rate plus the annual rate of forecast enplanement growth:

- Paid Auto Parking

- Concession - Car Rentals
- Concession - Food/Beverage and Retail
- Concession - Ground Transportation

Additionally, PIE is in the process of implementing new ground transportation fees for the transportation network companies operating at the airport. It is anticipated that these fees will be in full effect beginning in 2021. Therefore, projected revenues from ground transportation operators reflect this additional revenue anticipated to begin in 2021.

Non-airline revenue projections beginning in 2021 for the following categories are based on the airport's 2020 budget with growth at a 3.0 percent annual inflation rate thereafter:

- General Aviation Fixed Base Operators
- General Aviation Buildings/Hangar/Land Rents
- General Aviation Miscellaneous
- United States Coast Guard
- Concession - Advertising
- Terminal - Other Office Rents
- Terminal - Other Permit Fees
- Terminal - Badge Fees
- Terminal - Other Misc. Fees
- Industrial Rents
- Other Miscellaneous Revenue

Non-Operating Revenues

Non-operating revenue projections beginning in 2021 for investment income are based on the airport's 2020 budget and are assumed to remain flat throughout the planning period.

Projection of Operating Revenues

The projection of operating revenues is provided in **Schedule 8-4**. As shown, airline revenues are expected to grow from $2,130,120 budgeted for 2020 to $2,347,841 projected for 2023 with a total of $11,406,016 during the short-term planning period. During the intermediate-term period, airline revenues are projected to total $12,987,588 and during the long-term period, revenues are projected to total $33,526,734. The overall annual growth rate for airline revenues is 3.4 percent during the 20-year planning period. Non-airline revenues are expected to increase from $11,988,150 budgeted for 2020 to $13,537,800 projected for 2023 with a total of $63,746,425 during the short-term period. During the intermediate-term period, non-airline revenues are projected to total $76,066,064 and during the long-term period, non-airline revenues are projected to total $205,012,502. The overall annual growth rate for non-airline revenues is 4.0 percent. Total airport revenues (including non-operating revenues) are expected to increase from $14,939,840 budgeted for 2020 to $16,707,211 projected for 2023 with a total of $79,312,265 during the short-term period. During the intermediate-term period, revenues are projected to total $93,162,451 and during the long-term period, revenues are projected to total $246,753,987. The overall annual growth rate for total airport revenues is 3.8 percent.

Airline Cost Per Enplaned Passenger

Schedule 8-4 also provides a comparison of the airport's airline cost per enplaned passenger (CPEP) versus small hub airports with similar levels of aviation activity. The airline CPEP (all airline fees and rentals divided by enplaned passengers) is a measure that airlines use to compare their cost of operations among the airports they serve. The airport's airline CPEP is projected to grow slightly from $1.84 to $2.31 throughout the 20-year planning period. According to the *Small Hub Airports, FAA Operating and Financial Summary Report #127* and *FAA Air Carrier Activity Information System Enplanement Database*, over the same period, the overall small hub industry average grows from $8.26 in 2020 to $8.89 during the long-term.

The airport's low CPEP is reflective of its rates and charges strategy which is different from a typical small hub airport. The airport serves an ultra low-cost airline which operates leaner and with higher cost sensitivity than traditional low-cost or legacy air carriers. Ultra low-cost carriers offer generally low fares in exchange for eliminating many traditional passenger services, or providing additional services at a fee to the passenger. In response to their cost sensitivity, the airport developed a rates and charges strategy which allows them to generate sufficient non-airline revenues from sources such as parking, concessions, and industrial rents to fund operations and maintenance expenses and to keep airline costs very low. This enables the airport to be more competitive in attracting new airline service.

The airport could raise airline fees/rents very minimally to generate significant additional airline revenues. For each one dollar per enplanement increase, revenues would increase by approximately $1.1 million per year. If such an approach were taken, however, the airport could alienate an ultra low-cost carrier experiencing successful operations at PIE.

Operating Revenues Per Enplaned Passenger

Schedule 8-4 also provides a comparison of the airport's total operating revenue per enplaned passenger versus an average for other small hub airports. The airport's total operating revenue per enplaned passenger is projected to grow from $12.20 budgeted for 2020 to an average of $16.44 during the long-term planning period. According to the *Small Hub Airports, FAA Operating and Financial Summary Report #127* and *FAA Air Carrier Activity Information System Enplanement Database*, over the same period, the overall small hub industry average grows from $28.58 in 2020 to $30.76 during the long-term. The difference between the airport's operating revenue per enplaned passenger and the small hub industry average is reflective of the airport's low airline revenues and resulting low cost per enplaned passenger. It also indicates that the airport's non-airline revenues are lower than the small hub industry average.

An examination of two of the PIE's more significant non-airline revenues (parking revenues and revenue from food and beverage, and retail concessions) explains some of the difference between PIE's non-airline revenue per enplaned passenger and that of the small hub industry average. In

2018, PIE realized $2.67 in parking revenue per enplaned passenger. The small hub industry average was higher at approximately $7.25. This is indicative of PIE being a destination market with fewer of its passengers originating from the local area and parking vehicles. Additionally, in 2018, PIE generated approximately $0.58 per enplaned passenger through in-terminal food, beverage, and retail sales. In comparison, the small hub industry average was $1.33 per enplaned passenger. Airport management has recently updated its in-terminal food, beverage, and retail concession program in an effort to increase its revenue from this source. Additionally, airport management is implementing new ground transportation fees which are anticipated to be in full effect by 2021. The diversity of non-airline revenues at PIE provides a balance for those specific revenue categories which may be lower than similar small hub airports against those revenue categories which may be higher than similar small hub airports. PIE airport management continues to pursue opportunities to increase its non-airline revenues.

8.5.5 Financial Plan Summary

The Financial Plan Summary presented in **Schedule 8-5** includes a capital cash flow section which presents a summary of projected capital funding (from **Schedule 8-2**) and scheduled capital expenditures (from **Schedule 8-1**) with the cash flow that results from implementing the recommended CIP. **Schedule 8-5** also includes an operating cash flow section that summarizes totals for operating revenues (from **Schedule 8-4**) and operating expenses (from **Schedule 8-3**) with the addition of beginning cash reserve balances to provide the cash flow that results from these activities.

In **Schedule 8-1** of the Financial Feasibility Analysis, practical approaches were provided for scheduling capital expenditures to match the availability of capital funding. **Schedule 8-2** provided practical approaches for matching specific capital funding sources with each of the identified projects. As shown in **Schedule 8-5**, positive year end cash reserves are projected throughout the 20-year planning period (2019 to 2038). Based on the assumptions underlying the Financial Feasibility Analysis summarized in the capital cash flow section of **Schedule 8-5**, implementation of the recommended projects in the CIP that are scheduled throughout the 20-year planning period are projected to be financially reasonable.

Implementation of capital projects during the 20-year planning period that have AIP discretionary or FDOT SIS grants indicated as a funding source are subject to the availability of those grants which are provided at the sole discretion of the FAA and FDOT. If the identified portion of discretionary funding is not awarded by the FAA or FDOT, then these projects will need to be delayed until funding is available.

In the event that AIP discretionary grants and/or FDOT SIS grants are not awarded or are awarded in smaller amounts than assumed in this analysis, PIE airport management may consider debt financing as a means of interim funding for those projects, primarily as a result of the large costs of the planned passenger terminal development. As a department of Pinellas County, the airport has a variety of options in securing debt financing. One option would be to obtain a loan from another County department which may have available cash balances. This option would generally yield lower financing costs for the airport and often provide the loaning department with a greater rate of return on their excess cash than traditional municipal investing. A second option would be to secure debt financing through the issuance of general obligation bonds by Pinellas County. A third option would be through the issuance of revenue bonds by the airport. This third option would likely be the most costly option. PIE currently has no outstanding debt and as such, has the capacity to issue some level of debt, it required.

The COVID-19 outbreak in the U.S. has caused significant business disruption to the aviation industry through travel restrictions, stay-at-home orders, quarantine requirements, and an increased reliance on teleconferencing. While the disruption may be short-term, there is considerable uncertainty around the duration and long-term impacts on the aviation industry. Similarly, while there has been a quantifiable effect on aircraft operations, the related financial impacts and duration cannot be reasonably estimated at this time.

