Tampa International Airport

Hillsborough County Aviation Authority
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Plant City and Tampa Executive Airports

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2015 Master Plan Update for

Tampa Executive Airport

Final Technical Report

• • •

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Hillsborough County Aviation Authority

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Chapter 1.0
Introduction

Tampa International Airport

Hillsborough County Aviation Authority

1.0 Introduction

1.1 Overview

In January of 2014, the Hillsborough County Aviation Authority (HCAA) contracted with Michael Baker International, Inc. to develop a Master Plan Update for the Tampa Executive Airport (VDF). The need for the update was essentially twofold. The primary reason was that the Federal Aviation Administration (FAA) requires airports receiving development grants to conduct periodic updates of their future development plans. Secondly, many changes had occurred in both the aviation industry as well as within the nation's economy since the previous Master Plan Update was completed in 2003. Therefore, it was necessary to reassess the 20-year development plans for the Tampa Executive Airport.

Although the development of a Master Plan Update and associated Airport Layout Plan (ALP) Drawing Set serves many objectives, one of the most significant purposes it serves is to allow the airport to meet federal assurances for grant funding eligibility. In 1982, the federal government adopted the Airport and Airway Improvement Act, which allowed federal funds to be distributed through a grant program to airports throughout the country. The federal grants did not require repayment provided that certain rules were followed and adhered to (i.e., assurances). Over the years, the grant legislation has been revised, renamed, and expanded to presently include 39 separate assurances that must be met in order for an airport to be considered "compliant." The current grant program, referred to as the Airport Improvement Program (AIP), provides grant funding to cover a significant portion of the costs required to address airport safety, capacity, security, or environmental concerns. Grant Assurance Number 29 states that the airport sponsor will develop and maintain an ALP which denotes the airport's boundaries along with all existing and proposed development within. The ALP and any revision or modification thereof must be reviewed and approved via signature by an authorized representative of the United States Secretary of Transportation.

1.2 Public Involvement

The airport does not exist in a static environment, but rather within the context of a larger community. As such, any future developments identified by this study considered potential impacts to the community. Multiple opportunities were made available for community and governmental representatives to participate in this study. This involvement was facilitated through the formulation of a Master Plan Committee consisting of key stakeholders representing the FAA, Florida Department of Transportation, local planning organizations, the airport's fixed base operator, and representatives from HCAA and the master plan team. In addition, tenants and stakeholders were surveyed and interviewed to solicit key information in support of the planning process.

Over the course of the project, the master plan was supported by a robust public involvement program consisting two rounds of public open house meetings and a series of special presentations to the Metropolitan Planning Organization (MPO) and other local community organizations. Progress of the study was also presented and discussed in an open forum at HCAA briefings. Throughout the project, the local community was provided multiple opportunities to track the status of the plan and comment on project deliverables via the HCAA website.

1.3 Project Scope and Level of Effort

As part of this Master Plan Update, the HCAA wanted to focus on providing development recommendations that would help the airport become more financially self-sustainable while at the same time promoting airfield safety and satisfying aviation demand. Consequently, a parallel support effort concentrated on conducting a Strategic Business Plan to study the land development potential and opportunities for potential income generation. For that reason, the inventory and forecasting efforts were condensed to only focus on specific elements rather than an exhaustive discussion of multiple airport characteristics and activity variables. Additional efforts were allocated towards evaluating short-term and long-term facility needs, developing alternatives to fulfill the identified needs, and creating a financing plan that illustrates revenue-generating opportunities and describes how the HCAA may fund the recommendations of this Master Plan Update.

1.4 Tampa Executive Airport Key Issues

This Master Plan Update provides a comprehensive review of the airport's needs over the next 20 years including issues related to the timing of proposed developments, cost estimates, and financing and management options to provide a clear action plan for the HCAA. Prior to the start of the Master Plan Update, the HCAA identified the following key issues that should be addressed during this planning effort:

- Identify revenue-generating opportunities and/or provide development recommendations that may encourage revenue-generating opportunities in the future.
- Identify market demand in the context of a regional airport system.
- In an effort to increase VDF's visibility and potential to attract aviation and non-aviation businesses, identify options for improved automobile access between the airport and nearby highways and/or major roads.
- Review airport land parcels to identify the highest and best use of each in regards to its future development potential.
- Assess the operational efficiency, effectiveness and safety of the airport.
- Evaluate the airport facility layout for conformance with FAA Advisory Circular (AC) 150/5300-13A, *Airport Design*, as well as other applicable guidance.
- Review vertical obstacles located in the vicinity of VDF in comparison to the airport's airspace requirements.
- Assess the needs of current tenants and requirement improvements that will be necessary to attract new tenants and/or to expand existing tenant facilities.
- Assist the airport in supporting aviation demand within the HCAA's system of airports.
- Identify areas of environmental concern and provide mitigation options for future development.
- Evaluate long-term development options for general aviation and airport support facilities.
- Evaluate the airport's existing and ultimate runway length requirements to identify improvements necessary to meet demand and/or to entice additional traffic to the airport.

1.5 Process

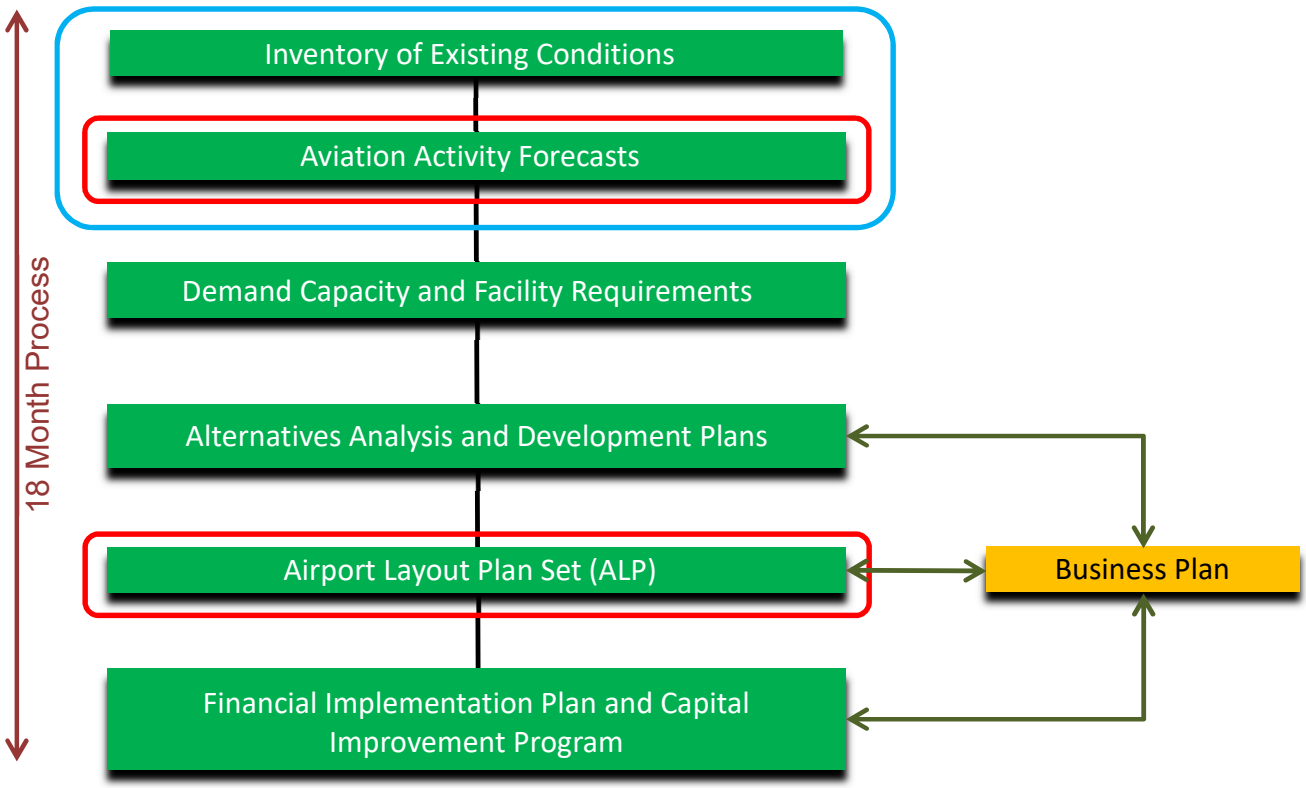
This Master Plan Update provides a systematic outline of the development actions that will be necessary to maintain and further develop VDF's airside and landside facilities. This process provides the officials responsible for the scheduling, budgeting, and ultimate funding of airport improvement projects with advanced notice of the future airport needs. By phasing the airport improvements, the development can be conducted in an orderly and timely fashion.

In order to accomplish the HCAA's long-term development goals for VDF, this Master Plan Update was prepared in accordance with FAA and the Florida Department of Transportation (FDOT) requirements. All portions of this document are based on the criteria set forth in the FAA AC 150/5070-6B, *Airport Master Plans*, and FAA AC 150/5300-13A, *Airport Design*. The following study tasks were performed for this effort:

- Conducted an inventory of the existing documents related to the airport, the physical airport facilities, the demographics of the airport service area, and the airport environment.
- Evaluated and compared the airfield capacity to the expected aviation activity.
- Determined the airport facilities improvements that will be necessary to meet the forecast demand.
- Developed and evaluated alternative methods to meet the facility requirements of the airfield.
- Developed a concise ALP Drawing Set that reflects proposed 20-year improvements.
- Compiled a schedule of the proposed improvements to include the cost estimates, phasing, and financial feasibility of each.

The individual report chapters provide detailed explanations of the tasks described above. It should be noted that each step in the master plan process is built upon information and decisions made during previous steps. Taken as a whole, they address the key issues identified in this chapter and describe how the study objectives were met.

Figure 1-1
Master Planning Process



RED - Requires FAA Approval

Chapter 2.0
Inventory of Existing Conditions

Tampa International Airport

Hillsborough County Aviation Authority

2.0 Inventory of Existing Conditions

2.1 Background

The master planning process requires the gathering of information related to the airport's existing airside and landside facilities. This information is important since it serves as the baseline for future evaluation steps throughout the remainder of the master planning process. For this reason, information related to the Tampa Executive Airport (VDF) and its surrounding areas was collected, evaluated, and documented within this chapter. The data collected in this phase provides an inventory of the following:

- Existing physical facilities: runways, taxiways, aircraft parking aprons, navigational aids, airport terminal, and facility areas for general aviation, corporate, and aviation support activities.
- Locale and climate information related to VDF.
- Airspace environment and land use controls within the vicinity of VDF.
- The airport's overall role in central Florida: development history, location, and access relationship to other transportation modes.

2.2 Airport History, Land Holdings, and Role

Jules Vandenberghe was an immigrant from Belgium who started a vegetable farm on a 105 acre parcel of land located in the eastern outskirts of the Tampa area. Jules had two sons, Julian and George, who owned and operated a grading and tractor business. Back in the 1950s, Julian and George were working on Davis Islands and decided to stop by the Peter O. Knight Airport (TPF). During their visit, they spoke to a flight instructor and shortly thereafter started taking flying lessons. After attaining their pilot's licenses, they decided to construct an airstrip on their father's farm property. Once constructed, the airport began to gain popularity and the Vandenberghes received multiple requests by pilots who wanted to store their aircraft within hangars at the field. Julian and George initially constructed 13 hangars from scrap metal; however, by the time they finished, there were already more people waiting for additional hangars to be built. Many additional hangar facilities were constructed during the 1970s and 1980s and the grass strip was improved through the construction of a paved runway. After recognizing the need for an additional public general aviation airport facility within the Tampa area, the Hillsborough County Aviation Authority (HCAA) negotiated with the Vandenburghes and eventually purchased the airport in 1985 for $4.8 million. After purchasing the airport, the HCAA continued to acquire land and expand the airport property until it had nearly tripled in size. In the late 1990s, the HCAA constructed an additional 5,000 foot runway, Runway 5-23. In 2009, the airport was renamed to the Tampa Executive Airport. The airport property currently comprises approximately 408 acres.

Presently, the airport serves as a general aviation reliever airport to Tampa International Airport (TPA) and provides storage for more than 130 based aircraft which range in size from recreational pistons to corporate jets. In addition, VDF also serves as a base of operations for a number of tenants including: Reliable Aviation, Hawk Aircraft Painting, Hillsborough County's Mosquito Control and Hillsborough County's Sheriff's Aviation Unit. Due to its available runway length

and precision approach capabilities, the airport has the features and amenities necessary to accommodate corporate aircraft activity – hence the term "Executive" in the airport's name.

FAA-designated Aeronautical Role

As part of the FAA's development and classification of public use airports within the Nation Plan of Integrated Airports (NPIAS), the National Asset Study (ASSET 1) classifies and further defines the activity and levels of service offered by three types of nearly 3,000 airports, heliports, and seaplane bases. The study aligns the general aviation airports into four categories---National, Regional, Local, and Basic to better capture their diverse functions and the economic contributions general aviation airports make to their communities and the Nation.

VDF is currently classified as one of 467 NPIAS listed general aviation airports having a "Regional" Role that supports regional economies by connecting communities to statewide and interstate markets. This type of ASSET-classified airport is typically characterized as having high levels of activity with some jets and multiengine propeller aircraft. The airport, on average, accommodates approximately 90 based aircraft, including 3 jets.

2.3 Location / Locale

As shown in **Figure 2-1**, Tampa Executive Airport is located approximately seven nautical miles northeast of downtown Tampa and just northwest of the Interchange of U.S. Interstates 4 and 75. VDF is strategically located between two of the fastest growing areas of Hillsborough County, New Tampa/Wesley Chapel to the north and Brandon/Riverview to the south. The nearest public use general aviation airport is TPF which is located approximately 8.1 nautical miles southwest. **Table 2-1** provides a brief comparison of the public airports located within a 20 nautical mile radius along with their respective facilities and associated distances from VDF.

Figure 2-1
Locale

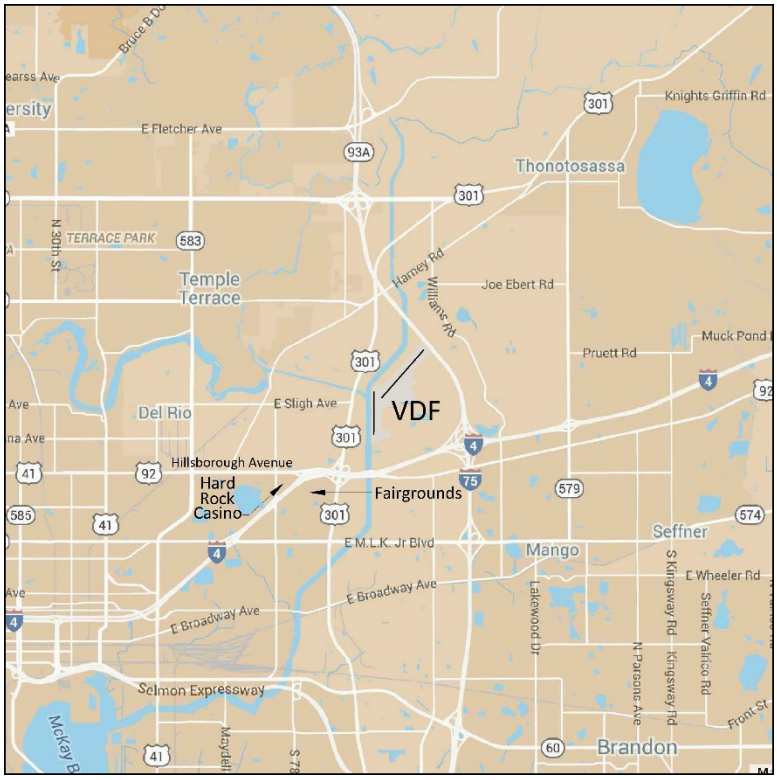


Table 2-1 Public Airports In The Region			
Airport	**NM from VDF**	**Runways**	**Published Instrument Approach Procedures**
Peter O. Knight (TPF)	8.1 SW	4-22 (3,580' x 100') 18-36 (2,687' x 75')	RNAV
Plant City (PCM)	9.7 E	10-28 (3,948' x 75')	RNAV, VOR
Tampa International (TPA)	10.2 W	1L-19R (11,002' x 150') 1R-19L (8,300' x 150') 10-28 (6,999' x 150')	ILS, RNAV, LOC
Tampa North Aero Park (X39)	12.5 N	14-32 (3,541 x 50')	None
Zephyrhills Municipal (ZPH)	16.3 NE	4-22 (4,999' x 100') 18-36 (4,954' x 100')	RNAV, NDB
Lakeland Linder Regional (LAL)	17.4 E	9-27 (8,499' x 150') 5-23 (5,005' x 150')	ILS, LOC, RNAV, VOR
Source: FAA Airport/Facility Directory, effective August 20, 2015.			

2.4 Climate

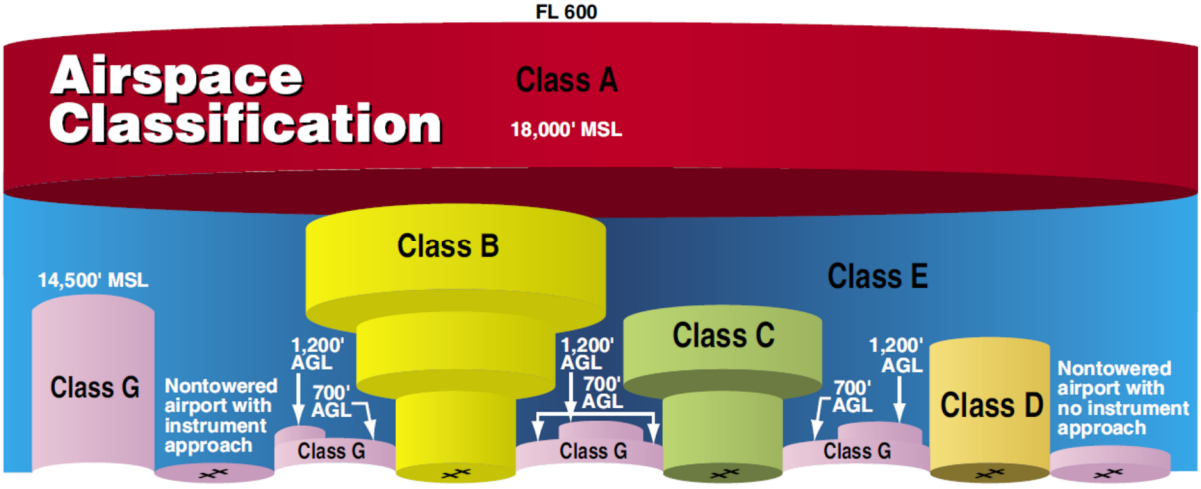
Due to its location within the west central region of Florida and close proximity to the warm waters of the Gulf of Mexico, temperatures within the Tampa area typically include hot and humid summers and relatively mild winters. The average low in the summer months (June, July, August, and September) varies between 75 and 76 degrees Fahrenheit; whereas, the average high during the same months is relatively steady at 90 degrees Fahrenheit. During the winter months

(December, January, and February), the average high temperature varies between 70 and 73 degrees Fahrenheit; whereas, the average low temperature during the same months varies between 52 and 55 degrees Fahrenheit. In regards to precipitation, the wettest months of the year are June, July, August, and September with an average precipitation that varies between six and eight inches per month. The precipitation amounts during the remaining eight months of the year typically average between 1.5 and three inches of rain per month.[1]

2.5 Airspace Environment

Because VDF is located within 30 nautical miles of TPA, it is located within TPA's Mode C Veil, which requires all aircraft operating at VDF must be equipped with a two-way radio and a Mode C transponder. VDF is also located beneath TPA's Class 'B' airspace where all aircraft operating between 3,000 feet Above Mean Sea Level (AMSL) and 10,000 feet AMSL must obtain clearance from Tampa Approach/Departure. Just west of VDF, the Class 'B' airspace floor associated with TPA is reduced to 1,200'. Thus, prior clearance must be obtained by those pilots that desire to operate between 1,200 feet AMSL and 10,000 feet AMSL in this area. Lastly, VDF itself is located within Class 'E' airspace which requires aircraft operating under Instrument Flight Rule (IFR) conditions to obtain clearance from Tampa Approach/ Departure when operating between 700 feet Above Ground Level (AGL) and up to 18,000 feet AMSL. All other Visual Flight Rule (VFR) activity that is not subject to the clearance requirements typically communicate (self-announce) by using the Common Traffic Advisory Frequency (CTAF) (frequency 122.7 MHz) once in the vicinity of the airport or traffic pattern. **Figure 2-2** graphically depicts a comparison of the airspace classes by type; whereas, the aeronautical chart for VDF and the surrounding areas is shown in **Figure 2-3**.

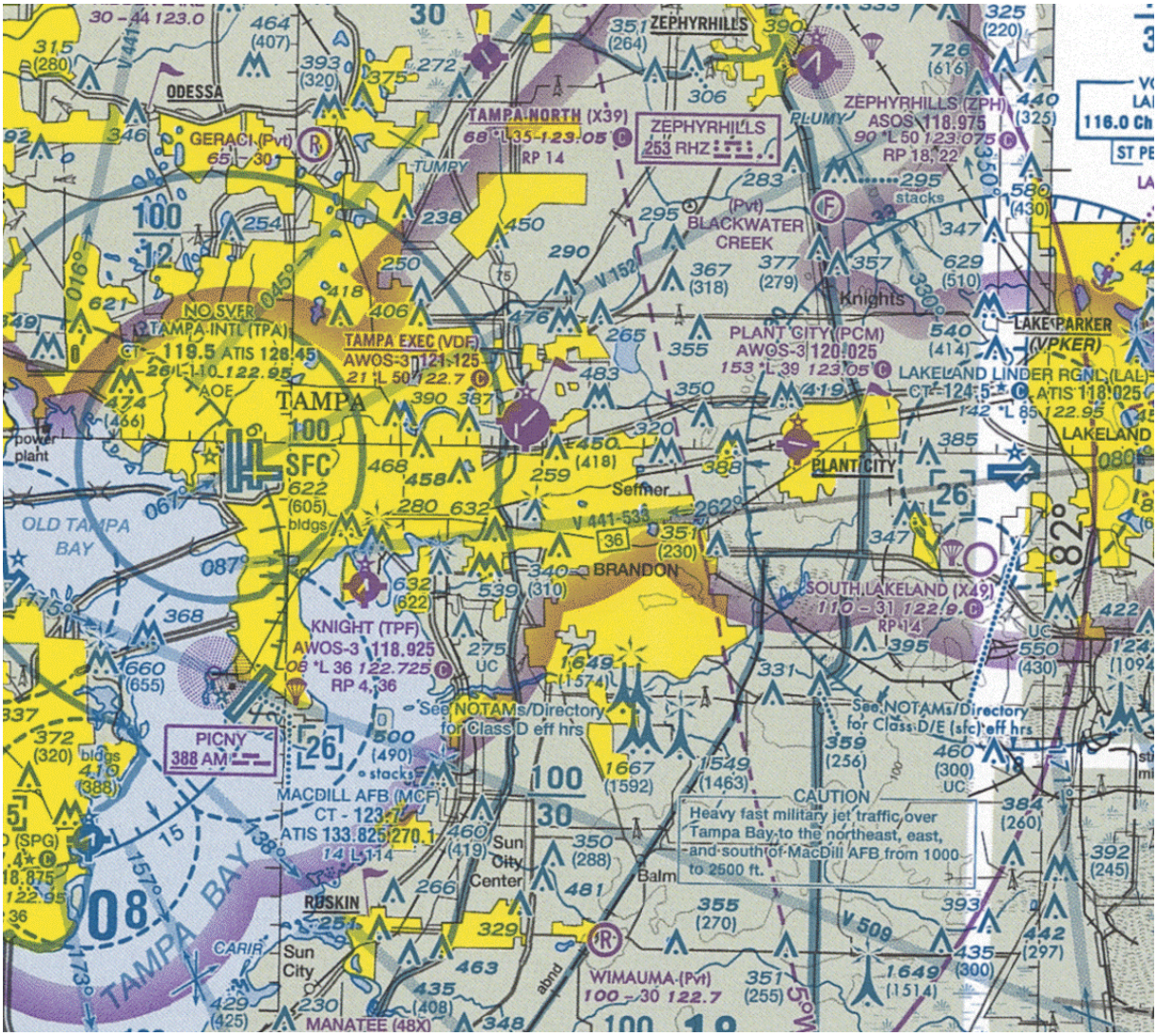
Figure 2-2
Airspace Classes



Source: FAA 2013 Pilot's Handbook of Aeronautical Knowledge.

[1] www.weather.com, accessed April 1, 2014.

Figure 2-3
Aeronautical Chart



Source: FAA Jacksonville Sectional Aeronautical Chart.

2.6 Airport Zoning and Land Use Controls

On April 1, 2010, the HCAA adopted Resolution No. 2010-54, Airport Zoning Regulations for Tampa International, Tampa Executive, Peter O. Knight, and Plant City Airports. The zoning regulations were established to promote aviation safety, to limit the height of structures located within the vicinity and approaches of airports, to discourage land uses that are incompatible with existing and planned airport operations, and to establish administrative procedures for the uniform review of land development proposals. The zoning regulations were based upon guidance provided in Florida Statute 333, Federal Aviation Regulations (FAR) Part 77, and FAR Part 150 regulations which address land use compatibility, height of objects in the vicinity of airports, and noise compatibility planning in relation to airport operations. As part of this Master Plan Update, the HCAA's recently updated Airport Zoning Regulations were considered during the creation and evaluation of development alternatives and the selection of recommended developments that are

illustrated on the Airport Layout Plan (ALP) for VDF. In addition, HCAA is working closely with Hillsborough County to establish an interlocal agreement in support of the zoning regulations.

2.7 Airport Access and Parking

Airport visitors, employees, air travelers, and others can gain access to the vicinity of VDF through one of three major roads: Interstate 75, Interstate 4, and U.S. Highway 301. However, access to airport itself is more tedious because it requires vehicles to travel on a series of two-lane roads that are mostly residential before arriving at the main airport entrance. As shown in Figure 2-1, travelers arriving from Interstate 4 must exit at U.S. Highway 301 and head north until it intersects Sligh Avenue. After proceeding east on Sligh Avenue, drivers must turn right on Maple Lane which turns into Eureka Springs Road after a left turn, and then cross a bridge over the Tampa Bypass Canal allowing them to continue to the airport's main entrance along Eureka Springs Road. The total distance travelled from U.S. Highway 301 to the airport's main entrance is approximately two miles. Consequently, it may be beneficial to provide improved automobile access to the airport in order for the property to be more attractive and convenient for new business opportunities, which will be evaluated later in this Master Plan Update and as part of the Business Plan study. Automobile parking is provided at the larger facilities throughout the airport (e.g., terminal building and executive hangars), while aircraft owners sometimes park in their hangar when utilizing their aircraft.

2.8 Airside Facilities

The inventory of airside facilities includes those facilities required to support the movement and operation of aircraft. Airside facilities include the airport's runways, taxiways, taxilanes, aprons, airfield lighting, navigational aids, pavement markings, and signage. The existing airfield facilities at VDF are discussed in the following sections and are illustrated in **Figure 2-4**.

Airfield Characteristics

The airfield at VDF consists of two runways with parallel taxiways. Runway 5-23 has a northeast-southwest orientation and is 5,000 feet long and 100 feet wide. There is an 800 foot long displaced threshold at the end of Runway 23, which means that aircraft are only provided with 4,200 feet of landing length to this runway. There is also a precision Instrument Landing System (ILS) approach available to the Runway 23 that is supplemented with a Medium Intensity Approach Lighting System (MALSR). Both ends of Runway 5-23 have precision markings and Medium Intensity Runway Lights (MIRLs) are provided along the edges of the runway. Parallel Taxiway E is 40 feet wide and runs along the east side of Runway 5-23 from the Runway 5 end to the Runway 23 threshold, and therefore, aircraft must back taxi along the 800 foot long displaced threshold section when utilizing the Runway 23 end for departures. Medium Intensity Taxiway Lighting (MITLs) are provided along the edges of the taxiway.

Runway 18-36 has a north-south orientation and is 3,219 feet long and 75 feet wide. Both ends of Runway 18-36 have non-precision markings and MIRLs are provided along the edges of the runway. Parallel Taxiway A is 40 feet wide and runs along the east side of Runway 18-36 for the full length of the runway. MITLs are provided along the edges of the taxiway. There are several additional taxiways at VDF that provide access between the runways and the various landside

areas. These taxiways are 40 feet wide and are equipped with MITLs. Signage is provided throughout the airfield that identifies the location of the runways, taxiways, and other airside facilities at the airport.

Apron Facilities

There are three separate apron facilities that are available for based and transient aircraft parking at VDF, which are referred to as Apron Areas 1500, 3100, and 4000. The following paragraphs describe the location and capacities of each of apron areas and a graphical depiction is provided in Figure 2-4.

Apron Area 1500 – This is the southernmost apron area at VDF and is located south of the general aviation hangar facilities that are parallel to Runway 18-36. This apron comprises approximately 155,000 square feet of space and provides tie-down parking for 48 small general aviation aircraft.

Apron Area 3100 – This apron is located to the north of the general aviation hangar facilities that are parallel to Runway 18-36. This apron area comprises approximately 114,000 square feet of space and provides tie-down parking for 26 small general aviation aircraft.

Apron Area 4000 – This the largest apron on the airfield and is located adjacent to the main terminal and Fixed Base Operator (FBO). This apron comprises approximately 418,000 square feet of space and includes 44 tie-down spaces for small general aviation aircraft parking and approximately 116,000 square feet of apron space for transient/visiting aircraft.

Airfield Pavement

It is important to establish the condition of VDF's existing airfield pavements in order to determine the phasing of future maintenance and development needs. Generally speaking, most of the airfield pavement at VDF is currently in satisfactory to good condition; however, some isolated areas such as the south and north T-hangar facilities and the parallel taxiway along Runway 18-36 are in fair condition. **Figure 2-5** graphically depicts the condition of the various airfield pavements at VDF as indicated in FDOT's Statewide Airfield Pavement Management Program Report for District 7, dated June 2015.

Navigational Aids and Instrument Approaches

An airport's navigational aids and instrument approach facilities collectively allow pilots to navigate to the runway ends during poor visibility conditions. **Table 2-2** illustrates the various navigational aids that are available at VDF. **Table 2-3** identifies the instrument approach procedures that are currently published to the runway ends and the lowest vertical and horizontal visibility minimums that are available for each runway end.

Table 2-2 VDF Navigational Aids		
Runway	Navigational Aids	Runway Markings
5	GPS, Runway End Identifier Lights (REILs), 2-Light Precision Approach Path Indicator (PAPI-2L)	Precision
23	GPS, MALSR, ILS (Glideslope and Localizer), PAPI-2L	Precision
18	GPS, REILs, 4-Light PAPI (PAPI-4L)	Non-Precision
36	REILs, PAPI-2L	Non-Precision
Airport	Beacon, Lighted Wind Cone and Segmented Circle, Supplemental Wind Cone	N/A
Sources: FAA Airport/Facility Directory and FAA Terminal Procedures Publication, effective August 20, 2015.		

Table 2-3 VDF Instrument Approach Procedures			
Runway	*Runway Dimensions*	*Lowest Approach Minimums (Vertical / Horizontal)*	*Published Approaches*
5	*5,000' x 100'*	*LPV (269' AMSL / 7/8 Mile)*	*GPS (LPV, LNAV/VNAV, LNAV, Circling)*
23	*5,000' x 100'*	*ILS (298' AMSL / 1 Mile)*	*ILS, LOC, GPS (LPV, LNAV/VNAV, LNAV, Circling)*
18	*3,219' x 75'*	*LPV (360' AMSL / 1 Mile)*	*GPS (LPV, LNAV/VNAV, LNAV, Circling)*
36	*3,219' x 75'*	*No Published Procedures*	*N/A*
Sources: FAA Airport/Facility Directory and FAA Terminal Procedures Publication, effective August 20, 2015.			

Weather Facilities

The airport is equipped with an on-site Automated Weather Observation System (AWOS-3) that is located near the end of Runway 23, just west of the glide slope antenna. The AWOS-3 includes a suite of sensors that measure, collect, and broadcast weather data to help pilots and flight dispatchers prepare and monitor weather during all phases of flight including en-route, departures, and landings. The AWOS-3 reports several variables such as wind speed, wind gusts, wind direction, temperature, dew point, altimeter setting, density altitude, cloud height, sky conditions, and present weather. The AWOS-3 broadcasts at VDF are transmitted on frequency 121.125 MHz and can be received by aircraft operating at altitudes up to 10,000 feet AGL and as far away as 25 nautical miles. Additional weather facilities at VDF include a lighted wind cone and segmented circle located near the Runway 18 end and a supplemental wind cone located near the AWOS-3. The wind cones allow pilots to see the surface wind conditions while in-flight or on the ground.

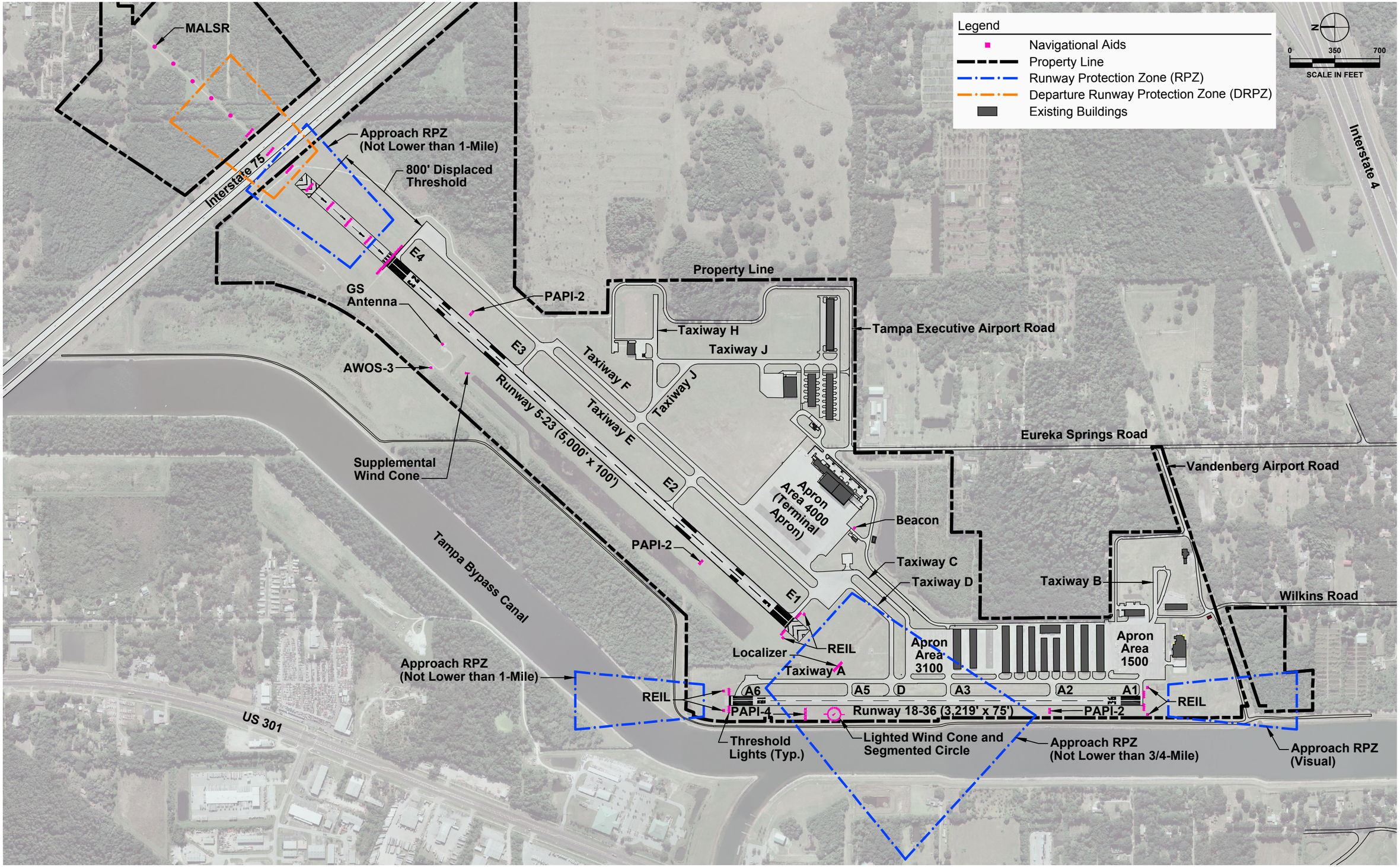


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Figure 2-4 Existing Airside Facilities

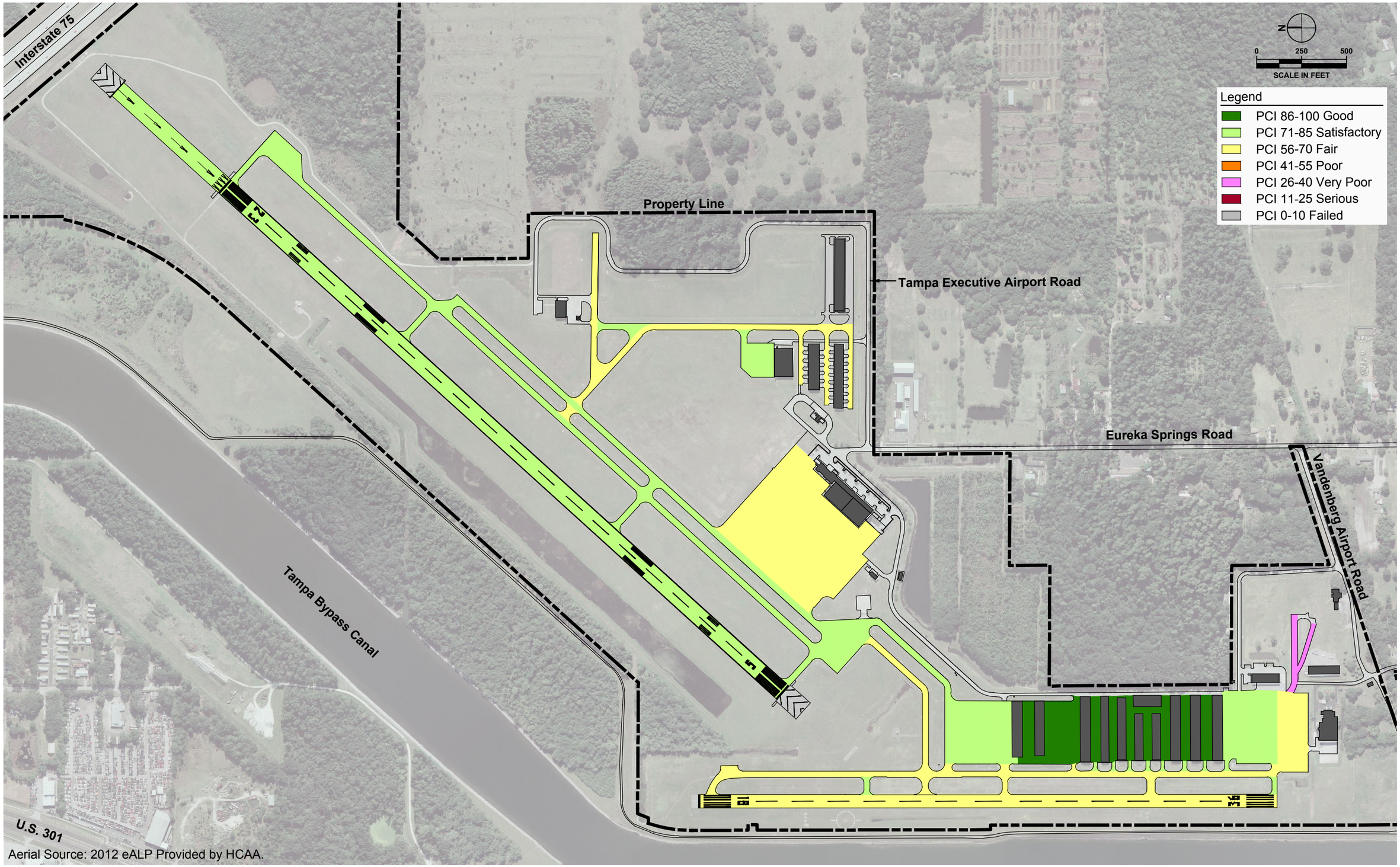

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Figure 2-5 Pavement Conditions Map

Source: Florida Department of Transportation - Aviation and Spaceports Office, 2015.