As described previously, the activity forecasts included in this master plan were prepared and approved prior to the COVID-19 impact, but are still considered valid for the purposes of this study. The Financial Feasibility Analysis relies on achievement of the aircraft operations and passenger enplanement forecasts. If the actual aviation activity varies temporarily from the projected levels, the adverse impact on the capital program may not be significant. However, if decreased traffic levels occur and persist, implementation of all the proposed projects may not be financially feasible. It should also be noted that if the forecast activity levels are not met, then a number of the planned capital improvements may be canceled or deferred as necessary.

Source: ESA, 2020.

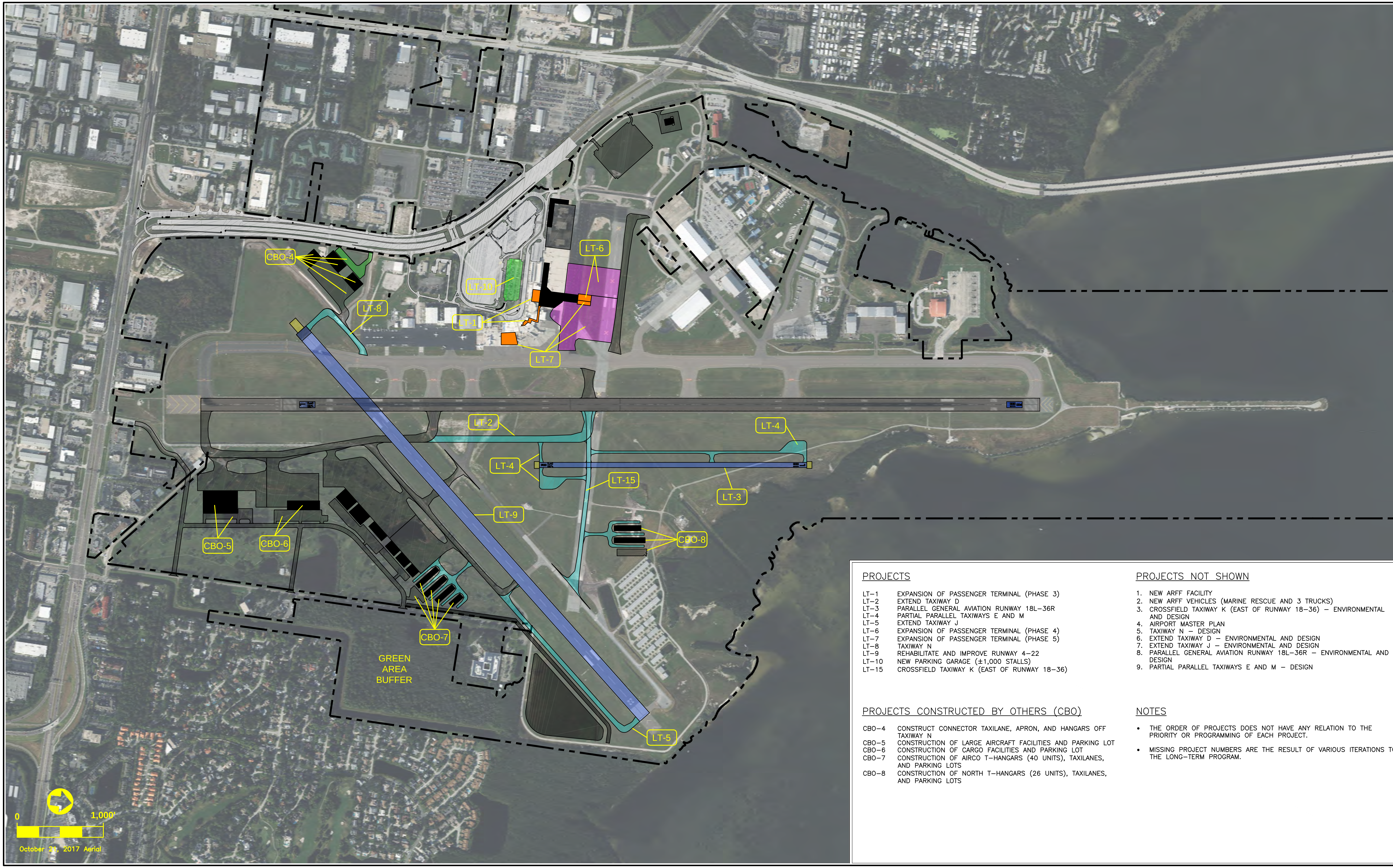
FIGURE 8.2-1

SHORT-TERM (2019 - 2023) CAPITAL IMPROVEMENT PROJECTS

Source: ESA, 2020.

FIGURE 8.2-2

INTERMEDIATE-TERM (2024 - 2028) CAPITAL IMPROVEMENT PROJECTS



Source: ESA, 2020.

St. Pete-Clearwater International Airport Master Plan

FIGURE 8.2-3

LONG-TERM (2029 - 2038) CAPITAL IMPROVEMENT PROJECTS

ST. PETE-CLEARWATER INTERNATIONAL AIRPORT (PIE)
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Capital Improvement Program	Funding Schedule								
	Short-Term						Intermediate-Term	Long-Term	Total
	2019	2020	2021	2022	2023	Total	2024-2028	2029-2038	Funding
Funds Used for Capital Improvement Projects									
AIP Entitlement Grants:	$4,053,471	$4,145,886	$4,172,006	$4,187,384	$4,202,969	$20,761,716	$21,284,545	$44,301,281	$86,347,541
AIP Entitlements carryover from the prior years	7,401,485	4,161,816	4,145,886	4,172,006	5,364,771	7,401,485	4,202,969	4,328,103	7,401,485
AIP Entitlement unspent current year + carryover	(4,161,816)	(4,145,886)	(4,172,006)	(5,364,771)	(4,202,969)	(4,202,969)	(4,328,103)	0	0
AIP Discretionary Grants	0	6,831,706	4,752,822	0	0	11,584,528	0	5,294,422	16,878,950
FDOT Aviation Grants	2,843,610	887,750	450,000	999,026	298,043	5,478,429	8,369,967	11,939,480	25,787,876
FDOT SIS Grants	0	386,250	4,113,750	0	0	4,500,000	31,400,000	0	35,900,000
Passenger Facility Charges:	4,512,066	4,572,824	4,634,400	4,696,805	4,760,050	23,176,144	25,066,303	57,341,709	105,584,156
PFC beginning year unliquidated balance	8,015,314	3,963,709	6,863,780	1,601,352	1,575,883	8,015,314	284,219	84,918	8,015,314
PFC unspent current year + carryover	(3,963,709)	(6,863,780)	(1,601,352)	(1,575,883)	(284,219)	(284,219)	(84,918)	0	0
Other Capital Contribution	9,749,878	0	0	98,345	0	9,848,223	6,437,972	0	16,286,195
RAC Customer Facility Charges	2,702,608	2,739,000	2,775,883	2,813,262	2,851,144	13,881,897	15,014,052	34,346,167	63,242,117
Other Unidentified Funding	0	0	0	0	0	0	0	11,952,181	11,952,181
Net Operating Cash Flow	2,731,017	417,080	653,352	742,212	837,799	5,381,461	6,382,002	29,525,995	41,289,457
Funds Available Current Year	33,883,925	17,096,354	26,788,521	12,369,738	15,403,472	105,542,009	114,029,008	199,114,257	418,685,274
Beginning Cash Balance/Funds Carried Over from Prior Year	37,572,080	29,326,680	28,912,162	27,456,164	30,168,053	37,572,080	28,506,560	15,162,948	37,572,080
Funds Used Current Year	(42,129,325)	(17,510,872)	(28,244,518)	(9,657,849)	(17,064,965)	(114,607,529)	(127,372,619)	(170,493,517)	(412,473,665)
Funds Carried Over to Next Year	$29,326,680	$28,912,162	$27,456,164	$30,168,053	$28,506,560	$28,506,560	$15,162,948	$43,783,689	$43,783,689

	Capital Project Description	2019 Base Year Costs	Estimated Project Costs and Development Schedule								
			Short-Term						Intermediate-Term	Long-Term	Total Escalated
			2019	2020	2021	2022	2023	Total	2024-2028	2029-2038	Costs
Short-Term Projects (2019-2023)											
Capital Projects 2019											
1544A	Terminal Improvements, Phase 3	$4,741,926	$4,741,926					$4,741,926			$4,741,926
2111A	Inline Baggage Handling System, Year 1	10,833,198	10,833,198					10,833,198			10,833,198
0031A	Airport Maintenance Facility	3,144,838	3,144,838					3,144,838			3,144,838
1583A	Security System Improvements	3,413,398	3,413,398					3,413,398			3,413,398
1546A	Landside, Roadway & Parking Improvements, Year 1	9,751,817	9,751,817					9,751,817			9,751,817
1548A	Airport Master Plan	935,743	935,743					935,743			935,743
2878A	CBP Improvements	8,013,432	8,013,432					8,013,432			8,013,432
0035A	Runway 18-36 Rehabilitation, Design	1,153,736	1,153,736					1,153,736			1,153,736
0034A	New Airco Property Development Environmental Assessment	141,237	141,237					141,237			141,237
	Total Capital Projects 2019	$42,129,325	$42,129,325	$0	$0	$0	$0	$42,129,325	$0	$0	$42,129,325
Capital Projects 2020											
0033A	Cargo Apron Rehab & Runway 09-27 Conv, Design	$750,000		$772,500				$772,500			$772,500
0035A	Runway 18-36 Rehabilitation, Construction Year 1	12,215,024		12,215,024				12,215,024			12,215,024
1064A	Relocate Electrical Vault, Design	500,000		515,000				515,000			515,000
4351A	Replace Passenger Exit Lane Portals	850,000		875,500				875,500			875,500
4352A	Install Service Elevator	300,000		309,000				309,000			309,000
4086A	Install Terminal 350-Ton Chiller	700,000		721,000				721,000			721,000

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	Funding Schedule								
	Short-Term						Intermediate-Term	Long-Term	Total
Capital Improvement Program	**2019**	**2020**	**2021**	**2022**	**2023**	**Total**	**2024-2028**	**2029-2038**	**Funding**
Funds Used for Capital Improvement Projects									
AIP Entitlement Grants:	$4,053,471	$4,145,886	$4,172,006	$4,187,384	$4,202,969	$20,761,716	$21,284,545	$44,301,281	$86,347,541
AIP Entitlements carryover from the prior years	7,401,485	4,161,816	4,145,886	4,172,006	5,364,771	7,401,485	4,202,969	4,328,103	7,401,485
AIP Entitlement unspent current year + carryover	(4,161,816)	(4,145,886)	(4,172,006)	(5,364,771)	(4,202,969)	(4,202,969)	(4,328,103)	0	0
AIP Discretionary Grants	0	6,831,706	4,752,822	0	0	11,584,528	0	5,294,422	16,878,950
FDOT Aviation Grants	2,843,610	887,750	450,000	999,026	298,043	5,478,429	8,369,967	11,939,480	25,787,876
FDOT SIS Grants	0	386,250	4,113,750	0	0	4,500,000	31,400,000	0	35,900,000
Passenger Facility Charges:	4,512,066	4,572,824	4,634,400	4,696,805	4,760,050	23,176,144	25,066,303	57,341,709	105,584,156
PFC beginning year unliquidated balance	8,015,314	3,963,709	6,863,780	1,601,352	1,575,883	8,015,314	284,219	84,918	8,015,314
PFC unspent current year + carryover	(3,963,709)	(6,863,780)	(1,601,352)	(1,575,883)	(284,219)	(284,219)	(84,918)	0	0
Other Capital Contribution	9,749,878	0	0	98,345	0	9,848,223	6,437,972	0	16,286,195
RAC Customer Facility Charges	2,702,608	2,739,000	2,775,883	2,813,262	2,851,144	13,881,897	15,014,052	34,346,167	63,242,117
Other Unidentified Funding	0	0	0	0	0	0	0	11,952,181	11,952,181
Net Operating Cash Flow	2,731,017	417,080	653,352	742,212	837,799	5,381,461	6,382,002	29,525,995	41,289,457
Funds Available Current Year	33,883,925	17,096,354	26,788,521	12,369,738	15,403,472	105,542,009	114,029,008	199,114,257	418,685,274
Beginning Cash Balance/Funds Carried Over from Prior Year	37,572,080	29,326,680	28,912,162	27,456,164	30,168,053	37,572,080	28,506,560	15,162,948	37,572,080
Funds Used Current Year	(42,129,325)	(17,510,872)	(28,244,518)	(9,657,849)	(17,064,965)	(114,607,529)	(127,372,619)	(170,493,517)	(412,473,665)
Funds Carried Over to Next Year	$29,326,680	$28,912,162	$27,456,164	$30,168,053	$28,506,560	$28,506,560	$15,162,948	$43,783,689	$43,783,689

			Estimated Project Costs and Development Schedule								
		2019	Short-Term						Intermediate-Term	Long-Term	Total
		Base Year									Escalated
Capital Project Description		**Costs**	**2019**	**2020**	**2021**	**2022**	**2023**	**Total**	**2024-2028**	**2029-2038**	**Costs**
4088A	Install APC Kiosks for CBP	141,600		145,848				145,848			145,848
4372A	Install Terminal Dynamic Wayfinding Roadway Signs	600,000		618,000				618,000			618,000
4350Aa	Upgrade Lift Station, Design	100,000		103,000				103,000			103,000
4350Ab	Upgrade Lift Station, Construction	1,200,000		1,236,000				1,236,000			1,236,000
	Total Capital Projects 2020	$17,356,624	$0	$17,510,872	$0	$0	$0	$17,510,872	$0	$0	$17,510,872
Capital Projects 2021											
0033A	Cargo Apron Rehab & Runway 09-27 Conv, Construction	$9,325,000			$9,892,893			$9,892,893			$9,892,893
0035A	Runway 18-36 Rehabilitation, Construction Year 2	12,130,508			12,130,508			12,130,508			12,130,508
1064A	Relocate Electrical Vault, Construction	4,500,000			4,774,050			4,774,050			4,774,050
ST-9	Landside Parking Demand and Revenue Study	100,000			106,090			106,090			106,090
ST-7a	Airco Drainage Improvements (Canal and Pond), Design	1,264,000			1,340,978			1,340,978			1,340,978
	Total Capital Projects 2021	$27,319,508	$0	$0	$28,244,518	$0	$0	$28,244,518	$0	$0	$28,244,518
Capital Projects 2022											
ST-2a	New Airco Taxiways, Design	$1,045,000				$1,141,900		$1,141,900			$1,141,900
0037A	New ARFF Vehicles	2,000,000				2,185,454		2,185,454			2,185,454
ST-1	Shoreline Stabilization Feasibility Study	100,000				109,273		109,273			109,273
ST-5/6	Modify and Pave New Economy Parking Lot and Airport Shuttle Road	1,524,000				1,665,316		1,665,316			1,665,316
ST-7b	Airco Drainage Improvements (Canal and Pond), Construction	4,169,300				4,555,907		4,555,907			4,555,907

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Capital Improvement Program	Funding Schedule: Short-Term 2019	2020	2021	2022	2023	Total	Intermediate-Term 2024-2028	Long-Term 2029-2038	Total Funding
Funds Used for Capital Improvement Projects									
AIP Entitlement Grants:	$4,053,471	$4,145,886	$4,172,006	$4,187,384	$4,202,969	$20,761,716	$21,284,545	$44,301,281	$86,347,541
AIP Entitlements carryover from the prior years	7,401,485	4,161,816	4,145,886	4,172,006	5,364,771	7,401,485	4,202,969	4,328,103	7,401,485
AIP Entitlement unspent current year + carryover	(4,161,816)	(4,145,886)	(4,172,006)	(5,364,771)	(4,202,969)	(4,202,969)	(4,328,103)	0	0
AIP Discretionary Grants	0	6,831,706	4,752,822	0	0	11,584,528	0	5,294,422	16,878,950
FDOT Aviation Grants	2,843,610	887,750	450,000	999,026	298,043	5,478,429	8,369,967	11,939,480	25,787,876
FDOT SIS Grants	0	386,250	4,113,750	0	0	4,500,000	31,400,000	0	35,900,000
Passenger Facility Charges:	4,512,066	4,572,824	4,634,400	4,696,805	4,760,050	23,176,144	25,066,303	57,341,709	105,584,156
PFC beginning year unliquidated balance	8,015,314	3,963,709	6,863,780	1,601,352	1,575,883	8,015,314	284,219	84,918	8,015,314
PFC unspent current year + carryover	(3,963,709)	(6,863,780)	(1,601,352)	(1,575,883)	(284,219)	(284,219)	(84,918)	0	0
Other Capital Contribution	9,749,878	0	0	98,345	0	9,848,223	6,437,972	0	16,286,195
RAC Customer Facility Charges	2,702,608	2,739,000	2,775,883	2,813,262	2,851,144	13,881,897	15,014,052	34,346,167	63,242,117
Other Unidentified Funding	0	0	0	0	0	0	0	11,952,181	11,952,181
Net Operating Cash Flow	2,731,017	417,080	653,352	742,212	837,799	5,381,461	6,382,002	29,525,995	41,289,457
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Beginning Cash Balance/Funds Carried Over from Prior Year	37,572,080	29,326,680	28,912,162	27,456,164	30,168,053	37,572,080	28,506,560	15,162,948	37,572,080
Funds Used Current Year	(42,129,325)	(17,510,872)	(28,244,518)	(9,657,849)	(17,064,965)	(114,607,529)	(127,372,619)	(170,493,517)	(412,473,665)
Funds Carried Over to Next Year	$29,326,680	$28,912,162	$27,456,164	$30,168,053	$28,506,560	$28,506,560	$15,162,948	$43,783,689	$43,783,689