2.9 Landside and Support Facilities

The inventory of landside and support facilities includes all facilities located within the airport boundaries that are not required for aircraft movement or air navigation. Some examples of these facilities include but are not limited to hangar structures, fuel storage and fueling facilities, and terminal/FBO facilities. **Figure 2-6** presents a graphic illustrating the various landside facilities at VDF and **Table 2-4** contains a photo of each facility along with the size, capacity, and use of each.

Fixed Base Operator (FBO)

Volo Aviation is the airport's only FBO and they provide services that include aircraft sales, aircraft line services, hangar rentals, tie-downs, car rentals, flight training, aircraft maintenance, 24-hour fuel sales, and aircraft and auto detailing. They also provide a number of amenities for pilots and visitors including a flight planning room with weather, a conference room, a flight crew lounge with showers, a snack and vending area, private offices, and wireless internet. Volo Aviation operates out of the airport's main terminal building which is located at the northernmost end of Eureka Springs Road. Their facilities include approximately 14,000 square feet of office/administrative space, a large 25,000 square foot maintenance hangar, and a 116,000 square foot apron area that is utilized for transient aircraft parking.

General Aviation Hangar Facilities

The general aviation hangar facilities at VDF are located in two areas: the first area is located east of Runway 18-36 between Apron Areas 1500 and 3100 and the second area is located east of Runway 5-23 in the vicinity of the main terminal. There are a number of different types of hangar facilities for the storage and maintenance of aircraft at VDF. The following sections describe the types and uses of each type of hangar facility. **Table 2-5** describes the size and condition of each hangar and Figure 2-5 illustrates the location of the hangar facilities at VDF.

Business Hangars – These hangars are larger in size in compared to other hangars because they are often utilized to house multiple aircraft or are utilized to conduct aviation-related business activity. There are presently four business hangars at VDF (Buildings 1000, 1200, 2200, and 6700).

Enclosed Hangar – These facilities include multiple T-hangar units that are enclosed on three sides by walls and contain a door at the front of each hangar for aircraft ingress and egress. There are presently five enclosed hangars at VDF that provide housing for approximately 76 small general aviation aircraft (Buildings 2000, 2700, 4600, 4700 and 5300).

Enclosed Pushback Hangar – These hangars are essentially T-hangar units that have some enclosed hangar facilities and others that are open on one side and therefore do not have hangar doors for ingress and egress. There are two of these types of hangar facilities presently at VDF that provide housing for 34 aircraft (Buildings 1800 and 1900).

Taxi-Through Hangar – These hangars are square in shape and have doors on opposite sides which allow aircraft owners to enter one side and exit the other without the need to push the aircraft back.

There are presently four of these types of hangar facilities at VDF that provide housing for 28 aircraft (Buildings 2100, 2300-2500).

Shade Hangar – The shade hangars are simply a roof structure that provides shade from the sun and limited protection from weather elements. At VDF, there are two shade hangars that are located adjacent to Apron Area 3100 that provide housing for 28 aircraft (Buildings 2900 and 3000).

Maintenance Hangar – As their name implies, maintenance hangars are bulk hangars that are intended to be used for aircraft maintenance. There is only three maintenance hangars at VDF and they are currently occupied by the Leading Edge Aviation Services, Global Pilot Academy, and Corporate Jet Solutions, Inc. (Buildings 3700, 3800 and 4800).

Bulk Hangar Facilities – These large facilities are sometimes called community hangars and they are typically utilized to store multiple aircraft that may be owned by one or multiple owners. There are presently two bulk hangar facilities at VDF in the vicinity of the main terminal (Buildings 3800 and 4800). These hangars are capable of storing up to 15 small aircraft.

Fuel Storage Facilities

The fuel storage facilities at VDF are located adjacent to and north of the FBO terminal within a secure portion of the airfield operations area. The fuel farm was constructed in 1998 and includes two large tanks that each have a capacity of 12,000 gallons, one of which is contains 100LL fuel and the other contains Jet-A fuel. The fuel storage tanks have reached the end of their useful service life and are scheduled for replacement in 2016. The FBO utilizes the tanks to refill their two fuel trucks which consist of a 3,000 gallon Jet-A truck and a 1,200 gallon 100LL truck.

Table 2-4
VDF Existing Landside Facilities

Facility #	Description	Size / Capacity	Notes	Image
1000	Business Hangar - Hillsborough County Sherriff	14,767 SF	Constructed Between 1994 and 1999	
1100	South Lift Station	N/A	Constructed Between 1995-1997	
1200	Business Hangar - Hawk Aircraft	7,739 SF	Constructed Between 1982-1995	
1300	HCAA Garage	880 SF	Constructed Prior to 1969	

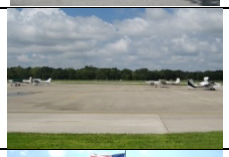
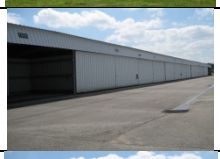
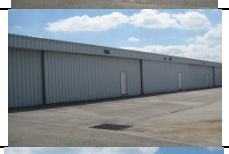
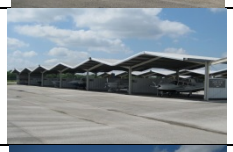
Table 2-4 VDF Existing Landside Facilities				
Facility #	**Description**	**Size / Capacity**	**Notes**	**Image**
1400	Club House - Civil Air Patrol	2,812 SF	Constructed Prior to 1969	
1500	Tie-Down	48 Parking Spots	Constructed Between 1971-1982	
1600	Operations and Maintenance Shop	7,625 SF	Constructed in 2007	
1700	Public Restrooms	315 SF	Constructed Between 1995-1999	
1800	Enclosed / Open Pushback Hangar	20,679 SF	Constructed Between 1971-1982	
1900	Enclosed / Open Pushback Hangar	20,731 SF	Constructed Between 1971-1982	
2000	Enclosed Hangar	20,397 SF	Constructed Between 1971-1982	
2100	Taxi-Thru Hangar	12,338 SF	Constructed Between 1971-1982	
2200	Business Hangar	9,761 SF	Constructed Between 1971-1982	
2300	Taxi-Thru Hangar	12,382 SF	Constructed Between 1971-1982	
2400	Taxi-Thru Hangar	14,657 SF	Constructed Between 1971-1982	

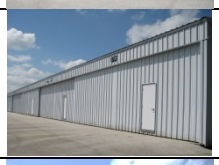
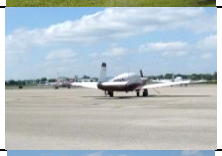
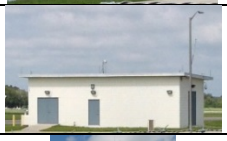
Table 2-4 VDF Existing Landside Facilities				
Facility #	**Description**	**Size / Capacity**	**Notes**	**Image**
2500	Taxi-Thru Hangar	16,090 SF	Constructed Between 1971-1982	
2508	Maintenance Storage Unit	2,170 SF	Constructed Between 1982 and 1995	
2700	Enclosed Hangar	20,731 SF	Constructed between 1971-1982	
2900	Shade Hangar	16,308 SF	Constructed Between 1982-1995	
3000	Shade Hangar	18,033 SF	Constructed Between 1982-1995	
3100	Tie-Down	26 Parking Spots	Constructed Between 1982-2000	
3200	Aircraft Wash Rack	N/A	Constructed in 2007	
3201	Localizer Shack	125 SF	Constructed Between 2002-2004	
3300	Fire Pump Building	760 SF	Constructed in 1998	
3400	Electrical Vault	944 SF	Constructed in 1998	
3500	Rotating Beacon	N/A	Constructed in 1998	

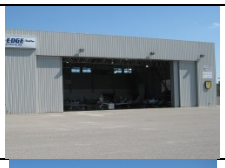
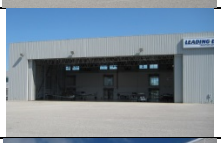
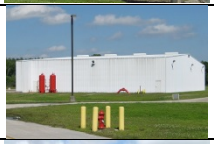
Table 2-4 VDF Existing Landside Facilities				
Facility #	**Description**	**Size / Capacity**	**Notes**	**Image**
3700	FBO Maintenance Hangar	13,151 SF	Constructed in 1998	
3800	Bulk Hangar	12,970 SF	Constructed in 1998	
3900	Terminal Building	12,824 SF	Constructed in 1998	
4000	Tie-Down	36 Parking Spots	Constructed in 1998	
4100	Lift Station	N/A	Constructed in 1998	
4200	Fuel Farm	N/A	Constructed in 1998	
4600	Enclosed Hangar	18,640 SF	Constructed in 2005	
4700	Enclosed Hangar	15,628 SF	Constructed Between 1999-2002	
4800	Bulk Hangar	16,179 SF	Constructed Between 1999-2002	
5300	Enclosed Hangar	21,339 SF	Constructed in 2009	
6700	Business Hangar	5,460 SF	Constructed in 2007	

Table 2-4 VDF Existing Landside Facilities				
Facility #	**Description**	**Size / Capacity**	**Notes**	**Image**
7000	AWOS	N/A	Constructed in 2005	
7001	Glide Slope Shack	96 SF	Constructed in 2005	
Sources: Airport Records and Michael Baker International, Inc., 2014.				

Figure 2-6 Existing Landside Facilities

2.10 Environmental Inventory

As a component of the inventory effort, an environmental overview was conducted to identify environmental considerations that could affect future airport development at VDF. This overview was based on a review of available resource materials and databases, which included:

- Federal Emergency Management Agency (FEMA) digital 100-year floodplain mapping
- Southwest Florida Water Management District (SWFWMD) Florida Land Use, Cover, and Forms Classification System (FLUCCS) data
- Florida Natural Areas Inventory (FNAI) tracking list of protected species for Hillsborough County
- National Register of Historic Places (NRHP) database
- United States Department of Agriculture, Natural Resources Conservation Service, Web Soil Survey, Farmland Classification and Hydric Rating by Map Unit- Hillsborough County, Florida
- United States Environmental Protection Agency (USEPA) NEPAssist database
- United States Fish and Wildlife Service (USFWS) Information, Planning, and Conservation System (IPAC) Protected Species data
- USFWS National Wetlands Inventory (NWI)
- Airport-specific information including the 2006 Commercial Water Use Permit Renewal and natural resource impacts from the 1989 Resolution for Airport Expansion at VDF

The environmental information was collected based upon the guidelines set forth in FAA Order 1050.1E, Environmental Impacts: Policies and Procedures, FAA Order 5050.4B, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions, and FAA's Environmental Desk Reference for Airport Actions, which includes 23 categories of potential areas of impact that must be addressed in compliance with NEPA.

For the purpose of this overview, only the environmental categories that were deemed applicable to VDF were addressed, with the goal of identifying features that could affect proposed development projects identified as a product of this Master Plan Update. Based on a review of available resource materials, the following paragraphs identify various criteria which should be considered prior to undertaking future development projects. **Figure 2-7** provides an illustration of sensitive environmental features on and surrounding the airport property.

Socioeconomics and Environmental Justice

The 2010 United States Census data (American Community Survey, 2008-2012/5-Year Summary File) was used at the Block Group (BG) level for determining population and income characteristics in the vicinity of VDF. A BG is the smallest geographic division that is used by the United States Census Bureau to categorize data.[2] The airport is encompassed by Census Tract (CT) 103.05 BG 3. **Table 2-5** provides demographic and economic characteristics of this BG, as compared to both Hillsborough County and Florida. The minority population in the vicinity of the airport comprises approximately 17.8 percent of the total population, as compared to 26.7 percent

[2] United States Census Bureau, "Glossary," http://factfinder.census.gov/home/en/epss/glossary_a.html (March 31, 2014).

and 23.5 percent for the Hillsborough County and Florida, respectively. The percent of the population in the immediate vicinity of the airport that is living below the poverty level (31.5 percent), however, is approximately double that of the county and state, at 16.5 and 15.6 percent respectively.

Table 2-5
Select Demographic and Economic Characteristics

Area	Characteristic		
	Total Population	% Minority	% Below Poverty
Florida	18,885,152	23.5%	15.6%
Hillsborough County	1,238,365	26.7%	16.5%
CT 103.05 BG 3	1,012	17.8%	31.5%
Source: U.S. Census Bureau, 2008-2012 American Community Survey 5-year Estimates.			

Executive Order (EO) 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, requires federal agencies to identify community issues of concern during the NEPA planning process, particularly those issues relating to decisions that may have a disproportionate impact to low-income or minority populations. To determine if there were higher concentrations of environmental justice populations in the vicinity of the airport, the block group data pertaining to percentage of low-income and minority populations were compared to that of Hillsborough County. The minority population in the vicinity of VDF is far smaller than that of Hillsborough County. However, because a high percentage of the population in CT 103.05 BG 3 (31.5 percent) is comprised by those living below the poverty level, potential environmental justice populations may exist in the vicinity of the airport.

Hazardous Material Sites

The USEPA NEPAssist database[3] was utilized to obtain information regarding potential waste and hazardous material sites. No sites in the vicinity of the airport that are listed on federal or state solid and hazardous waste databases were identified. Two Aboveground Storage Tanks (ASTs) for aviation fuel are located northeast of the terminal apron. Other ASTs that store fuel were also noted on the airfield.

Floodplains

The 100-year floodplain boundary delineates a flood elevation that has a one percent chance of being equaled or exceeded any given year. EO 11988, Floodplains, and the United States Department of Transportation Order 5650.2, Floodplain Management and Protection, require that all airport development actions must avoid floodplain impacts wherever there is a practicable alternative. In addition, the design must also minimize the adverse impacts to the floodplain's natural and beneficial values and minimize the likelihood of flood-related risk to human life, health, and welfare.

As depicted on Figure 2-7, several areas designated as 100-year floodplains are located on and adjacent to the airport property. This includes areas classified as Zone AE and areas classified as

[3] USEPA, NEPAssist, http://nepassisttool.epa.gov/nepassist/nepamap.aspx?action=searchloc&wherestr=Plant%20City%20Airport%2C%20Tampa%2C%20Florida (March 13, 2014).

Zone A. Zone AE floodplains are areas inside of the 100-year floodplain for which prior hydraulic studies have been completed and Base Flood Elevations (BFEs) are available. The Zone AE floodplains on airport property have a defined BFE ranging between 15 and 17 feet. One area of Zone A floodplains is located in the northeast corner of airport property (refer to Figure 2-7). Zone A floodplains are defined as areas inside of the 100-year floodplain for which prior hydraulic studies have not been completed and for which no BFEs have been indicated. West of VDF is the Tampa Bypass Canal, a flood bypass that provides flood protection in the Hillsborough River Basin.

Water Quality

The airport property is located within the Palm River sub-watershed of the Lower Hillsborough River-Delaney Creek Frontal watershed (United States Geological Survey [USGS] Hydrologic Unit Code [HUC] 0310020603) of Tampa Bay, which is one of 29 major drainage basins in Florida. The closest surface waters include the Tampa Bypass Canal located to the west of Runway 5-23 and two ponds that are located on airport property. Just west of Runway 18-36, the Harney Canal flows into the Tampa Bypass Canal, which flows south to McKay Bay, East Bay, and then into Hillsborough Bay. The section of the Tampa Bypass Canal that is located south of the Harney Canal is also referred to as Six Mile Creek. The airport maintains a commercial water use permit for less than 100,000 gallons per day.

As part of the Clean Water Act, states are required to record the condition of surface waters in accordance with Section 303(d) documentation. The Florida 303(d) documentation identifies water bodies that are considered impaired because they do not meet state water quality standards regarding pollutant levels. The Tampa Bypass Canal is included on the 2014 Florida Section 303(d) list[4] due to algal blooms (measured as high levels of chlorophyll-A) and oxygen depletion (low levels of dissolved oxygen). A Total Maximum Daily Load (TMDL) that addresses Biochemical Oxygen Demand (BOD), as well as total nitrogen and phosphorus levels, was approved in 2013. TMDLs calculate the maximum amount of a pollutant allowed to enter a waterbody, also known as the loading capacity, so that the waterbody will attain water quality standards for that particular pollutant.[5]

Airport development projects are required to acquire a SWFWMD Environmental Resource Permit which includes stormwater runoff treatment water quality protection, and stormwater pollution prevention best management practices. National Pollutant Discharge Elimination System (NPDES) Construction Permits are required prior to construction of development projects. NPDES Construction Permits mandate sediment and erosion control measures prior to, during and after construction is completed.

[4] Statewide Comprehensive Verified List of Impaired Waters, http://www.dep.state.fl.us/water/watersheds/assessment/a-lists.htm (March 25, 2014)
[5] USEPA, "Overview of Impaired Waters and Total Maximum Daily Loads Program," http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/intro.cfm (March 31, 2014).

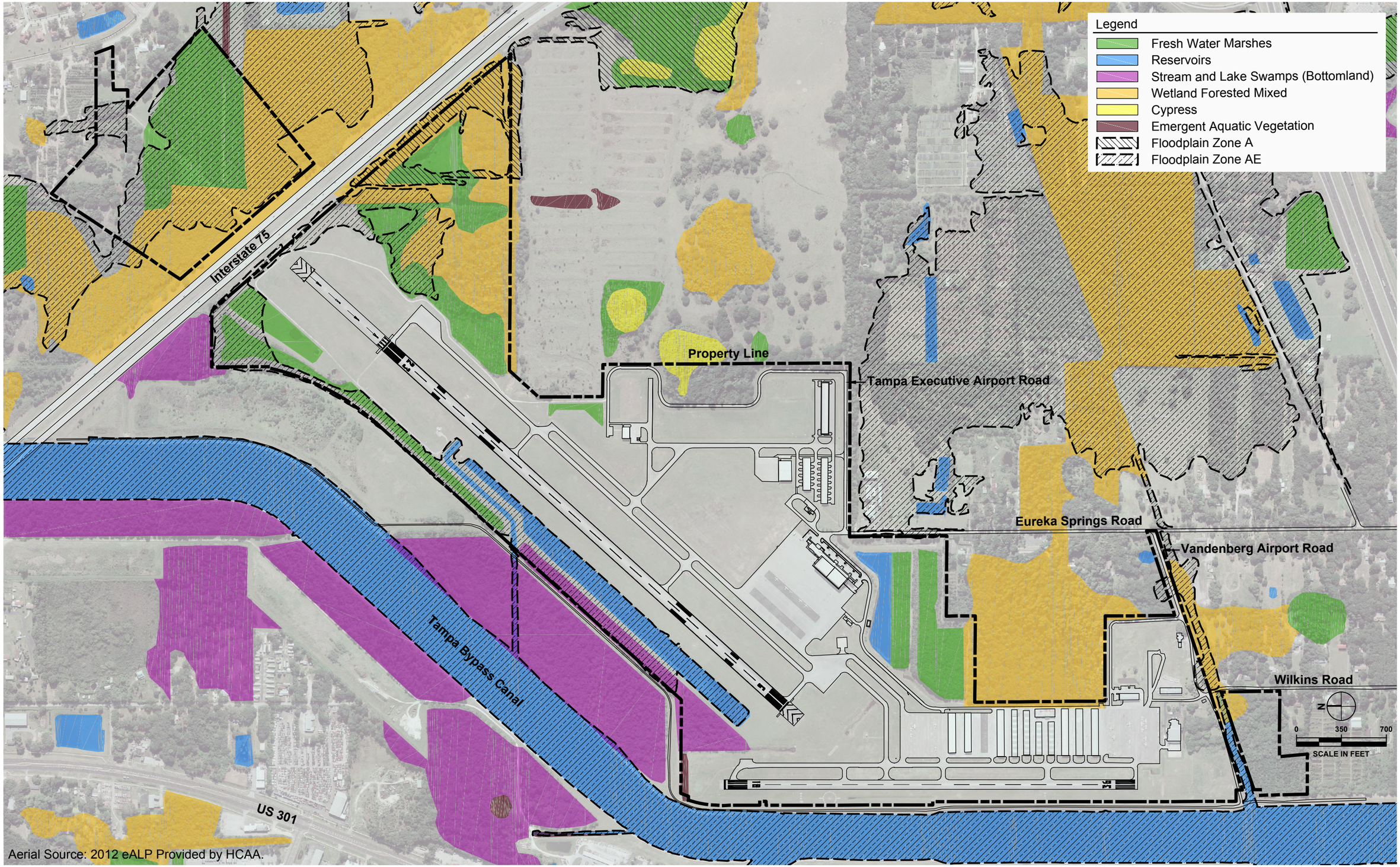


Figure 2-7 Natural Features Inventory

Source: FEMA Floodplain Data, 2008. SWFWMD FLUCCS Data, 2011.

Wetlands and Other Jurisdictional Waters of the United States

In Florida, land use and vegetative cover are frequently described using FLUCCS. This classification scheme was originally developed by the FDOT, but has been adopted by Florida's Water Management Districts for mapping land cover types within their respective jurisdictions.[6] The SWFWMD FLUCCS mapping identified freshwater marshes and wetland forested mix to the north, reservoir and freshwater marsh to the west, as well as stream and lake swamps adjacent to Tampa Bypass Canal (refer to Figure 2-7). The stream and lake swamps land cover type is commonly referred to as bottomland hardwoods and is typically associated with river, creek, or lake floodplain areas.[7] The freshwater marsh areas are typically dominated by emergent vegetation, such as cattails, arrowhead, or cordgrass and the wetland forested mix areas are characterized by a mix of both hardwoods and pines.

Potential wetland areas within and adjacent to the airport were also identified using USFWS NWI mapping, which indicated the occurrence of small areas of emergent marsh to the northwest and southeast, as well as larger forested wetlands to the west and northeast of Runway 5-23. The NWI emergent and forested wetland areas that were identified are generally consistent with the FLUCCS freshwater marshes and stream and lake swamps (refer to Figure 2-7).

Ponds and wetlands located on airport property are maintained in perpetuity as required by the SWFWMD as mitigation for previous impacts to wetlands.

Coastal Zone Management Act

The Coastal Zone Management Act (CZMA, 16 U.S.C. §§1451-1466) is administered by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA). After a state develops its coastal zone management plan and NOAA approves the plan, CZMA provisions allow for the transfer of coastal zone management authority to the state. The Florida Coastal Management Program (FCMP) received approval from NOAA in 1981, and the FDEP became the lead agency for implementation of the FCMP through its Office of Intergovernmental Programs (OIP).

One of the primary requirements of the CZMA is federal consistency review. Federal consistency review is required for federal agency activities that affect coastal resources, for projects involving federal assistance (grants, loans, subsidies, insurance, etc.) to state or local governments and for federal licensing and permitting actions. The Florida State Clearinghouse within OIP coordinates federal consistency review by the nine state agencies and five water management districts that comment during the review process. Hillsborough County is a coastal county and is within Florida's regulated coastal zone.

Threatened and Endangered Species

Pursuant to Section 7 of the Endangered Species Act of 1973, as amended, the Bald and Golden Eagle Protection Act of 1940, and the Florida Endangered and Threatened Species Act, habitats at VDF were evaluated with respect to suitability for federal- and state-protected species. A list of

[6] FDOT, Florida Land Use, Cover and Forms Classification System, January 1999.
[7] FDOT, Florida Land Use, Cover and Forms Classification System, January 1999, p.41.

federally protected species known to occur or with potential to occur in Hillsborough County, dated May 1, 2013, was acquired from the USFWS.[8] A list of state-protected species was accessed from the Florida Natural Areas Inventory (FNAI) species database for Hillsborough County, last updated in December 2013.[9] Due to lack of suitable habitats, several of the species on the USFWS list for Hillsborough County and the FNAI Tracking List for Hillsborough County would not be anticipated to occur in the immediate vicinity of the airport. The remaining species which could potentially occur in the immediate vicinity due to the presence of suitable habitats are included in **Table 2-6**.

Table 2-6
Potential Federal and State Protected Species in Vicinity of the Airport

Scientific Name	Common Name	Federal Status	State Status
Plants			
Andropogon arctatus	Pine-woods Bluestem	Not Listed	Threatened
Asplenium erosum	Auricled Spleenwort	Not Listed	Endangered
Campanula robinsiae	Brooksville Bellflower	Endangered	Endangered
Carex chapmanii	Chapman's Sedge	Not Listed	Threatened
Ophioglossum palmatum	Hand Fern	Not Listed	Endangered
Pecluma plumula	Plume Polypody	Not Listed	Endangered
Pteroglossaspis ecristata	Giant Orchid	Not Listed	Threatened
Triphora amazonica	Broad-leaved Nodding-caps	Not Listed	Endangered
Animals			
Alligator mississippiensis	American Alligator	Threatened	Threatened
Drymarchon couperi	Eastern Indigo Snake	Threatened	Threatened
Gopherus polyphemus	Gopher Tortoise	C	Threatened
Falco sparverius paulus	Southeastern American Kestrel	Not Listed	Threatened
Grus canadensis pratensis	Florida Sandhill Crane	Not Listed	Threatened
Mycteria americana	Wood Stork	Endangered	Endangered

Sources: USFWS, Federally Listed Species in Hillsborough County, Florida, last updated May 1, 2013, and FNAI species database for Hillsborough County, last updated in December 2013.
Acronyms:
C = Candidate for federal listing as Endangered or Threatened

NEPA and permitting requirements associated with the preferred airport development alternative may be found in Section 6 of this report.

[8] USFWS, "Federally Listed Species in Hillsborough County, Florida," http://www.fws.gov/northflorida/CountyList/Hillsbor.htm, May 1, 2013 (March 24, 2014).
[9] FNAI, "FNAI Tracking List, Hillsborough County," http://www.fnai.org/bioticssearch.cfm, December 2013 (March 24, 2014).

Chapter 3.0
Aviation Activity Forecasts

Tampa International Airport

Hillsborough County Aviation Authority

3.0 Aviation Activity Forecasts

3.1 Introduction

The purpose of the aviation activity forecast is to provide reasonable and acceptable estimates of projected aircraft operational and aircraft basing level demand that would be accommodated at the airport for a foreseeable future (20-year) period. Such forecasts also typically include, but are not limited to: annual aircraft operational and basing levels and derivative forecasts of instrument activity and peaking levels.

Aviation activity forecasts directly support airport facility planning and to identify the need, type, and timing of the development of airport facility improvements. Aviation activity forecasting also attempts to further identify anticipated changes in the mix (e.g., type and size) of the aircraft that are anticipated to operate and base at the airport throughout the Airport Master Plan's 20-year (2014-2033) forecast period.

The Tampa Executive Airport is located near the Interstate 4/75 interchange within the central unincorporated portion of Hillsborough County. While located approximately 7 statute miles from the downtown Tampa central business district, the surrounding land areas are anticipated to undergo significant business growth. The airport is strategically located between two of the fastest growing areas of Hillsborough County, New Tampa/Wesley Chapel to the north and Brandon/Riverview to the south. The airport is bounded by the Tampa Bypass Canal to the west and northwest, Vandenberg Airport Road to the south and Interstate 75 to the northeast. The airport is designated within the FAA's National Plan of Integrated Airport Systems (NPIAS) as a "Reliever" Airport having the primary function of relieving congestion at Tampa International Airport by attracting and accommodating a significant portion of the light-general aviation activity away from the airport.

The airport was acquired by the Hillsborough County Aviation Authority (HCAA) in 1985 and later improved with the goal of accommodating the anticipated growth of general aviation activity within the central portions of Hillsborough County and to better accommodate the growing demand by larger business-related general aviation aircraft within the HCAA system of general aviation airports.

Aviation activity at the airport is heavily influenced by a nearby entertainment, hospitality and gambling resort, and other vacation-based attractions and venues. One of HCAA's primary development goals for this airport includes enhancing the ability to attract and service larger general aviation turbo-prop and fan-jet aircraft that typically support business aviation activity. While the airport has the requisite airfield facilities and service capabilities to accommodate the entire fleet of recreation aircraft, the ability to fully accommodate larger general aviation turbo-props and jets may be limited primarily because of available runway take-off lengths and the absence of an operating Airport Traffic Control Tower (ATCT). The airport's anticipated role and level of service within HCAA's System of airports is to accommodate and serve existing and anticipated increased future levels of demand of a wider range of general aviation aircraft throughout the 20-year forecast period.

3.2 Forecast Development Assumptions

The development of the aviation activity forecasts for each of the three HCAA general aviation airports were predicated upon the following overlying and guiding assumptions:

- HCAA's system of general aviation airports will remain in place and will evolve as demand dictates throughout the 20-year Master Planning Forecast Period (2014-2033).
- HCAA will continue to develop and improve the availability of needed aviation facilities to maintain the desired level of services, and to fully accommodate existing and latent general aviation demand at each airport.
- HCAA desires to maintain the highest and best use of each airport to support and enhance the entire system of general aviation airports to: 1) provide opportunities for continued airport facility development, 2) increase levels of services offered to the flying public, 3) accommodate increased demand for aircraft activity and aircraft basing needs, and 4) preserve the capability and flexibility to accommodate and facilitate on-airport economic and revenue generation activities.

3.3 Previously Published Forecasts and Available Information

Forecasts of aviation activity provide the necessary information and data that is used for the assessment of the need and timing of airport development projects. For the purpose of identifying previously published aviation activity forecasts that may be suitable for the development of a forecast of aviation activity specific to this update of the Tampa Executive Airport (VDF) Master Plan, the following documents were reviewed:

- The Federal Aviation Administration's (FAA) Terminal Area Forecast (TAF),
- The FAA Aerospace Forecast (2014 – 2034),
- The Florida Department of Transportation's (FDOT) Florida Aviation System Plan (FASP) Forecast,
- FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS*),
- HCAA Based Aircraft Inventory 2008 through 2013,
- Volo Aviation Based Aircraft Count for VDF, July 2014,
- FAA's Traffic Flow Management System Instrument Activity Counts (TFMSC),
- Flightwise.com Aircraft Flight Tracking Data,
- HCAA's Airscene.com (Exelis) Noise Monitoring Data, and
- HCAA-Coordinated Telephone Interviews of Airport Tenants.

Following the review and use of one or more previously published aviation activity forecasts for VDF, and/or through the use of airport-specific FAA-TAF and FDOT-FASP generated Compound Annual Growth Rates (CAGR) and Operations Per Based Aircraft (OPBA) forecasting methodologies, a derived Master Plan-specific forecast of based aircraft and aircraft operations was developed. Derivative forecasts of peak activity levels and instrument operations were compared to the derived aviation activity forecast developed for the Master Plan Update and the FAA TAF as required for FAA acceptance and review purposes.

Review of FAA Aerospace Forecast

The FAA Aerospace Forecast Fiscal Year 2014-2034 was reviewed for possible use in the development of a forecast of aviation activity for the Master Plan Update. The FAA Aerospace Forecast contains projections of future United States (U.S.) aviation demand at the national level. This publication provides a 21-year outlook and is updated each year in March. It is the official FAA view of the immediate future for aviation within the United States. The FAA Aerospace Forecast examines future trends expected in the aerospace industry. The publication includes aggregate level forecasts of the fleet, hours flown, and pilots for general aviation and considers the economics of the aviation industry in general, as well as trends expected to affect the commercial and general aviation community. The FAA Aerospace Forecast was reviewed to ascertain the general health and prosperity of the general aviation industry as a whole and to provide a sense of future aviation activity growth that may occur at VDF throughout the 20-year Master Plan Update planning period.

Highlights of the FAA Aerospace Forecast that were considered germane to VDF are as follows:

- The active domestic (U.S.) general aviation fleet is projected by the FAA Aerospace Forecast[10] to increase at an average annual rate of 0.5 percent over the 21-year forecast period. This forecast of future general growth of general aviation aircraft fleet nationwide is considered to be virtually flat.
- The number of active piston-powered aircraft (including rotorcraft) is projected to decrease at an average annual rate of 0.3 percent. This includes declines in both single and multi-engine fixed wing aircraft, but with the smaller category of piston-powered rotorcraft growing at 1.7 percent a year. Single-engine fixed-wing piston aircraft are projected to decline at a rate of 0.4 percent, while multi-engine fixed wing piston aircraft are projected to decline by 0.5 percent a year.
- In 2005, a new category of aircraft (previously not included in the FAA's aircraft registry counts) was created: "light sport" aircraft. At the end of 2012, a total of 2,001 active aircraft were estimated to be in this category. The forecast assumes a 4.1 percent annual growth of the fleet by 2034.
- The number of general aviation hours flown nationwide is projected to increase by 1.4 percent yearly over the forecast period. The FAA projects above average growth in hours will occur after 2023 with increases in the fixed wing turbine aircraft fleet, as well as increasing utilization of both single and multi-engine piston aircraft as the aging of this fleet starts to slow down. In the medium term, much of the increase in hours flown reflects strong growth in the rotorcraft and turbine jet fleets.
- Hours flown by turbine aircraft (including rotorcraft) are forecast to increase 3.2 percent yearly over the forecast period, compared with a decline of 0.4 percent for piston-powered aircraft. Jet aircraft are forecasted to account for most of the increase, with hours flown increasing at an average annual rate of 4.2 percent over the forecast period. The large increases in jet hours result mainly from the increasing size of the business jet fleet, along with a measured recovery in utilization rates from recession induced record lows. Rotorcraft hours, which were less impacted by the economic downturn when compared to other categories and rebounded earlier, are projected to grow by 2.8 percent yearly, with

[10] FAA Aerospace Forecast fiscal years (FY) 2014-2034 Tables 28 and 29.

turbine rotorcraft growing at an average annual rate of 3.1 percent. Sales reports show that most replacements were not for pistons, which suggests that the new purchases were possibly to replace other turbine helicopter at the lower end of the market, or the newly introduced light turbine model was a product fulfilling a previously unmet need at the light end of the market. Overall, the market growth was robust in both segments of the industry. Lastly, the light sport aircraft category, which not includes only the special light sport, is expected to see an increase in hours flown of 5.1 percent a year; this is primarily driven by growth in the fleet.

Based upon the FAA Aerospace Forecast regarding the manufacture and utilization of general aviation aircraft within the U.S., it can be readily assumed that the year-over-year growth of general aviation activity and aircraft basing levels at VDF will continue, albeit at a relatively low annualized rate of growth. The airport will most likely experience continued growth in aviation activity based primarily on the number of and annualized growth rate of locally-based aircraft and their associated activity levels.

Review of FAA Terminal Area Forecast

The FAA's Terminal Area Forecast (TAF) was reviewed as part of the development of a forecast of aviation activity for the Master Plan Update. The TAF is a detailed FAA forecast planning database that the FAA Office of Aviation Policy and Plans (APO) produces each year covering airports in the National Plan of Integrated Airport Systems (NPIAS). The TAF is prepared to assist the FAA in meeting its planning, budgeting, and staffing requirements. The TAF contains both historical and forecast data. The TAF forecasts are made at the individual airport level and are based in part on the national FAA Aviation Forecast. The TAF assumes an unconstrained demand for aviation services (i.e., an airport's forecast is developed independent of the ability of the airport and/or the air traffic control system to supply the capacity required to meet the demand). The FAA TAF forecast of aviation activity published for the Tampa Executive Airport is presented in **Table 3-1.**

Table 3-1
FAA TAF Aircraft Operations and Based Aircraft

Historical Activity

	Itinerant					Local				
Year	Air Carrier	Air Taxi/ Commuter	General Aviation	Military	Total	Civil	Military	Total	TOTAL	Based Aircraft
2000	0	0	0	0	0	0	0	0	0	0
2001	0	520	44,000	30	44,550	50,040	0	50,040	94,590	112
2002	0	520	44,000	30	44,500	50,040	0	50,040	94,590	130
2003	0	0	44,000	30	44,030	50,040	0	50,040	94,070	130
2004	0	0	34,305	0	34,305	39,014	0	39,014	73,319	130
2005	0	520	44,000	30	44,550	50,040	0	50,040	94,590	130
2006	0	520	44,000	30	44,550	50,040	0	50,040	94,590	130
2007	0	520	44,000	30	44,550	50,040	0	50,040	94,590	130
2008	0	520	44,000	30	44,550	50,040	0	50,040	94,590	166
2009	0	520	44,000	30	44,550	50,040	0	50,040	94,590	148
2010	0	520	44,000	30	44,550	50,040	0	50,040	94,590	151
2011	0	520	44,000	30	44,550	50,040	0	50,040	94,590	139
2012	0	520	44,000	30	44,550	50,040	0	50,040	94,590	139

Projected Activity

	Itinerant					Local				
Year	Air Carrier	Air Taxi/ Commuter	General Aviation	Military	Total	Civil	Military	Total	TOTAL	Based Aircraft
2013	0	520	44,836	30	45,386	50,992	0	50,992	96,378	142
2014	0	520	45,688	30	46,238	51,960	0	51,960	98,198	146
2018	0	520	49,264	30	49,814	56,025	0	56,025	105,839	160
2020	0	520	51,154	30	51,704	58,174	0	58,174	109,878	167
2023	0	520	54,124	30	54,674	61,553	0	61,553	116,227	177
2025	0	520	56,201	30	56,751	63,914	0	63,914	120,665	185
2028	0	520	59,469	30	60,019	67,627	0	67,627	127,646	197
2030	0	520	61,752	30	62,302	70,222	0	70,222	132,524	206
2033	0	520	65,341	30	65,891	74,303	0	74,303	140,194	221
2035	0	520	67,848	30	68,398	77,154	0	77,154	145,552	231
2040	0	520	74,547	30	75,097	84,772	0	84,772	159,869	261

Compound Annual Growth Rate

Period	Air Carrier	Air Taxi/ Commuter	General Aviation	Military	Total	Civil	Military	Total	TOTAL	Based Aircraft
2013-2018	--	--	1.90	--	1.88	1.90	--	1.90	1.89	2.04
2018-2023	--	--	1.90	--	1.88	1.90	--	1.90	1.89	2.04
2023-2033	--	--	1.90	--	1.88	1.90	--	1.90	1.89	2.24
2013-2040	--	--	1.90	--	1.88	1.90	--	1.90	1.89	2.28

Source: FAA TAF Tampa Executive Airport, February 2014.
Note: Listed historical operations represent estimates and do not reflect actual based aircraft and aircraft operations.