	Capital Project Description	2019 Base Year Costs	Estimated Project Costs and Development Schedule: Short-Term 2019	2020	2021	2022	2023	Total	Intermediate-Term 2024-2028	Long-Term 2029-2038	Total Escalated Costs
	Total Capital Projects 2022	$8,838,300	$0	$0	$0	$9,657,849	$0	$9,657,849	$0	$0	$9,657,849
Capital Projects 2023											
ST-2b	New Airco Taxiway D, Construction	$6,162,000					$6,935,385	$6,935,385			$6,935,385
ST-8	Consolidated Rental Car Facility and Parking	9,000,000					10,129,579	10,129,579			10,129,579
0033A	Reimburse Airport with PFCs on Project 0033A	0					0	0			0
	Total Capital Projects 2023	$15,162,000	$0	$0	$0	$0	$17,064,965	$17,064,965	$0	$0	$17,064,965
	Total Short-Term Project Costs	$110,805,757	$42,129,325	$17,510,872	$28,244,518	$9,657,849	$17,064,965	$114,607,529	$0	$0	$114,607,529

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	Funding Schedule								
	Short-Term						Intermediate-Term	Long-Term	Total
Capital Improvement Program	**2019**	**2020**	**2021**	**2022**	**2023**	**Total**	**2024-2028**	**2029-2038**	**Funding**
Funds Used for Capital Improvement Projects									
AIP Entitlement Grants:	$4,053,471	$4,145,886	$4,172,006	$4,187,384	$4,202,969	$20,761,716	$21,284,545	$44,301,281	$86,347,541
AIP Entitlements carryover from the prior years	7,401,485	4,161,816	4,145,886	4,172,006	5,364,771	7,401,485	4,202,969	4,328,103	7,401,485
AIP Entitlement unspent current year + carryover	(4,161,816)	(4,145,886)	(4,172,006)	(5,364,771)	(4,202,969)	(4,202,969)	(4,328,103)	0	0
AIP Discretionary Grants	0	6,831,706	4,752,822	0	0	11,584,528	0	5,294,422	16,878,950
FDOT Aviation Grants	2,843,610	887,750	450,000	999,026	298,043	5,478,429	8,369,967	11,939,480	25,787,876
FDOT SIS Grants	0	386,250	4,113,750	0	0	4,500,000	31,400,000	0	35,900,000
Passenger Facility Charges:	4,512,066	4,572,824	4,634,400	4,696,805	4,760,050	23,176,144	25,066,303	57,341,709	105,584,156
PFC beginning year unliquidated balance	8,015,314	3,963,709	6,863,780	1,601,352	1,575,883	8,015,314	284,219	84,918	8,015,314
PFC unspent current year + carryover	(3,963,709)	(6,863,780)	(1,601,352)	(1,575,883)	(284,219)	(284,219)	(84,918)	0	0
Other Capital Contribution	9,749,878	0	0	98,345	0	9,848,223	6,437,972	0	16,286,195
RAC Customer Facility Charges	2,702,608	2,739,000	2,775,883	2,813,262	2,851,144	13,881,897	15,014,052	34,346,167	63,242,117
Other Unidentified Funding	0	0	0	0	0	0	0	11,952,181	11,952,181
Net Operating Cash Flow	2,731,017	417,080	653,352	742,212	837,799	5,381,461	6,382,002	29,525,995	41,289,457
Funds Available Current Year	33,883,925	17,096,354	26,788,521	12,369,738	15,403,472	105,542,009	114,029,008	199,114,257	418,685,274
Beginning Cash Balance/Funds Carried Over from Prior Year	37,572,080	29,326,680	28,912,162	27,456,164	30,168,053	37,572,080	28,506,560	15,162,948	37,572,080
Funds Used Current Year	(42,129,325)	(17,510,872)	(28,244,518)	(9,657,849)	(17,064,965)	(114,607,529)	(127,372,619)	(170,493,517)	(412,473,665)
Funds Carried Over to Next Year	$29,326,680	$28,912,162	$27,456,164	$30,168,053	$28,506,560	$28,506,560	$15,162,948	$43,783,689	$43,783,689

			Estimated Project Costs and Development Schedule								
		2019	Short-Term						Intermediate-Term	Long-Term	Total
		Base Year									Escalated
	Capital Project Description	**Costs**	**2019**	**2020**	**2021**	**2022**	**2023**	**Total**	**2024-2028**	**2029-2038**	**Costs**
	Intermediate-Term Projects (2024-2028)										
ST-3	New Airco Taxiways J & G3, Construction	$4,590,000						$0	$5,562,303		$5,562,303
IT-3a	Passenger Terminal Improvements, Enviro & Programming	1,500,000						0	1,817,746		1,817,746
IT-3b	Passenger Terminal Improvements, Phase 1, Year 1	20,000,000						0	24,236,615		24,236,615
IT-3c	Passenger Terminal Improvements, Phase 1, Year 2	11,400,000						0	13,814,870		13,814,870
IT-1a	Airco Parcel Access Roads, Design	445,000						0	539,265		539,265
IT-6a	Passenger Terminal Improvements, Phase 2, Year 1	29,500,000						0	35,749,006		35,749,006
IT-1b	Airco Parcel Access Roads, Construction	4,867,600						0	5,898,707		5,898,707
IT-6b	Passenger Terminal Improvements, Phase 2, Year 2	29,500,000						0	35,749,006		35,749,006
IT-4a	Rehabilitate and Improve Runway 4-22, Design	375,000						0	454,437		454,437
IT-5a	New Parking Garage, Design	2,130,000						0	2,581,199		2,581,199
3342A	New ARFF Facility, Design	800,000						0	969,465		969,465
	Total Intermediate-Term Project Costs	$105,107,600	$0	$0	$0	$0	$0	$0	$127,372,619	$0	$127,372,619

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Capital Improvement Program	Funding Schedule								
	Short-Term						Intermediate-Term	Long-Term	Total
	2019	2020	2021	2022	2023	Total	2024-2028	2029-2038	Funding
Funds Used for Capital Improvement Projects									
AIP Entitlement Grants:	$4,053,471	$4,145,886	$4,172,006	$4,187,384	$4,202,969	$20,761,716	$21,284,545	$44,301,281	$86,347,541
AIP Entitlements carryover from the prior years	7,401,485	4,161,816	4,145,886	4,172,006	5,364,771	7,401,485	4,202,969	4,328,103	7,401,485
AIP Entitlement unspent current year + carryover	(4,161,816)	(4,145,886)	(4,172,006)	(5,364,771)	(4,202,969)	(4,202,969)	(4,328,103)	0	0
AIP Discretionary Grants	0	6,831,706	4,752,822	0	0	11,584,528	0	5,294,422	16,878,950
FDOT Aviation Grants	2,843,610	887,750	450,000	999,026	298,043	5,478,429	8,369,967	11,939,480	25,787,876
FDOT SIS Grants	0	386,250	4,113,750	0	0	4,500,000	31,400,000	0	35,900,000
Passenger Facility Charges:	4,512,066	4,572,824	4,634,400	4,696,805	4,760,050	23,176,144	25,066,303	57,341,709	105,584,156
PFC beginning year unliquidated balance	8,015,314	3,963,709	6,863,780	1,601,352	1,575,883	8,015,314	284,219	84,918	8,015,314
PFC unspent current year + carryover	(3,963,709)	(6,863,780)	(1,601,352)	(1,575,883)	(284,219)	(284,219)	(84,918)	0	0
Other Capital Contribution	9,749,878	0	0	98,345	0	9,848,223	6,437,972	0	16,286,195
RAC Customer Facility Charges	2,702,608	2,739,000	2,775,883	2,813,262	2,851,144	13,881,897	15,014,052	34,346,167	63,242,117
Other Unidentified Funding	0	0	0	0	0	0	0	11,952,181	11,952,181
Net Operating Cash Flow	2,731,017	417,080	653,352	742,212	837,799	5,381,461	6,382,002	29,525,995	41,289,457
Funds Available Current Year	33,883,925	17,096,354	26,788,521	12,369,738	15,403,472	105,542,009	114,029,008	199,114,257	418,685,274
Beginning Cash Balance/Funds Carried Over from Prior Year	37,572,080	29,326,680	28,912,162	27,456,164	30,168,053	37,572,080	28,506,560	15,162,948	37,572,080
Funds Used Current Year	(42,129,325)	(17,510,872)	(28,244,518)	(9,657,849)	(17,064,965)	(114,607,529)	(127,372,619)	(170,493,517)	(412,473,665)
Funds Carried Over to Next Year	$29,326,680	$28,912,162	$27,456,164	$30,168,053	$28,506,560	$28,506,560	$15,162,948	$43,783,689	$43,783,689