Between 2001 and 2012, the number of reported based aircraft increased from 112 to 139, however, the number of estimated aircraft operations remained unchanged at 94,590 for the same time period. These published historical levels of aviation activity and number of locally-based aircraft were not recorded or considered to be verifiable because the airport is non-towered. The TAF indicates that VDF had 142 based aircraft and 96,378 aircraft operations in 2013. The TAF forecast projections of based aircraft increases this number from 142 to 261 over the next 27 years representing a CAGR of 2.28 percent. For the same period, the number of annual aircraft operations at the airport is expected to increase from 96,378 to 159,869 representing a CAGR of 1.89 percent. Because there are no formal records of past aircraft activity levels for the airport, for the purposes of this Master Plan Update, that the stated number of 96,378 annual aircraft operations, albeit non-verifiable, was considered to be reasonable and acceptable for use as one of several data sources from which the forecast of future aircraft activity at VDF through the 20-year planning period could be developed.

Review of FDOT FASP Forecast

In cooperation with the FAA and Florida's public airports as part of the Continuing Florida Aviation System Planning Process (CFASPP), the Florida Department of Transportation's Aviation Office (FDOT) developed the Florida Aviation System Plan (FASP) that incorporates the traditional planning elements that are typically included in most state aviation system plans. The FASP 2031 forecast includes an analysis of the intermodal aspects of the state transportation system and a strategic planning element which identifies strategic goals, approaches, measurements, and recommendations to achieve these goals. Each year, as part of the CFASPP, the FDOT Aviation Office updates the forecasts of based aircraft and operational activity levels for each Florida public-use airport or airpark. **Table 3-2** summarizes the FDOT FASP listing of historical levels of based aircraft and aircraft operations data through 2010, and lists projections for based aircraft and annual aircraft operations at VDF through the year 2033.

Table 3-2 FDOT FASP General Aviation Forecast (2012-2033)		
Year	Based Aircraft	Aircraft Operations
Historical Activity		
2000	136	94,590
2001	130	94,590
2002	118	66,712
2003	164	66,712
2004	179	66,712
2005	185	66,712
2006	185	66,712
2007	130	66,712
2008	152	66,712
2009	171	94,590
2010	164	98,070
2011	164	98,070
Projected Activity		
Year	Based Aircraft	Aircraft Operations
2012	166	99,914
2013	167	101,792
2014	169	103,706
2018	176	111,727
2023	185	122,632
2028	194	134,601
2033[1]	204	147,738
Period	Compound Annual Growth Rates	
2013-2018	0.99%	1.88%
2018-2023	0.99%	1.88%
2023-2033[1]	0.99%	1.88%
Sources: URS, 2014. FDOT FASP, 2012-2031. Period 2031-2033 assumes FASP extrapolated CAGR.		

Between 2000 and 2012, the number of reported based aircraft increased from 136 to 166; the number of estimated aircraft operations increased from 94,590 to 99,914 for the same time period. These published historical levels of aviation activity and number of locally-based aircraft were not recorded or considered to be verifiable because the airport is non-towered. FASP records indicate that VDF had 167 based aircraft and 101,792 aircraft operations in 2013. The FASP forecast projections of based aircraft increases this number from 167 to 204 over the next 20 years representing a CAGR of 0.99 percent. For the same period, the number of annual aircraft operations at the airport is expected to increase from 101,792 to 147,738 representing a CAGR of 1.88 percent. Because there are no formal records of past aircraft activity levels for the airport, for the purposes of this Master Plan Update, that the stated number of 101,792 annual aircraft operations, albeit non-verifiable, was considered to be reasonable and acceptable for use as one of several data sources from which the forecast of future aircraft activity at VDF through the 20-year planning period could be developed.

3.4 Based Aircraft and Aircraft Operations Forecasts

The number of aircraft based at an airport or airpark is typically used to determine the level of existing and future forecasted levels of aviation activity and to determine the number and size of facilities needed to accommodate the based aircraft tie-down and covered aircraft storage needs of aircraft owners.

The forecast of based aircraft for the 20-year planning period was developed using information provided by the HCAA and Volo Aviation, the Airport's only Fixed Based Operator (FBO), that included the total number and relative mix of aircraft type that were based at the airport in 2013 and 2014, respectively.

Based Aircraft Levels Using TAF CAGR

While the forecast of based aircraft levels for each of the three HCAA general aviation airports was to be based upon HCAA's 2013 annual inventory of based aircraft, recent changes in the FBO ownership, currently Volo Aviation, at the airport and its associated changes in the retail business strategy and level of services offered have, since 2013, served to significantly increase the number of based aircraft at the airport. The improved level of services are now offered to the entire spectrum of general aviation aircraft owners that operate at the airport. Such changes in business strategy and related levels of service are also anticipated to generate increase fuel flowage sales to both local and itinerant aircraft operators. A derived annualized base aircraft growth rate was subsequently developed for VDF.

Because of the recent and significant change in the number of reported based aircraft at VDF, and for the purpose of more accurately reflecting future projected levels of based aircraft activity at VDF, the FBO-reported July 2014 number of based aircraft was utilized as the "base year" for the development of the based aircraft forecast. The number of based aircraft at VDF reflects a shift in basing preferences by aircraft owners within HCAA's system of general aviation airports and that of one other general aviation airport in proximity to Hillsborough County. Using the 2014 Volo Aviation-inventoried number of based aircraft at VDF and applying the period-to-period (2014-2033) based aircraft growth rates as projected in the TAF forecast (2.24 percent annually), a "normalized" based aircraft forecast for VDF was developed. By using this forecasting methodology, the number of based aircraft at VDF is projected to increase from 150 to 229 through the 20-year planning period and is presented in **Table 3-3**.

Table 3-3 Normalization of Based Aircraft Forecast		
Year	TAF	Normalized
2013	142	136[1]
2014	145	150[2]
2018	160	164
2023	177	183
2028	197	205
2033	221	229
CAGR	**2.24 %**	**2.24 %**

Sources: URS, 2014.
FAA TAF Tampa Executive Airport, February 2014.
1 Actual HCAA Based Aircraft Count for VDF, November 2013.
2 Actual Volo Aviation Based Aircraft Count for VDF, July 2014.
Note: Listed based aircraft values rounded for each forecast period using stated CAGR value.

Based Aircraft Levels Using FASP CAGR

Using the 2014 Volo-inventoried number of based aircraft at VDF and applying the period-to-period (2014-2033) based aircraft growth rates as projected in the FASP forecast (0.99 percent annually), a "normalized" based aircraft forecast for VDF was developed. By using this forecasting methodology, the number of based aircraft at VDF is projected to increase from 150 to 181 through the 20-year planning period and is presented in **Table 3-4**.

Table 3-4 Normalization of Based Aircraft Forecast		
Year	FASP	Normalized[3]
2013	167	136[1]
2014	169	150[2]
2018	176	156
2023	185	164
2028	194	172
2033	204	181
CAGR	**0.99%[3]**	**0.99%**

Sources: FDOT FASP, 2012-2031.
URS, 2014.
1 Actual HCAA Based Aircraft Count for VDF, November 2013.
2 Volo Aviation Based Aircraft Count for VDF, July 2014.
3 FASP 2012-2031 CAGR, Period 2031-2033 assumes extrapolated FASP CAGR of 0.99 percent.
Note: Listed based aircraft values rounded for each forecast period using stated CAGR value.

Averaging of Based Aircraft Levels

Using the 2014 Volo Aviation-inventoried number and mix of based aircraft at VDF and applying the period-to-period (2014 to 2033) based aircraft growth rates as projected in the TAF (2.24 percent annually) and the FASP forecast (0.99 percent annually), average based aircraft forecasts for VDF were developed. **Table 3-5** summarizes these forecasts and averages the normalized TAF and FASP forecasts. The normalized average (1.66% annually) was found to be reasonable and was subsequently adopted for future planning purposes.

Table 3-5
Averaging of Based Aircraft Forecast

Year	TAF Normalized	FASP Normalized[3]	Normalized Average
2013	136[1]	136[1]	136[1]
2014	150[2]	150[2]	150[2]
2018	164	156	160
2023	183	164	174
2028	205	172	189
2033	229	181	205
CAGR	**2.24%**	**0.99%**	**1.66%**

Source: URS, 2014.
[1] Actual HCAA Based Aircraft Count for VDF, November 2013.
[2] Volo Aviation Based Aircraft Count for VDF, July 2014.
[3] FASP 2012-2031 CAGR, Period 2031-2033 assumes extrapolated FASP CAGR of 0.99 percent.
Note: Listed based aircraft values rounded for each forecast period using stated CAGR value.

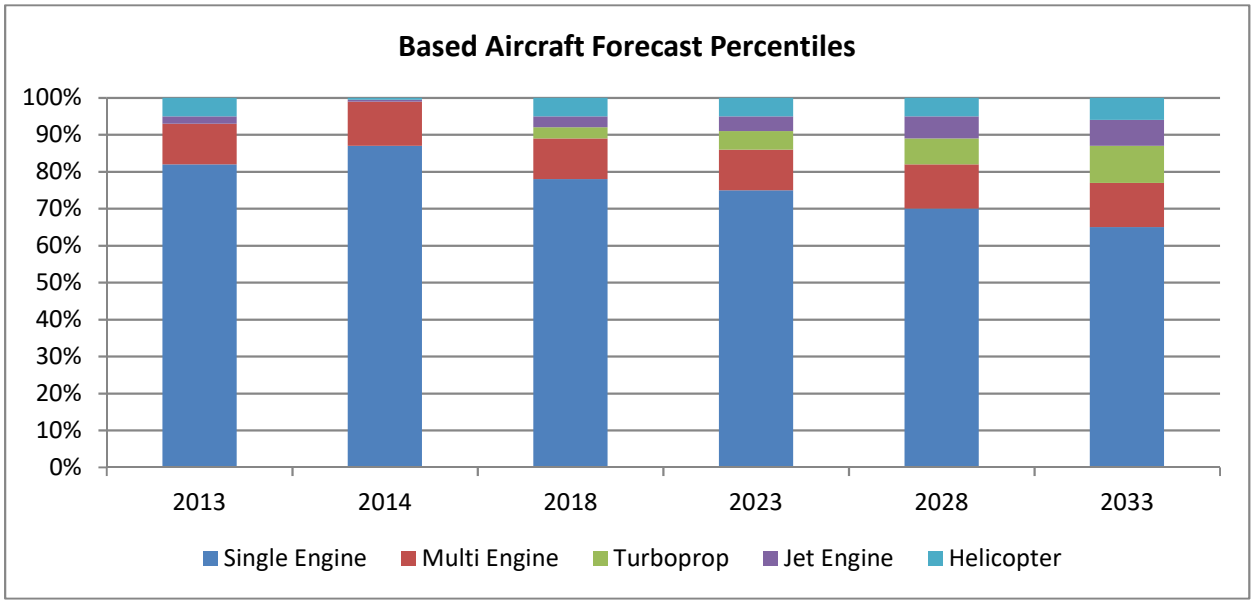
3.5 Adoption of Based Aircraft Forecast

As listed in **Table 3-6** and illustrated in the graph presented below, the relative mix of aircraft types that will be based and operating at the airport is anticipated to change throughout the forecast period. This will be primarily influenced by the anticipated increase in the availability of aircraft storage and maintenance facilities and the associated level of services offered at the airport.

Table 3-6
Based Aircraft Forecast Percentiles

Year	Single Engine	Multi Engine	Turboprop	Jet Engine	Helicopter	Total
2013	82%	11%	0%	2%	5%	100%
2014	87%	12%	0%	0.5%	0.5%	100%
2018	78%	11%	3%	3%	5%	100%
2023	75%	11%	5%	4%	5%	100%
2028	70%	12%	7%	6%	5%	100%
2033	65%	12%	10%	7%	6%	100%

Source: URS, 2014.



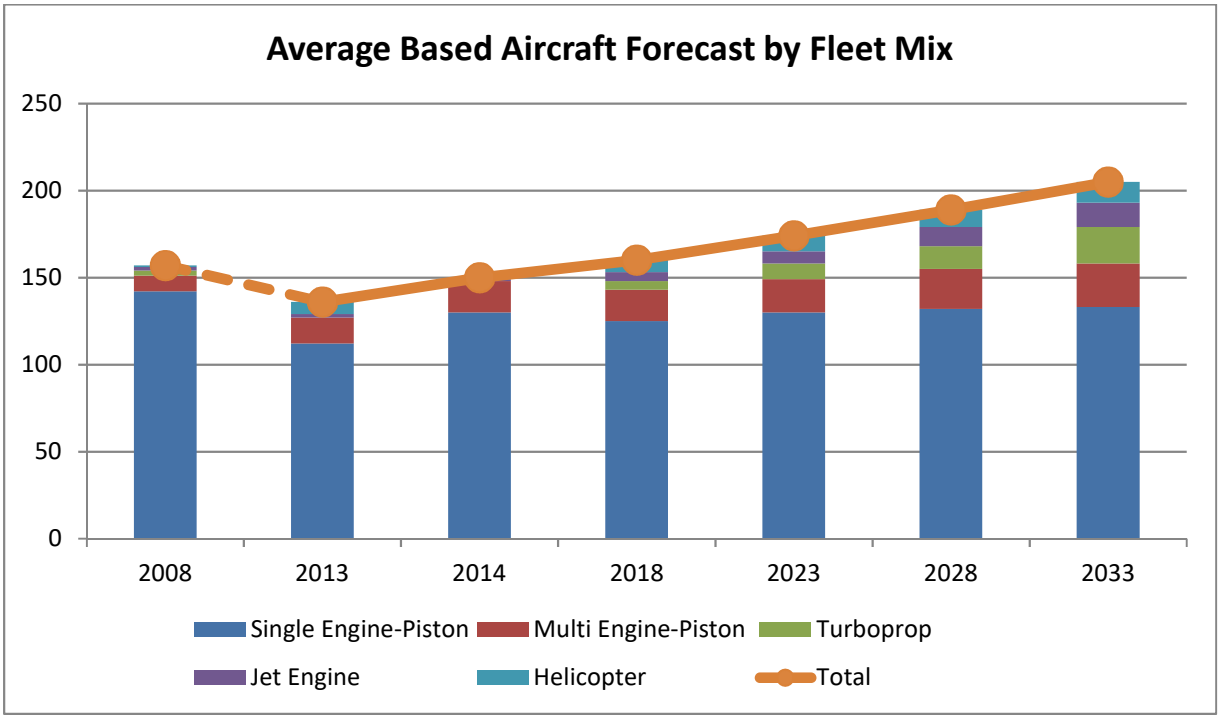
Source: URS, 2014.

Table 3-7 and the associated graph show the based aircraft forecast by aircraft type for VDF using the average normalized based aircraft forecast, which was adopted for future planning purposes.

Table 3-7
Average Based Aircraft Forecast by Fleet Mix

Year	Single Engine	Multi Engine	Turboprop	Jet Engine	Helicopter	Total
2008	*142*	*9*	*3*	*2*	*1*	*157*[1]
2013	112	15	0	2	7	136[1]
2014	130	18	0	1	1	150[2]
2018	125	18	5	5	7	160
2023	130	19	9	7	9	174
2028	132	23	13	11	10	189
2033	133	25	21	14	12	205
Year	**CAGR**	**CAGR**	**CAGR**	**CAGR**	**CAGR**	**CAGR**
2013-2018	2.22%	3.71%	37.97%	20.11%	0.00%	1.66%
2019-2023	0.79%	1.09%	12.47%	6.96%	5.15%	1.66%
2024-2028	0.31%	3.90%	7.63%	9.46%	2.13%	1.66%
2029-2033	0.15%	1.68%	10.07%	4.94%	3.71%	1.66%

Source: URS, 2014.
[1] Number and type of based aircraft at the airport in 2008 and 2013 were provided by the Tampa Executive Airport.
[2] Volo Aviation Based Aircraft Count for VDF, July 2014.



Source: URS, 2014.

3.6 Forecast of Aircraft Operations Using OPBA Forecasting Methodologies

While this forecast of general aviation activity included the review of similar forecasts published for VDF as part of the TAF and FASP, two additional "bottom-up" aviation activity forecasts for VDF were developed using the Operations Per Based Aircraft (OPBA) metric. The OPBA metric offers an alternative, yet comparative, method to assess historical and potential future levels of aircraft operations at an individual airport. The OPBA metric however, provides an overly simplistic, high-level comparative measure of aircraft operation activity levels that is driven solely by the number of based aircraft at an airport and ignores the relative split between the number of operations generated by those based aircraft and operations generated by visiting (i.e. itinerant) aircraft. The use of the OPBA metric also ignores operations generated by intensified levels of training activities by locally-based or itinerant aircraft that typically include recursive Touch-and-Go pattern-based training activities. Various industry-published recommendations regarding the use of and formulation of OPBA factors vary ranging from 250 to 750 depending upon the airport's level of service, size and training activity.

Recognizing that the airfield capabilities, number and availability of aircraft storage facilities, and the inherent level of services offered at each of the three HCAA general aviation airports vary, airport-specific average (5-year) OPBA factors were developed for each airport.

Development of Forecast-Specific Historical OPBA Factors

Using the 2014 Volo Aviation-inventoried number of based aircraft for VDF, the TAF- and FASP-normalized forecasts of based aircraft based upon respective CAGRs, year- and forecast-specific OPBA values were derived using the historical inventoried based aircraft levels and the reported TAF and FASP operations levels for the five-year period 2008 through 2012. The respective 5-year average OPBA values and OPBA-generated forecasts of aircraft operations are listed in **Table 3-8.**

Table 3-8
Average (5-Year) OPBA TAF & FASP Normalized

TAF					FASP			
Year	Operations	Based Aircraft	OPBA		Year	Operations	Based Aircraft	OPBA
2008	94,590	157	602		2008	66,712	157	425
2009	94,590	179	528		2009	94,590	179	528
2010	94,590	166	570		2010	98,070	166	591
2011	94,590	143	661		2011	98,070	143	686
2012	94,590	123	769		2012	99,914	123	812
Average (5-Year) OPBA			626		Average (5-Year) OPBA			588

Sources: URS, 2014.
FAA TAF Tampa Executive Airport, February 2014
FASP 2012-2031 Based Aircraft Forecast, Tampa Executive Airport.
HCAA Based Aircraft Count for VDF, November 2013.

Using the 2014 Volo-inventoried based aircraft, the respective TAF- and FASP-based average annual rates of projected based aircraft level growth at VDF (Table 3-5), and the TAF- and FASP-derived OPBA factors, forecasts of future aircraft operational levels were derived and are listed in **Tables 3-9** and **3-10**.

Table 3-9
Operations Forecast
5-Year Historical TAF OPBA

Year	Based Aircraft	OPBA	Operations
2013	136	626	85,136
2014	150	626	93,900
2018	160	626	100,160
2023	174	626	108,924
2028	189	626	118,314
2033	205	626	128,330
CAGR	1.66%	--	1.66%

Sources: URS, 2014.
HCAA Based Aircraft Count for VDF, November 2013.
Volo Aviation Based Aircraft Count for VDF, July 2014.
FAA TAF Tampa Executive Airport, February 2014.
5-Year Historical TAF OPBA-VDF.

Table 3-10
Derivative Operations Forecast
5-Year Historical FASP OPBA

Year	Based Aircraft	OPBA	Operations
2013	136	588	79,968
2014	150	588	88,200
2018	160	588	94,080
2023	174	588	102,312
2028	189	588	111,132
2033	205	588	120,540
CAGR	**1.66%**	**–**	**1.66%**

Sources: URS, 2014.
HCAA Based Aircraft Count for VDF, November 2013.
Volo Aviation Based Aircraft Count for VDF, July 2014.
FASP 2012-2031 Based Aircraft Forecast-CAGR.
5-Year Historical FASP OPBA-VDF.

There has been no record keeping of past itinerant Part 135 Air Taxi/Commuter, Military or Air Cargo operational activity at VDF. Inspection of the FAA TAF forecast for VDF reveals an assumed static historical level (530 annual operations) of Air Taxi operations and 30 military operations.

Considering the airport's relative proximity to the Hard Rock Casino, entertainment venues, and the Interstate 4/75 corridor, as well as the ability to provide ease of access to the Tampa downtown central business district, additional itinerant annual operations were added and are listed in **Table 3-11**. The CAGR is based on Volo Aviation-inventoried based aircraft counts for 2014 and reflects a 19-year forecasting period from 2014 to 2033.

For the purpose of this update of the forecast of aviation activity at VDF, and to provide a commonality between all but the FASP operational forecast, similar to the TAF forecast, projections of future Air Taxi operations were included within the respective 5-Year OPBA-TAF and OPBA-FASP operational forecasts. The annual number of Air Taxi operations at VDF were assumed to be 520 operations in 2013 and were further assumed to remain static throughout the forecast period.

Based upon the FAA TAF, no historical or projected future military operations have been documented or forecasted for VDF. For the purpose of this update of the forecast of aviation activity at VDF, a static level of 30 annual military operations were projected to occur throughout the forecast period. No Air Cargo operations were projected to occur at VDF throughout the forecast period.

Table 3-11
Normalized Average (5-Year) OPBA
with Additional CFR Part 135 and Military Itinerant

TAF					FASP			
Year	Operations	Additional CFR Part 135 and Military Itinerant Operations	Total Operations		Year	Operations	Additional CFR Part 135 and Military Itinerant Operations	Total Operations
2013	85,136	550	85,686		2013	79,968	550	80,518
2014	93,900	550	94,450		2014	88,200	550	88,750
2018	100,160	550	100,710		2018	94,080	550	94,630
2023	108,924	550	109,474		2023	102,312	550	102,862
2028	118,314	550	118,864		2028	111,132	550	111,682
2033	128,330	550	128,880		2033	120,540	550	121,090
CAGR			1.65%[1]		CAGR			1.65%[1]

Source: URS, 2014.
[1] CAGR based on 19-year (2014-2033) forecast period.

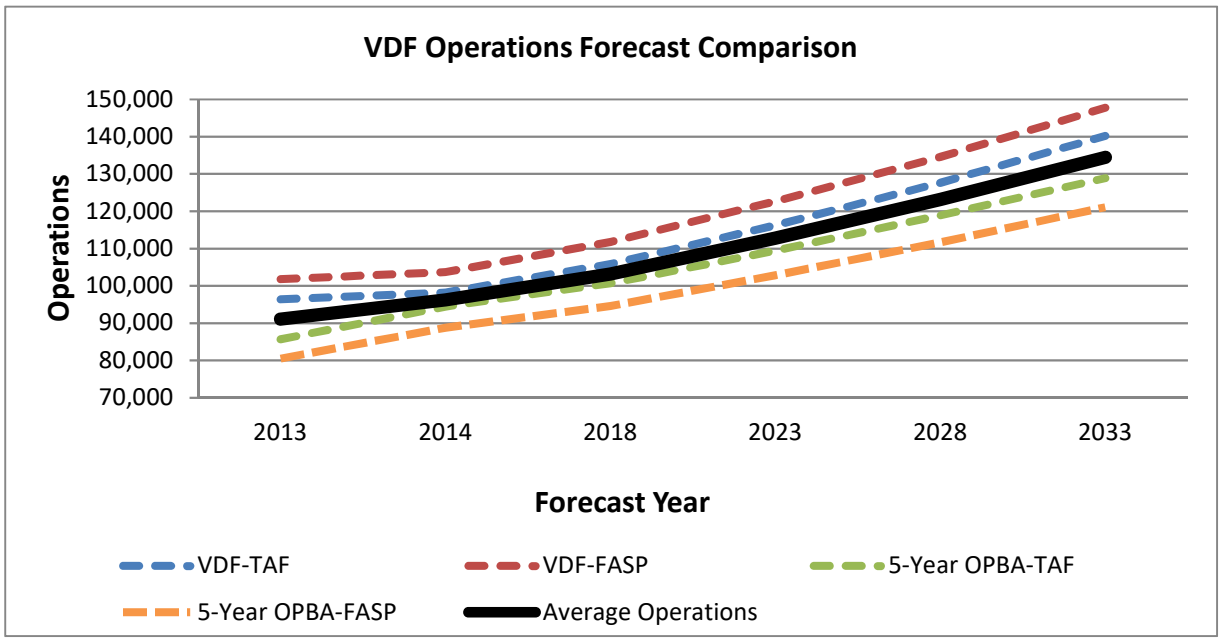
Table 3-12 provides a comparison of the operations forecasts between the FAA TAF, FDOT FASP, TAF- and FASP-OPBA normalized forecasts, and an average of the four forecasts. The CAGR is based on a 19-year (2014-2033) forecasting period.

Table 3-12
Operations Forecast Comparison

Forecast	CAGR	2013	2014	2018	2023	2028	2033
TAF	1.89 %	96,378	98,198	105,839	116,227	127,646	140,194
FASP	1.88 %	101,792	103,706	111,727	122,632	134,601	147,738
5-Year OPBA-TAF	1.65%	85,686	94,450	100,710	109,474	118,864	128,880
5-Year OPBA-FASP	1.65%	80,518	88,750	94,630	102,862	111,682	121,090
Average of all Forecasts	**1.77%**	**91,094**	**96,276**	**103,227**	**112,799**	**123,198**	**134,476**

Source: URS, 2014.

Source: URS, 2014.



After careful review and consideration of the four separate operations forecasts, as well as an average of the four forecasts, HCAA selected and retained the average of all forecasts for submittal to the FAA for review and approval for HCAA's incorporation and use within this update of the VDF Airport Master Plan.

3.7 Derivative Forecast of Aircraft Operations by Fleet Mix

The derivative percentile forecasts of aircraft operations by fleet mix are shown in **Table 3-13** and **Table 3-14** and will be used within subsequent elements of this Master Plan Update for the identification of future airport facility development needs.

Table 3-13
Aircraft Operations Forecast Percentiles

Year	Single Engine	Multi Engine	Turboprop	Jet Engine	Helicopter	Total
2013	85.50%	7.00%	1.72%	0.77%	5.00%	100.00%
2014	85.53%	7.00%	1.80%	0.81%	4.86%	100.00%
2018	84.44%	6.91%	2.47%	1.11%	5.07%	100.00%
2023	82.58%	6.76%	3.68%	1.65%	5.32%	100.00%
2028	79.92%	6.54%	5.48%	2.46%	5.59%	100.00%
2033	76.05%	6.23%	8.17%	3.67%	5.88%	100.00%

Source: URS, 2014.

Table 3-14
Aircraft Operations Forecast By Fleet Mix

Year	Single Engine	Multi Engine	Turboprop	Jet Engine	Helicopter	Total
2013	77,889	6,377	1,569	705	4,555	91,095
2014	82,345	6,742	1,729	777	4,683	96,276
2018	87,162	7,136	2,552	1,147	5,229	103,227
2023	93,152	7,627	4,151	1,865	6,004	112,799
2028	98,458	8,061	6,752	3,034	6,893	123,198
2033	102,272	8,373	10,983	4,935	7,913	134,476
AAGR 2013-2018	2.28%	2.28%	10.22%	10.22%	2.80%	2.53%
AAGR 2019-2023	1.32%	1.32%	10.22%	10.22%	2.80%	1.79%
AAGR 2024-2028	1.11%	1.11%	10.22%	10.22%	2.80%	1.79%
AAGR 2029-2033	0.67%	0.67%	10.22%	10.22%	2.80%	1.72%
AAGR 2013-2033	1.37%	1.37%	10.22%	10.22%	2.80%	1.97%

Source: URS, 2014.

3.8 Aircraft Operations Split

Table 3-15 shows the projected split between itinerant and local operations. The determination of itinerant to local aircraft is based on 2014 airport operations statistics provided by AirNav, LLC.

Table 3-15 Aircraft Operations Forecast Split			
Year	Itinerant 47%	Local 53%	Total Operations
2013	42,814	48,280	91,094
2014	45,250	51,026	96,276
2018	48,517	54,710	103,227
2023	53,016	59,783	112,799
2028	57,903	65,295	123,198
2033	63,204	71,272	134,476
Sources: AirNav, LLC, Tampa Executive Airport May 29, 2014. URS, 2014.			

3.9 Forecast of Instrument Operations

Each of the three HCAA general aviation airports have published instrument procedures and associated instrument-related aircraft operations. An instrument operation represents a single take-off or landing. The Tampa Executive Airport has six published Standard Terminal Arrivals (STARs) procedures and one Precision Instrument Approach Procedure (IAP) serving Runway 23 (ILS OR LOC) and three Non-precision IAPs serving Runway 5, [RNAV (GPS)], Runway 18, [RNAV (GPS) and Runway 23 [RNAV (GPS)].

Based upon the use of FAA's TFMSC system of historical instrument operations at VDF, instrument operational data as reported through Flightwise.com, an aviation industry commercial subscription service, a total of 5,047 instrument operations for VDF, that would represent 5.54 percent of all operations, were reported in 2013. This percentile of instrument operations was assumed to be reasonable for the development of the derivative forecast of instrument operations at VDF through the 20-year forecast period. The relative share of instrument operations generated by aircraft type, however, was assumed to change over time and is reflected in **Table 3-16**. The number of projected instrument operations by aircraft type is listed in **Table 3-17.**

Table 3-16 Aircraft Instrument Forecast Percentiles						
Year	Single Engine	Multi Engine	Turboprop	Jet Engine	Helicopter	Total
2013	52%	11%	24%	12%	1%	100%
2014	52%	11%	24%	12%	1%	100%
2018	53%	9%	25%	12%	1%	100%
2023	52%	8%	26%	13%	1%	100%
2028	50%	7%	27%	14%	2%	100%
2033	49%	6%	28%	15%	2%	100%
Source: URS, 2014.						

Table 3-17 Aircraft Instrument Operations By Fleet Mix						
Year	Single Engine	Multi Engine	Turboprop	Jet Engine	Helicopter	Total
2013	2,624	555	1,211	606	50	5,047
2014	2,774	587	1,280	640	53	5,334
2018	3,031	515	1,430	686	57	5,719
2023	3,874	500	1,625	812	62	6,249
2028	3,413	477	1,843	956	136	6,825
2033	3,650	447	2,086	1,118	149	7,450
Year	CAGR	CAGR	CAGR	CAGR	CAGR	CAGR
2013-2018	2.92%	-1.50%	3.37%	2.53%	2.53%	2.53%
2019-2023	5.03%	-0.58%	2.59%	3.43%	1.79%	1.79%
2024-2028	-2.51%	-0.90%	2.55%	3.30%	16.91%	1.78%
2029-2033	1.36%	-1.32%	2.51%	3.18%	1.77%	1.77%
Source: URS, 2014.						

3.10 Operational Peaking Characteristics

Aviation activity forecasts were derived for facility planning purposes that include derivative forecasts of peak month operations, average day peak month operations, and average hour average day peak month operations.

The peak month was estimated to represent 15 percent of annual aircraft operations. The average day peak month operations were derived by dividing the estimated peak month operations by 30.42 (365/52=30.42). At non-towered airports, the average day peak hour can be difficult to measure, but it is estimated that peak hour activity can equate to as much as 20 percent of the average day peak month operations. Peak activity projections for VDF are presented in **Table 3-18**.

Table 3-18 Aircraft Operations Peaking Characteristics Forecast				
Year	Annual	Peak Month	Average Day Peak Month	Average Day Peak Hour
2013	91,094	13,664	449	90
2014	96,276	14,441	475	95
2018	103,227	15,484	509	102
2023	112,799	16,920	556	111
2028	123,198	18,480	607	121
2033	134,476	20,171	663	133
Source: URS, 2014.				

3.11 Forecast Summary and Comparison to FAA TAF

FAA forecast development guidance includes the requirement to develop a comparison between the selected Master Plan Update forecasts and the FAA TAF forecasts as published for VDF. **Table 3-19** summarizes the aviation activity forecast. The comparison of the derived forecast of aviation activity at VDF to the FAA TAF forecast is presented in **Table 3-20**.

The projected future annual operational levels will not deviate from the FAA TAF annual level of aircraft operations by more than 10 percent in the five-year forecast period, or by 15 percent in the

ten-year forecast period. For all classes or airports, forecasts for total enplanements, based aircraft, and total operations are considered consistent with the TAF if they meet these criteria. Although there is a low variance between the FAA TAF of 1.89 percent CAGR and the selected forecast of 1.77 percent CAGR, the FAA TAF does not provide a true forecast for VDF. Aircraft operations growth at VDF is projected to increase at a steady rate annually. This growth accounts for based aircraft and fleet mix changes at VDF and is considered reasonable for planning purposes.

The forecasts presented in Table 3-19 were approved by the FAA on September 25, 2014.

Table 3-19
Summary of Aviation Activity Forecast

Forecast Levels and Growth Rates

	Forecast Level of Aviation Activity						Average Annual Compound Growth Rates				
Passenger Enplanements	**2013**	**2014**	**2018**	**2023**	**2028**	**2033**	**2013 to 2014**	**2013 to 2018**	**2013 to 2023**	**2013 to 2028**	**2013 to 2033**
Air Carrier	0	0	0	0	0	0	0.00%	0.00%	0.00%	0.00%	0.00%
Commuter	0	0	0	0	0	0	0.00%	0.00%	0.00%	0.00%	0.00%
Total Enplanements	0	0	0	0	0	0	0.00%	0.00%	0.00%	0.00%	0.00%
Operations	0	0	0	0	0	0	0.00%	0.00%	0.00%	0.00%	0.00%
Itinerant											
Air Carrier/Commuter (Part 121)	0	0	0	0	0	0	0.00%	0.00%	0.00%	0.00%	0.00%
Air Taxi (Part 135)	520	520	520	520	520	520	0.00%	0.00%	0.00%	0.00%	0.00%
Total Commercial Operations	520	520	520	520	520	520	0.00%	0.00%	0.00%	0.00%	0.00%
General Aviation	42,264	44,700	47,967	52,466	57,353	62,654	5.76%	2.56%	2.19%	2.06%	1.99%
Military	30	30	30	30	30	30	0.00%	0.00%	0.00%	0.00%	0.00%
Local											
General Aviation	48,280	51,026	54,710	59,783	65,295	71,272	5.69%	2.53%	2.16%	2.03%	1.97%
Military	0	0	0	0	0	0	0.00%	0.00%	0.00%	0.00%	0.00%
Total Operations	91,094	96,276	103,227	112,799	123,198	134,476	5.69%	2.53%	2.16%	2.03%	1.97%
Instrument Operations	5,047	5,334	5,719	6,249	6,825	7,450	5.69%	2.53%	2.16%	2.03%	1.97%
Peak Day Operations	449	475	509	556	607	663	5.79%	2.54%	2.16%	2.03%	1.97%
Cargo/Mail (Enplaned+Deplaned Tons)	0	0	0	0	0	0	0.00%	0.00%	0.00%	0.00%	0.00%
Single-Engine (Non-jet)	112	130	125	130	132	133	16.07%	2.22%	1.50%	1.10%	0.86%
Multi-Engine (Non-jet)	15	18	18	19	23	25	20.00%	3.71%	2.39%	2.89%	2.59%
Turboprop	0	0	5	9	13	21	0.00%	37.97%	24.57%	18.65%	16.44%
Rotorcraft	7	1	7	9	10	12	-85.71%	0.00%	2.54%	2.41%	2.73%
Jets	2	1	5	7	11	14	-50.00%	20.11%	13.35%	12.04%	10.22%
Total Based Aircraft	136	150	160	174	189	205	10.29%	3.30%	2.49%	2.22%	2.07%

Operational Factors

Average Aircraft Size (Seats)	**2013**	**2014**	**2018**	**2023**	**2028**	**2033**
Air Carrier	--	--	--	--	--	--
Commuter	--	--	--	--	--	--
Average Enplaning Load Factor	**2013**	**2014**	**2018**	**2023**	**2028**	**2033**
Air Carrier	--	--	--	--	--	--
Commuter	--	--	--	--	--	--
GA Operations Per Based Aircraft	666	638	642	645	649	653

Source: URS, 2014.

Table 3-20
Comparison of Derived and FAA TAF Forecast

Year	Selected Forecast	FAA TAF	Selected Forecast vs. FAA TAF (%)
Passenger Enplanements			
2013	0	0	0.0%
2018	0	0	0.0%
2023	0	0	0.0%
2028	0	0	0.0%
Commercial Operations			
2013	0	0	0.0%
2018	0	0	0.0%
2023	0	0	0.0%
2028	0	0	0.0%
Total Operations			
2013	91,094	96,378	-5.48%
2018	103,227	105,839	-2.47%
2023	112,799	116,227	-2.95%
2028	123,198	127,646	-3.48%
2033	134,476	140,194	-4.08%

Source: URS, 2014.
Note: FAA TAF data is on a U.S. Government FY basis (October through September).

Chapter 4.0
Capacity Assessment and Identification of Facility Needs

Tampa International Airport

Hillsborough County Aviation Authority

4.0 Capacity Assessment and Facility Requirements

4.1 Introduction

The purpose of the airport capacity assessment and identification of facility needs is to evaluate the two runway airfield system and supporting landside facilities to accommodate existing and future projected aviation activity at Tampa Executive Airport (VDF).

The airport capacity assessment serves to identify annual service volume and hourly capacity, as well as aircraft operational delay for future airport operations planning. Airfield design standards will also be reviewed to identify current design standards and future needs. Facility requirements for current and future aviation demand will also be evaluated.

4.2 Quantification of Airfield Capacity

Approach and Methodology

Airfield capacity analysis provides a numerical metric measure of the airfield's ability to accommodate the safe and efficient movement of aircraft activities. The capacity of the airfield is primarily affected by several factors that include the physical layout of the airfield, local prevailing meteorological conditions, aircraft fleet mix, runway utilization rates, percent of aircraft arrivals to each runway, relative level of aircraft touch-and-go activity on one or more of an airport's runways, and the location of exit taxiways relative to the approach end of the runway. An airport's airfield capacity is expressed in terms of Annual Service Volume (ASV) and represents a reasonable estimate of the maximum level of aircraft operations that can be accommodated in a year without induced aircraft operational delay.

Annual Service Volume and Hourly Capacity

The ability of the airport's runway system to accommodate existing and future levels of operational demand was determined by the use of published FAA guidelines as detailed in FAA AC 150/5060-5, *Airport Capacity and Delay.* The aircraft fleet mix for VDF during 2013 was determined using based aircraft information provided by HCAA and Flightwise.com data from January to December 2013.

Based on the data, it is estimated that Class A and Class B aircraft comprise 90.09 percent of aircraft operations, Class C aircraft comprise 9.80 percent of aircraft operations, and helicopter operations comprise 0.11 percent of aircraft operations.

The FAA's handbook methodology uses the term "Mix Index" to describe an airport's fleet mix. The FAA defines the Mix Index as the percentage of Class C operations plus three times the percentage of Class D operations. By applying this calculation to the fleet mix percentages for the airport, a Mix Index of 9.80 percent is obtained per the following equation:

Class C Operations (9.80%) + (3 * Class D Operations (0.00%)) = Mix Index (9.80%)

The Annual Service Volume (ASV) is a reasonable estimate of an airport's annual capacity. ASV takes into consideration differences in runway use, aircraft mix, weather conditions, and other

factors that would be encountered over a year. For VDF, the ASV is 270,000 operations per year. VDF has an hourly capacity of 150 VFR operations per hour and 59 IFR operations per hour.

Aircraft Operational Delay

Aircraft operational delay is the difference in time between a constrained and an unconstrained aircraft operation. As the level of aircraft operations increase as a relative proportion of the calculated ASV value, aircraft operational delay increases at an increasing rate. The level of aircraft operations at VDF for the year 2013 represented approximately 34 percent of the calculated ASV, (91,094/270,000) thus indicating virtually no associated aircraft operational delay. At the end of the 20-year forecasting period (2033), this relative percentage increases to approximately 50 percent, (134,476/270,000) continuing to reflect little or no associated aircraft operational delay.

Findings

The aircraft operations forecast for VDF indicates that projected aircraft operations (134,476 operations annually in 2033) through the 20-year planning period are not expected to exceed the ASV (270,000 operations annually). The capacity of the airfield system will not be exceeded and will be able to fully satisfy existing and projected future aircraft operational demand for the forecast period without induced adverse effects to aircraft operations and associated aircraft operational delay.

4.3 Runway Orientation and Wind Coverage

Required Wind Coverage

A key meteorological factor is wind direction and speed. Ideally, runways should be aligned with the prevailing wind to reduce the effects of crosswinds on landing aircraft, especially for small aircraft. A tailwind is not a favorable condition for take-off and landing. A wind analysis is to insure that the runway is properly oriented to suit both Visual Meteorological Conditions (VMC) and Instrument Meteorological Conditions (IMC).

Crosswind Components

The crosswind component of wind direction and velocity is the resultant vector which acts at a right angle to the runway. When a runway orientation provides less than 95 percent wind coverage for the aircraft which are forecast to use the airport on a regular basis, a crosswind runway may be required. The 95 percent wind coverage is computed on the basis of the crosswind component not exceeding the allowable value, per Runway Design Code (RDC). For a RDC of B-I, the allowable crosswind component is 10.5 knots and for a B-II RDC, the crosswind component is 13 knots. **Table 4-1** shows the allowable crosswind component RDC.

Table 4-1
Allowable Crosswind Component per RDC

RDC	Allowable Crosswind Component
A-I and B-I	10.5 knots
A-II and B-II	13 knots
Source: Advisory Circular 150/5300-13A, Change 1, *Airport Design,* Table 3-1.	

Wind Coverage Analysis

Ten years of historical wind data was analyzed to determine the wind coverage at VDF. The all-weather wind coverage of Runway 5-23 is 99.51 percent using a 13 knot crosswind component. The all-weather wind coverage of Runway 18-36 is 98.62 percent using a 10.5 knot crosswind component. This exceeds the FAA's recommended 95 percent wind coverage for the future design aircraft and the most critically affected aircraft at VDF. **Table 4-2** shows the wind coverage crosswind components for VDF. The All-Weather, VMC, and IMC conditions are show in **Figures 4-1** through **4-3**.

Table 4-2
Runway Wind Coverage Percentiles

Meteorological Condition	Runway	Wind Coverage Crosswind Component	
		10.5 knots	13 knots
All-Weather	5-23	98.95	99.51
	18-36	98.62	99.40
	Combined	99.55	99.98
Visual Meteorological Conditions (VMC)	5-23	98.93	99.51
	18-36	98.56	99.37
	Combined	99.54	99.89
Instrument Meteorological Conditions (IMC)	5-23	99.34	99.65
	18-36	99.40	99.75
	Combined	99.77	99.92
Instrument Meteorological Conditions (IMC) - Lowest Minimus	5-23	99.18	99.53
	18-36	99.43	99.74
	Combined	99.72	99.90

Source: Vandenberg USAF 722021 – Period: 2004 to 2013 FAA Airports GIS Program, Airport Design Tools, Standard Wind Analysis.

Findings

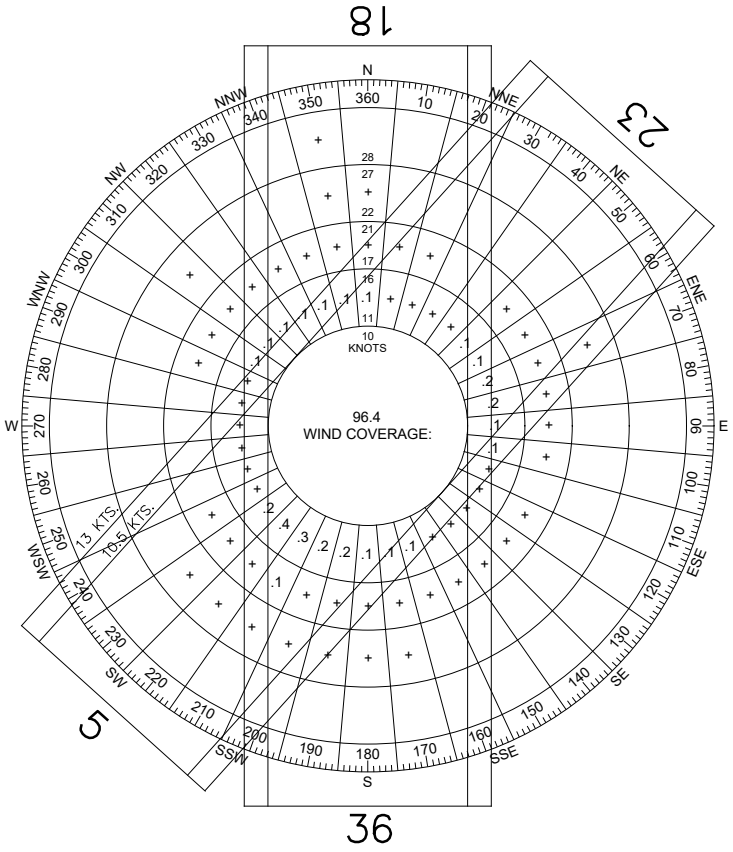
The existing runway system at VDF exceeds FAA guidelines for wind coverage, which requires at least 95 percent wind coverage. Additional runways are not required for the purpose of wind coverage.

4.4 Airfield Design Standards

The following sections describe the fundamental airfield design standards for safe, efficient, and economic aircraft operations. Airfield design standards are determined by a careful analysis of the aircraft characteristics for which the airfield will be designed.

Aircraft Approach Category

The Aircraft Approach Category (AAC) as specified in 14 CFR Part 97 § 97.3, *Symbols and Terms Used in Procedures*, represent a grouping of aircraft based on a reference landing speed (V_{REF}), if specified, or if V_{REF} is not specified, 1.3 times stall speed (V_{SO}) at the maximum certificated landing weight. V_{REF}, V_{SO}, and the maximum certificated landing weight are those values as established for the aircraft by the certification authority of the country of registry. The AAC definitions are shown in **Table 4-3**. VDF has an AAC of B for Runways 5-23 and 18-36, representing an approach speed of 91 knots or more, but less than 121 knots.



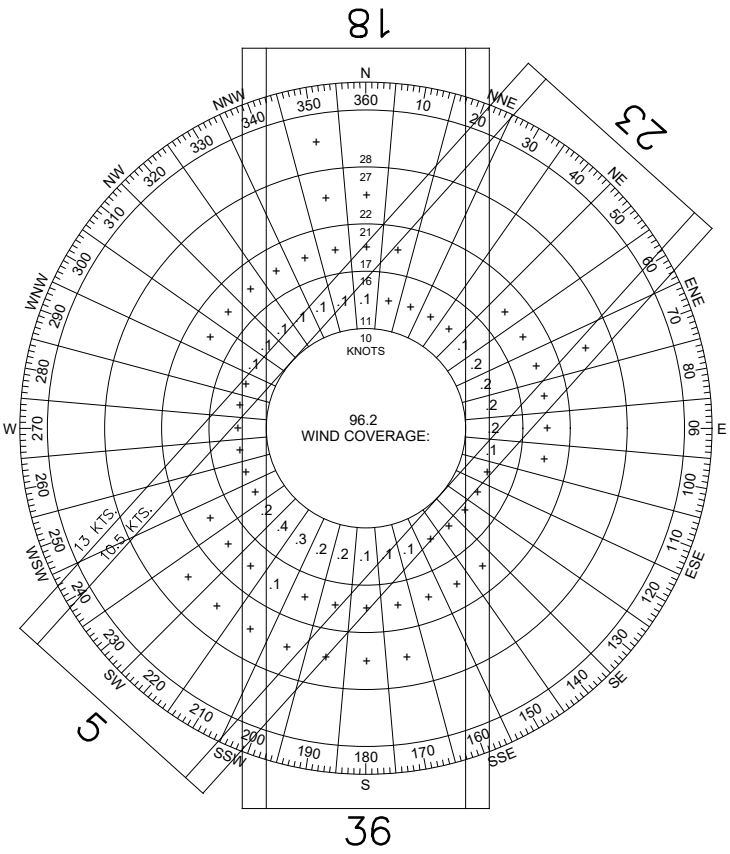
METEOROLOGICAL CONDITION	RUNWAY	RUNWAY WIND COVERAGE BY PERCENT		
		10.5 KNOTS (12 MPH)	13 KNOTS (15 MPH)	OBSERVATIONS
ALL - WEATHER	5/23	98.95	99.51	239,042
ALL - WEATHER	18/36	98.62	99.40	
ALL - WEATHER	COMBINED	99.55	99.98	

WIND ROSE DEPICTED RELATIVE TO TRUE NORTH (NAD 83)
RUNWAY 5 ORIENTATION: 42°24'35.99" (TRUE)
RUNWAY 23 ORIENTATION: 222°24'35.99" (TRUE)
RUNWAY 18 ORIENTATION: 180°10'48" (TRUE)
RUNWAY 36 ORIENTATION: 0°10'12" (TRUE)
MAGNETIC DECLINATION: 4°54'42"W

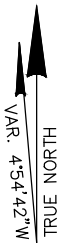
NOTES:

1. THIS GRAPHICAL CHART PLOTS, FOR THE DATA PERIOD LISTED, THE RECORDED OCCURRENCES (IN PERCENT) OF WIND BY DIRECTION AND SPEED WHILE THE RECTANGULAR BOXES REPRESENT THE MAXIMUM ACCEPTABLE CROSSWIND COMPONENTS OF 10.5, AND 13 KNOTS FOR BOTH RUNWAYS BASED ON ARC B-II AIRCRAFT DESIGN AND CROSSWIND LIMITATIONS. THE AIRFIELD COVERAGE CAPABILITY (ALL RUNWAYS) IS THUS DETERMINED BY TOTALING ALL OCCURRENCES FALLING WITHIN THE RECTANGLE.
2. RUNWAYS ARE NUMBERED USING MAGNETIC HEADINGS WHILE WIND DATA IS PRESENTED USING TRUE HEADINGS. THEREFORE, THERE IS A 4°54'42"W DIFFERENCE BETWEEN THE RUNWAY HEADINGS AND THE WIND ROSE HEADINGS.

SOURCES:
U.S DEPARTMENT OF COMMERCE; NATIONAL CLIMATIC DATA CENTER (NCDC) ASHEVILLE, NORTH CAROLINA, SURFACE OBSERVATION DATA OBTAINED FOR WEATHER STATION: VANDENBERG
STATION NO.: 722021
RECORD PERIOD: 2004-2013
SURFACE OBSERVATION DATA COMPILED BY URS, 2014.



METEOROLOGICAL CONDITION	RUNWAY	RUNWAY WIND COVERAGE BY PERCENT		
		10.5 KNOTS (12 MPH)	13 KNOTS (15 MPH)	OBSERVATIONS
VMC	5/23	98.93	99.51	219,429
VMC	18/36	98.56	99.37	
VMC	COMBINED	99.54	99.89	



WIND ROSE DEPICTED RELATIVE TO TRUE NORTH (NAD 83)
RUNWAY 5 ORIENTATION: 42°24'35.99" (TRUE)
RUNWAY 23 ORIENTATION: 222°24'35.99" (TRUE)
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RUNWAY 36 ORIENTATION: 0°10'12" (TRUE)
MAGNETIC DECLINATION: 4°54'42"W

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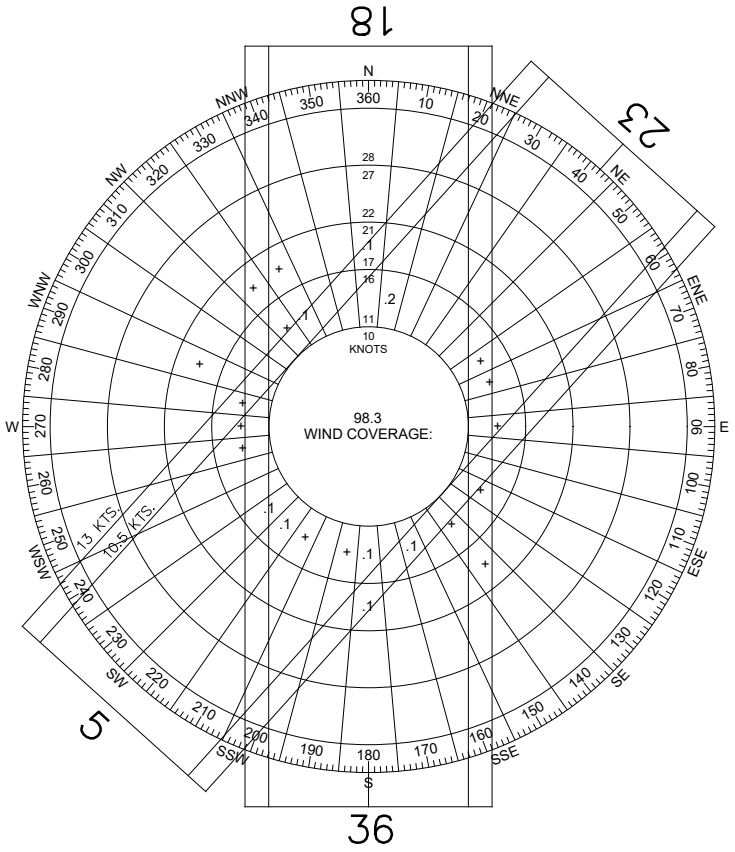
2. RUNWAYS ARE NUMBERED USING MAGNETIC HEADINGS WHILE WIND DATA IS PRESENTED USING TRUE HEADINGS. THEREFORE, THERE IS A 4°54'42"W DIFFERENCE BETWEEN THE RUNWAY HEADINGS AND THE WIND ROSE HEADINGS.

SOURCES:
U.S DEPARTMENT OF COMMERCE; NATIONAL CLIMATIC DATA CENTER (NCDC) ASHEVILLE, NORTH CAROLINA,
SURFACE OBSERVATION DATA OBTAINED FOR WEATHER STATION: VANDENBERG
STATION NO.: 722021
RECORD PERIOD: 2004–2013
SURFACE OBSERVATION DATA COMPILED BY URS, 2014.



METEOROLOGICAL CONDITION	RUNWAY	RUNWAY WIND COVERAGE BY PERCENT		
		10.5 KNOTS (12 MPH)	13 KNOTS (15 MPH)	OBSERVATIONS
IMC (LOWEST MIN.)	5/23	99.18	99.53	2,014
IMC (LOWEST MIN.)	18/36	99.43	99.74	
IMC (LOWEST MIN.)	COMBINED	99.72	99.90	

WIND ROSE DEPICTED RELATIVE TO TRUE NORTH (NAD 83)
RUNWAY 5 ORIENTATION: 42°24'35.99" (TRUE)
RUNWAY 23 ORIENTATION: 222°24'35.99" (TRUE)
RUNWAY 18 ORIENTATION: 180°10'48" (TRUE)
RUNWAY 36 ORIENTATION: 0°10'12" (TRUE)
MAGNETIC DECLINATION: 4°54'42"W

NOTES:

1. THIS GRAPHICAL CHART PLOTS, FOR THE DATA PERIOD LISTED, THE RECORDED OCCURRENCES (IN PERCENT) OF WIND BY DIRECTION AND SPEED WHILE THE RECTANGULAR BOXES REPRESENT THE MAXIMUM ACCEPTABLE CROSSWIND COMPONENTS OF 10.5, AND 13 KNOTS FOR BOTH RUNWAYS BASED ON ARC B-II AIRCRAFT DESIGN AND CROSSWIND LIMITATIONS. THE AIRFIELD COVERAGE CAPABILITY (ALL RUNWAYS) IS THUS DETERMINED BY TOTALING ALL OCCURRENCES FALLING WITHIN THE RECTANGLE.
2. RUNWAYS ARE NUMBERED USING MAGNETIC HEADINGS WHILE WIND DATA IS PRESENTED USING TRUE HEADINGS. THEREFORE, THERE IS A 4°54'42"W DIFFERENCE BETWEEN THE RUNWAY HEADINGS AND THE WIND ROSE HEADINGS.

SOURCES:
U.S DEPARTMENT OF COMMERCE; NATIONAL CLIMATIC DATA CENTER (NCDC) ASHEVILLE, NORTH CAROLINA, SURFACE OBSERVATION DATA OBTAINED FOR WEATHER STATION: VANDENBERG
STATION NO.: 722021
RECORD PERIOD: 2004-2013
SURFACE OBSERVATION DATA COMPILED BY URS, 2014.

Table 4-3 Aircraft Approach Category	
Aircraft Approach Category	Approach Speed
A	Approach speed less than 91 knots
B	Approach speed 91 knots or more, but less than 121 knots
C	Approach speed 121 knots or more, but less than 141 knots
D	Approach speed 141 knots or more, but less than 166 knots
E	Approach speed 166 knots or more
Source: AC 150/5300-13A Change 1, *Airport Design, Paragraph 105.*	

Airplane Design Group

The Airplane Design Group is classification of aircraft based on wingspan and tail height as shown in **Table 4-4**. When the aircraft wingspan and tail height fall in different groups, the higher group is used. VDF has an ADG of II for Runway 5-23, representing a tail height of 20 feet to less than 30 feet and a wingspan of 49 feet to less than 79. Runway 18-36 has an ADG of I, representing a tail height of less than 20 feet and a wingspan of less than 49 feet.

Table 4-4 Airplane Design Group		
Group	Tail Height (Feet)	Wingspan (Feet)
I	Less than 20	Less than 49
II	20 to less than 30	49 to less than 79
III	30 to less than 45	79 to less than 118
IV	45 to less than 60	118 to less than 171
V	60 to less than 66	171 to less than 214
VI	66 to less than 80	214 to less than 262
Source: AC 150/5300-13A Change 1, *Airport Design, Paragraph 105.*		

Design Aircraft

Airfield geometric designs that are based on only existing aircraft can severely limit the ability to expand the airport to meet future requirements for larger, more demanding aircraft. On the other hand, airfield designs that are based on large aircraft never likely to operate at the airport are not economical.

FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS),* §3-4, airport dimensional standards (such as runway length and width, separation standards, surface gradients, etc.) should be selected which are appropriate for the *"critical"* or *"design"* aircraft that will make *substantial use* of the airport in the planning period. Based upon the NPIAS definition, substantial use means either 500 or more annual itinerant operations, or scheduled commercial service.

The critical aircraft may be a single aircraft or a composite of the most demanding characteristics of several aircraft. The "design" or "critical" aircraft (or composite aircraft) is used to identify the appropriate Airport Reference Code (ARC) for airport design criteria (such as dimensional standards and appropriate pavement strength) and is contained within FAA Advisory Circular 150/5300-13A, Change 1, *Airport Design*. A runway may be designed with a number of different design aircraft. For example, a very large aircraft may be the design aircraft when it comes to

runway length specifications, while a very small aircraft may be the design aircraft when designing for runway orientation, while yet another may be used to design the pavement specifications of the runway. For the purposes of airspace protection, the aircraft with the greatest "approach speed" is used. Although the NPIAS Field Formulation guidance prescribes the use of a "design" or critical aircraft for consideration of future airport development, it was recognized that although currently classified as having an ARC of B-II, there are occasional aircraft operations that are generated by aircraft having greater operational and physical characteristics, (i.e, faster approach speeds and wider wingspans). The design aircraft at VDF is the Cessna Citation 560XL having an ARC of B-II.

Instrument Approach Capabilities

Instrument flight visibility minimums are expressed in feet of Runway Visual Range (RVR) as shown in **Table 4-5**. For VDF, the visibility is not lower than 1 mile and the RVR is 5,000 feet for Runways 18 and 23, and 4,000 feet for Runway 5. In the future, the instrument flight visibility is expected to change to lower than 1 mile but not lower than ¾ mile with a RVR of 4,000 feet for Runway 23.

Table 4-5
Instrument Flight Visibility Category (Statute Mile)

RVR (Feet)	Visibility (statute mile)
5,000	**Not lower than 1 mile**
4,000	Lower than 1 mile but not lower than ¾ mile
2,400	Lower than ¾ mile but not lower than ½ mile
1,600	Lower than ½ mile but not lower than ¼ mile
1,200	Lower than ¼ mile

Source: AC 150/5300-13A Change 1, Airport Design, Paragraph 105.

Required Protection of Navigable Airspace

Federal Regulation 49 CFR Part 77 establishes standards and notification requirements for objects affecting navigable airspace. This part provides criteria for whether or not a proposed object should be submitted to the FAA for evaluation; whether or not that object would be classified as an obstruction to air navigation; and, if so, whether it should be studied further in order to assess hazard status. This part in itself does not contain the criteria for determining whether or not an obstruction will be considered a hazard to air navigation.

Civil airport imaginary surfaces defined and prescribed by this part are established with relation to the each airport and to each runway at that airport. The size and slope of each such imaginary surface is based on the category of each runway according to the type of approach available or planned for that runway. The slope and dimensions of an Approach Surface that is applied to a particular runway end are determined by the most precise (i.e., having the lowest published cloud base and horizontal visibility) approach procedure minimums that exist, or are planned for that runway end. The slopes of the Approach Surface that extend outward and upward from the end of the Primary Surface are expressed in terms of rise over run ratios (e.g., 20:1, 34:1 or 50:1).

Civil airport imaginary surfaces that are applicable to this airport include:

- Primary Surface – A flat surface that is longitudinally-aligned with each runway centerline that extends to a length of 200 feet beyond end of the runway at the same elevations as the end of the runway.
- Approach Surface – A sloping surface that is longitudinally-aligned with each runway centerline that extends outward and upward at varying ratios (depending on type of approach) beyond from the end of the Primary Surface.
- Transitional Surface – A sloping surface that extends outward and upward at right angles to the runway centerline and the runway centerline extended at a slope of 7 to 1 from the sides of the Primary Surface and from the sides of the Approach Surface. Transitional Surfaces for those portions of the precision Approach Surface which project through and beyond the limits of the Conical Surface extend to a distance of 5,000 feet measured horizontally from the edge of the Approach Surface and at right angles to the runway centerline.
- Horizontal Surface – A flat surface that represents a horizontal plane established 150 feet above the highest runway elevation. The perimeter of the Horizontal Surface is constructed by swinging arcs of specified radii from the center of each end of the Primary Surface of each runway of each airport and connecting the adjacent arcs by lines tangent to those arcs.
- Conical Surface – A sloping surface that extends outward and upward from the periphery of the Horizontal Surface at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

Each published instrument approach procedure established for each runway end has published minima describing the lowest cloud base height expressed in feet Above Mean Sea Level (MSL) and Above Ground Level (AGL), and horizontal visibility distances expressed in statute miles or Runway Visual Range (RVR) reporting values expressed in feet.

The following describes each runway end having one or more published instrument procedures, the associated cloud base height and visibility distance minimums and Approach Surface slope:

- Runway 23 is served by an ILS Precision Instrument approach procedure having straight-in cloud base and horizontal visibility minimums of 298 feet and 1 statute mile. The Part 77 approach slope for this published instrument approach procedure is 50:1.

- Runway 5 is served by a RNAV (GPS) non-precision approach procedure having LPV (straight-in) cloud base and horizontal visibility minimums of 271 feet and 7/8 statute mile. The Part 77 approach slope for this published instrument approach procedure is 34:1.

- Runway 18 is served by a RNAV (GPS) Non-precision Instrument approach procedure having (straight-in) cloud base and horizontal visibility minimums of 580 feet and 1 statute mile. The Part 77 approach slope for this published instrument approach procedure is 20:1.

- Runway 23 is served by a RNAV (GPS) Non-precision Instrument approach procedure having LPV (straight-in) cloud base and horizontal visibility minimums of 298 feet and 1 statute mile. The approach slope for this published instrument approach procedure is 34:1.

The FAA periodically reviews Instrument Approach Procedures established for each runway. Obstacles discovered and/or reported within Approach, Departure, Horizontal or Conical surfaces may result in the FAA establishing increased (i.e., "higher") cloud base and/or visibility minima for one or more published instrument approach procedures, loss of approaches and/or loss of night operations. Development on and off an airport may potentially create adverse effects to the protection of navigable airspace at and around airports. Such adverse effects, may affect current and future airport operations when it creates obstacles to the safe and efficient use of the airspace surrounding the airport. Approach and Departure surfaces should remain clear of obstacles, including aircraft, in order to prevent operational restrictions that might affect aircraft operating weights and visibility minimums.

The Civil Airport Imaginary surfaces established for this airport by CFR Part 77 were found to be appropriate and sufficient. The HCAA's protection of navigable airspace above and surrounding each of its three general aviation airports has been developed, constructed and publicly published to fully comply with Title 14 of the Code of Federal Regulations (14 CFR) Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace and Florida Statutes 14-60.009, Airspace Protection.

At such time that any runway is lengthened, shortened, or upgraded to provide increased published instrument approach capabilities, these Civil Airport Imaginary surfaces should be reviewed and modeled as required.

Runway Design Code

The Runway Design Code (RDC) is a code signifying the design standards to which the runway is to be built. It is comprised of the AAC, ADG, and the runway visibility minimums. VDF has a RDC of B-I-5000 for Runway 18-36 and a RDC of B-II-5000 for Runway 5-23.

Although FAA criteria are based upon the three described parameters, aircraft weight should also be considered when assessing the adequacy of pavement strength and length of haul should be considering when considering runway length requirements.

Airport Reference Code

The ARC is a coded system composed of the AAC and ADG. The ARC relates airport design criteria to the operational and physical characteristics of the aircraft that will operate at the airport. VDF has an ARC of B-I for Runway 18-36 and an ARC of B-II for Runway 5-23. Existing and future aircraft operations are considered based on FAA-approved aviation demand forecasts and the airport's existing and future role within the air transportation system. The ARC is used for planning and design only and does not limit the aircraft that may be able to operate safely on the airport.

4.5 Runway Design Standards

Runway design standard guidance is provided by FAA Advisory Circular 150/5300-13A, *Airport Design* and FAA Advisory Circular 150/5325-4B, *Runway Length Requirements for Airport Design.*

Width

Runway width requirement factors include approach minimums, AAC, and ADG for the runway's design aircraft. With an RDC of B-I-5000, the runway width standard at VDF for Runway 18-36 is 60 feet. For Runway 5-23, with an RDC of B-II-5000, the recommended width is 75 feet. VDF currently has a runway width of 75 feet for Runway 18-36 and 100 feet for Runway 5-23, meeting design standards.

Length

Runway length requirements for the Airport were determined using FAA Advisory Circular 150/5325-4B, *Runway Length Requirements for Airport Design*. This methodology accounts for a wide variety of factors including: airport elevation, runway gradient, aircraft take-off and landing weights, air temperature, runway conditions (wet or dry), length of haul, etc. All of these factors were considered in the development of runway length requirements. To define the mean daily maximum temperature of the hottest month of the year, data was obtained from NOAA's National Climatic Data Center (NCDC) 1981-2010 Climate Normals. This provided the latest data, averaged over a thirty year period. This data showed August to be the hottest month of the year for VDF, with a mean daily maximum temperature of 90.4° Fahrenheit.

Table 4-6 shows runway length requirements for select aircraft operating at VDF. To determine length requirements, critical design aircraft were identified for the planning period. AC 150/5325-4B, Table 1-1 categorized the selected aircraft into the 12,500 pounds or less Maximum Takeoff Weight (MTOW) and divided the fleet by aircraft with less than 10 passengers and those with 10 or more passengers and aircraft over 12,500 pounds but less than 60,00 pounds. This determined that Chapter 3, Paragraph 306, Figure 3-1 and Figure 3-2 were utilized for runway length requirement calculations in addition to mean daily temperature of the hottest month at the airport and the airport's elevation.

Table 4-6 Runway Length Requirements			
Length Requirements for Aircraft with MTOWs Less Than 12,500 Pounds			
Fleet Category	**Elevation / Temperature (°F)**	**Takeoff**	**Landing**
Less Than 10 Passenger Seats (95% of Fleet)	21.8' AMSL / 90.4°	3,100 Feet	3,100 Feet
Less Than 10 Passenger Seats (100% of Fleet)	21.8' AMSL / 90.4°	3,700 Feet	3,700 Feet
More Than 10 Passenger Seats	21.8' AMSL / 90.4°	4,200 Feet	4,200 Feet
Length Requirements for Jets with MTOWs Between 12,500 Pounds and 60,000 Pounds			
75% of Fleet @ 60% Useful Load	21.8' AMSL / 90.4°	4,600 Feet	5,300 Feet
75% of Fleet @ 90% Useful Load	21.8' AMSL / 90.4°	6,800 Feet	7,000 Feet
100% of Fleet @ 60% Useful Load	21.8' AMSL / 90.4°	5,800 Feet	5,500 Feet
100% of Fleet @ 90% Useful Load	21.8' AMSL / 90.4°	8,300 Feet	7,000 Feet
Sources: FAA AC 150/5325-4B, Runway Length Requirements for Airport Design, Gulfstream Aerospace Corporation, and Michael Baker Jr., Inc., 2014. Note: Runway length requirements based on mean daily temperature of the hottest month at the airport, 90.4°F, and Tampa Executive Airport elevation, 21.1 feet. In the absence of information about specific aircraft runway length requirement ranges, Advisory Circular 150/5325-4B, Figure 3-1 and Figure 3-2 were utilized to determine specific runway length requirements.			

Based on the review of guidance offered in FAA Advisory Circular 150/5325-4B, the current available runway take-off lengths of 3,259 and 5,000 for Runways 18-36 and 5-23 respectively were found to be sufficient to accommodate the runway take-off length requirements for the Cessna Citation 560XL aircraft throughout the 20-year planning period.

Although the Advisory Circular lists the recommended runway take-off lengths, these take-off length values are listed for a wide variety of aircraft makes and models, some of which may choose to operate at the airport, but at reduced operating weights. It should also be noted that these take-off length values reflect aircraft operations during the hottest day temperatures and when operating at the each aircraft's respective published maximum gross take-off weight.

Based upon typical aircraft operating conditions and local daily temperatures, the existing available runway take-off lengths for each runway were considered to be adequate to accommodate the majority of general aviation aircraft that are anticipated to operate at this airport throughout the 20-year planning period. At such time, that sustained (500 or more) annual operations by larger and more demanding aircraft are documented to operate at this airport, it is recommended that a runway specific runway length analysis be undertaken to assess the need for additional runway lengths and increased pavement strengths.

Shoulders

Runway shoulders provide resistance to blast erosion and accommodate the passage of maintenance and emergency equipment and the occasional passage of an aircraft veering from the

runway. A stabilized surface, such as turf, normally reduces the possibility of soil erosion and engine ingestion of foreign objects. Soil not suitable for turf establishment requires a stabilized or low cost paved surface. Paved shoulders are required for runways accommodating ADG-IV and higher aircraft, and are recommended for runways accommodating ADG-III aircraft.

Turf, aggregate-turf, soil cement, lime or bituminous stabilized soil are recommended adjacent to runways accommodating ADG-I and ADG-II aircraft. VDF does not currently have runway shoulders. The recommended width is 10 feet.

Blast Pad

Paved runway blast pads provide blast erosion protection beyond runway ends during jet aircraft operations. Blast pads at runway ends should extend across the full width of the runway plus the shoulders. For a RDC of B-I-5000 (Runway 18 end), the standard blast pad width is 80 feet and the length is 60 feet. For a RDC of B-I-Visual (Runway 36 end), the standard blast pad width is 80 feet and the length is 100 feet. For a RDC of B-II-5000 (Runway 5-23), the standard blast pad width is 95 feet and the blast pad length is 150 feet. For Runway 5-23, each runway end has a blast pad 120 feet wide and 150 feet long. Since this is the runway primarily used for jet activity, this satisfies requirements at VDF.

Safety Area

The Runway Safety Area (RSA) is a defined surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft in the event of an undershoot, overshoot, or excursion from the runway. The current RSA requirements, for a RDC of B-I-Visual and B-I-5000 (Runway 36 end and 18 end respectively) are 240 feet beyond the departure end of the runway, 240 feet prior to the threshold, and a width of 120 feet. For Runway 5-23, a RDC of B-II-5000, the RSA requirements are 300 feet beyond the departure end of the runway, 300 feet prior to the threshold, and a width of 150 feet. VDF meets all standards for RSA dimensions.

Object Free Area

The Object Free Area (OFA) is an area centered on the ground on a runway, taxiway, or taxilane centerline provided to enhance the safety of aircraft operations by remaining clear of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes. The standard for a RDC of B-I-Visual and B-I-5000 is 240 feet beyond the runway end, 240 feet prior to the threshold, and 250 feet in width. For a RDC of B-II-5000, the standard is 300 feet beyond the runway end, 300 feet prior to the threshold, and 500 feet in width. VDF meets all design requirements for the OFA.

Obstacle Free Zone

The Obstacle Free Zone (OFZ) is the three-dimensional airspace along the runway and extended runway centerline that is required to be clear of obstacles for protection of aircraft landing or taking off from the runway and for missed approaches. For a RDC of B-I-5000, B-I-Visual, and B-II-5000, the design standards are 200 feet in length and 250 feet in width. VDF currently satisfies OFZ requirements.

Runway Protection Zone

The Runway Protection Zone (RPZ) is a predefined ground-level area of land trapezoidal in shape and centered about the extended runway centerline. By designed, shape, size and function, the RPZ serves to enhance the safety and protection of people and property on the ground. The central portion and controlled activity area are the two components of the RPZ:

1. Central Portion of the RPZ. The central portion of the RPZ extends from the beginning to the end of the RPZ, centered on the runway centerline. Its width is equal to the width of the runway OFA.

2. Controlled Activity Area. The controlled activity area is the remaining area of the RPZ on either side of the central portion of the RPZ.

Typically, RPZs are established 200 feet prior to the threshold, or 200 feet beyond the departure end of the runway. When an RPZ begins at a location other than 200 feet beyond the end of runway (e.g., through the required application and use of declared distances), two (overlapping) RPZs are required and are designated as either an "Arrival" RPZ, or a "Departure" RPZ. The size and shape (i.e., dimensions) of an Approach RPZ for a particular runway end are a function of the aircraft approach category and approach visibility minimums associated with the approach runway end. The Approach RPZ typically extends outward along the extended runway centerline approach path from a point 200 feet from the runway threshold, for a pre-determined distance.

The dimensions of the Departure RPZ are a function of the aircraft approach category and departure procedures associated with the runway. The Departure RPZ typically begins 200 feet beyond the departure end of the runway end outward along the extended runway centerline departure path or, if the Takeoff Run Available (TORA) and the runway end are not the same, 200 feet beyond the far end of the TORA. The departure RPZ dimensional standards are equal to, or less than the approach RPZ dimensional standards.

The following land uses are permissible within the confines of a RPZ without further evaluation:

1. Farming that meets airport design standards.
2. Irrigation channels that meet the requirements of AC 150/5200-33 and FAA/USDA manual, Wildlife Hazard Management at Airports.
3. Airport service roads, as long as they are not public roads and are directly controlled by the airport operator.
4. Underground facilities, as long as they meet other design criteria, such as RSA requirements, as applicable.
5. Unstaffed NAVAIDs and facilities, such as equipment for airport facilities that are considered fixed-by-function in regard to the RPZ.

Where practical, airport owners should own the property within the dimensional limits of the RPZ. It is desirable to clear the entire RPZ of all above-ground objects. Where this is impractical, airport owners, as a minimum, should maintain the RPZ clear of all facilities supporting incompatible activities. Although the FAA recognizes that in certain situations the airport owner may not fully

control land within the RPZ, the FAA expects airport owner to take all possible measures to protect against and remove or mitigate incompatible land uses.

On September 27, 2012, to clarify the FAA's policy on land uses within the RPZ, the FAA's Office of Airports' (ARP) issued a Memorandum titled*: Interim Guidance on Land Uses Within a Runway Protection Zone.* The memorandum presented interim policy guidance on compatible land uses within RPZs and addressed recurrent questions about what constitutes a compatible land use and how to airport owners should evaluate proposed land uses that would reside in an RPZ. This interim policy only addressed the introduction of new or modified land uses to an RPZ and proposed changes to the RPZ size or location.

Table 1 of the Memorandum listed the following land uses of critical concern:

- Buildings and structures (Examples include, but are not limited to: residences, schools, churches, hospitals or other medical care facilities, commercial/industrial buildings, etc.),
- Recreational land use (Examples include, but are not limited to: golf courses, sports fields, amusement parks, other places of public assembly, etc.),
- Transportation facilities. Examples include, but are not limited to:
    - Rail facilities -light or heavy, passenger or freight
    - Public roads/highways
    - Vehicular parking facilities
- Fuel storage facilities (above and below ground),
- Hazardous material storage (above and below ground),
- Wastewater treatment facilities, and
- Above-ground utility infrastructure (i.e. electrical substations), including any type of solar panel installations.