	Capital Project Description	2019 Base Year Costs	Estimated Project Costs and Development Schedule								
			Short-Term						Intermediate-Term	Long-Term	Total Escalated
			2019	2020	2021	2022	2023	Total	2024-2028	2029-2038	Costs
	Long-Term Projects (2029-2038)										
IT-4b	Rehabilitate and Improve Runway 4-22, Construction	$5,206,500						$0		$7,875,298	$7,875,298
3342A	New ARFF Facility, Construction	5,000,000						0		7,562,949	7,562,949
IT-5b	New Parking Garage, Construction	19,170,000						0		28,996,345	28,996,345
LT-11	Replace ARFF Vehicle (2014 Replacement)	1,000,000						0		1,512,590	1,512,590
IT-2a	Crossfield Taxiway K (East of Runway 18-36), Enviro & Design	315,000						0		476,466	476,466
IT-6	Reimburse Airport with PFCs on Project IT-6	0								0	0
LT-1	Expansion of Passenger Terminal, Phase 3	9,000,000						0		13,613,308	13,613,308
IT-2b	Crossfield Taxiway K (East of Runway 18-36), Construction	2,684,000						0		4,059,791	4,059,791
LT-14	Airport Master Plan	1,500,000						0		2,268,885	2,268,885
LT-12	Replace ARFF Marine Rescue	1,000,000						0		1,512,590	1,512,590
LT-6	Expansion of Passenger Terminal, Phase 4	19,000,000						0		28,739,205	28,739,205
LT-8a	Taxiway N, Design	135,000						0		204,200	204,200
LT-8b	Taxiway N, Construction	1,330,000						0		2,011,744	2,011,744
LT-2a	Extend Taxiway D, Design	300,000						0		453,777	453,777
LT-2b	Extend Taxiway D, Construction	2,894,000						0		4,377,435	4,377,435
LT-7	Expansion of Passenger Terminal, Phase 5	31,000,000						0		46,890,281	46,890,281
LT-5a	Extend Taxiway J, Design	275,000						0		415,962	415,962
LT-13	Replace 2 ARFF Trucks (2022 Acquisitions)	2,000,000						0		3,025,179	3,025,179

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Capital Improvement Program	Funding Schedule: Short-Term 2019	2020	2021	2022	2023	Total	Intermediate-Term 2024-2028	Long-Term 2029-2038	Total Funding
Funds Used for Capital Improvement Projects									
AIP Entitlement Grants:	$4,053,471	$4,145,886	$4,172,006	$4,187,384	$4,202,969	$20,761,716	$21,284,545	$44,301,281	$86,347,541
AIP Entitlements carryover from the prior years	7,401,485	4,161,816	4,145,886	4,172,006	5,364,771	7,401,485	4,202,969	4,328,103	7,401,485
AIP Entitlement unspent current year + carryover	(4,161,816)	(4,145,886)	(4,172,006)	(5,364,771)	(4,202,969)	(4,202,969)	(4,328,103)	0	0
AIP Discretionary Grants	0	6,831,706	4,752,822	0	0	11,584,528	0	5,294,422	16,878,950
FDOT Aviation Grants	2,843,610	887,750	450,000	999,026	298,043	5,478,429	8,369,967	11,939,480	25,787,876
FDOT SIS Grants	0	386,250	4,113,750	0	0	4,500,000	31,400,000	0	35,900,000
Passenger Facility Charges:	4,512,066	4,572,824	4,634,400	4,696,805	4,760,050	23,176,144	25,066,303	57,341,709	105,584,156
PFC beginning year unliquidated balance	8,015,314	3,963,709	6,863,780	1,601,352	1,575,883	8,015,314	284,219	84,918	8,015,314
PFC unspent current year + carryover	(3,963,709)	(6,863,780)	(1,601,352)	(1,575,883)	(284,219)	(284,219)	(84,918)	0	0
Other Capital Contribution	9,749,878	0	0	98,345	0	9,848,223	6,437,972	0	16,286,195
RAC Customer Facility Charges	2,702,608	2,739,000	2,775,883	2,813,262	2,851,144	13,881,897	15,014,052	34,346,167	63,242,117
Other Unidentified Funding	0	0	0	0	0	0	0	11,952,181	11,952,181
Net Operating Cash Flow	2,731,017	417,080	653,352	742,212	837,799	5,381,461	6,382,002	29,525,995	41,289,457
Funds Available Current Year	33,883,925	17,096,354	26,788,521	12,369,738	15,403,472	105,542,009	114,029,008	199,114,257	418,685,274
Beginning Cash Balance/Funds Carried Over from Prior Year	37,572,080	29,326,680	28,912,162	27,456,164	30,168,053	37,572,080	28,506,560	15,162,948	37,572,080
Funds Used Current Year	(42,129,325)	(17,510,872)	(28,244,518)	(9,657,849)	(17,064,965)	(114,607,529)	(127,372,619)	(170,493,517)	(412,473,665)
Funds Carried Over to Next Year	$29,326,680	$28,912,162	$27,456,164	$30,168,053	$28,506,560	$28,506,560	$15,162,948	$43,783,689	$43,783,689

	Capital Project Description	2019 Base Year Costs	Estimated Project Costs and Development Schedule: Short-Term 2019	2020	2021	2022	2023	Total	Intermediate-Term 2024-2028	Long-Term 2029-2038	Total Escalated Costs
LT-5b	Extend Taxiway J, Construction	3,005,000						0		4,545,332	4,545,332
LT-3a	Parallel GA Runway 18L-36R, Enviro & Design	625,000						0		945,369	945,369
LT-3b	Parallel GA Runway 18L-36R, Construction	4,579,800						0		6,927,358	6,927,358
LT-4a	Partial Parallel Taxiways E & M, Design	110,000						0		166,385	166,385
LT-4b	Partial Parallel Taxiways E & M, Construction	2,587,000						0		3,913,070	3,913,070
	Total Long-Term Project Costs	$112,716,300	$0	$0	$0	$0	$0	$0	$0	$170,493,517	$170,493,517
Total Project Costs		$328,629,657	$42,129,325	$17,510,872	$28,244,518	$9,657,849	$17,064,965	$114,607,529	$127,372,619	$170,493,517	$412,473,665

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	Capital Improvement Projects	Total Escalated Costs	AIP Entitlement Funding	AIP Discretionary Funding	Total AIP Funding	FDOT Aviation Grants	FDOT SIS Grants	Passenger Facility Charges (PAYG)	Other Capital Contribution	Other Unidentified Funding	Cash Reserves/ Net Revs	Total Funding
Short-Term Projects (2019-2023)												
Capital Projects 2019												
1544A	Terminal Improvements, Phase 3	$4,741,926			$0			$3,698,702			$1,043,224	$4,741,926
2111A	Inline Baggage Handling System, Year 1	10,833,198			0	800,000		283,320	9,749,878		0	10,833,198
0031A	Airport Maintenance Facility	3,144,838			0	750,000					2,394,838	3,144,838
1583A	Security System Improvements	3,413,398	2,287,439		2,287,439	324,513		253,980			547,466	3,413,398
1546A	Landside, Roadway & Parking Improvements, Year 1	9,751,817			0			3,489,834			6,261,983	9,751,817
1548A	Airport Master Plan	935,743	734,240		734,240	40,792		31,627			129,084	935,743
2878A	CBP Improvements	8,013,432	3,233,099		3,233,099	800,000		748,521			3,231,812	8,013,432
0035A	Runway 18-36 Rehabilitation, Design	1,153,736	1,038,362		1,038,362	57,687		57,687			0	1,153,736
0034A	New Airco Property Development Environmental	141,237			0	70,619					70,619	141,237
	Totals for 2019	$42,129,325	$7,293,140	$0	$7,293,140	$2,843,610	$0	$8,563,671	$9,749,878	$0	$13,679,026	$42,129,325
Capital Projects 2020												
0033A	Cargo Apron Rehab & Runway 09-27 Conv, Design	$772,500			$0		$386,250	$386,250			$0	$772,500
0035A	Runway 18-36 Rehabilitation, Construction Year 1	12,215,024	4,161,816	6,831,706	10,993,522	450,000		771,502			0	12,215,024
1064A	Relocate Electrical Vault, Design	515,000			0			515,000			0	515,000
4351A	Replace Passenger Exit Lane Portals	875,500			0	437,750					437,750	875,500
4352A	Install Service Elevator	309,000			0						309,000	309,000
4086A	Install Terminal 350-Ton Chiller	721,000			0						721,000	721,000
4088A	Install APC Kiosks for CBP	145,848			0						145,848	145,848
4372A	Install Terminal Dynamic Wayfinding Roadway Signs	618,000			0						618,000	618,000
350Aa	Upgrade Lift Station, Design	103,000			0						103,000	103,000
350Ab	Upgrade Lift Station, Construction	1,236,000			0						1,236,000	1,236,000
	Totals for 2020	$17,510,872	$4,161,816	$6,831,706	$10,993,522	$887,750	$386,250	$1,672,752	$0	$0	$3,570,598	$17,510,872
Capital Projects 2021												
0033A	Cargo Apron Rehab & Runway 09-27 Conv, Construction	$9,892,893			$0		$4,113,750	$1,000,000			$4,779,143	$9,892,893
0035A	Runway 18-36 Rehabilitation, Construction Year 2	12,130,508	4,145,886	4,752,822	8,898,708	450,000		2,781,800			0	12,130,508
1064A	Relocate Electrical Vault, Construction	4,774,050			0			4,774,050			0	4,774,050
ST-9	Landside Parking Demand and Revenue Study	106,090			0						106,090	106,090
ST-7a	Airco Drainage Improvements (Canal and Pond), Design	1,340,978			0			1,340,978			0	1,340,978
	Totals for 2021	$28,244,518	$4,145,886	$4,752,822	$8,898,708	$450,000	$4,113,750	$9,896,827	$0	$0	$4,885,233	$28,244,518
Capital Projects 2022												
ST-2a	New Airco Taxiways, Design	$1,141,900	1,027,710		$1,027,710	$57,095		$57,095			$0	$1,141,900
0037A	New ARFF Vehicles	2,185,454	1,966,909		1,966,909	109,273		109,273			0	2,185,454
ST-1	Shoreline Stabilization Feasibility Study	109,273			0				98,345		10,927	109,273
ST-5/6	Modify and Pave New Economy Parking Lot and Airport Shuttle Road	1,665,316			0	832,658					832,658	1,665,316
ST-7b	Airco Drainage Improvements (Canal and Pond), Construction	4,555,907			0			4,555,907			0	4,555,907
	Totals for 2022	$9,657,849	$2,994,618	$0	$2,994,618	$999,026	$0	$4,722,274	$98,345	$0	$843,585	$9,657,849
Capital Projects 2023												
ST-2b	New Airco Taxiway D, Construction	$6,935,385	$5,364,771		$5,364,771	$298,043		$1,272,571			$0	$6,935,385
ST-8	Consolidated Rental Car Facility and Parking	10,129,579			0						10,129,579	10,129,579
0033A	Reimburse Airport with PFCs on Project 0033A	0			0			4,779,143			-4,779,143	0
	Totals for 2023	$17,064,965	$5,364,771	$0	$5,364,771	$298,043	$0	$6,051,714	$0	$0	$5,350,436	$17,064,965
	Total Short-Term Project Funding	$114,607,529	$23,960,232	$11,584,528	$35,544,760	$5,478,429	$4,500,000	$30,907,239	$9,848,223	$0	$28,328,878	$114,607,529

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	Capital Improvement Projects	Total Escalated Costs	AIP Entitlement Funding	AIP Discretionary Funding	Total AIP Funding	FDOT Aviation Grants	FDOT SIS Grants	Passenger Facility Charges (PAYG)	Other Capital Contribution	Other Unidentified Funding	Cash Reserves/ Net Revs	Total Funding
Intermediate-Term Projects (2024-2028)												
ST-3	New Airco Taxiways J & G3, Construction	$5,562,303	$4,200,000		$4,200,000	$233,333		$1,128,970			$0	$5,562,303
IT-3a	Passenger Terminal Improvements, Enviro &	1,817,746	1,177,899		1,177,899	65,439		65,439			508,969	1,817,746
IT-3b	Passenger Terminal Improvements, Phase 1, Year 1	24,236,615	3,000,000		3,000,000	2,000,000	10,000,000	5,000,000			4,236,615	24,236,615
IT-3c	Passenger Terminal Improvements, Phase 1, Year 2	13,814,870	4,200,000		4,200,000	2,000,000	1,400,000	5,000,000			1,214,870	13,814,870
IT-1a	Airco Parcel Access Roads, Design	539,265			0				539,265		0	539,265
IT-6a	Passenger Terminal Improvements, Phase 2, Year 1	35,749,006	4,300,000		4,300,000	2,000,000	10,000,000	7,000,000			12,449,006	35,749,006
IT-1b	Airco Parcel Access Roads, Construction	5,898,707			0				5,898,707		0	5,898,707
IT-6b	Passenger Terminal Improvements, Phase 2, Year 2	35,749,006	3,000,000		3,000,000	2,000,000	10,000,000	7,000,000			13,749,006	35,749,006
IT-4a	Rehabilitate and Improve Runway 4-22, Design	454,437	408,993		408,993	22,722		22,722			0	454,437
IT-5a	New Parking Garage, Design	2,581,199			0						2,581,199	2,581,199
3342A	New ARFF Facility, Design	969,465	872,518		872,518	48,473		48,473			0	969,465
	Total Intermediate-Term Project Funding	$127,372,619	$21,159,410	$0	$21,159,410	$8,369,967	$31,400,000	$25,265,604	$6,437,972	$0	$34,739,666	$127,372,619
Long-Term Projects (2029-2038)												
IT-4b	Rehabilitate and Improve Runway 4-22, Construction	$7,875,298	$4,300,000	$2,787,769	$7,087,769	$393,765		$393,765			$0	$7,875,298
3342A	New ARFF Facility, Construction	7,562,949	4,300,000	2,506,654	6,806,654	378,147		378,147			0	7,562,949
IT-5b	New Parking Garage, Construction	28,996,345			0						28,996,345	28,996,345
LT-11	Replace ARFF Vehicle (2014 Replacement)	1,512,590			0						1,512,590	1,512,590
IT-2a	Crossfield Taxiway K (East of Runway 18-36), Enviro &	476,466	428,819		428,819	23,823		23,823			0	476,466
IT-6	Reimburse Airport with PFCs on Project IT-6	0			0			10,487,147			-10,487,147	0
LT-1	Expansion of Passenger Terminal, Phase 3	13,613,308	5,000,000		5,000,000	2,500,000		5,000,000			1,113,308	13,613,308
IT-2b	Crossfield Taxiway K (East of Runway 18-36), Construction	4,059,791	3,653,812		3,653,812	202,990		202,990			0	4,059,791
LT-14	Airport Master Plan	2,268,885	2,041,996		2,041,996	113,444		113,444			0	2,268,885
LT-12	Replace ARFF Marine Rescue	1,512,590	1,361,331		1,361,331	75,629		75,629			0	1,512,590
LT-6	Expansion of Passenger Terminal, Phase 4	28,739,205	5,000,000		5,000,000	2,500,000		15,000,000			6,239,205	28,739,205
LT-8a	Taxiway N, Design	204,200	183,780		183,780	10,210		10,210			0	204,200
LT-8b	Taxiway N, Construction	2,011,744	1,810,570		1,810,570	100,587		100,587			0	2,011,744
LT-2a	Extend Taxiway D, Design	453,777	408,399		408,399	22,689		22,689			0	453,777
LT-2b	Extend Taxiway D, Construction	4,377,435	3,939,691		3,939,691	218,872		218,872			0	4,377,435
LT-7	Expansion of Passenger Terminal, Phase 5	46,890,281	9,013,160		9,013,160	5,000,000		25,000,000			7,877,121	46,890,281
LT-5a	Extend Taxiway J, Design	415,962	374,366		374,366	20,798		20,798			0	415,962
LT-13	Replace 2 ARFF Trucks (2022 Acquisitions)	3,025,179	2,722,662		2,722,662	151,259		151,259			0	3,025,179
LT-5b	Extend Taxiway J, Construction	4,545,332	4,090,799		4,090,799	227,267		227,267			0	4,545,332
LT-3a	Parallel GA Runway 18L-36R, Enviro & Design	945,369			0					945,369	0	945,369
LT-3b	Parallel GA Runway 18L-36R, Construction	6,927,358			0					6,927,358	0	6,927,358
LT-4a	Partial Parallel Taxiways E & M, Design	166,385			0					166,385	0	166,385
LT-4b	Partial Parallel Taxiways E & M, Construction	3,913,070			0					3,913,070	0	3,913,070
	Total Long-Term Project Funding	$170,493,517	$48,629,384	$5,294,422	$53,923,806	$11,939,480	$0	$57,426,627	$0	$11,952,181	$35,251,422	$170,493,517
Total Project Funding		$412,473,665	$93,749,026	$16,878,950	$110,627,977	$25,787,876	$35,900,000	$113,599,470	$16,286,195	$11,952,181	$98,319,965	$412,473,665