Instructional guidance contained in the Memorandum further stated: *when any of the land uses described in Table I would enter the limits of the RPZ as the result of:*

1. An airfield project (e.g., runway extension, runway shift),
2. A change in the critical design aircraft that increases the RPZ dimensions,
3. A new or revised instrument approach procedure that increases the RPZ dimensions, or
4. A local development proposal in the RPZ (either new or reconfigured);

coordination with the FAAs' Planning and Environmental Division / Airport Planning and Programming Division (APP-400) is required.

Runway 18-36 has a full-length parallel taxiway system having a runway-to-taxiway centerline separation of 150 feet. The runway is classified as a "Utility Runway" that fully meets Airport Reference Code (ARC) A/B-I "Small Aircraft" airport design standards to accommodate aircraft having maximum certificated takeoff weights of 12,500 pounds or less.

Runway 18

Runway 18 is served by a published non-precision RNAV (GPS) instrument approach procedure having visibility minimums not lower than one statute mile.

The dimensions of the applicable Approach and Departure RPZs for a "Utility" runway having these published instrument approach visibility minimums are identical with each having an inner width of 250 feet, an outer width of 450 feet and a length of 1,000 feet.

Runway 36

Runway 36 is not served by a published non-precision instrument approach procedure and is therefore classified as a "Visual Runway".

The dimensions of the applicable Approach and Departure RPZs for a "Utility" runway having these published instrument approach visibility minimums are identical with each having an inner width of 250 feet, an outer width of 450 feet and a length of 1,000 feet.

Runway 5-23 currently has a partial-length parallel taxiway system having a runway-to-taxiway centerline separation of 300 feet and fully meets ARC A/B-II airport design standards to provide the capability to accommodate "Large Aircraft" having maximum certificated takeoff weights of more than 12,500 pounds, but less than 38,000 pounds.

Runway 5

Runway 5 is served by a published non-precision RNAV (GPS) instrument approach procedure having visibility minimums not lower than three-quarter statute mile.

The dimensions of the applicable Approach and Departure RPZs for an "Other than Utility" runway having visual approach visibility minimums vary. The Approach RPZ has an inner width of 1,000 feet, an outer width of 1,510 feet and a length of 1,700 feet. The Departure RPZ is smaller having an inner width of 500 feet, an outer width of 700 feet and a length of 1,000 feet.

Runway 23 (A/B-II)

Runway 23 is served by a published precision ILS or LOC instrument approach procedure having visibility minimums not lower than one statute mile.

The dimensions of the applicable Approach and Departure RPZs for an "Other than Utility" runway a having these published instrument approach visibility minimums are identical with each having an inner width of 500 feet, an outer width of 700 feet and a length of 1,000 feet.

Runway Centerline to Parallel Taxiway Centerline Separation

Runway centerline to parallel taxiway centerline separation standards for a RDC of B-I-5000 and B-I-Visual is 150 feet. For a RDC of B-II-5000, the standard is 240 feet. VDF currently meets these design standards.

Runway Pavement Strength

Runway 5-23 has pavement strength to accommodate aircraft with a single-wheel load rating of 30,000 pounds or less and is constructed of asphalt-concrete. Runway 18-36 has pavement strength to accommodate aircraft with a single-wheel load rating of 12,500 pounds or less and is constructed of asphalt. Both runways are in fair to good condition as recorded in the FAA 5010, Airport Master Records and Reports for VDF. Based upon the Florida Department of Transportation – Aviation and Spaceports Office, 2015 Pavement Conditions Report, VDF has runway, taxiway and areas that range from fair to good condition. As identified in VDF's Inventory of Existing Conditions, **Figure 2-4,** there is a taxiway connector that need improvement and is in poor condition.

In the event that sustained (500 or more) annual operations by larger and more demanding aircraft are documented to operate at this airport in the future, it is recommended that a runway-specific runway length analysis be undertaken to assess the need for increased pavement strengths.

Threshold Siting Surface

For any given runway, the threshold is the demarcation line that defines the beginning of useable pavement for an aircraft to land. Typically, the threshold is located at the end of the physical pavement of the runway, thereby allowing an approaching aircraft to land with the maximum amount of pavement provided. When required, a threshold can be "*displaced*" at a specified distance from the approach end of the runway. The displaced threshold defines a new location along the runway where an approaching aircraft may begin their touchdown on the runway. Often, the purpose of the displaced threshold is to allow an approaching aircraft ample clearance over obstacles in the approach area (i.e., those obstacles that would exceed the Threshold Siting Surfaces as defined in FAA Advisory Circular 150/5300-13A Change 1, Table 3-2*, Approach/Departure Standards.*)

Displacement of the threshold shortens the useable runway length for landing, while not adversely (i.e., shortening) affecting the length of the runway available for departing aircraft. As a basic airport design requirement, threshold siting surfaces must be kept clear of obstacles either by removing or lowering the obstacles or displacing the threshold.

The dimensions of the Threshold Siting Surfaces, which depend on the runway type, approach type, and other factors, include the following:

- Whether or not the runway is authorized for visual, non-precision, precision approaches.
- Night-time operations and the approach visibility minimums.
- Whether or not there are published instrument departure procedures on the runway.
- Whether or not the runway is used by scheduled air carriers (those operating under FAR Part 121).
- The approach category of the runway's design aircraft.

In many cases the requirements for maintaining airspace clear of objects depend, in part, on the type of aircraft that typically use a runway. Airport runway design standards are based, in fact, on what is known as the runway's "*critical"* or "*design*" aircraft.

When a penetration to a Threshold Siting Surface occurs, one or more of the following actions may be required by the airport owner to protect the runway Approach Surface:

- Removal or lowering of the object to preclude penetration of applicable threshold siting surface;
- Displacement of the threshold to preclude object penetration of applicable threshold siting surface, with a resulting shorter landing distance;
- Modification of the approach Glide Path Angle and/or Threshold Crossing Height, or a combination of both;
- Increase of published instrument approach procedure visibility minimums; or
- Prohibition of night-time operations unless the object is lighted or an approved Visual Glide Slope Indicator (VGSI) is in use.

The existing Threshold Siting Surfaces established for each runway end were found to be appropriate and sufficient. At such time that any runway is lengthened or shortened, or a threshold is relocated or displaced on an existing runway, these siting surfaces should be reviewed and modeled by HCAA as required.

HCAA should continue to monitor and review all proposals for the erection of temporary or permanent objects in proximity to the airport as filed by proponents via the FAA's 7460-1 and OE/AAA notification process. Further, HCAA should maintain its current pro-active role within this review process with the goal of reducing or eliminating any potential penetrations to the various approach and departure surfaces to preserve the safe and efficient use of the airport.

Runway Design Standard Compliance Needs Summary

Summarized in **Table 4-7**, **Table 4-8, Table 4-9,** and **Table 4-10** are the runway design standards for VDF. VDF currently meets design standards at this time with exception of runway shoulders and blast pad width. Turf, aggregate-turf, soil cement, lime or bituminous stabilized soil are recommended adjacent to runways accommodating ADG-I and ADG-II aircraft.

Table 4-7 Runway 5 Design Standard Matrix (RDC B-II-5000)			
Item	**Standard**	**Existing**	**Satisfies Requirements**
Runway Design			
Runway Length	See Section 4.5.2	5,000 ft	☑
Runway Width	75 ft	100 ft	☑
Shoulder Width	10 ft	0	☒
Blast Pad Width	95 ft	120 ft	☑
Blast Pad Length	150 ft	150 ft	☑
Crosswind Component	13 knots	13 knots	☑
Runway Protection			
Runway Safety Area (RSA)			
Length beyond departure end	300 ft	300 ft	☑
Length prior to threshold	300 ft	300 ft	☑
Width	150 ft	150 ft	☑
Runway Object Free Area (ROFA)			
Length beyond runway end	300 ft	300 ft	☑
Length prior to threshold	300 ft	300 ft	☑
Width	500 ft	500 ft	☑
Runway Obstacle Free Zone (ROFZ)			
Length	200 ft [1]	200 ft	☑
Width	250 ft[2]	250 ft	☑
Inner-approach Obstacle Free Zone			
Length	2,600 ft	2,600 ft	☑
Width	250 ft	250 ft	☑
Precision Obstacle Free Zone (POFZ)			
Length	N/A	N/A	N/A
Width	N/A	N/A	N/A
Approach Runway Protection Zone (RPZ)			
Length	1,000 ft	1,000 ft	☑
Inner Width	500 ft	500 ft	☑
Outer Width	700 ft	700 ft	☑
Area (Acres)	13.770	13.770	☑
Departure Runway Protection Zone (RPZ)			
Length	1,000 ft	1,000 ft	☑
Inner Width	500 ft	500 ft	☑
Outer Width	700 ft	700 ft	☑
Area (Acres)	13.770	13.770	☑
Runway Separation			
Runway centerline to:			
Parallel runway centerline	N/A	N/A	N/A
Holding Position	125 ft	250 ft	☑
Parallel Taxiway / Taxilane centerline	240 ft	300 ft	☑
Aircraft parking area	250 ft	460 ft	☑

Sources: FAA Advisory Circular 150/5325-4B, Runway Length Requirements for Airport Design.
FAA Advisory Circular 150/5300-13A, Change 1, Airport Design.
Note 1: Refer to Advisory Circular 150/5300-13A paragraph 308 for design standards. Inner-approach OFZ extends 200 feet beyond the last light unit (MALS-R).
Note 2: Refer to Advisory Circular 150/5300-13A paragraph 308 for design standards. ROFZ width changes based on aircraft approach speed.
Note: N/A= Not Applicable

Table 4-8 Runway 23 Design Standard Matrix (RDC B-II-5000)			
Item	**Standard**	**Existing**	**Satisfies Requirements**
Runway Design			
Runway Length	See Section 4.5.2	5,000 ft	☑
Runway Width	75 ft	100 ft	☑
Shoulder Width	10 ft	0	☒
Blast Pad Width	95 ft	120 ft	☑
Blast Pad Length	150 ft	150 ft	☑
Crosswind Component	13 knots	13 knots	☑
Runway Protection			
Runway Safety Area (RSA)			
Length beyond departure end	300 ft	300 ft	☑
Length prior to threshold	300 ft	300 ft	☑
Width	150 ft	150 ft	☑
Runway Object Free Area (ROFA)			
Length beyond runway end	300 ft	300 ft	☑
Length prior to threshold	300 ft	300 ft	☑
Width	500 ft	500 ft	☑
Runway Obstacle Free Zone (ROFZ)			
Length	200 ft[1]	200 ft	☑
Width	250 ft[1]	250 ft	☑
Precision Obstacle Free Zone (POFZ)			
Length	N/A	N/A	N/A
Width	N/A	N/A	N/A
Approach Runway Protection Zone (RPZ)			
Length	1,000 ft	1,000 ft	☑
Inner Width	500 ft	500 ft	☑
Outer Width	700 ft	700 ft	☑
Area (Acres)	13.770	13.770	☑
Departure Runway Protection Zone (RPZ)			
Length	1,000 ft	1,000 ft	☑
Inner Width	500 ft	500 ft	☑
Outer Width	700 ft	700 ft	☑
Area (Acres)	13.770	13.770	☑
Runway Separation			
Runway centerline to:			
Parallel runway centerline	N/A	N/A	N/A
Holding Position	125 ft	250 ft	☑
Parallel Taxiway / Taxilane centerline	240 ft	300 ft	☑
Aircraft parking area	250 ft	460 ft	☑

Sources: FAA Advisory Circular 150/5325-4B, Runway Length Requirements for Airport Design.
FAA Advisory Circular 150/5300-13A, Change 1, Airport Design.
Note 1: Refer to Advisory Circular 150/5300-13A paragraph 308 for design standards. ROFZ width changes based on aircraft approach speed.
Note: N/A= Not Applicable

Table 4-9 Runway 18 Design Standard Matrix (RDC B-I-5000)			
Item	**Standard**	**Existing**	**Satisfies Requirements**
Runway Design			
Runway Length	See Section 4.5.2	3,259 ft	☑
Runway Width	60 ft	75 ft	☑
Shoulder Width	10 ft	0	☒
Blast Pad Width	80 ft	N/A	
Blast Pad Length	60 ft	N/A	
Crosswind Component	10.5 knots	13 knots	☑
Runway Protection			
Runway Safety Area (RSA)			
Length beyond departure end	240 ft	250 ft	☑
Length prior to threshold	240 ft	250 ft	☑
Width	120 ft	120 ft	☑
Runway Object Free Area (ROFA)			
Length beyond runway end	240 ft	240 ft	☑
Length prior to threshold	240 ft	240 ft	☑
Width	250 ft	250 ft	☑
Runway Obstacle Free Zone (ROFZ)			
Length	200 ft[1]	200 ft	☑
Width	250 ft[1]	250 ft	☑
Precision Obstacle Free Zone (POFZ)			
Length	N/A	N/A	N/A
Width	N/A	N/A	N/A
Approach Runway Protection Zone (RPZ)			
Length	1,000 ft	1,000 ft	☑
Inner Width	250 ft	250 ft	☑
Outer Width	450 ft	450 ft	☑
Area (Acres)	8.035	8.035	☑
Departure Runway Protection Zone (RPZ)			
Length	1,000 ft	1,000 ft	☑
Inner Width	250 ft	250 ft	☑
Outer Width	450 ft	450 ft	☑
Area (Acres)	8.035	8.035	☑
Runway Separation			
Runway centerline to:			
Parallel runway centerline	N/A	N/A	N/A
Holding Position	125 ft		
Parallel Taxiway / Taxilane centerline	150 ft	150 ft	☑
Aircraft parking area	125 ft	200 ft	☑

Sources: FAA Advisory Circular 150/5325-4B, Runway Length Requirements for Airport Design.
FAA Advisory Circular 150/5300-13A, Change 1, Airport Design.
Note 1: Refer to Advisory Circular 150/5300-13A paragraph 308 for design standards. ROFZ width changes based on aircraft approach speed.
Note: N/A= Not Applicable

Table 4-10 Runway 36 Design Standard Matrix (RDC B-I-Visual)			
Item	**Standard**	**Existing**	**Satisfies Requirements**
Runway Design			
Runway Length	See Section 4.5.2	3,259 ft	☑
Runway Width	60 ft	75 ft	☑
Shoulder Width	10 ft	0	☒
Blast Pad Width	80 ft	N/A	
Blast Pad Length	60 ft	N/A	
Crosswind Component	10.5 knots	13 knots	☑
Runway Protection			
Runway Safety Area (RSA)			
Length beyond departure end	240 ft	250 ft	☑
Length prior to threshold	240 ft	250 ft	☑
Width	120 ft	120 ft	☑
Runway Object Free Area (ROFA)			
Length beyond runway end	240 ft	250 ft	☑
Length prior to threshold	240 ft	250 ft	☑
Width	250 ft	120 ft	☑
Runway Obstacle Free Zone (ROFZ)			
Length	200 ft[1]	200 ft	☑
Width	250 ft[1]	250 ft	☑
Precision Obstacle Free Zone (POFZ)			
Length	N/A	N/A	N/A
Width	N/A	N/A	N/A
Approach Runway Protection Zone (RPZ)			
Length	1,000 ft	1,000 ft	☑
Inner Width	250 ft	250 ft	☑
Outer Width	450 ft	450 ft	☑
Area (Acres)	8.035	8.035	☑
Departure Runway Protection Zone (RPZ)			
Length	1,000 ft	1,000 ft	☑
Inner Width	250 ft	250 ft	☑
Outer Width	450 ft	450 ft	☑
Area (Acres)	8.035	8.035	☑
Runway Separation			
Runway centerline to:			
Parallel runway centerline	N/A	N/A	N/A
Holding Position	125 ft		
Parallel Taxiway / Taxilane centerline	150 ft	150 ft	☑
Aircraft parking area	125 ft	200 ft	☑

Sources: FAA Advisory Circular 150/5325-4B, Runway Length Requirements for Airport Design.
FAA Advisory Circular 150/5300-13A, Change 1, Airport Design.
Note 1: Refer to Advisory Circular 150/5300-13A paragraph 308 for design standards. ROFZ width changes based on aircraft approach speed.
Note: N/A= Not Applicable

4.6 Declared Distance Criteria

As defined in §322 of Advisory Circular 150/5300-13A, Change 1, *Airport Design,* declared distances represent the maximum distances available and suitable for meeting takeoff, rejected takeoff, and landing distances performance requirements for turbine powered aircraft where it is impracticable to meet the airport design standards or mitigate the environmental impacts by other means, and the use of declared distances is practical. When applicable and prudent, declared distance criteria is applied and published for each runway end where it is impracticable to meet the standard design criteria established for the Runway Safety Area (RSA), the Runway Object Free Area (ROFA), the Runway Protection Zone (RPZ), or where required to fully satisfy minimum vertical clearances over traverseways as prescribed for CFR Part 77 Approach Surfaces and/or TERPS Departure Surfaces. One or more of the any or all of the following declared distances may apply to a particular runway by direction of travel (i.e., arrival or departure).

1. Takeoff Run Available (TORA) – the runway length declared available and suitable for the ground run of an aircraft taking off;
2. Takeoff Distance Available (TODA) – the TORA length plus the length of any remaining runway or clearway beyond the far end of the TORA; the full length of TODA may need to be reduced because of obstacles in the departure area;
3. Accelerate-Stop Distance Available (ASDA) – the runway length plus stopway length declared available and suitable for the acceleration and deceleration of an aircraft aborting a takeoff; and
4. Landing Distance Available (LDA) – the runway length declared available and suitable for landing an aircraft.

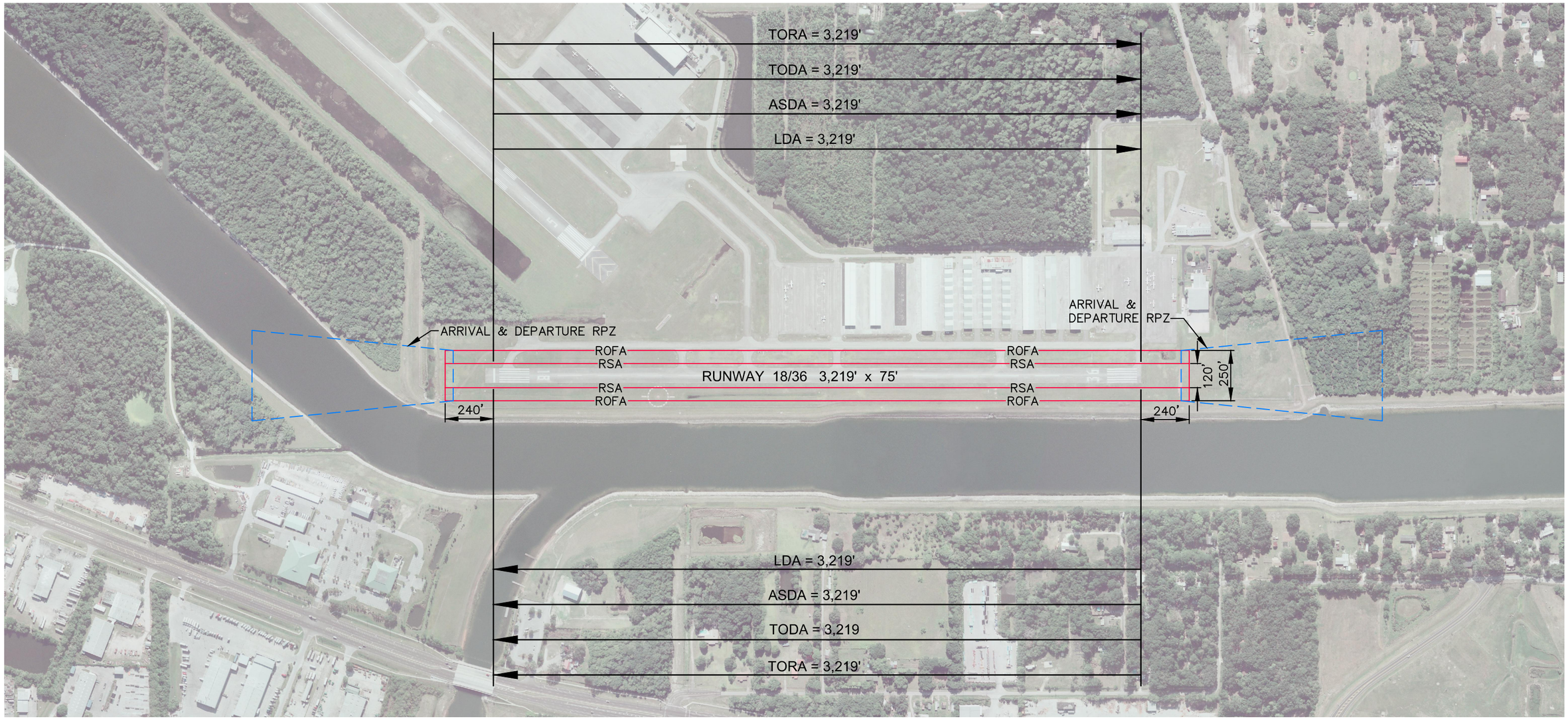
By treating these distances independently, application of declared distances is a design methodology that results in declaring and reporting the TORA, TODA, ASDA and LDA for each operational direction. When applicable, declared distances limit or increase runway use.

Runway 18-36 has a surveyed and published length of 3,219 feet and has no applicable declared distances. Runway 5-23 has a surveyed and published length of 5,000 feet. Because frangible approach lights are within the 300-foot portions of the RSA and ROFA located beyond the end of the runway, the Runway 05 ASDA and LDA lengths are increased. Because of the need to provide the required TERPS Departure Surface 17 foot vertical clearance over I-75, the TORA and TODA lengths are reduced. Runway 23 LDA is reduced because of the 800-foot displaced threshold. **Table 4-11** contains the existing declared distances for VDF. The applicable declared distances for Runway 18-36 and Runway 5-23 are shown in **Figured 4-4** and **4-5** respectively.

Table 4-11
Existing Declared Distances

Runway	TORA (ft)	TODA (ft)	ASDA (ft)	LDA (ft)
18	3,219	3,219	3,219	3,219
36	3,219	3,219	3,219	3,219
05	4,574	4,574	4,956	4,956
23	5,000	5,000	5,000	4,200

Source: HCAA, August 2014.



NO 40:1 DEPARTURE SURFACE APPLIED

NO 40:1 DEPARTURE SURFACE APPLIED

NOTE:
RSA/ROFA LENGTHS AND WIDTHS BASED ON AAC A/B AND
ADG II CRITERIA WITH VISIBILITY MINIMUMS GREATER THAN 3/4 MILE.

N

0 250 500
SCALE IN FEET

Y:\Planning\HCAA\GA MPs Project – 2-6-2014\Received URS\VDF-FIG 4-4_4-5.dwg May 09 2018-08:19

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Figure 4-4 Runway 18/36 Declared Distances

40:1 DEPARTURE SURFACE APPLIED

40:1 DEPARTURE SURFACE APPLIED

NOTE:
RSA/ROFA LENGTHS AND WIDTHS BASED ON AAC A/B AND
ADG II CRITERIA WITH VISIBILITY MINIMUMS GREATER THAN 3/4 MILE.

N

0 250 500
SCALE IN FEET

Michael Baker INTERNATIONAL

Figure 4-5 Runway 5/23 Declared Distances

4.7 Taxiway/Taxilane Design Standards

Runway design standard guidance is provided by FAA Advisory Circular 150/5300-13A Change 1, *Airport Design.* VDF's taxiway design standards are based on Taxiway Design Group (TDG) 2, the TDG for VDF's design aircraft.

Width

Taxiway pavement requirements are based on Taxiway Design Group (TDG), which in turn is based on the dimensions of the airplane's undercarriage, which includes the Main Gear Width (MGW) and Cockpit to Main Gear (CMG) distance. For a TDG 2 taxiway, the design standard for width is 25 feet. VDF has a current taxiway width of 40 feet both full length runway taxiways.

Shoulders

Unprotected soils adjacent to taxiways are susceptible to erosion, which can result in engine ingestion problems for jet engines that overhang the edge of the taxiway pavement. A dense, well-rooted turf cover can prevent erosion and support the occasional passage of aircraft, maintenance equipment, or emergency equipment under dry conditions. Turf, aggregate-turf, soil cement, lime or bituminous stabilized soil are recommended adjacent to paved surfaces accommodating ADG-I and ADG-II aircraft.

Safety Area

The Taxiway Safety Area (TSA) is centered on the taxilane centerline. To provide room for rescue and fire-fighting operations, the TSA width equals the maximum wingspan of the ADG. For VDF, the TSA is 49 feet for ADG I and 79 feet for ADG II.

Object Free Area

The Taxiway Object Free Area (TOFA) is centered on the taxiway centerline. The TOFA clearing standards prohibit service vehicle roads, parked aircraft, and other objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes. For VDF, the TOFA is 89 feet for ADG I and 131 feet for ADG II.

Taxiway Design Group

The Taxiway Design Group (TGD) is a classification of airplanes based on outer to outer Main Gear Width (MGW) which is the distance from the outer edge to outer edge of the widest set of main gear tires, and the Cockpit to Main Gear distance (CMG) which the distance from the pilot's eye to the main gear turn center.

Unlike the AAC and the ADG, the TDGs do not fit in a simple table format. TDG standards can be found in Advisory Circular 150/5300-13A, Change 1, *Airport Design.* VDF has a TDG of 2.

Edge Margin

The Taxiway Edge Safety Margin (TESM) is the distance between the outer edge of the landing gear of an airplane with its nose gear on the taxiway centerline and the edge of the taxiway pavement. The TESM for TDG 2 is 5 feet.

Wingtip Clearance

Wingtip clearance for TDG 2 is 20 feet for taxiways and 15 feet for taxilanes. VDF currently satisfies these requirements.

Centerline to Fixed or Moveable Object

TDG 2 taxiway centerline to fixed or moveable object separation is 39.5 feet. VDF currently satisfies these requirements.

Taxiway Centerline to Parallel Taxiway Centerline Separation

Taxiway centerline to parallel taxilane centerline separation is 70 feet for ADG I design standards and 105 feet for ADG II standards. VDF currently satisfies requirements for both ADG I and ADG II design standards.

Holding Bays and Aircraft Run-Up Areas

The purpose of a holding bay is to provide space for one aircraft to pass another in order to reach the runway end. This reduces airfield delays which can result when an aircraft is conducting engine run-ups or pre-flight checks.

The airport has no designated or marked aircraft run-up areas within which pilots can safely conduct pre-flight engine run-ups and systems testing. It is recommended that one or more areas be identified and developed for such activities.

Aircraft Run-up Areas can be located within designated portions of apron areas, but should not be in proximity of buildings, adjacent roadways, pedestrian sidewalks and parked aircraft. Aircraft run-up Areas can also be located within taxiway by-pass holding bays that are typically located adjacent to taxiways serving the approach end of a runway. When by-pass holding bays are used to conduct engine run-ups and testing, their size and configuration should accommodate the engine run-up activities of the largest propeller-driven aircraft that operate at the airport while remaining clear of the taxi movements of other aircraft, Safety Areas and Obstacle Free Zones.

The airport currently has three paved areas of different sizes and shapes that may be suitable for conducting aircraft engine run-ups. One is located southeast of the displaced threshold for Runway 23 at Taxiway E3 and connects to Taxiway E, one is southeast of the approach end of Runway 5 at Taxiway E1 and connects to Taxiway E and one is east of the approach end of Runway 18 connecting to Taxiway A.

When by-pass holding bays are used to conduct engine run-ups and testing, their design and configuration should accommodate the engine run-up activities of the largest propeller-driven aircraft that operate at the airport while remaining clear of the taxi movements of other aircraft, Safety Areas, Obstacle Free Zones (OFZ), the Runway 23 POFZ and ground based electronic navigation system critical areas (i.e., Localizer Antenna Array and Glideslope Antenna Critical Areas). The suitability of these existing paved areas as well as other areas on the airport will be examined within the identification of development alternatives.

Taxiway Design Standard Compliance Needs Summary

VDF meets TDG 2 taxiway design standards, based on the design aircraft at the airport. The full-length parallel taxiway system provides adequate capacity and efficient flow of aircraft operations. Turf, aggregate-turf, soil cement, lime or bituminous stabilized soil are recommended adjacent to paved surfaces accommodating ADG-I and ADG-II aircraft. For VDF, the recommended taxiway shoulder width is 10 feet.

AC 150/5300-13A, Change 1, *Airport Design,* Paragraph 401 (b) (5) (g) provides guidance on recommended taxiway and taxilane layouts to enhance safety by avoiding runway incursions. Taxiways should not be designed to lead directly to a runway without requiring a turn. Such configurations can lead to confusion when a pilot typically expects to encounter a parallel taxiway but instead accidentally enters a runway. Grassed or painted islands are recommended to comply with this recommendation.

4.8 Airfield Facility Requirements

Lighting

The airfield lighting at VDF consists of Medium Intensity Runway Lights (MIRLs) located along the edge of Runway 5-23 and 18-36. Runways 5, 18, and 36 have Runway End Identifier Lights (REILs). Runway 23 has a 2,400 foot Medium Intensity Approach Light System with Runway Alignment Indicator Lights (MALSR). Runway 18 has a 4-box Visual Approach Slope Indicator (VASI) on the left side of the runway. Runways 5, 23, and 36 have a 2-box Precision Approach Path Indicator (PAPI) on the left side of the runway. There are no anticipated changes to the airfield lighting system and current airfield lighting satisfies requirements for non-precision approaches.

Marking and Signage

Advisory Circular 150/5324-1K, *Standards for Airport Markings,* contains standards for markings used on airport runways, taxiways, and aprons. Runway 5-23 is properly marked for precision instrument approaches. The Runway 5 end is in good condition and the Runway 23 end is in fair condition. Runway 18-36 is properly marked for non-precision instrument approaches and markings are in good condition for both runway ends. No issues with airfield signage were identified. Future changes to RDC and TDG at VDF will require reevaluation of runway, taxiway, and apron area markings for compliance.

Based Aircraft Space Requirements

Although the airport is currently designed to fully accommodate aircraft having ARC B-I and B-II dimensional characteristics, larger more demanding makes and models of aircraft (i.e., having wider wingspans and longer lengths) occasionally operate and base their aircraft at the airport. Accordingly, hangar and apron tie-down/parking space needs for based aircraft must be identified to accommodate the parking and sheltering needs of these aircraft throughout the 20-year planning period.

Based upon discussions with the Fixed Base Operator (FBO), there is a current and anticipated future need for additional aircraft storage space for single-aircraft (i.e., grouped T-hangar or single unit), or for multiple-aircraft (i.e., bulk storage).

Projections of future based aircraft hangar storage and apron tie-down needs were developed using the FAA-approved aviation activity forecast for this Master Plan Update and the 2013 Base Year distribution of aircraft storage at the airport by aircraft type as reported by the FBO. As shown in **Table 4-12** and for space planning purposes only, the distribution of based aircraft was assumed to remain constant throughout the 20-year planning period.

Table 4-12
VDF Based Aircraft Distribution

	T-Hangars/ Shade Hangars	Conventional Box Hangar	Large Common Use Hangar	Apron	TOTAL
Single-Engine	115	0	2	20	137
Multi-Engine	13	0	3	1	17
Turboprop	0	0	0	0	0
Jet	2	0	2	0	4
Helicopter	2	0	0	0	2
TOTAL	**132**	**0**	**7**	**21**	**160**

	T-Hangars/ Shade Hangars	Conventional Box Hangar	Large Common Use Hangar	Apron	TOTAL
Single-Engine	84%	0%	1%	15%	100%
Multi-Engine	76%	0%	18%	6%	100%
Turboprop	76%	0%	18%	6%	100%
Jet	50%	0%	50%	0%	100%
Helicopter	100%	0%	0%	0%	100%

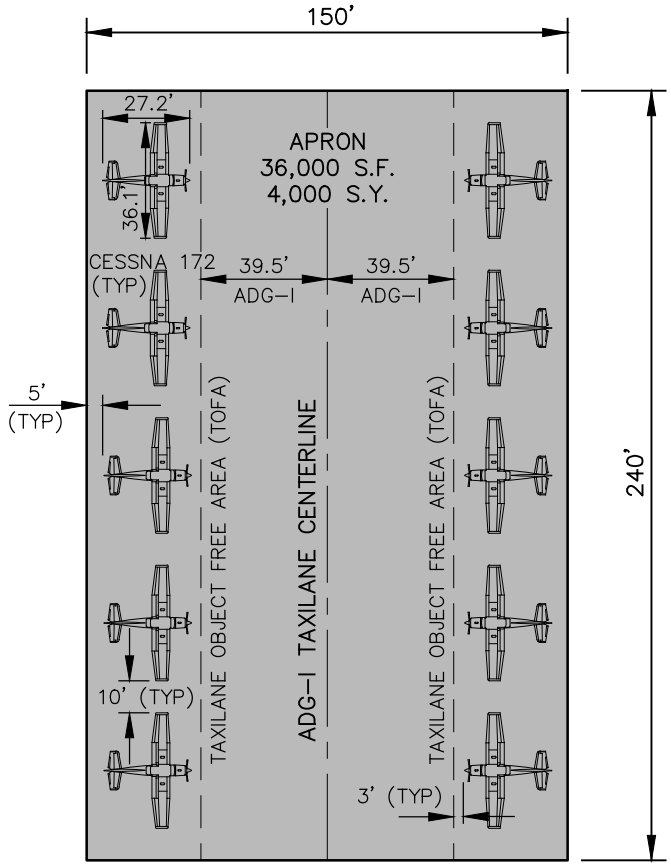
Source: Volo Aviation, September 2014.
Compiled by URS, 2014.

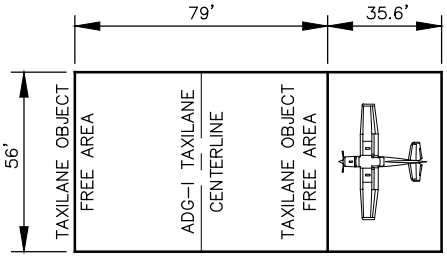
The identification of needed based aircraft hangar space, or the location, layout and spacing for apron tie-downs vary for each airport by type of aircraft depending upon make and model of aircraft that are known to currently operate at the airport, or that are anticipated to operate at the airport (i.e., single-engine, multi-engine, turbo-prop, jet and rotorcraft).

When determining based aircraft hangar and apron tie-down space requirements, the aircraft size (i.e., wingspan and length), as well as, the two-dimensional envelope within which the aircraft will be operate, be stored, or tied down must also be considered.

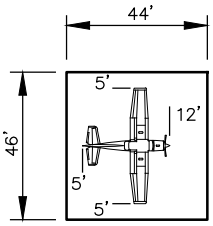
For example, bulk hangar operators typically utilize best-practice methods in the towing, placement and separation of aircraft. When determining apron tie-down space requirements, the aircraft wingspan, length and safety-related separation must be considered, as well as the Object Free Area dimensional setbacks from each taxilane centerline to provide power-in/power-out taxi movement capabilities to and from each tie-down position.

Utilizing published aircraft dimensional data, guidance prescribed in FAA AC 150/5300-13A, Change 1, *Airport Design*, Appendix 5, the based aircraft hangar and tie-down space needs were identified and documented as listed in **Table 4-13** and shown in **Figures 4-6 through 4-9**.