ST. PETE-CLEARWATER INTERNATIONAL AIRPORT (PIE)
Pinellas County, Florida

Schedule 8-3

Master Plan - Financial Feasibility Analysis
Actual, Budgeted and Projected Operations & Maintenance Expenses

19-Mar-20

				Short-Term						Intermediate-	Long-
	Actual	Actual	Actual	Actual	Budgeted	Projected				Term	Term
Operations & Maintenance Expenses	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**Total**	**2024-2028**	**2029-2038**
Personal Services - Salaries/Wages	$3,161,804	$3,436,009	$3,538,627	$3,807,718	$3,863,920	$3,979,838	$4,099,233	$4,222,210	$19,972,918	$23,088,773	$57,795,597
Personal Services - Taxes/Benefits	1,478,138	1,688,003	1,779,280	1,947,967	2,227,300	2,294,119	2,362,943	2,433,831	11,266,159	$13,309,185	$33,315,424
Professional Services & Legal	412,671	154,976	1,283,057	861,528	1,139,600	1,173,788	1,209,002	1,245,272	5,629,190	$6,809,656	$17,045,866
Accounting & Auditing	36,597	8,905	18,988	10,500	40,000	41,200	42,436	43,709	177,845	$239,019	$598,310
Other Contractual Services	1,538,648	1,703,449	2,037,367	2,324,359	2,476,650	2,550,950	2,627,478	2,706,302	12,685,739	$14,799,170	$37,045,142
Travel	54,135	47,518	40,510	49,312	137,190	141,306	145,545	149,911	623,264	$819,776	$2,052,055
Communication Services	50,013	39,843	45,565	64,457	31,420	32,363	33,333	34,333	195,906	$187,750	$469,973
Freight/Postage	1,183	1,336	659	914	980	1,009	1,040	1,071	5,014	$5,856	$14,659
Utility Services	648,134	625,918	676,923	809,392	797,800	821,734	846,386	871,778	4,147,089	$4,767,237	$11,933,303
Rentals & Leases	11,431	17,233	62,033	36,191	82,700	85,181	87,736	90,369	382,177	$494,172	$1,237,007
Repairs & Maintenance	194,681	267,628	381,015	810,365	823,950	848,669	874,129	900,352	4,257,465	$4,923,496	$12,324,448
Printing & Binding	4,335	4,428	3,521	1,445	5,000	5,150	5,305	5,464	22,364	$29,877	$74,789
Promotional Activities	308,756	359,300	362,097	348,318	572,760	589,943	607,641	625,870	2,744,532	$3,422,515	$8,567,208
Other Charges & Obligations	33,520	33,244	52,821	30,875	86,350	88,941	91,609	94,357	392,131	$515,983	$1,291,603
Intergovernmental Services	1,282,311	1,583,046	1,539,799	1,537,114	1,713,920	1,765,338	1,818,298	1,872,847	8,707,516	$10,241,493	$25,636,408
Office Supplies	18,325	19,628	19,726	33,553	15,000	15,450	15,914	16,391	96,308	$89,632	$224,366
Operational Supplies	415,189	399,829	454,703	453,794	443,040	456,331	470,021	484,122	2,307,308	$2,647,376	$6,626,887
Subscriptions & Memberships	20,531	24,647	27,847	25,480	37,030	38,141	39,285	40,464	180,400	$221,272	$553,886
Training & Education	25,141	33,319	19,174	19,710	28,150	28,995	29,864	30,760	137,479	$168,210	$421,061
						0	0	0	0	$0	$0
Total Operations & Maintenance Expenses	$9,695,544	$10,448,259	$12,343,712	$13,172,993	$14,522,760	$14,958,443	$15,407,196	$15,869,412	$73,930,804	$86,780,449	$217,227,992
Annual Growth Rate	-	7.8%	18.1%	6.7%	10.2%	3.0%	3.0%	3.0%	5.2%	3.0%	3.0%
Operating Expenses Per Enplaned Passenger:											
St. Pete-Clearwater International Airport	$10.59	$10.21	$11.06	$11.53	$12.55	$12.75	$12.96	$13.17	$12.60	$13.68	$14.97
Small-Hub Industry Average	$19.12	$19.47	$19.57	$19.67	$19.78	$19.88	$19.99	$20.09	$19.88	$20.47	$21.29

ST. PETE-CLEARWATER INTERNATIONAL AIRPORT (PIE)
Pinellas County, Florida

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Schedule 8-4

Master Plan - Financial Feasibility Analysis
Actual, Budgeted and Projected Operating Revenues

19-Mar-20

				Short-Term						Intermediate-	Long-
	Actual	Actual	Actual	Actual	Budgeted	Projected				Term	Term
Revenues	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**Total**	**2024-2028**	**2029-2038**
					LDW - Landed Weight Growth						
					ENP - Enplanement Growth						
AIRLINE REVENUES											
Airline Landing Fees	$595,643	$809,914	$906,636	$998,899	$909,130	$942,709	$977,527	$1,013,632	$4,841,896	$5,691,587	$15,263,456
Airline Office Rent	100,110	74,820	72,407	53,600	46,510	47,905	49,342	50,823	248,181	277,920	695,686
Airline Apron Parking Fees	73,040	73,150	73,080	73,000	69,550	71,637	73,786	75,999	363,971	415,595	1,040,312
Airline Terminal Fees	255,475	359,760	402,240	447,000	367,440	378,463	389,817	401,512	1,984,232	2,195,630	5,496,080
Airline Loading Bridge Fees	53,165	86,485	114,345	78,225	67,000	69,010	71,080	73,213	358,528	400,357	1,002,170
Airline Building Rent	87,077	126,480	128,719	163,514	142,980	147,269	151,687	156,238	761,689	854,374	2,138,661
Airline Passenger Security Fees	352,738	494,575	563,952	631,814	519,130	534,704	550,745	567,267	2,803,661	3,102,050	7,765,023
Airline - Misc.	5,280	0	10,560	8,800	8,380	8,631	8,890	9,157	43,859	50,075	125,346
Total Airline Revenues	$1,522,528	$2,025,183	$2,271,938	$2,454,852	$2,130,120	$2,200,328	$2,272,876	$2,347,841	$11,406,016	$12,987,588	$33,526,734
Annual Growth Rate	-	33.0%	12.2%	8.1%	-13.2%	3.3%	3.3%	3.3%	0.7%	3.4%	3.4%
Airline Cost Per Enplaned Passenger:											
St. Pete-Clearwater International Airport	$1.66	$1.98	$2.04	$2.15	$1.84	$1.88	$1.91	$1.95	$1.94	$2.05	$2.31
Small-Hub Industry Average	$8.20	$8.13	$8.17	$8.21	$8.26	$8.30	$8.34	$8.39	$8.30	$8.54	$8.89
NON-AIRLINE REVENUES											
Airline Fuel Flowage Fee	$32,211	$31,886	$37,638	$38,521	$31,600	$32,767	$33,977	$35,232	$172,097	$197,831	$530,535
Cargo Revenues	274,006	302,591	11,900	0	0	0	0	0	0	0	0
General Aviation Fuel Flowage Fee	173,799	186,698	208,864	235,463	213,630	221,520	229,702	238,186	1,138,501	1,337,426	3,586,651
General Aviation Fixed Base Operators	319,770	374,031	368,210	368,210	345,190	355,546	366,212	377,198	1,812,356	2,062,676	5,163,270
General Aviation Bldgs/Hangar/Land Rents	491,700	540,729	582,273	615,258	592,580	610,357	628,668	647,528	3,094,392	3,540,949	8,863,671
General Aviation Misc	0	1,380	0	0	0	0	0	0	0	0	0
United States Coast Guard	1,008,963	662,259	680,820	565,115	498,750	513,713	529,124	544,998	2,651,699	2,980,270	7,460,184
Paid Auto Parking	2,660,065	2,874,329	2,960,461	2,478,934	2,512,750	2,622,983	2,738,053	2,858,170	13,210,890	16,477,773	47,337,062
Concession - Car Rentals	2,969,610	3,285,023	3,480,763	3,569,598	3,400,000	3,549,157	3,704,857	3,867,387	18,090,999	22,296,061	64,051,741
Concession - Food/Beverage & Retail	496,880	566,587	652,052	727,775	704,310	735,208	757,264	779,982	3,704,539	4,265,261	10,676,761
Concession - Ground Transportation	30,000	30,000	30,300	29,250	30,870	182,224	187,691	193,322	623,357	1,057,162	2,646,279
Concession - Advertising	49,571	48,609	55,076	52,071	43,870	45,186	46,542	47,938	235,606	262,144	656,197
Terminal - Other Office Rents	107,565	104,878	104,378	102,015	88,690	91,351	94,091	96,914	473,061	529,965	1,326,604
Terminal - Other Permit Fees	8,925	9,950	9,330	11,685	10,510	10,825	11,150	11,485	55,655	62,802	157,206
Terminal - Badge Fees	52,847	44,532	30,843	29,987	24,560	25,297	26,056	26,837	132,737	146,758	367,363
Terminal - Other Misc. Fees	25,636	129,092	122,509	152,992	131,790	135,744	139,816	144,010	704,352	787,508	1,971,283
Industrial Rents	3,236,885	3,287,706	3,333,070	3,498,000	3,357,300	3,458,019	3,561,760	3,668,612	17,543,691	20,061,476	50,217,695
Other Miscellaneous Revenue	21,606	10,364	10,411	100,742	1,750	0	0	0	102,492	0	0
Total Non-Airline Revenues	$11,960,039	$12,490,645	$12,678,898	$12,575,615	$11,988,150	$12,589,897	$13,054,962	$13,537,800	$63,746,425	$76,066,064	$205,012,502
Annual Growth Rate	-	4.4%	1.5%	-0.8%	-4.7%	5.0%	3.7%	3.7%	1.3%	3.9%	4.0%
NON-OPERATING REVENUES											
Investment Earnings	$173,455	$325,009	$536,549	$847,400	$820,620	$820,620	$820,620	$820,620	$4,129,880	$4,103,100	$8,206,200
Sale - County Land	0	12,521,614	0	0	0	0	0	0	0	0	0
Sale - Surplus Equipment	26,794	4,865	1,338	25,783	950	950	950	950	29,583	5,700	8,550
Inter-Sales Tax Commission	360	360	360	360	0	0	0	0	360	0	0
Total Non-Operating Revenues	$200,608	$12,851,848	$538,246	$873,544	$821,570	$821,570	$821,570	$821,570	$4,159,824	$4,108,800	$8,214,750
Annual Growth Rate	-	6306.4%	-95.8%	62.3%	-5.9%	0.0%	0.0%	0.0%	8.8%	0.0%	0.0%
Total Revenues	$13,683,175	$27,367,676	$15,489,083	$15,904,010	$14,939,840	$15,611,795	$16,149,408	$16,707,211	$79,312,265	$93,162,451	$246,753,987
Annual Growth Rate	-	100.0%	-43.4%	2.7%	-6.1%	4.5%	3.4%	3.5%	1.5%	3.7%	3.8%
Operating Revenues Per Enplaned Passenger:											
St. Pete-Clearwater International Airport	$14.72	$14.18	$13.40	$13.16	$12.20	$12.61	$12.89	$13.19	$12.81	$14.04	$16.44
Small-Hub Industry Average	$27.90	$28.13	$28.28	$28.43	$28.58	$28.73	$28.88	$29.03	$28.73	$29.57	$30.76

ST. PETE-CLEARWATER INTERNATIONAL AIRPORT (PIE)
Pinellas County, Florida

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Master Plan - Financial Feasibility Analysis
Financial Plan Summary
Budgeted and Projected Net Revenues, Capital Funding and Capital Expenditures

19-Mar-20

Operating/Capital Cash Flow	Short-Term						Intermediate-Term	Long-Term
	Actual	Budgeted	Projected					
	2019	2020	2021	2022	2023	Total	2024-2028	2029-2038
Passenger Enplanements	1,142,006	1,157,384	1,172,969	1,188,764	1,204,771	5,865,893	6,344,293	14,513,214
Annual Growth Rates	-	1.35%	1.35%	1.35%	1.35%	1.35%	1.73%	1.82%
Operating Cash Flow								
Revenues:								
Airline Revenues	$2,454,852	$2,130,120	$2,200,328	$2,272,876	$2,347,841	$11,406,016	$12,987,588	$33,526,734
Non-Airline Revenues	12,575,615	11,988,150	12,589,897	13,054,962	13,537,800	63,746,425	76,066,064	205,012,502
Non-Operating Revenues	873,544	821,570	821,570	821,570	821,570	4,159,824	4,108,800	8,214,750
Total Revenues	$15,904,010	$14,939,840	$15,611,795	$16,149,408	$16,707,211	$79,312,265	$93,162,451	$246,753,987
Operations & Maintenance Expenses	(13,172,993)	(14,522,760)	(14,958,443)	(15,407,196)	(15,869,412)	(73,930,804)	(86,780,449)	(217,227,992)
Total Net Operating Cash Flow Available For Capital Expenditures	$2,731,017	$417,080	$653,352	$742,212	$837,799	$5,381,461	$6,382,002	$29,525,995
Capital Cash Flow								
Beginning Cash Balance	$37,572,080	$29,326,680	$28,912,162	$27,456,164	$30,168,053	$37,572,080	$28,506,560	$15,162,948
Other Capital Funding Sources:								
AIP Entitlement Grants:	$4,053,471	$4,145,886	$4,172,006	$4,187,384	$4,202,969	$20,761,716	$21,284,545	$44,301,281
AIP Entitlement unspent current year + carryover	(4,161,816)	(4,145,886)	(4,172,006)	(5,364,771)	(4,202,969)	(4,202,969)	(4,328,103)	0
AIP Entitlements carryover from the prior years	7,401,485	4,161,816	4,145,886	4,172,006	5,364,771	7,401,485	4,202,969	4,328,103
AIP Discretionary Grants	0	6,831,706	4,752,822	0	0	11,584,528	0	5,294,422
FDOT Aviation Grants	2,843,610	887,750	450,000	999,026	298,043	5,478,429	8,369,967	11,939,480
FDOT SIS Grants	0	386,250	4,113,750	0	0	4,500,000	31,400,000	0
Passenger Facility Charges:	4,512,066	4,572,824	4,634,400	4,696,805	4,760,050	23,176,144	25,066,303	57,341,709
PFC beginning year unliquidated balance	8,015,314	3,963,709	6,863,780	1,601,352	1,575,883	8,015,314	284,219	84,918
PFC unspent current year + carryover	(3,963,709)	(6,863,780)	(1,601,352)	(1,575,883)	(284,219)	(284,219)	(84,918)	0
Other Capital Contribution	9,749,878	0	0	98,345	0	9,848,223	6,437,972	0
RAC Customer Facility Charges	2,702,608	2,739,000	2,775,883	2,813,262	2,851,144	13,881,897	15,014,052	34,346,167
Other Unidentified Funding	0	0	0	0	0	0	0	11,952,181
Total Other Capital Funding Sources	$31,152,908	$16,679,274	$26,135,168	$11,627,526	$14,565,672	$100,160,548	$107,647,006	$169,588,263
Total Funds Available for Capital Expenditures	$71,456,005	$46,423,034	$55,700,682	$39,825,902	$45,571,525	$143,114,089	$142,535,568	$214,277,206
Capital Improvement Program Expenditures	42,129,325	17,510,872	28,244,518	9,657,849	17,064,965	114,607,529	127,372,619	170,493,517
Ending Cash Balance	$29,326,680	$28,912,162	$27,456,164	$30,168,053	$28,506,560	$28,506,560	$15,162,948	$43,783,689

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