CESSNA 172
APRON TIE-DOWN AREA REQUIREMENT
6,418 SF
713 SY

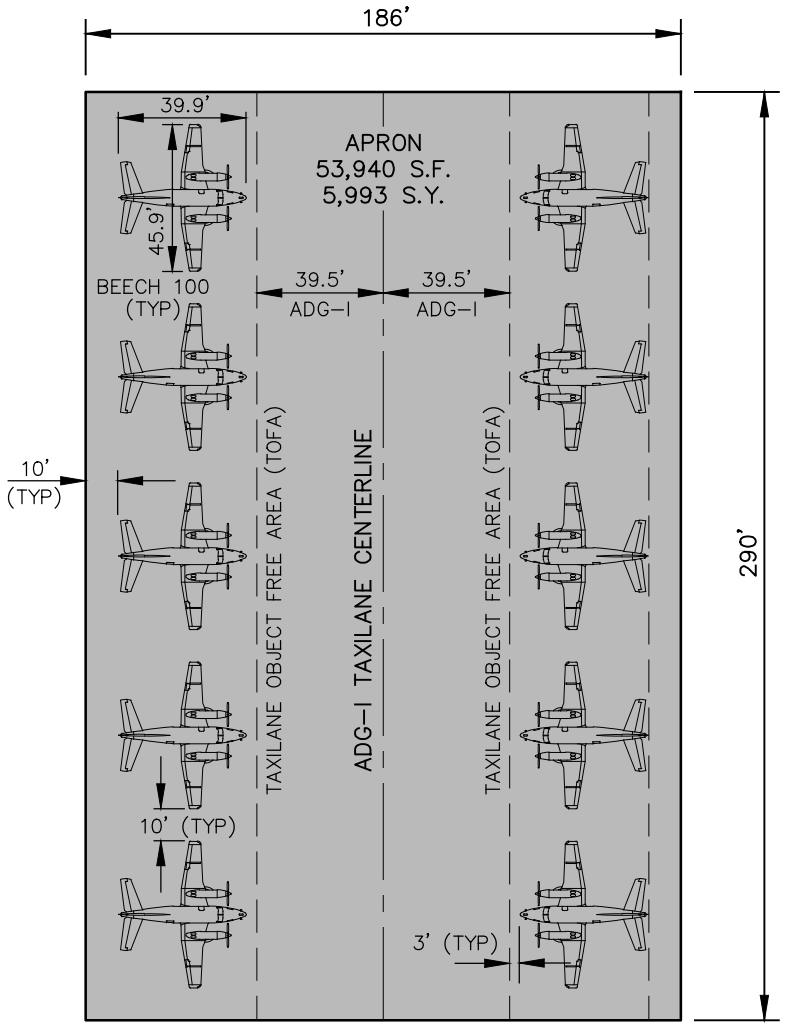


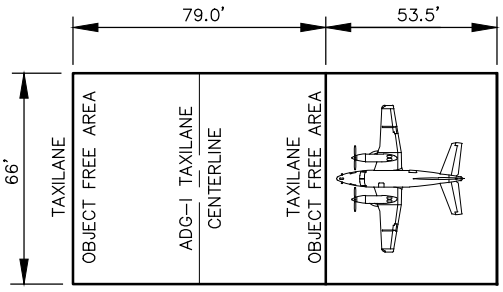
CESSNA 172
HANGAR STORAGE AREA REQUIREMENT
2,024 SF

0 30 60
SCALE IN FEET

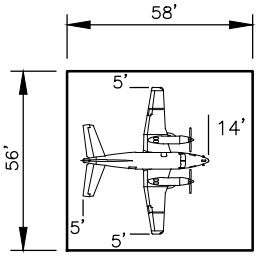
SOURCE : URS, 2014

Figure 4-6 ADG-I Aircraft Space Requirements





BEECH 100
APRON TIE-DOWN AREA REQUIREMENT
8,745 SF
972 SY



BEECH 100
HANGAR STORAGE AREA REQUIREMENT
3,248 SF

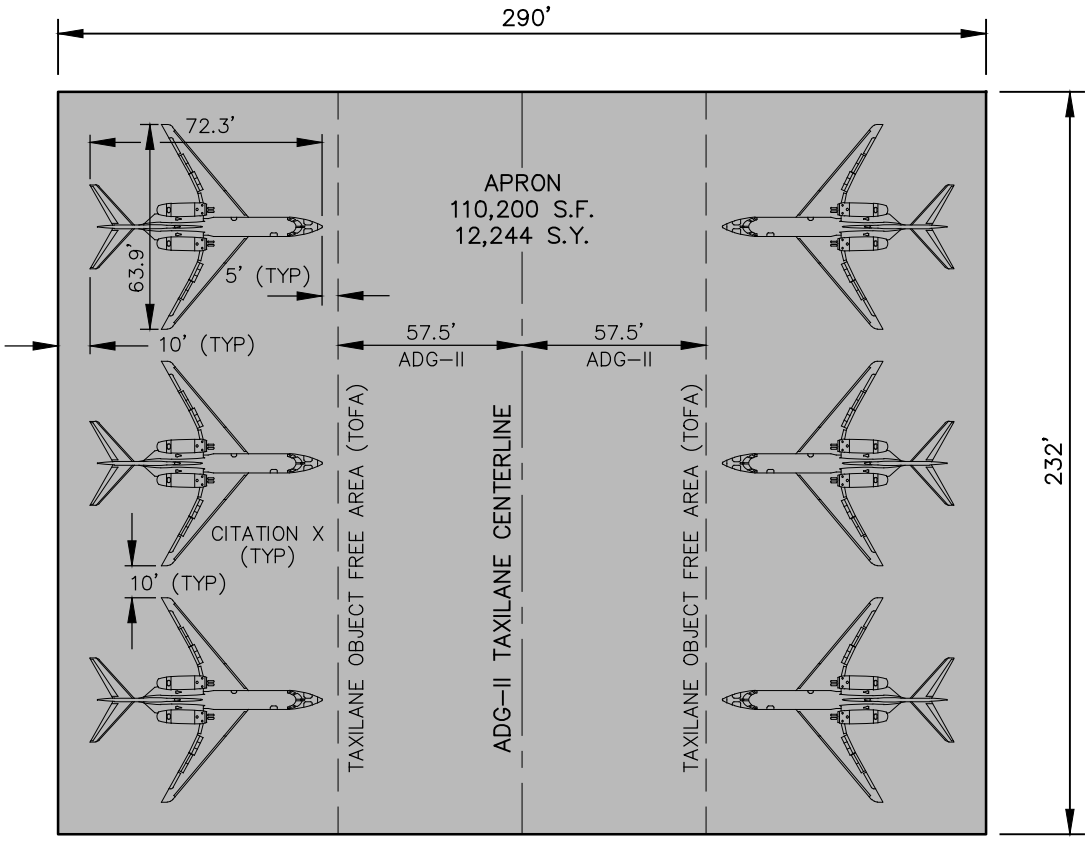
0 30 60
SCALE IN FEET

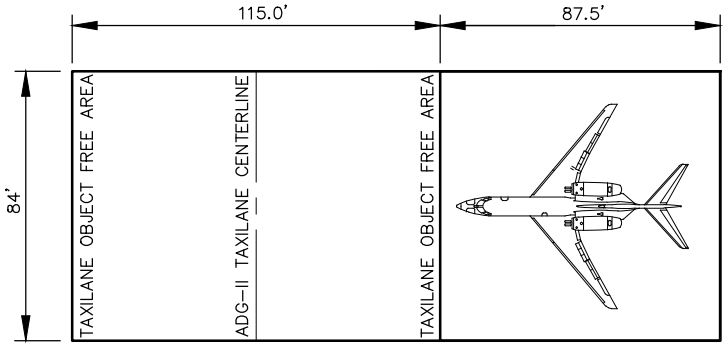
SOURCE : URS, 2014

Y:\Planning\HCAA\GA MPs Project - 2-6-2014\Received URS\VDF-AIRCRAFT SPACE REQUIREMENTS.dwg May 14 2018-11:38

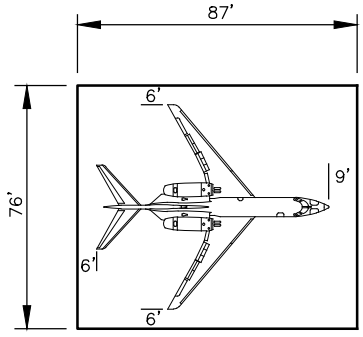
Michael Baker INTERNATIONAL

Figure 4-7 ADG-I Aircraft Space Requirements





CITATION X
APRON TIE-DOWN AREA REQUIREMENT
17,010 SF
1,890 SY

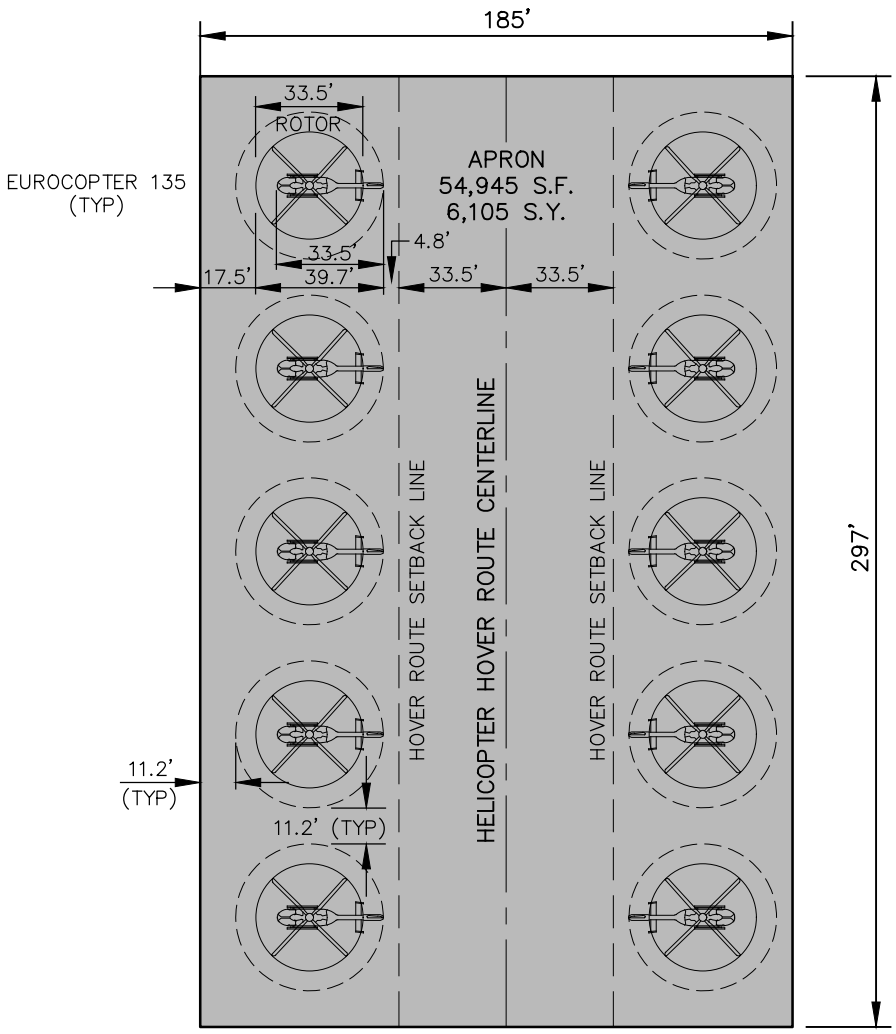


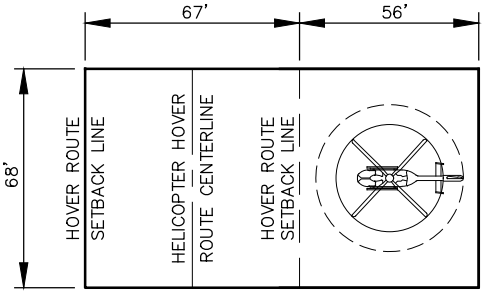
CITATION X
HANGAR STORAGE AREA REQUIREMENT
6,612 SF

0 30 60
SCALE IN FEET

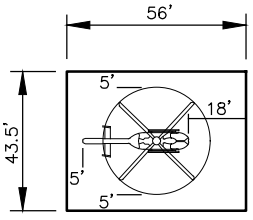
SOURCE : URS, 2014

Figure 4-8 ADG-II Aircraft Space Requirements





EUROCOPTER 135
33.5' ROTOR DIAMETER
APRON TIE-DOWN AREA REQUIREMENT
6,418 SF
713 SY



EUROCOPTER 135
33.5' ROTOR DIAMETER
HANGAR STORAGE AREA REQUIREMENT
2,436 SF

0 30 60
SCALE IN FEET

SOURCE : URS, 2014

Figure 4-9 Helicopter Space Requirements

Table 4-13 Based Aircraft Space Requirements			
Space Requirements	Representative Aircraft	Apron Tie-Down (Square Yards)	Bulk Hangar (Square Feet)
ADG-I Single-Engine	Cessna 172	713	2,024
ADG-I Multi-Engine	Beech 100	972	3,248
ADG-II Cabin-Class Jet	Citation X	1,890	6,612
ADG-I Helicopter	Eurocopter 135	713	2,436
Source: URS, 2014.			

Utilizing the 2013 distribution of based aircraft by type as shown in **Table 4-12**, the aircraft-specific dimensional storage and tie-down requirements listed in **Table 4-13** and the forecast of based aircraft in **Table 4-14,** hangar and apron tie-down space requirements for based aircraft were determined for each forecast year by aircraft type and are listed in **Table 4-15**.

Table 4-14 VDF Forecast of Based Aircraft						
Type	2013	2014	2018	2023	2028	2033
Single-Engine (Non-Jet)	112	130	125	130	132	133
Multi-Engine (Non-Jet)	15	18	18	19	23	25
Turboprop	0	0	5	9	13	21
Rotorcraft	7	1	7	9	10	12
Jets	2	1	5	7	11	14
Total Based Aircraft	**136**	**150**	**160**	**174**	**189**	**205**
Source: URS, 2014 and Table 3-19.						

Table 4-15 VDF Based Aircraft Storage Analysis										
Apron Tie-Downs	2013		2018		2023		2028		2033	
	Spaces	SY	Spaces	SY	Spaces	SY	Spaces	SY	Spaces	SY
Existing	118	64,444	118	64,444	118	64,444	118	64,444	118	64,444
Needed	21	15,232	19	14,098	21	15,491	21	15,491	22	16,463
Surplus/ (Deficit)	**97**	**49,212**	**99**	**50,346**	**97**	**48,953**	**97**	**48,953**	**96**	**47,981**
Bulk Hangar Space	**SF**		**SF**		**SF**		**SF**		**SF**	
Existing	44,149[1]		44,149		44,149		44,149		44,149	
Needed	27,016		27,710		27,848		34,876		43,262	
Surplus/ (Deficit)	**17,133**		**16,439**		**16,301**		**9,273**		**887**	
Single Unit Hangars	**Units**		**Units**		**Units**		**Units**		**Units**	
Existing	166		166		166		166		166	
Needed	21		132		142		154		166	
Surplus/ (Deficit)	**145**		**34**		**24**		**12**		**0**	
Source: URS, 2014. Note: [1] Existing bulk hangar space square footage at VDF is reflective of a bulk hangar to be acquired in 2015.										

The projection of future required hangar space was based solely upon the 2014 distribution of based aircraft by type of storage available. This assumption, however, may be found to be unrealistic in that the existing distribution of based aircraft is typically predicated upon aircraft owner preference to utilize covered hangar space based on size and frequency of use.

Based on the evidence of latent demand for additional single-unit hangar space at the airport, it was assumed that regardless of the existing distribution of based aircraft, the availability and aircraft owner preference for single-unit aircraft storage will most likely dictate the development and timing for single-unit or grouped T-hangar development. It is further assumed that hangar facilities will mostly likely be constructed as demand dictates, and that based upon available funding opportunities, HCAA will continue to develop grouped single-unit T-hangars or a variety of hangar styles currently in use at the airport. For long-range planning purposes, it was assumed that development of larger bulk-style hangars will be needed to support FBO or other commercial aircraft maintenance activities that are anticipated to occur throughout the 20-year planning period.

Itinerant Aircraft Space Requirements

Itinerant aprons provide for the movement and parking of visiting aircraft (i.e., transient aircraft") that choose to operate at the airport. Itinerant apron space determinations are typically based upon calculated current and projected future Peak Month Average Day (PMAD) aircraft activity levels, relative percentage mix of local and transient operations, and aircraft type and size. Utilizing industry accepted FAA planning guidance[11] the following procedural planning steps were used to identify required itinerant aircraft apron space:

Step 1. Determine Peak Month Average Day Operations (PMAD) aircraft operations for 2013 Base year and all forecast planning years as listed in Forecast Chapter **Table 3-13**.

Step 2. Increase PMAD aircraft operations by 10 percent.

Step 3. Determine relative percentage mix of local and itinerant aircraft operations as listed in Forecast Chapter **Table 3-15** (47 percent of the total aircraft operations were determined as itinerant, based on data provided by AirNav for VDF.)

Step 4. Derive total itinerant operations by multiplying value derived in Step 2 by the itinerant percentage value.

Step 5. Assume that 50 percent of all itinerant operations require apron space.

Step 6. Multiply value derived in Step 5 by 50 percent (itinerant arrivals).

Step 7. Assume that 50 percent of all itinerant arrival operations require apron space.

Step 8. Increase value derived in Step 7 by 10 percent.

[11] FAA Advisory Circular 150/5300-13 Changes 1-18, Airport Design, Appendix 5, page 117

Table 4-16 shows the itinerant apron area needs assessment for the 20-year planning period following this methodology.

Table 4-16
Itinerant Apron Area Needs Assessment

	2013	2014	2018	2023	2028	2033
Peak Month Average Day Operations	449	475	509	556	607	663
Increase by 10%	494	523	560	612	668	729
Percent Itinerant Traffic (Assumed to Remain Constant)	47%	47%	47%	47%	47%	47%
Total Itinerant Activity	232	246	263	287	314	343
One-Half of Itinerant Operations	116	123	132	144	157	171
Assumed 50% Need Transient Apron Space	58	61	66	72	78	86
Increase This Area by 10%	64	68	72	79	86	94

Sources: Advisory Circular 150/5300-13 Changes 1-18, *Airport Design,* Appendix 5, page 117.
AirNav, LLC, Tampa Executive Airport May 29, 2014.

Table 4-17 provides the aircraft operations forecast percentiles by fleet mix and is based on information provided by the FBO, Volo Aviation, for the base year (2014) and anticipated fleet mix changes at VDF through the 20-year planning period. **Table 4-18** utilizes the methodology provided in **Table 4-14** and distributes the itinerant aircraft operations by type for the 20-year planning period. When mathematically distributing assignment of aircraft by type, whole numbers of aircraft were utilized for conservative planning purposes.

Table 4-17
Aircraft Operations Forecast Percentiles

Year	Single Engine	Multi Engine	Turboprop	Jet Engine	Helicopter	Total
2014	75%	10%	5%	5%	5%	100%
2018	75%	9%	6%	5%	5%	100%
2023	73%	8%	7%	6%	6%	100%
2028	71%	7%	8%	7%	7%	100%
2033	66%	6%	10%	10%	8%	100%

Sources: URS, 2014.
Volo Aviation, 2014.

Table 4-18[1]
Itinerant Aircraft by Fleet Mix

Year	Single Engine	Multi Engine	Turboprop	Jet Engine	Helicopter	Total
2014	51	7	4	4	4	70
2018	55	7	5	4	4	75
2023	58	7	6	5	5	81
2028	62	7	7	7	7	90
2033	63	6	10	10	8	97

Source: URS, 2014.
Note: [1] Assignment to whole number values.

Table 4-19 shows the spacing requirements in square yards for the aircraft fleet mix. The basis for this spacing was determined by analyzing ADG B-I and B-II aircraft that are known to currently operate, or are anticipated to operate at VDF as shown in **Figures 4-5** to **4-8**.

Table 4-19
Fleet Mix Spacing Requirements by Aircraft Type

	Single Engine	Multi Engine	Turboprop	Jet Engine	Helicopter
Space Needs (Square Yards)	713	972	972	1,890	713

Source: URS, 2014.

Using the itinerant aircraft fleet mix by type and the respective spacing requirements by aircraft type, it is anticipated that additional itinerant apron area is needed today and through the 20-year planning period. The existing itinerant apron area is currently 12,889 square yards. **Table 4-20** shows the aircraft-specific and total itinerant apron area needs.

Table 4-20
Itinerant Apron Area Needs by Fleet Mix (Square Yards)

Year	Single Engine	Multi Engine	Turboprop	Jet Engine	Helicopter	Total	Existing	Surplus/ (Deficit)
2014	36,363	6,804	3,888	7,560	2,852	**57,467**	12,889	**(44,578)**
2018	39,215	6,804	4,860	7,560	2,852	**61,291**	12,889	**(48,402)**
2023	41,354	6,804	5,832	9,450	3,565	**67,005**	12,889	**(54,116)**
2028	44,206	6,804	6,804	13,230	4,991	**76,035**	12,889	**(63,146)**
2033	44,919	5,832	9,720	18,900	5,704	**85,075**	12,889	**(72,186)**

Source: URS, 2014.

NAVAIDS

Navigational Aids are used for airport approaches and allow pilots to navigate to the airport and runway ends. Runway 5 has a GPS, Runway End Identifier Lights (REILs), and a 2-Light Precision Approach Path Indicator (PAPI-2L) for precision approaches. Runway 23 has a GPS, MALSR, ILS (glideslope and localizer), and PAPI-2L for precision approaches. Runway 18 has a GPS, REILs, and a PAPI-4L for non-precision approaches. Runway 36 has REILs and a PAPI-2L for visual approaches. The airport has a beacon, a lighted wind cone, and a segmented circle. Navigational aids are in good condition but should be monitored throughout the planning period for maintenance issues or if replacement is deemed necessary.

Windsock/Segmented Circle

VDF airport management maintains a lighted wind indicator and segmented circle located next to Runway 18-36. The windsock and segmented circle are in fair condition and are anticipated to adequately serve the airport through the foreseeable future with routine maintenance and upkeep.

Security Fencing

Security fencing at VDF is adequate and well maintained. Portions of the airport's perimeter fencing are not accessible by vehicle for security inspection and maintenance purposes. It is recommended that all existing and planned future fence lines be cleared, graded and stabilized to accommodate airport service vehicles. Such clearing and grading action should be undertaken

only after environmental review and assessment. Fencing should be monitored throughout the planning period.

4.9 Airport Support Facilities

This section addresses the General Aviation (GA) facility requirements based on current and projected levels of local and itinerant traffic.

General Aviation Terminal

The GA terminal at VDF is 12,824 square feet in size and includes a waiting area and pilot lounge, management and operations, public restrooms and concessions. Public and employee parking spaces are located in front of the terminal building.

The following planning assumptions were used to assess functional passenger terminal space based upon Peak Hour passenger movements:

- Peak Day Operations = Peak Month / 30.42 days (365/52)
- Peak Hour Operations = 10% of Peak Day
- Average of 2.5 passengers per general aviation operation
- Total Peak Hour Passengers = Peak Hour Operations X 2.5 Passengers
- Peak Hour Passengers require a total of 50 square feet (sf) of space
    - Common waiting area – 15 sf
    - FBO retail area - 3 sf
    - Public Convenience – 2 sf
    - Concessions – 5 sf
    - Circulation – 25 sf

As shown in **Table 4-21**, based upon these planning assumptions and the forecast of Peak Hour passenger movements at VDF the existing general aviation / FBO terminal facility will provide the required terminal space into the latter half of the 20-year forecast period.

If operational demand and associated Peak Hour passenger movements increase at year-over-year rates greater than projected in the aviation activity forecast, the terminal space needs should be re-evaluated at that time.

Table 4-21 Terminal Area Requirements								
Year	Peak Day Operations (Peak Month/ 30.42)	Peak Hour Operations (10% of Peak Day)	Passengers Per Operation	Total Peak Hour Passengers	Space Needs Per Passenger[1] (SF)	Total Space Needs (SF)	Existing Space (SF)	Surplus/ (Deficit) (SF)
2018	509	51	2.5	127	50	6,363	12,824	6,462
2023	556	56	2.5	139	50	6,950	12,824	5,874
2028	607	61	2.5	152	50	7,588	12,824	5,237
2033	663	66	2.5	166	50	8,288	12,824	4,537
Source: URS, 2014. Note: [1] General Planning Area Needs (SF): Common Waiting Area: 15, FBO Retail: 3, Public Convenience: 2, Concessions: 5, Circulation: 25.								

Fueling Facilities

Using VDF (2013 Base Forecast Year) the assessment of aircraft fuel storage capacity was based upon the following methodology:

Step 1. Compilation of total annual aircraft operational activity by type (i.e., Piston versus Jet/Rotorcraft).

Step 2. Compilation of the total annual fuel flowage by type (i.e, 100-Low Lead (AVGAS) and Jet-A).

Step 3. Derivation of the relative operational split between piston and jet/rotorcraft aircraft operations as previously listed in the Forecast of Aviation Activity (See Table 3-13, *Aircraft Operations Forecast Percentiles*).

Step 4: Derivation of the fuel flow (by type) per aircraft operation (by type). These respective ratios were held constant for all future forecast periods.

Step 5: Derivation of Average Daily Fuel Flowage (by type),

Step 6: Derivation of 14 Day Fuel Flowage (by type),

Step 7: Assessed of AVGAS and Jet-A 14-day storage needs considering existing storage capacity (by fuel type).

The following planning assumptions were used to assess the existing aircraft fuel storage capacity and capabilities of the existing aircraft fuel storage facilities:

- Existing aviation fuel storage capacities are fixed and adequate,
- Purchase of aviation fuels (by type) is not constrained by price and/or delivery time,
- Aviation fuel (by type) is purchased as demand dictates to provide a minimum 14-day supply level.

Based upon discussions with the sole FBO, the existing aircraft fuel storage facilities are adequate and sufficient. It is recognized, however, that although excess fuel storage capacity exists today, the need for additional storage capacity may be desired to maintain a 14-day supply as aircraft activity levels increase throughout the 20-year planning period.

The assessment of aircraft fuel storage need is listed in **Table 4-22.**

Table 4-22 Fuel Storage Requirements (14-Day Supply in Gallons)		
2018	**AVGAS**	**JET-A**
Existing Capacity	12,000	12,000
Required Capacity for 14-Day Supply	4,433	6,450
Surplus/(Deficit)	7,567	5,550
2023	**AVGAS**	**JET-A**
Existing Capacity	12,000	12,000
Required Capacity for 14-Day Supply	4,844	7,048
Surplus/(Deficit)	7,156	4,952
2028	**AVGAS**	**JET-A**
Existing Capacity	12,000	12,000
Required Capacity for 14-Day Supply	5,291	9,237
Surplus/(Deficit)	6,709	2,763
2033	**AVGAS**	**JET-A**
Existing Capacity	12,000	12,000
Required Capacity for 14-Day Supply	5,775	11,763
Surplus/(Deficit)	6,225	237
Source: URS, 2014.		

Airport Maintenance

VDF performs aircraft maintenance activities within a 13,151 square foot hangar built in 1998 as well as an operations and maintenance shop that is 7,625 square feet and that was constructed in 2007. There is also a 2,170 foot maintenance storage unit constructed between 1982 and 1995. Maintenance facilities should be constructed as demand for such facilities arises. The size of these facilities cannot be pre-determined but will be developed as space, function, and location dictate.

Ground Access

Although the airport is bordered by U.S. Highway 301 to the west, Interstate 4 to the south and Interstate 75 to the east, ground access to and from the airport and its general aviation terminal is extremely limited. Primary ground access to and from the airport is provided via Eureka Springs Road, a circuitous two-mile long undivided two-lane rural roadway having an open swale drainage system that meanders through residential neighborhoods. Secondary access to other areas of the airport from Eureka Springs Road is provided via Vandenburg Airport Road and Wilkins Road.

Because of the proximity of these inter-connecting limited access right-of-ways, direct ground access to and from the airport via these highways cannot be developed. The Tampa Bypass Canal operated by the Southwest Florida Water Management District bordering the west side of the airport further serves to limit the opportunity to develop additional less circuitous ground access routes to and from the airport.

The current limited and circuitous ground access to and from the airport is considered by HCAA to be inadequate. Improved access is needed to support airport user access and economic development opportunities in the future. Opportunities for potential improvements to the Eureka Springs Road right-of-way to provide improved traffic flow as well as potential alternative ground access routes to support and promote aviation-compatible and allied economic development will be evaluated as part of the Business Plan and airport alternatives analysis.

Automobile Parking

Automobile parking at VDF is located at the main terminal building as well as the executive hangars. If new construction is proposed for the airport, more parking will be required to meet anticipated increased demand.

4.10 Airport Security

The Transportation Security Administration (TSA) has developed guidance, in cooperation with the General Aviation (GA) community, to provide GA airport owners, operations, and users with guidelines and recommendations that address aviation security concepts, technology, and enhancements. These guidelines and recommendations are found within Information Publication A-001, *Security Guidelines for General Aviation Airports,* published in May 2004.

The TSA uses an airport characteristics measuring tool that includes airport location, runways, and based aircraft to assess the most appropriate security enhancements for the Airport. Each airport is assigned a certain point value that is calculated considering the airport's location, number and types of based aircraft, runway length and surface characteristics, and number and types of aircraft operations. The airport's value is the compared to the TSA's recommended security features to evaluate whether additional security features may be appropriate. A point value of 42 was calculated for VDF, which means that all security features shown in the "25-44 Point Range" are recommended. **Table 4-23** lists TSA recommended security features and VDF's compliance with these features.

Although VDF currently satisfies the security features suggested by TSA, it is recommended that the airport's older existing code-entry access control system be upgraded to a more secure proximity card system in the future. Since a higher level of administrative oversight is typically associated with such systems, HCAA will also need to evaluate its ability to administer the proximity system at that time. Currently, VDF has a CCTV system that is connected to HCAA's centralized operations center. In the future, it is recommended that HCAA periodically evaluate the need to accommodate expanded coverage and additional access points.

In recent years, HCAA has taken steps to improve protective lighting at the airport by adding additional lighting and converting existing lights to a light-emitting diode (LED) system. In the

future, it is recommended that the security lighting system be connected to the airport's emergency power source. Also, LED lighting should be incorporated with planned hangar and apron expansion at VDF in the future.

Table 4-23
Analysis of TSA Recommended Security Features

TSA Recommended Security Feature	Point Range/Applicable Security Feature				VDF Status
	>45	25-44	15-24	0-14	
Fencing					☑
Hangars					☑
Closed Circuit Television (CCTV)					☒
Intrusion Detection System					☒
Access Controls		☑			☑
Lighting System		☑			☑
Personnel ID System		☑			☑
Vehicle ID System		☑			☑
Challenge Procedures		☑			☑
Law Enforcement Support		☑			☑
Security Committee		☑			☑
Pilot Sign-In/Out Procedures		☑			☑
Signs		☑			☑
Documented Security Procedures		☑			☑
Positive Passenger/Cargo ID		☑			☑
All Aircraft Secured		☑			☑
Community Watch Program		☑			☑
Contact List		☑			☑

Source: TSA Security Guidelines for General Aviation Airports, May 2004.

4.11 Summary of Facility Needs

Table 4-24 identifies and summaries VDF's facility requirements. The following table presents recommendations to satisfy these facility requirements.

Table 4-24
Summary of Facility Requirements

Category	Requirements
Airfield Capacity and Configuration	No Improvements Recommended
Design Aircraft and Airport Reference Code (ARC)	King Air F90 – ARC B-I and B-II
Runway Strength	No Improvements Recommended
Instrument Approaches	No Improvements Recommended
Runway Design Standards	Runway Shoulders Recommended
Taxiway Design Standards	Taxiway Shoulders Recommended Grassed or Paved Islands
Airfield Lighting	No Improvements Recommended
Airfield Markings	No Improvements Recommended
Airfield Signage	No Improvements Recommended
Navigational Aids	No Improvements Recommended
Aircraft Apron (2033)	Additional Apron Space
Based Aircraft Hangars (2033)	Additional Single-Unit Hangars Additional Bulk Hangars
Airport Terminal	Evaluated in Alternatives Analysis
Airport Maintenance Facilities	Evaluated in Alternatives Analysis
Fueling Facilities	No Improvements Recommended
Automobile Access	Evaluated in Alternatives Analysis
Automobile Parking	No Improvements Recommended
Airport Security Analysis	Evaluate Deficiencies Based on Table 4-23
Source: URS, 2014.	

Chapter 5.0
Airport Alternatives Analysis

Tampa International Airport

Hillsborough County Aviation Authority

5.0 Airport Alternatives Analysis

5.1 Background

This chapter presents the preliminary alternatives for the Tampa Executive Airport (VDF). The purpose of the preliminary alternatives is to evaluate options for satisfying the airfield and landside facility requirements that were identified in the previous chapter. At VDF, the most significant airfield recommendation consists of improvements and expansion of parallel Taxiway E in order to allow for more efficient aircraft traffic flows between Runway 5-23 and the terminal area. The landside recommendations primarily include the provision of additional hangars and improved automobile access to the airport. The preliminary alternatives are intended for discussion purposes between the various stakeholders including airport tenants, the Hillsborough County Aviation Authority (HCAA), and the public. The individual components of each preliminary alternative were evaluated to aid in the selection of a preferred alternative that represents the desired development plan for the 20-year planning period, which is presented in Chapter 6. For that reason, the preliminary alternatives should be viewed as flexible development plans that may be refined or combined to best satisfy the needs of the airport's stakeholders. They are intended to provide a clear understanding of the airport's possibilities and limitations for airfield and landside development.

- Runway Approach Analysis
- Airfield Alternatives
- Airport Land Use Analysis
- Landside Alternatives
- Airport Support Facilities
- Access Alternatives

5.2 Runway Approach Analysis

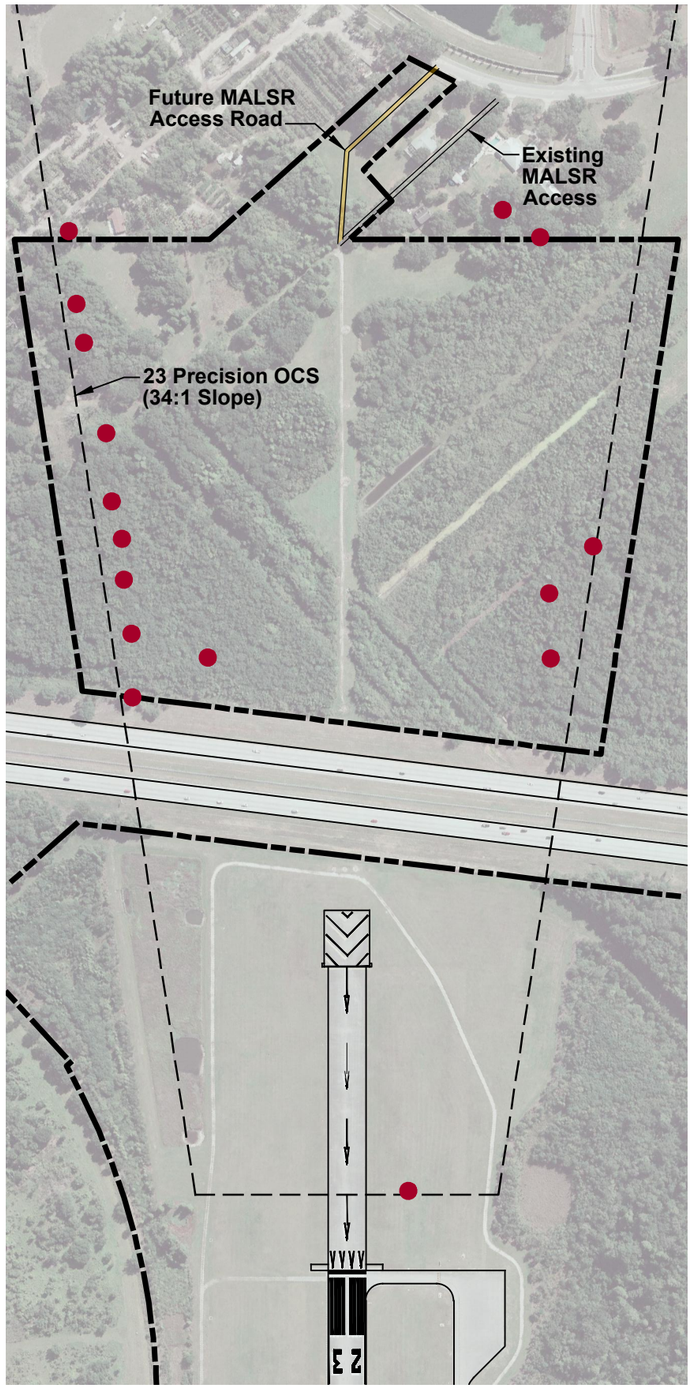
As part of the airfield alternatives analysis, the associated instrument approach procedures were evaluated for each runway end at VDF. The analysis focused on identifying any existing or potential Threshold Siting Surface (TSS) obstructions. Unlike the Federal Aviation Regulations (FAR) Part 77 surfaces that are primarily used to adopt building height and land use restrictions around airports, the TSS is the surface that is evaluated to determine if one or more of the following actions are necessary.

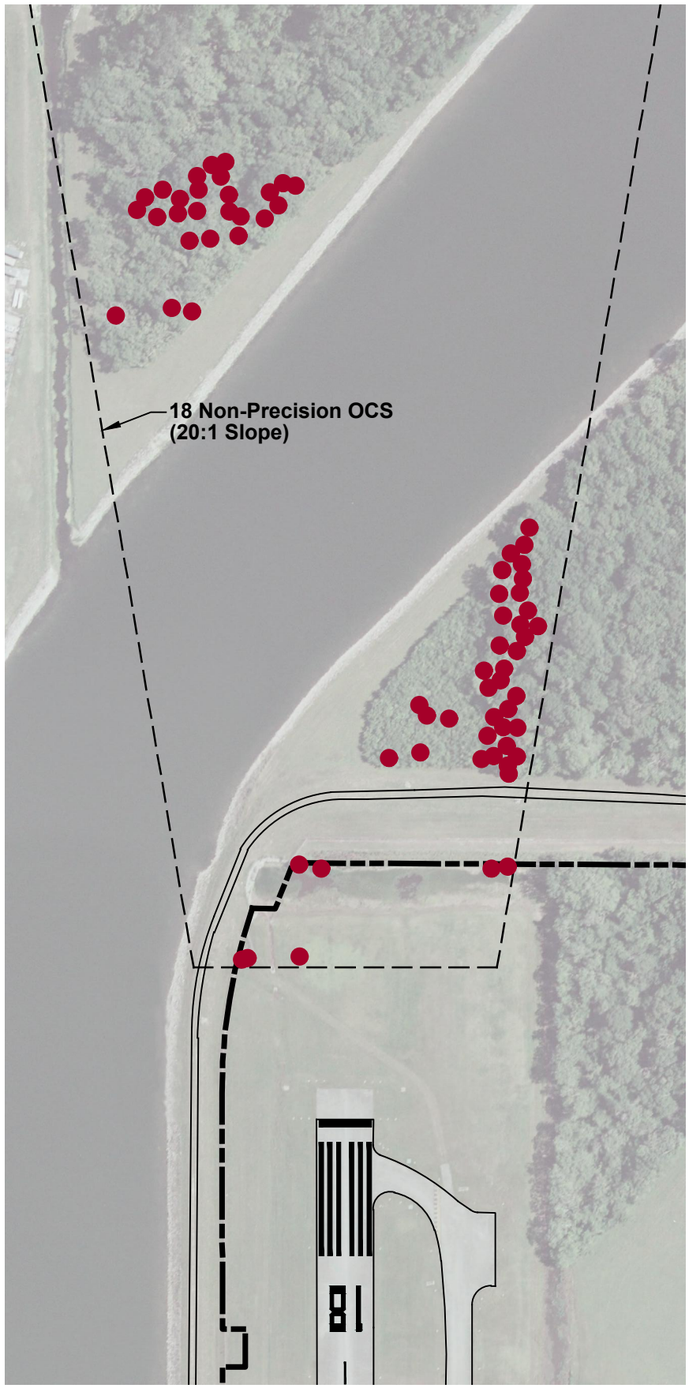
- Obstacle clearing, marking, or lighting is necessary within the TSS.
- Displacement of the runway threshold is necessary because obstacles cannot be cleared from the TSS, which results in a shorter landing distance.
- Modification of the approach glide path and/or threshold crossing height is necessary.
- Prohibition of nighttime operations may be necessary unless an approved Visual Glide Slope Indicator (VGSI) is in use.

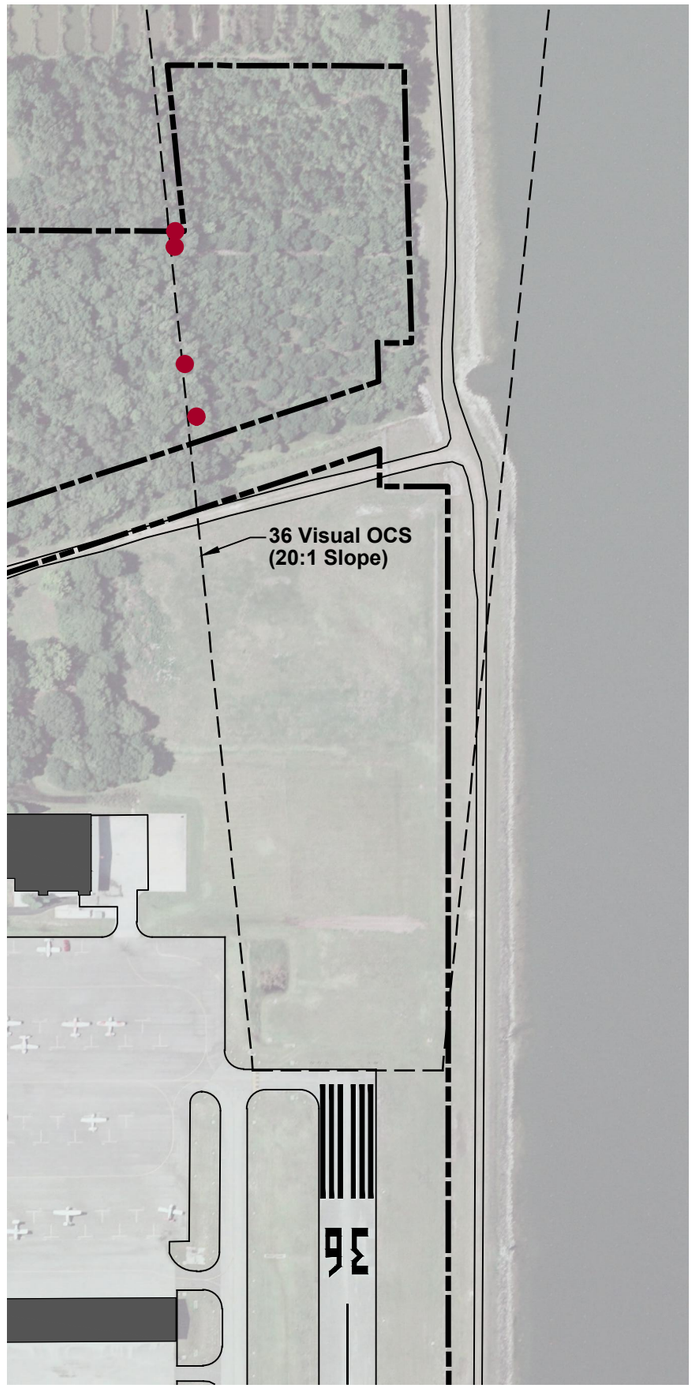
At VDF, the following Obstacle Clearance Surfaces (OCS) were evaluated for the approaches to each runway end (refer to **Figure 5-1**):

- **Runway 5 –** 1) The Glide Path Qualification Surface (GQS) associated with the LPV approach that extends out from the runway threshold at a slope of one foot vertical for every 30 feet horizontal, and 2) an Obstacle Clearance Surface (OCS) for runways that support instrument night operations that starts 200 feet beyond the threshold and extends out at a slope of one foot vertical for every 20 feet horizontal. Penetrations to the Runway 5 approach consisted of the Runway End Identifier Lights (REILs), but it is anticipated that the light units are mounted on frangible couplings which are permissible for navigational aids within the approach.
- **Runway 23 –** The Runway 23 end has a precision Instrument Landing System (ILS) approach and the associated OCS begins 200 feet from the runway threshold and extends out at a slope of one foot vertical for every 34 feet horizontal. Approximately 15 tree clusters were found to penetrate the Runway 23 OCS, the majority of which are located on the airport property. Figure 5-1 also illustrates a potential access road for the Medium Intensity Approach Lighting System (MALSR) beyond the Runway 23 end. In order to perform maintenance on the MALSR, vehicles currently travel through the residential properties along Williams Road. The proposed road would keep vehicles on the airport's existing property and extends from Williams Road to the MALSR.
- **Runway 18 –** The non-precision GPS-based approach to Runway 18 was evaluated with an OCS for runways that support instrument night operations that starts 200 feet beyond the threshold and extends out at a slope of one foot vertical for every 20 feet horizontal. Approximately 67 tree clusters, a fence, and a gate were found to penetrate the Runway 18 OCS. The trees are mostly located along either side of the Tampa Bay Bypass Canal.
- **Runway 36 –** The visual approach to Runway 36 has an OCS that starts at the threshold and extends out at a slope of one foot vertical for every 20 feet horizontal. There are four tree clusters that penetrate the Runway 36 approach, all of which are located on the portion of the airport property to the southwest of the intersection of Vandenberg Airport Road and Wilkins Road.

It would be desirable to remove or lower the tree and fence penetrations within the Runway 23, 18, and 36 approaches and also to provide improved access to the MALSR beyond the Runway 23 end.







Legend

- Obstruction

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Figure 5-1 Obstruction Analysis

5.3 Airfield Alternatives

The airfield alternatives for VDF consist of an evaluation of runway extension options and the potential to upgrade parallel Taxiway E in order to accommodate the occasional passage of larger aircraft. Other navigational aid improvements may be considered during the planning period, which are incorporated into the preferred alternative and Capital Improvement Program (CIP) for VDF.

Parallel Taxiway E Alternative

HCAA has been contacted by occasional users of the airport that have issues operating on the taxiways due to the width and fillet radiuses. The taxiways that support Runway 5-23 are currently designed in accordance with Taxiway Design Group (TDG) II standards and are therefore 35 feet wide with 30 degree centerline fillets (on 90 degree intersections). Most of those aircraft tend to be larger corporate jets that fall into the TDG III category due to their wider and longer wheel configurations. TDG III category aircraft require 50 foot wide taxiways and 60 degree centerline fillets (on 90 degree intersections). As part of this planning effort, HCAA wanted to evaluate the effort required to allow for those aircraft to utilize select taxiways on the airfield. The aircraft of specific concern was the Gulfstream IV corporate jet. For that aircraft, it was found that the current 35 foot width of Taxiway E is sufficient, but that some minor fillet improvements may be needed along taxiways connecting to Taxiway E. A new connector between Taxiway E and the terminal apron would also be constructed to with the same fillet geometry.

One additional project that was evaluated for parallel Taxiway E is an extension to the Runway 23 end. The taxiway currently ends at the 23 threshold and does not extend for the remaining 800 feet of the runway. That requires aircraft to back taxi on the runway when using the displaced threshold section for Runway 23 takeoffs and Runway 5 landings. According to FAA Engineering Brief No. 75: Incorporation of Runway Incursion Prevention into Taxiway and Apron Design (EB-75), back taxiing "can lead to runway incursions either by a pilot inadvertently attempting to takeoff or land on the runway while someone is taxiing or by a lapse in communication between air traffic controllers." The Taxiway E extension illustrated throughout this chapter includes a turn in the taxiway in order to make sure that aircraft are holding outside of the Terminal Instrument Procedures (TERPS) "W" and "X" surfaces and the applicable TSS and departure surface. At the Runway 23 end, the runway centerline to holding position separation would have to be increased in order to provide appropriate clearance to those surfaces.

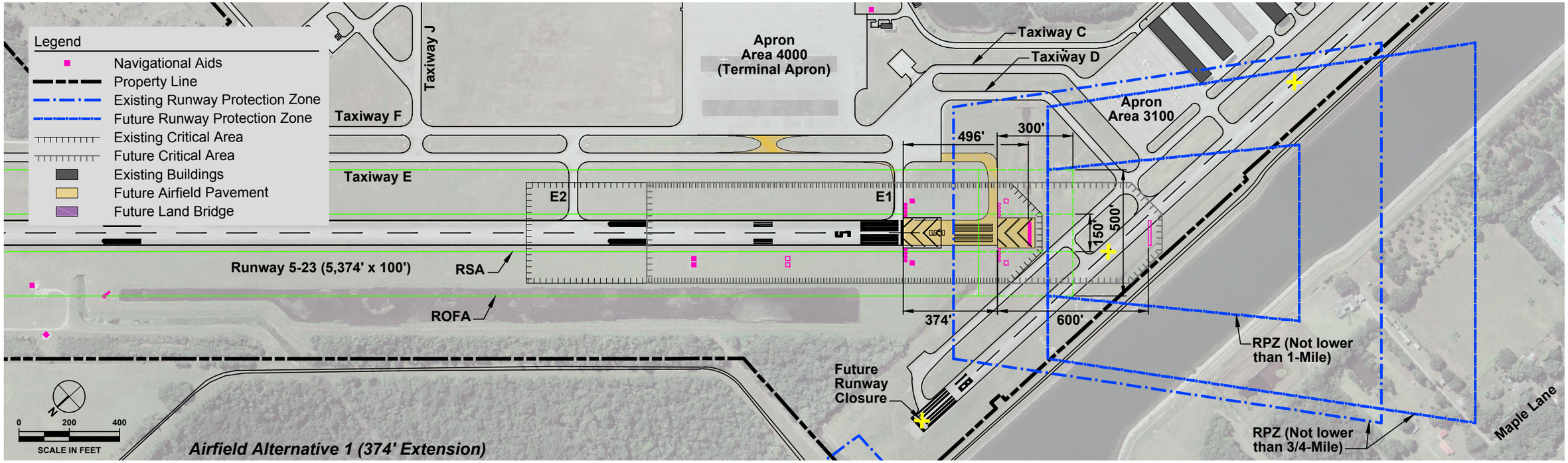
Runway Extension Alternatives

The facility requirements for VDF identified various runway length requirements for corporate jets that ranged between 4,600 feet and 8,300 feet. Due to the current constraints associated with runway expansion at VDF (i.e., the Tampa Bay Bypass Canal and Interstate 75), it was recognized that most extension options for Runway 5-23 would likely have high project costs, large impacts to the canal and/or interstate, and could also impact the operation of Runway 18-36. Two extension options were evaluated for Runway 5-23, both of which extend the Runway 5 end southwest towards the canal.

Airfield Alternative 1 is illustrated in **Figure 5-2** and was focused on maximizing the runway length within the existing property envelope. Under this alternative, the localizer critical area was

pulled back to the point where it just touches the airport property line and then a standard 600 foot separation between the localizer and runway end was used to identify the extended Runway 5 end. A 374 foot extension of Runway 5-23 was possible under the identified parameters, which produced a total length of 5,374 feet, but closure of Runway 18-36 would be necessary because of the relocated localizer location. The increased runway length would provide added flexibility for corporate jet operations, particularly for landings during wet and slippery conditions. The majority of the impacts associated with this alternative would be related to the shift in the RPZ to the south. If the current horizontal visibility minimums of seven-eighths of a mile are maintained for the Runway 5 approach, the associated RPZ would extend further off the airport property boundary and would produce further incompatible land uses in the residential area near Maple Lane. However, the Runway 5 horizontal approach visibility minimums could be increased to one mile under Alternative 1 and the RPZ impacts would be virtually nonexistent and less than they currently are to the south of the airport property. It is anticipated that the FAA would require acquisition of any properties that would be newly impacted from any RPZ shift. It is noted that no approach analysis was conducted for this alternative.

Airfield Alternative 2 is also illustrated in Figure 5-2 and was intended to provide an overall length of 6,500 feet for Runway 5-23 via a 1,500 foot extension to the southwest. In order to implement this alternative, a land bridge would have to be constructed over the Tampa Bay Bypass Canal and the canal would flow through culverts under the land bridge. The minimum land bridge dimensions would encapsulate the Taxiway Safety Area (TSA) and Runway Safety Area (RSA) of the extended Runway 5 end and Taxiway A. Due to the 6,500 foot length, the Runway Design Code (RDC) for Runway 5-23 would likely be upgraded from RDC B-II to RDC C-II because more demanding jets could regularly utilize the runway at that point. The localizer would be relocated at a 1,000 foot separation from the extended runway end (i.e., outside of the RSA) on property on the other side of the canal. Under this alternative, Runway 18-36 could remain operational and the taxiways would be reconfigured to provide a more efficient layout than what is shown. The increased runway length would provide a significantly more flexible operating environment for corporate jet operations at VDF; however, the costs to extend the runway and the impacts associated with the construction of the land bridge, the RPZ shift, and an increase in the width of the RSA and Runway Object Free Area (ROFA) may limit the feasibility of such an undertaking. The associated RPZ would extend further off the airport property and would produce a large amount of incompatible land uses in the industrial and residential areas between the canal and U.S. Route 301. Furthermore, the FAA may require the relocation of U.S. Route 301 outside of the RPZ with this extension. No smaller RPZ option could be considered in conjunction with Airfield Alternative 2 due to the RDC upgrade. It is noted that no approach analysis was conducted for this alternative.



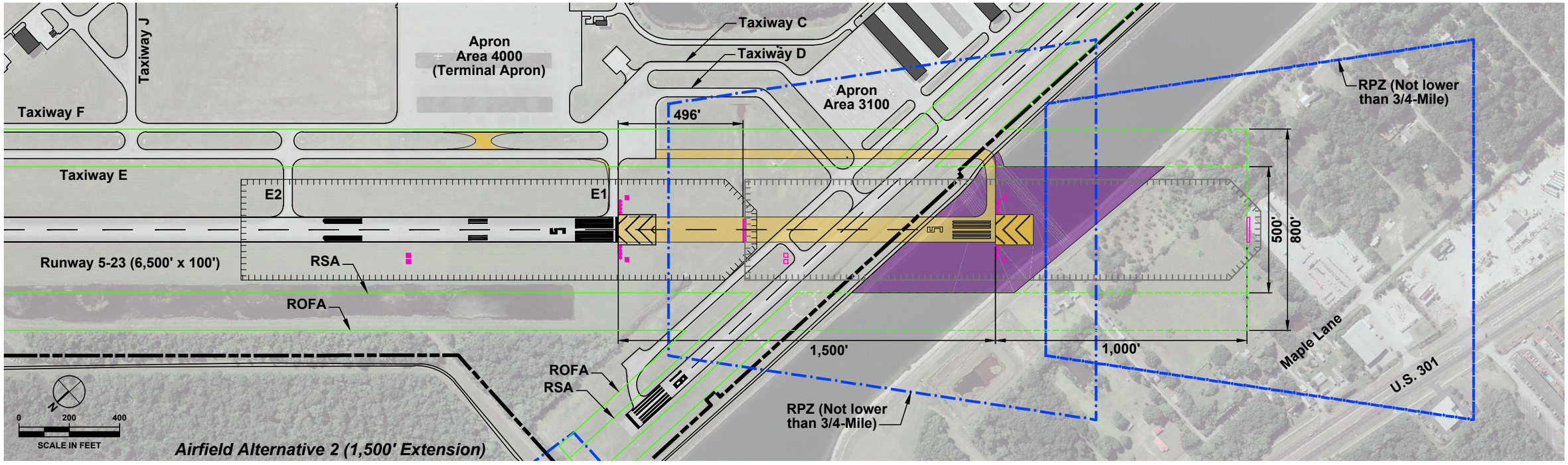


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Figure 5-2 Airfield Alternatives

5.4 Airport Land Use Analysis

Considering the airfield developments shown under Airfield Alternative 2, the remaining vacant sections of the airport property were analyzed in terms of their potential use, aircraft and automobile access, and feasibility of development. The intent was to evaluate the highest and best use for the vacant parcels, as well as to determine if additional property should be acquired to accommodate the airport's growth initiatives. This is particularly important since VDF is strategically located between two of the fastest growing areas of Hillsborough County, New Tampa/Wesley Chapel to the north and Brandon/Riverview to the south. Furthermore, this land use analysis should provide the airport with a plan to maximize development opportunities on the property and to generate additional revenues. The information included in this analysis places priority on reserving as much space as possible for aviation development and expansion. The results of the Tampa Executive Airport Strategic Business Plan, dated January 2016, should be viewed in conjunction with this analysis in order to determine practicable methods of encouraging both aviation and non-aviation development on the airport property. The parcels are illustrated in **Figure 5-3** and evaluated in **Table 5-1**.

Table 5-1
Airport Land Use Analysis

Landside Zone	Approximate Acreage	Potential Use	Access	Feasibility of Development
1	29.6 Acres	Open Space	Vehicle access could be provided from Tampa Executive Airport Road. Airfield access could be provided from Taxiway E.	Ponds and wetlands located in this area of the airport property are maintained in perpetuity as required by the SWFMD as mitigation for previous impacts to wetlands.
2	1.5 Acres	Aviation Development	Vehicle access could be provided from Tampa Executive Airport Road. Airfield access could be provided from Taxiway H.	It is anticipated that this area would be a logical site for developing box/corporate hangars to accommodate larger general aviation aircraft.
3	3.2 Acres	Open Space	Vehicle access could be provided from Tampa Executive Airport Road.	This site contains sensitive environmental features and should be left as open space.
4	3.3 Acres	Aviation Development	Vehicle access could be provided from Tampa Executive Airport Road. Airfield access could be provided from Taxiway J.	It is anticipated that this area would be a logical site for developing box/corporate hangars to accommodate larger general aviation aircraft.
5	3.3 Acres	Aviation Development	Vehicle access could be provided from Tampa Executive Airport Road. Airfield access could be	It is anticipated that this area would be suitable for developing T-hangars.

Table 5-1
Airport Land Use Analysis

Landside Zone	Approximate Acreage	Potential Use	Access	Feasibility of Development
			provided from Taxiway J.	
6	13.4 Acres	Aviation Development	Vehicle access could be provided from Eureka Springs Road or Tampa Executive Airport Road. Airfield access could be provided from Taxiways F and J.	It is anticipated that this area would be a logical site for expanding corporate and maintenance hangar facilities.
7	16.1 Acres	Open Space	The site is accessible from Eureka Springs Road.	Ponds and wetlands located in this area are maintained in perpetuity as required by the SWFMD as mitigation for previous impacts to wetlands.
8	2.2 Acres	Aviation Development	Vehicle access would be provided from Vandenberg Airport Road. Airside access would be provided via Taxiway B.	It is anticipated that this area would be a logical site for developing maintenance hangars with street access. The area is also suitable for developing box and T-hangars with larger door openings.
9	1.8 Acres	Non-Aviation Development	Vehicle access could be provided from Wilkins Road.	This area is more suited to non-aviation related development or could be used in support of access alternatives being considered.
10	2.6 Acres	Open Space	Vehicle access to this area could be provided from Wilkins Road or Vandenberg Airport Road.	This site could be used in support of access alternatives being considered.

Source: Michael Baker International, Inc., 2015.

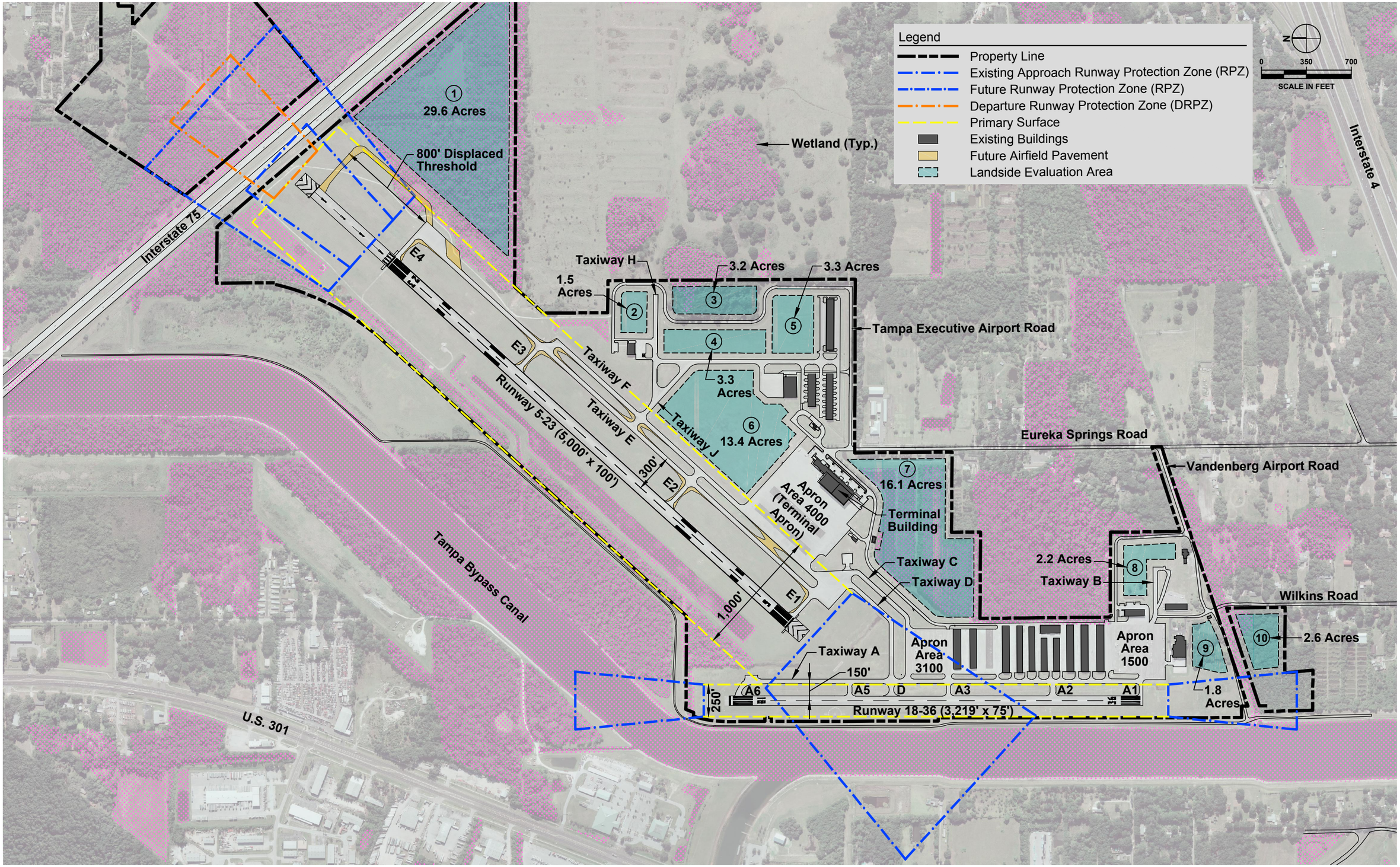

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Figure 5-3 Landside Evaluation Areas

5.5 Landside Alternatives

The purpose of conducting the landside alternatives analysis is to show options for meeting the hangar, apron, and support facility requirements and also to illustrate the overall development potential of the airport from a conceptual standpoint. Many of the hangar dimensions that are discussed in this section are based on typical pre-fabricated facilities and/or typical sizes of corporate hangars. **Figures 5-4 and 5-5** illustrate potential landside development alternatives for the vacant sites within the terminal area along Runway 5-23. As shown in Terminal Area Development Alternative 1, the proposed landside development would include a combination of T-hangars, corporate/box hangars, and bulk hangar facilities. Under this alternative, three additional T-hangar buildings are shown which would provide 30 additional units to accommodate aircraft with larger wingspans. Thirteen corporate hangars are shown in a variety of sizes ranging from 6,400 square feet to 12,000 square feet. The six box hangars shown are 62 feet wide by 65 feet deep. Each of the corporate and box hangars shown are provided with adjacent apron areas and are capable of storing a range of jet aircraft sizes. This alternative also includes the construction of a 25,000 square foot maintenance hangar northeast of the terminal. The proposed apron expansion of 45,000 square yards would provide additional parking capacity for itinerant aircraft and improve the ability to accommodate larger aircraft, including aircraft that are classified under TDG 3 design standards (e.g. Gulfstream IV). A small square foot expansion of the terminal building is also included to support future needs.

Terminal Area Development Alternative 2 illustrates development options previously considered by HCAA. Under this alternative, three T-hangar buildings are shown which would provide an additional 39 units. Ten of the 12 box hangars shown are 60 feet wide by 75 feet deep. Two box hangars are 60 feet wide by 68 feet deep. Seven corporate hangars are shown in a variety of sizes ranging from 12,500 square feet to 15,500 square feet. Each of the box and corporate hangars shown are provided with adjacent apron areas and are capable of storing a range of jet aircraft sizes. The proposed apron expansion of 55,213 square yards would provide additional parking capacity for itinerant aircraft and improve the ability to accommodate larger TDG 3 aircraft. This alternative also includes a small expansion of the terminal building to support future needs. Taxiway access improvements associated with Terminal Area Development Alternatives 1 and 2 includes new connections to Taxiway E that do not provide direct access to the runway.

Figure 5-6 illustrates a series of improvements designed to replace some of the aging hangars in the southeast portion of the airport property. This alternative provides solutions for replacing aging shade, partially enclosed, and enclosed hangars with a combination of T-hangars and box hangars. With the exception of the two shade hangars and the newly proposed T-hangar, the other four hangars are identified as to be replaced in HCAA's Capital Improvement Program (CIP). The proposed hangars were designed to maximize the taxilane spacing between the hangars and to utilize existing taxilane connections to parallel Taxiway A.

The proposed landside development near Vandenberg Road includes eight box hangars that are 48 feet wide by 41 feet deep. The proposed facilities can be used to support a variety of aviation-related business activities and could be made accessible to the public. This alternative also proposes the construction of four T-hangar buildings to provide an additional 32 units capable of accommodating aircraft with larger wingspans. Existing buildings located in this area would be removed as shown. Taxiway access improvements associated with this area include relocating the

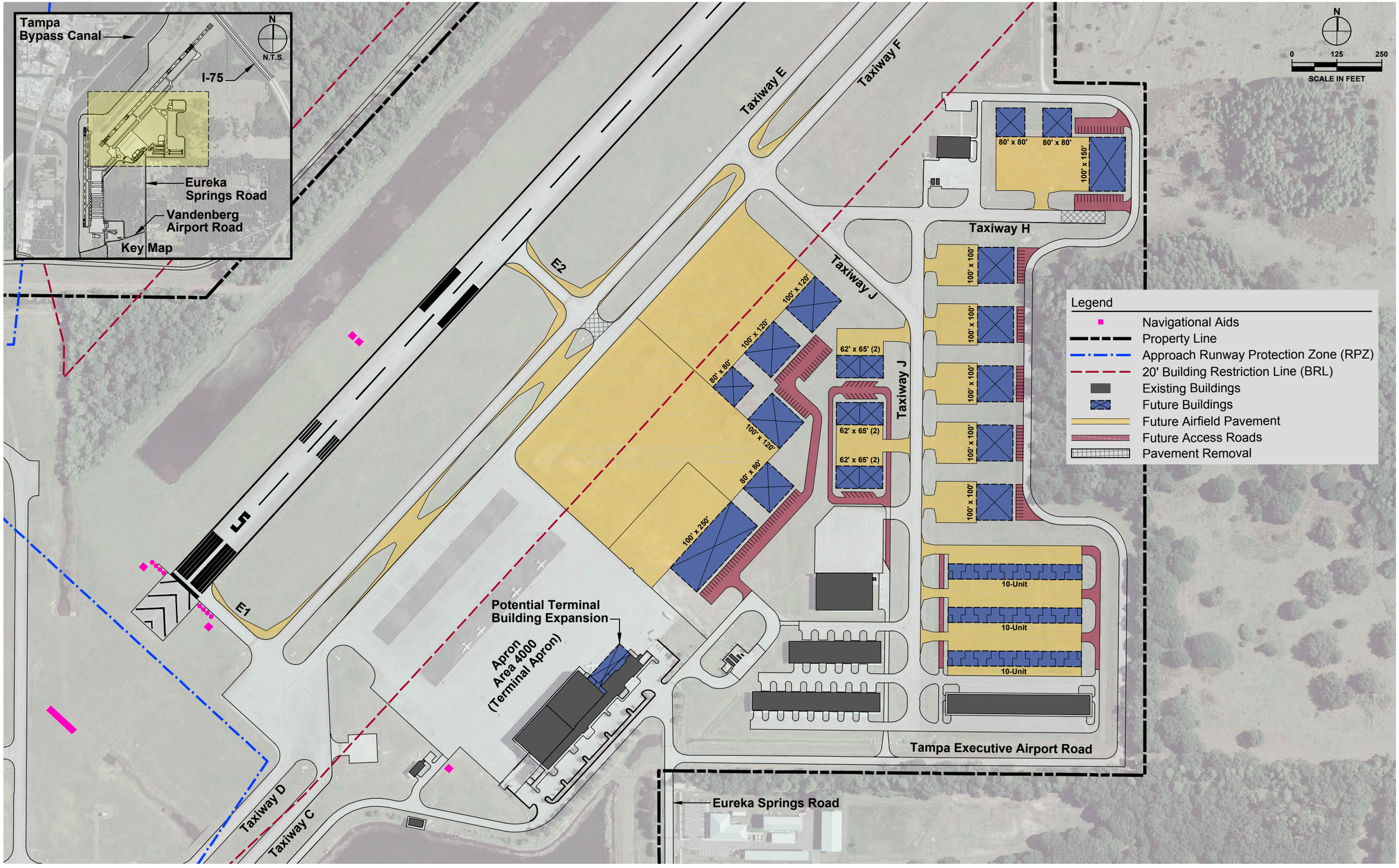

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Figure 5-4 Terminal Area Development Alternative 1

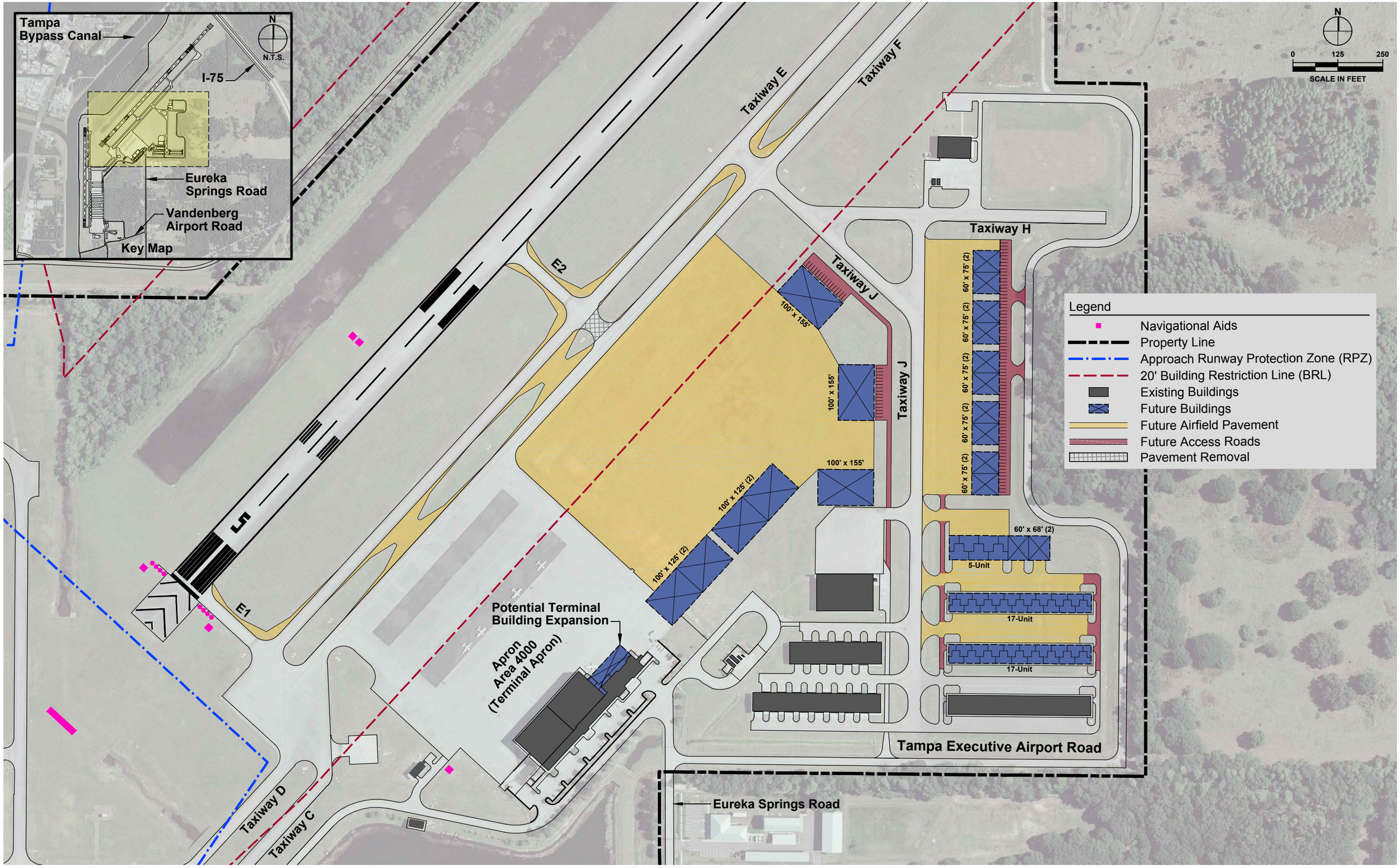

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Figure 5-5 Terminal Area Development Alternative 2

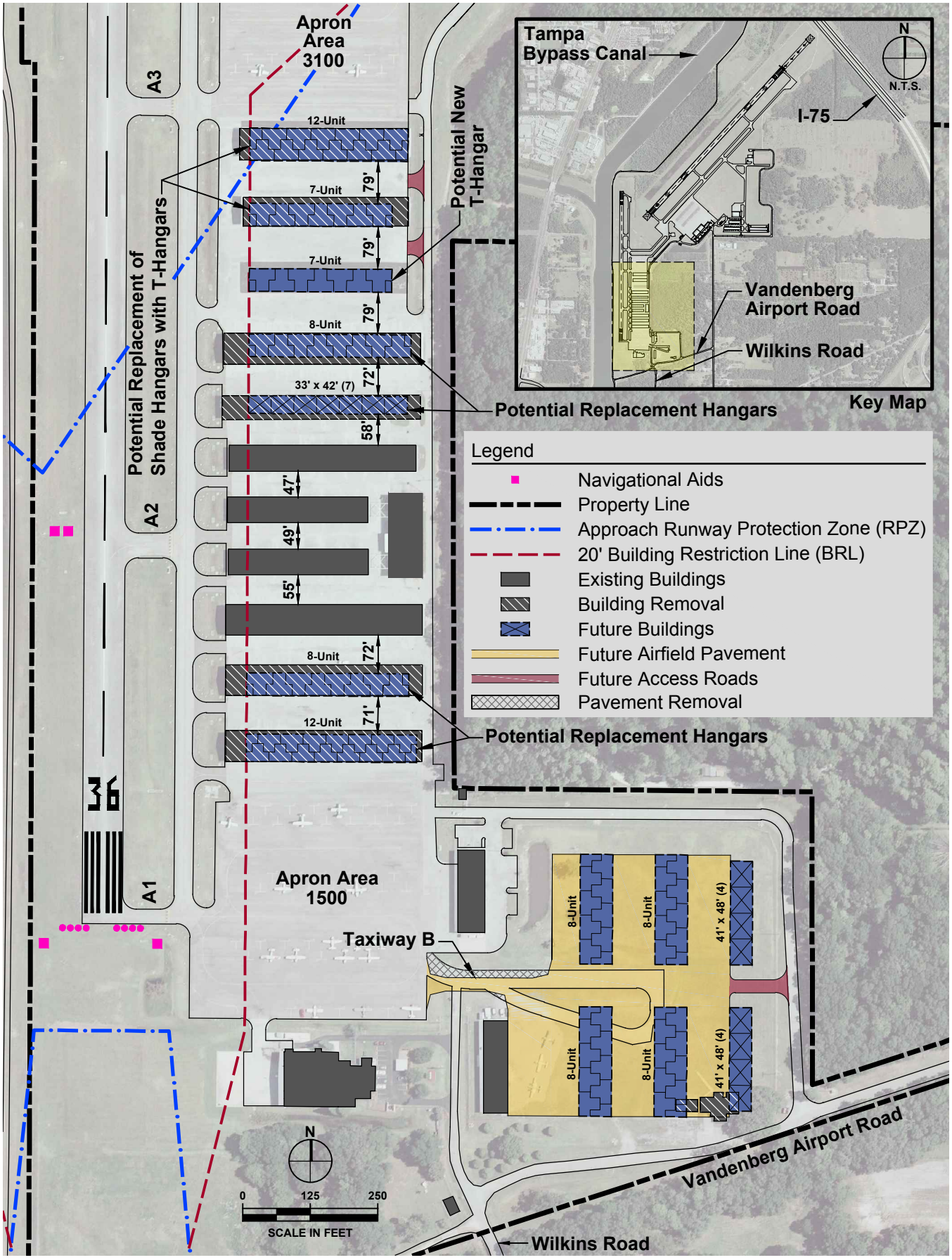

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Figure 5-6 Southeast Development Alternative

Taxiway B connection from existing Apron Area 1500. **Figure 5-7** illustrates an alternate layout for the same site and could be utilized for aviation-related businesses, a potential flight school operation, or non-aviation use if a demand exists. The illustrated development shows publically-accessible hangars or buildings that have secure airsides (i.e., no card reader gate is required in order to access the buildings, but the airside is secured by fencing around the buildings).

5.6 Airport Support Facilities

The provision of support facilities was considered as part of the landside alternatives analysis. The main support facility improvements include the expansion of the terminal building at and the provision of aviation business related activities in the southeast portion of the airport. Automobile access to the airport is discussed in the following section of this chapter.

5.7 Access Alternatives

Current ground access to the airport is via Maple Lane from the west and East Sligh Avenue from the east. Direct access to the airport is via Maple Lane to Wilkins Road, Eureka Springs Road and Vandenberg Airport Road. Each of these County-owned roads are located in a rural area, all of which were constructed along 50-foot wide right-of-ways having two-lane urban roadway section design with adjacent swale drainage systems collectively bordered by residential land uses. The route to and from the airport requires the use of multiple symbolized airport directional signs that serve to guide drivers along circuitous and varied routes to the airport (refer to **Figure 5-8**).

These roads were originally designed to accommodate the 30 mile per hour surface traffic volumes supporting a small general aviation airport and residential land uses. These roadways do not currently meet the County's two-lane undivided urban roadway design criteria published in the Hillsborough County Transportation Technical Manual issued by the County's Public Works Department Engineering Division. It is the expressed desire of HCAA to provide improved surface access routing and roadway design elements for each of these roadways to provide increased levels of service and to better accommodate existing and anticipated future ground access movement demand of a NPIAS-listed "Reliever" airport.

Need to Reduce Airport Ground Traffic in Residential Neighborhoods

HCAA is keenly aware that the past, ongoing, and planned future development of the airport has and will serve to increase traffic volumes along each of the three roadways. It is the expressed desire of HCAA to identify and assess all possible roadway improvement alternatives that would serve to ameliorate concerns expressed by local residential land owners regarding airport-generated roadway traffic.

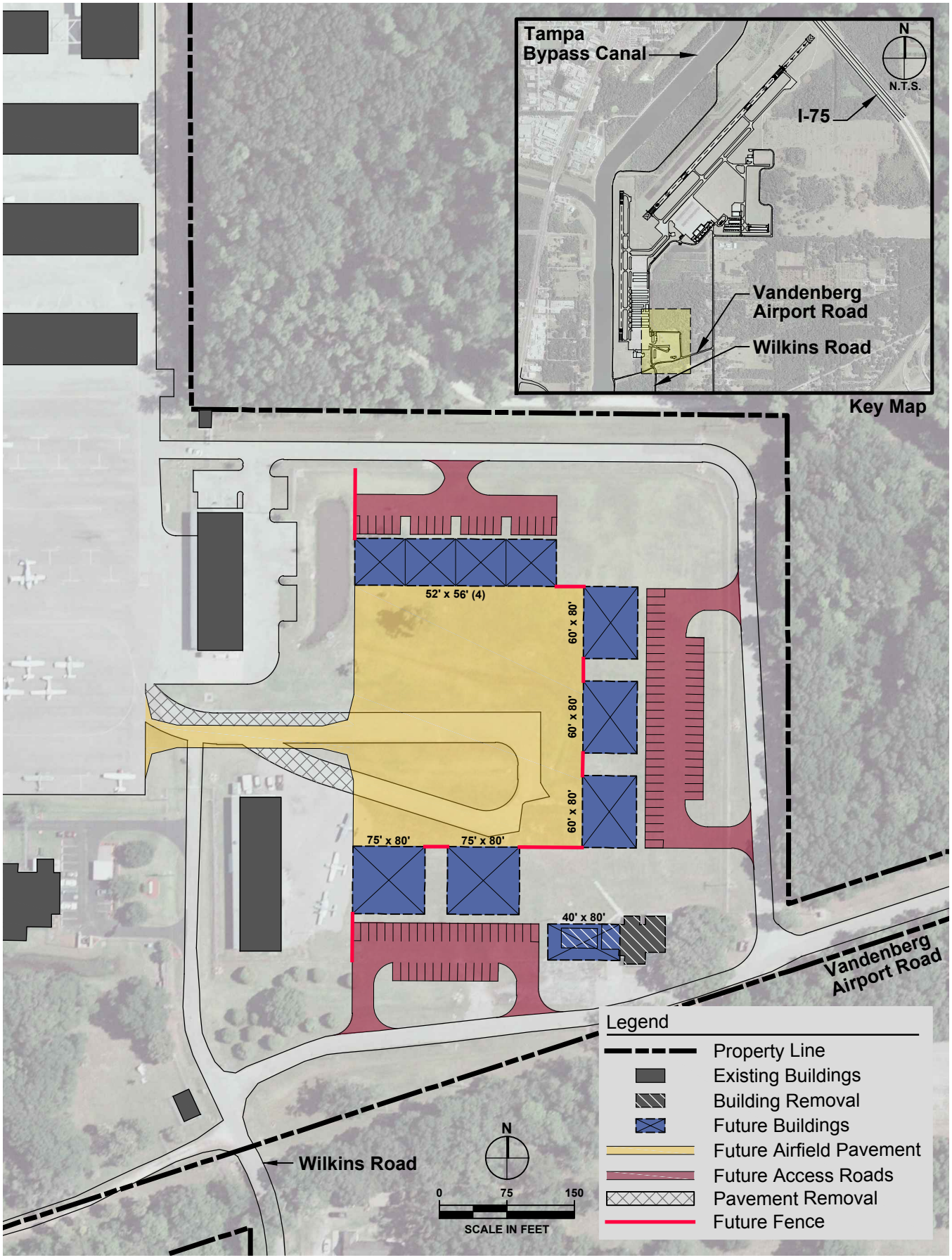


Figure 5-7 Publically-Accessible Development

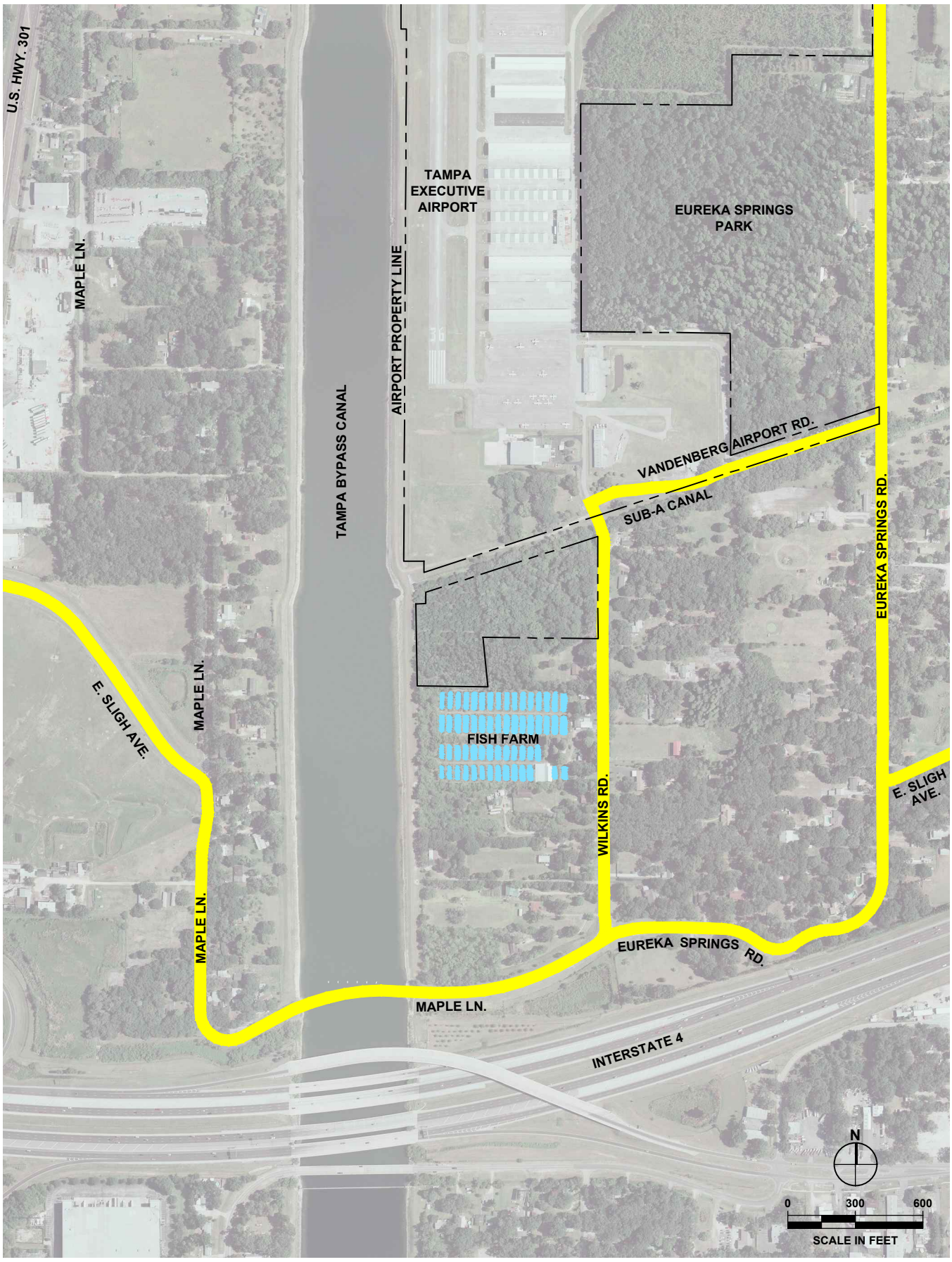


Figure 5-8 Existing Surface Access

Roadway Improvement Constraints and Opportunities

The improvement of the existing roadway section design and/or the construction of new roadways to the airport, will require considerable planning and support from both the county and local land owners. Other issues related to land ownership and the avoidance, minimization or mitigation of associated adverse impacts to local environs will all play an important part in the anticipated future improvement of existing and development of new ground access to and from the airport.

Constraints

Regional Drainage Canal – A major regional drainage canal (Sub Main "A") traverses the area in a northeast-to-southwest direction and borders the south side of the airport. Wilkins Road and Eureka Springs Road both cross the canal. Any improvements to these roads or the development of new road to the airport must consider the improvement to the crossing of this canal via via a new bridge crossing (refer to **Figure 5-10**).

Public Use Recreational Park – The Eureka Springs Regional Park is located immediately east of and adjacent to the airport, is 31 acres in size and serves as public-use outdoor (recreational) park. Access to the park is via a single entrance at Eureka Springs Road. The park is owned and operated by the Hillsborough County Parks Department and contains a botanical garden of rare and unusual plants and features a greenhouse, interpretive trails, boardwalks, and a picnic area. This park is protected under the Department of Transportation Act of 1966.

Wetlands – There are jurisdictionally-delineated wetlands on and adjacent to the airport that must be protected. One such wetland area is located adjacent to the north side of Eureka Springs Regional Park and serves as a natural wetland receiver of surface water and is an integral part of the airport's surface water drainage treatment system. The entirety of the Eureka Springs Regional Park is designated as a wetland with one or more portions being spring-fed. Other wetland areas are located along and south of Sub-A Canal and Vandenberg Airport Road and west of Eureka Springs Road. Agency coordination and federal 404 Permits would be required to impact, alter or remove any of these wetland areas.

Tampa Bypass Canal

The airport is bordered along its entire east side by the Tampa Bypass Canal and Palm River that is part of a 14-mile-long man-made flood bypass system operated by the Southwest Florida Water Management District (SWFWMD). The Canal was constructed during the 1960s and 1970s and serves as floodwater control for the Lower Hillsborough Flood Detention Area which is land owned by the SWFWMD.

Currently, the SWFWMD has an agreement with the Hillsborough County Parks Department and the Tampa Bypass Canal Rowing Council for use of a designated north/south portion the canal as a public sporting venue for competitive rowing events. The length of the rowing venue is reported to be 6,562 feet (2,000 meters) beginning at the Maple Lane Bridge extending due north to the point where direction of the canal changes to a northeast/southwest alignment. The distance between the designated Starting Line (at Maple Lane Bridge) and the Finish Line (directly west of Harney Park) is approximately 5,280 feet (1 statute mile). The rowing venue is also considered to

include Harney Park and Harney Canal Boat Ramp that are both east of the delineated rowing lanes for ingress and egress points for the racing "shells."

The proposed future design of any bridge crossing the Tampa Bypass canal north of the Maple Lane Bridge and Harney Park must consider the high potential for associated adverse impacts the completive rowing venue. It is anticipated that any future bridge design must include "clear-span" design and edge-to-edge vertical clearance over the canal to provide continued and similar use of the canal as a viable venue for competitive rowing activities.

Potentially Contaminated Soils

In the past, the local surrounding land areas east of the Tampa Bypass Canal have been used for the development and long-term operation of commercial fish farms. The land uses located east of the Tampa Bypass Canal, west of Wilkins Road and north of Maple Lane contain one prominent abandoned and derelict fish farm. While this Airport Master Plan has not investigated the issue, there may be a potential for contaminated soils within the confines of this or similar (existing or derelict) fish farm facilities.

Opportunities to Improve Airport Ground Access

Improve Existing Urban Road Design

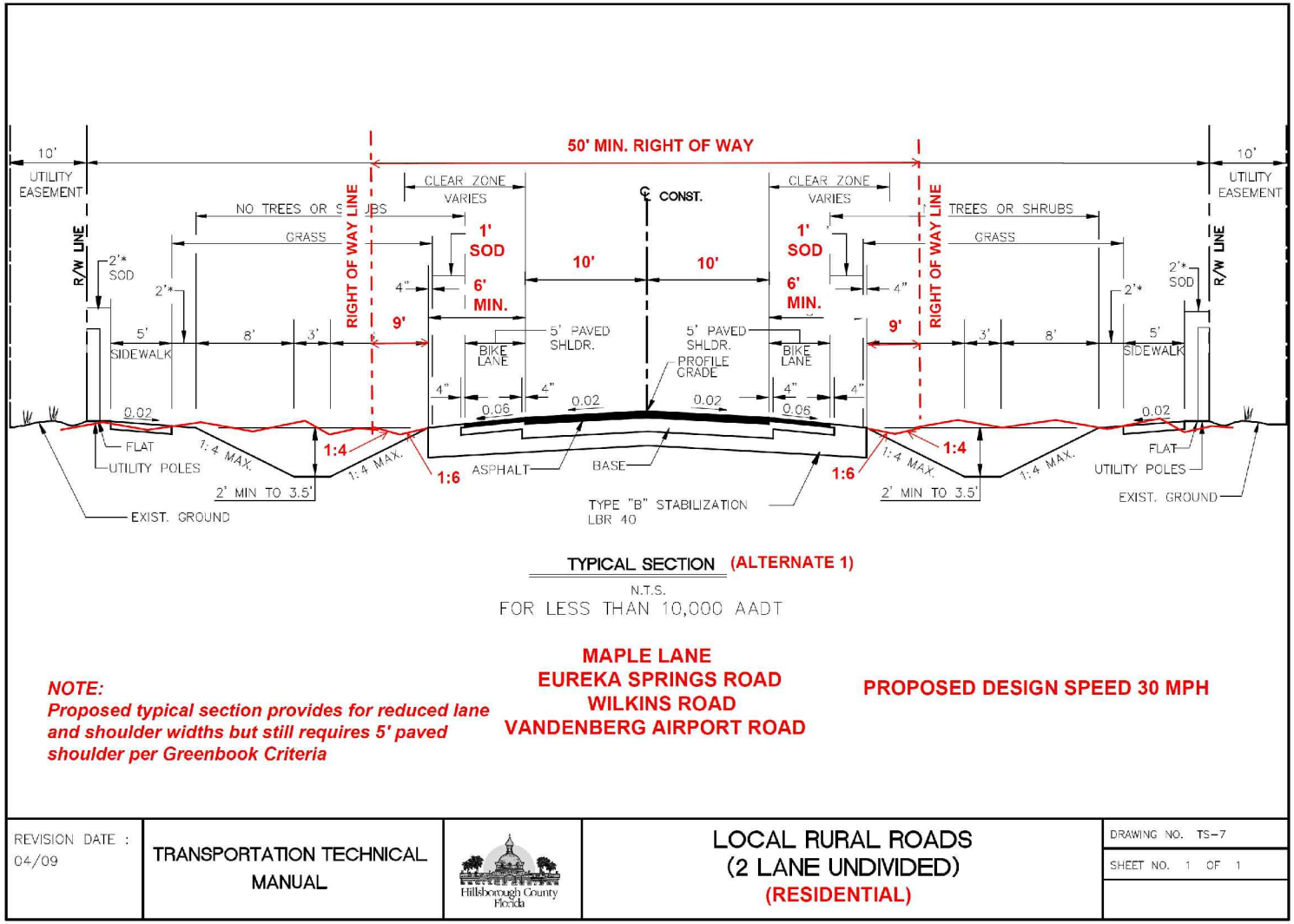
Any improvements to the existing local roadways that provide ground access to the airport must be: 1) accomplished within the width and limits of the existing 50-foot-wide right-of-ways, or 2) include the widening of the existing right-of ways to accommodate wider travel lane widths and associated drainage features. The widening of right-of-ways would most likely require partial or complete public taking of adjacent private residential or public use lands.

Improvements to the local roadways would most likely include the associated realignment and/or wholesale reconstruction of the existing travel lanes and the development of improved open ditch/swale drainage systems, or the development of "Miami" Curb and gutter drainage system and pedestrian sidewalks on one or both sides of the roadway. While the use of curb and gutter storm system inherently serves to reduce or mitigate the need for expanded right-of-ways, the use of pipes rather than earthen-bottomed swales and ditches require the development of associated regional water retention ponds for the treatment of the surface water prior to discharge to the local waters and/or wetlands.

Referencing the Hillsborough County Transportation's Technical Manual for Subdivisions and Site Development Projects, "Typical [roadway] Sections" prescribed in that guidance document were reviewed and assessed to identify potential alternative roadways section designs that may be considered viable and prudent alternative roadway designs to improve the ground access to the airport. Because this "Urban Road" design would be located within a rural area of the County, the prescribed two-lane urban roadway sections may conceivably include overall right-of way widths ranging from 50 to 100 feet (see **Figure 5-9**).

Extension of East Sligh Avenue (Figure 5-10)

The need and desire to improved ground access to the airport and adjacent land areas east of the airport have included the westward extension of East Sligh Avenue over the Tampa Bypass Canal.



TYPICAL SECTION (ALTERNATE 1)

N.T.S.

FOR LESS THAN 10,000 AADT

NOTE:
Proposed typical section provides for reduced lane and shoulder widths but still requires 5' paved shoulder per Greenbook Criteria

MAPLE LANE
EUREKA SPRINGS ROAD
WILKINS ROAD
VANDENBERG AIRPORT ROAD

PROPOSED DESIGN SPEED 30 MPH

REVISION DATE : 04/09	TRANSPORTATION TECHNICAL MANUAL	Hillsborough County Florida	LOCAL RURAL ROADS (2 LANE UNDIVIDED) (RESIDENTIAL)	DRAWING NO. TS-7 SHEET NO. 1 OF 1

N

0 0 0

SCALE IN FEET

SOURCE: HILLSBOROUGH COUNTY TRANSPORTATION TECHNICAL MANUAL

Figure 5-9 Local Rural Roads - 2 Lane Undivided (Residential)

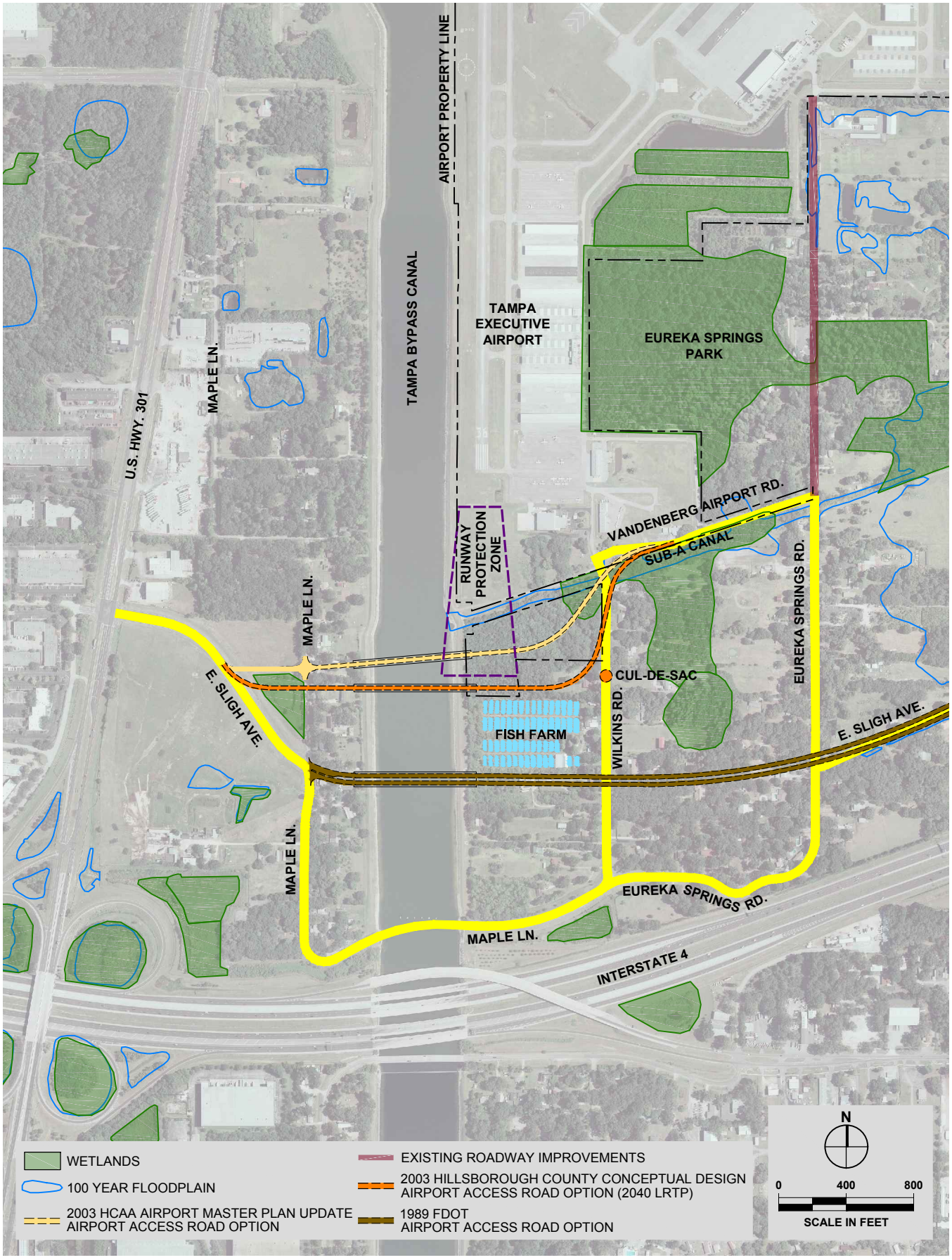


Figure 5-10 Various E. Sligh Ave. Extensions Previously Considered

Beginning as far back as the late 1980s, several planning initiatives and preliminary design activities have been undertaken by a variety of interested parties and/or agencies. Roadway alignments associated with these projects are shown in **Figure 5-10**.

Greiner Engineering, Inc. – In 1989, Greiner Engineering as part of the FDOT Tampa Interstate Study, Master Plan Concept developed Design Segment 4B that included the westward extension of East Sligh Avenue to connect to the western-most end of East Sligh Avenue the currently ends at Eureka Springs Road. The proposed roadway and bridge has an east/west alignment that traversed land south of the abandoned fish farm. The extended East Sligh Avenue alignment then curved to the northeast to connect to East Sligh Avenue at Eureka Springs Road. This proposed roadways and bridge planning scheme was intentionally limited to the improvement of regional ground access and to serve as an alternative roadway to alleviate traffic volumes on the nearby Interstate highways. Any associated ancillary improvements to the ground access to or from the airport [then Vandenberg Airport] were considered as secondary benefits.

Airport Master Plan Update – As part of the 2003 VDF Airport Master Plan Update conducted by HCAA in 2003, HNTB proposed a similar East Sligh Avenue extension concept that also bridged the Canal at a more northerly location having a slightly angled alignment to cross the canal while remaining within the southern-most property boundary of the airport.

This proposed alignment however, places the proposed roadway within the limits of the Runway Protection Zone that extends outward along the extended Runway 18-36 centerline. Based upon current "interim" airport design and land use guidance contained in FAA's Interim Guidance on Land Uses Within a Runway Protection Zone dated September 27, 2012. In an effort to protect people and property on the ground, the development of new or modified land uses within the defined limits of the RPZ including, but not limited to public roads/highways are highly discouraged. Although not prohibited, extensive coordination with the FAA and the development of "Alternatives and Avoidance Studies" would potentially be required to traverse through the RPZ.

Follow-on Study – Under Contract to Hillsborough County Transportation, a follow-on Sligh Avenue Extension and 30% Design Study was conducted by Owen Ayres & Associates in 2003 that also included a bridging of the Canal that also addressed the need to improve ground access to and from the airport. The proposed westward extension of East Sligh Avenue Bridge crossed the canal at the northern-most limits of the abandoned fish farm, but beyond the southern-most limits of the Runway 18-36 RPZ.

Chapter 6.0
Refined Alternatives

Tampa International Airport

Hillsborough County Aviation Authority

6.0 Refined Alternatives

6.1 Background

The previous chapter presented the preliminary alternatives for VDF including options for extending Runway 5-23, conforming to current FAA airfield design guidelines and the continued expansion of the airport's landside facilities (e.g., the development of hangars, a new terminal and support facilities). The intent of the preliminary alternatives was to evaluate various scenarios for satisfying the identified facility requirements. A preferred alternative was ultimately selected that represented the recommended development concept for the 20-year planning period of this Master Plan Update. This chapter describes each component of the preferred alternative and also presents an environmental action plan that describes the potential environmental impacts and level of documentation that would be necessary to undertake the proposed developments. The cost estimates for the preferred alternative are presented in the next chapter in conjunction with a Capital Improvement Plan (CIP) that shows anticipated project phasing and funding sources over the course of the 20-year planning period.

6.2 Preferred Alternative

As shown in **Figure 6-1**, the preferred alternative includes a combination of the airfield improvements designed to support the landside development alternatives that were presented in the previous chapter. Due to current constraints associated with the proposed runway expansion, high project costs, large impacts to the canal and/or interstate, possible impact to Runway 18-36 operations and insufficient demand to currently justify the project, the proposed extension was not included in the preferred development alternative. However, the runway extension analysis will serve as a valuable reference in the future in the event that the project can be justified. The primary airfield recommendations include fillet improvements associated with the taxiways that serve Runway 5-23, the extension of Taxiway E to provide access to the end of Runway 23, and run-up area improvements. These improvements are designed to meet current FAA design guidelines and provide a safer operating environment for some of the larger jets currently operating at VDF. A detailed listing of all airfield projects that are anticipated during the planning period is presented with the CIP.

The proposed landside improvements were tailored to meet future needs and support the highest and best use of airport property available for development. For this study, it was determined that nearly all available airport property would be needed to support the demand for aeronautical development over the 20-year planning period. The development of the terminal area is focused on providing facilities that maximize aircraft storage capacity and revenue generating potential by developing a series of T-hangars, corporate/box hangars, and bulk hangar facilities. The proposed development includes the provision of 3 additional T-hangar buildings with a total of 30 bays capable of accommodating aircraft with larger wing spans. A combination of 13 corporate hangars, 6 box hangars and a large maintenance hangar are included to support larger aircraft and business activities. On the south end, four of these box hangars could be utilized as a dedicated helicopter storage and parking area. Aircraft aprons, taxilanes and automobile access/parking improvements in support of the proposed landside development are incorporated into the preferred development concept.

Within the southeast development area, the preferred development concept focuses on a series of improvements designed to replace aging hangar facilities, promote larger hangars in support of business activities, and promote aeronautical development that is more publically accessible via Vandenberg Airport Road. The preferred alternative includes the development of publically-accessible hangars and support facilities that could be used for aviation-related businesses, a potential flight school operation, or non-aviation use if demand exists. An aircraft apron, taxilane and automobile access/parking improvements are included in support of this concept. The remainder of the preferred development alternative focuses on providing additional t-hangars to replace aging shade hangars during the 20-year planning period. In the future, existing T-hangar buildings could be replaced on site as existing facilities reach the end of their useful service life.

Another important facet of the plan included evaluating opportunities to improve ground access to and from the airport via existing and previously planned future County-initiated roadway improvement projects. As mentioned previously as part of the discussion of ground access alternatives, it was determined that the planned extension of East Sligh Avenue (eastward from U.S. 301) westward over the Tampa Bypass Canal would serve as the best way to improve ground access to and from the airport while reducing airport-generated vehicular traffic within and through the surrounding residential neighborhoods. One of the inherent benefits is that this planned East Sligh Avenue extension roadway improvement project would serve to reduce the majority of airport-generated traffic on Maple Lane and Wilkins Road, as well as similar traffic on Eureka Springs Road south of Vandenberg Airport Road.

Although the East Sligh Avenue extension project is incorporated in the Hillsborough County MPO's Long Range Transportation Plan, it is currently unfunded. Therefore, it is recommended that HCAA continue to encourage the MPO to reinitiate, prioritize and maintain community planning support for the funding needed to bring this important County roadway improvement project to fruition. In the meantime, HCAA should work with the County to ensure that Eureka Springs Road is regularly maintained as it continues to serve as the airport's primarily access route. The alignment of the proposed East Sligh Avenue project and improvements to Eureka Springs Road are reflected in the preferred alternative.

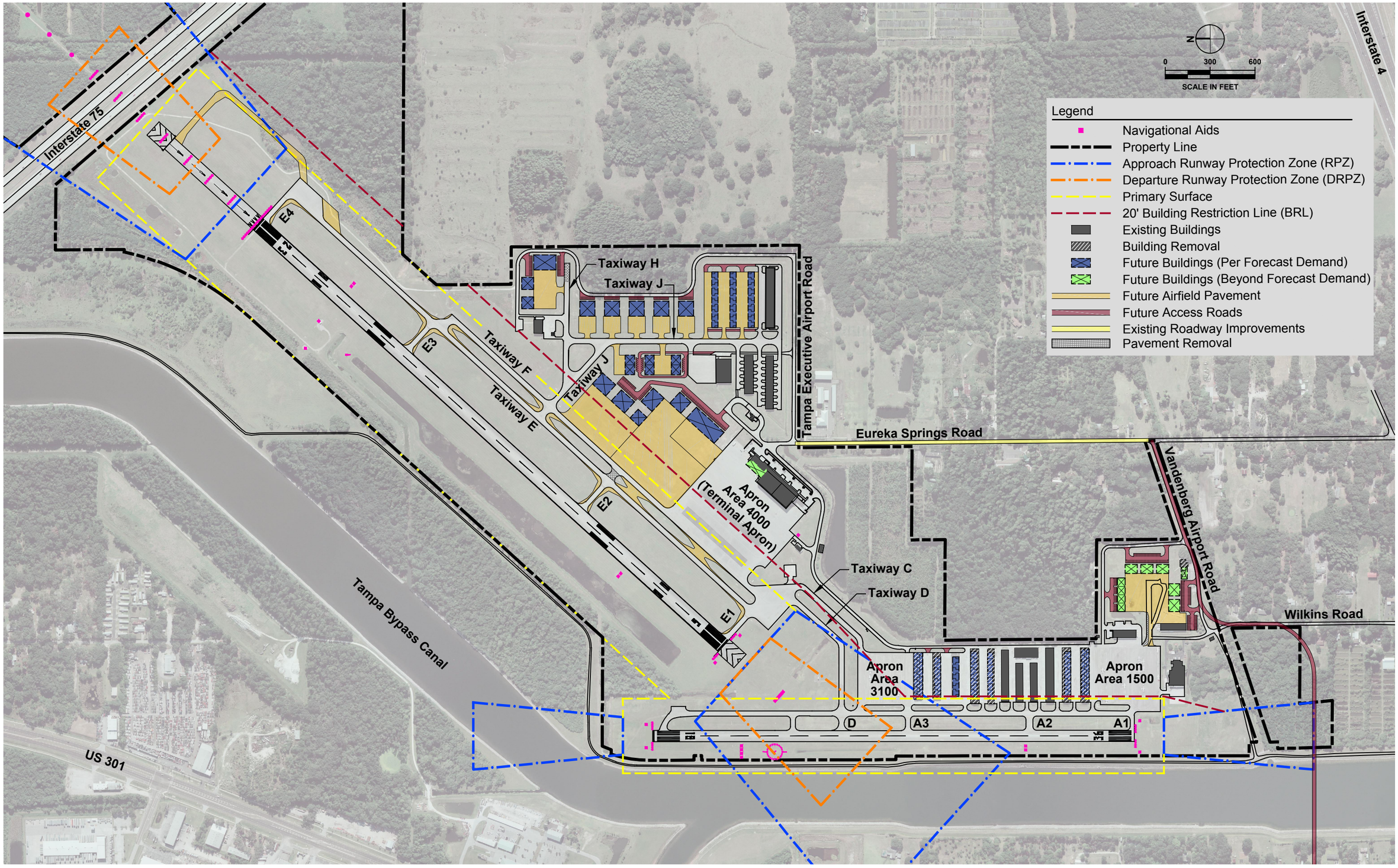


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Figure 6-1 Preferred Alternative

Recommended Capital Improvements

Table 6-1 summarizes the recommended capital improvements associated with the master plan projects only. The projects are presented in no particular order and can be seen in the key map in **Figure 6-2**. The following chapter of this study includes a detailed phasing and funding plan for the master plan recommendations, in addition to cost estimates and additional projects associated with the annual maintenance of facilities at VDF.

Table 6-1
Recommended Capital Projects

ID	Description	Project Details
A	Maintenance Hangar	Maintenance hangar and apron
B	Apron and Taxiway	To allow for aircraft parking and hangar development
C	Corporate Hangar	Corporate Hangar and road/parking
D	Corporate Hangar	Corporate Hangar and road/parking
E	Corporate Hangar	Corporate Hangar and road/parking
F	Corporate Hangar	Corporate Hangar and road/parking
G	Box Hangar	1 box hangar
H	Apron	To allow for aircraft parking and hangar development
I	Taxiway Improvements	Taxiway Fillet Improvements
J	Taxiway	Taxiway Connector
K	Taxiway E	Taxiway extension and run-up improvements
L	Maintenance/Box Hangars	1 maintenance hangar/2 box hangars
M	Box Hangar	1 box hangar, apron, road/parking
N	Box Hangar	1 box hangar, apron, road/parking
O	Box Hangar	1 box hangar, apron, road/parking
P	Box Hangar	1 box hangar, apron, road/parking
Q	Box Hangar	1 box hangar, apron, road/parking
R	T-hangars	1 10-unit T-hangar Building
S	T-hangars	1 10-unit T-hangar Building
T	T-hangars	1 10-unit T-hangar Building
U	Terminal Expansion	Terminal Building Expansion
V	Vandenberg Airport Road	Rehab of portion on airport property
W	Hangar Development	9 box hangars, apron, road/parking
X	Shade to T-hangars	Add doors & panels to enclose 10 bay shade hangar
Y	Shade to T-hangars	Add doors & panels to enclose 10 bay shade hangar
Z	Access Road	Access Road to PAPIs

Source: Michael Baker International, Inc.

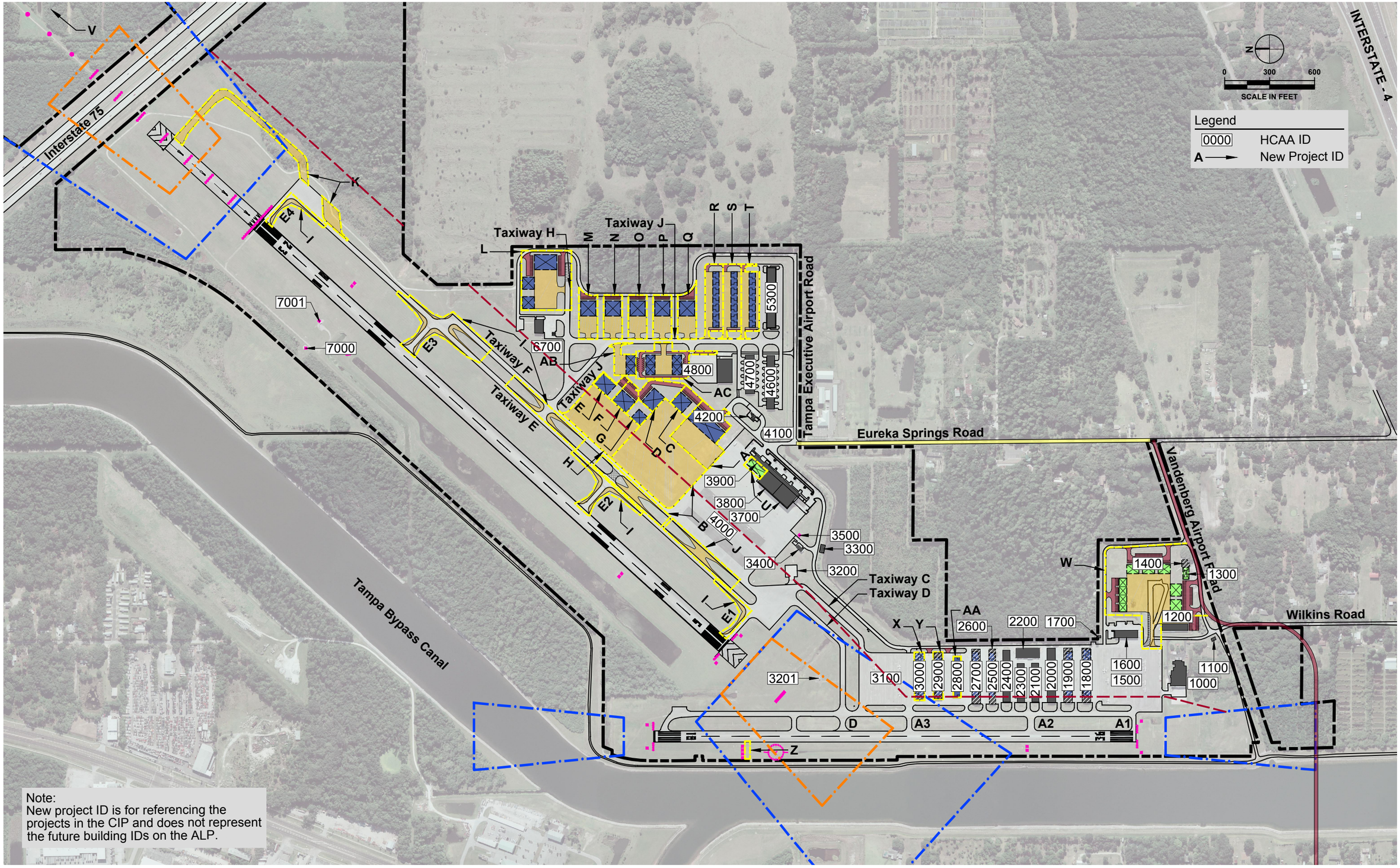

Figure 6-2 Project Key Map

6.3 Noise Contours & Land Use Compatibility

The FAA's Integrated Noise Model (INM) computer program is used to generate airport noise contours and to evaluate incompatible noise exposure to sensitive land uses such as residential properties, schools, places of worship, and hospitals. At the time of this study, INM was the FAA-accepted program for airport noise analysis, but the FAA switched to the Aviation Environmental Design Tool (AEDT) program in May 2015. The noise contours illustrate the Day-Night Average Sound Level (DNL) that occurs during an average day and are generated by inputting various airport-specific factors into INM (aircraft activity and fleet mix, flight tracks, runway utilization, day and night activity, etc.). According to the FAA's Environmental Desk Reference for Airport Actions, "DNL is the 24-hour average sound level in decibels (dB). This average is derived from all aircraft operations during a 24-hour period that represents an airport's average annual operational day. […] DNL adds a 10 dB noise penalty to each aircraft operation occurring during nighttime hours (10 p.m. to 7 a.m.). DNL includes that penalty to compensate for people's heightened sensitivity to noise during this period." The FAA identifies DNL levels of 65 dB and higher as incompatible with noise sensitive land uses.

Using the latest version of INM (Version 7.0d), DNL noise contours were generated for the following two scenarios at VDF: 1) existing 2013 activity levels, fleet mix, and runway configuration, and 2) forecast 2033 activity levels, fleet mix, and runway configuration. The INM inputs in **Table 6-2** were derived from the fleet mix forecast in Table 3-14 and by reviewing historical flight records to identify aircraft models that commonly operate at VDF. As shown in **Figure 6-3**, the 2013 and 2033 DNL 65 dB contours mostly remain within the airport's boundary, except for a small portions that extend over the canal and U.S. Interstate 75, both of which are compatible land uses. Therefore, no incompatible noise impacts would be anticipated from the implementation of the preferred alternative.

Because of the anticipated improvement in minimums for the Runway 23 approach from one mile to ¾ mile, the associated RPZ would increase in size and would encompass incompatible land uses outside the airport property (refer to Figure 6-3). The FAA recommends that airport owners own and control all property within RPZs, and therefore, easements are recommended within all off-airport portions of the existing and future RPZs. The FAA is slated to release guidance on land use compatibility within RPZs as part of an update to the Land Use Compatibility Advisory Circular (AC), but has released a memorandum named Interim Guidance on Land Uses Within a Runway Protection Zone that describes the information that airport sponsors need to submit to the FAA so that a determination can be made regarding potential incompatible land uses. Therefore, an analysis of the RPZs would be necessary prior reduction in minimums to determine if the FAA would require some type of mitigation measures for the new incompatible land uses. No other incompatible land use issues would be anticipated from the development of the preferred alternative. It is noted that the airspace surrounding the runways is protected in accordance with HCAA Resolution 2010-54, Airport Zoning Regulations.

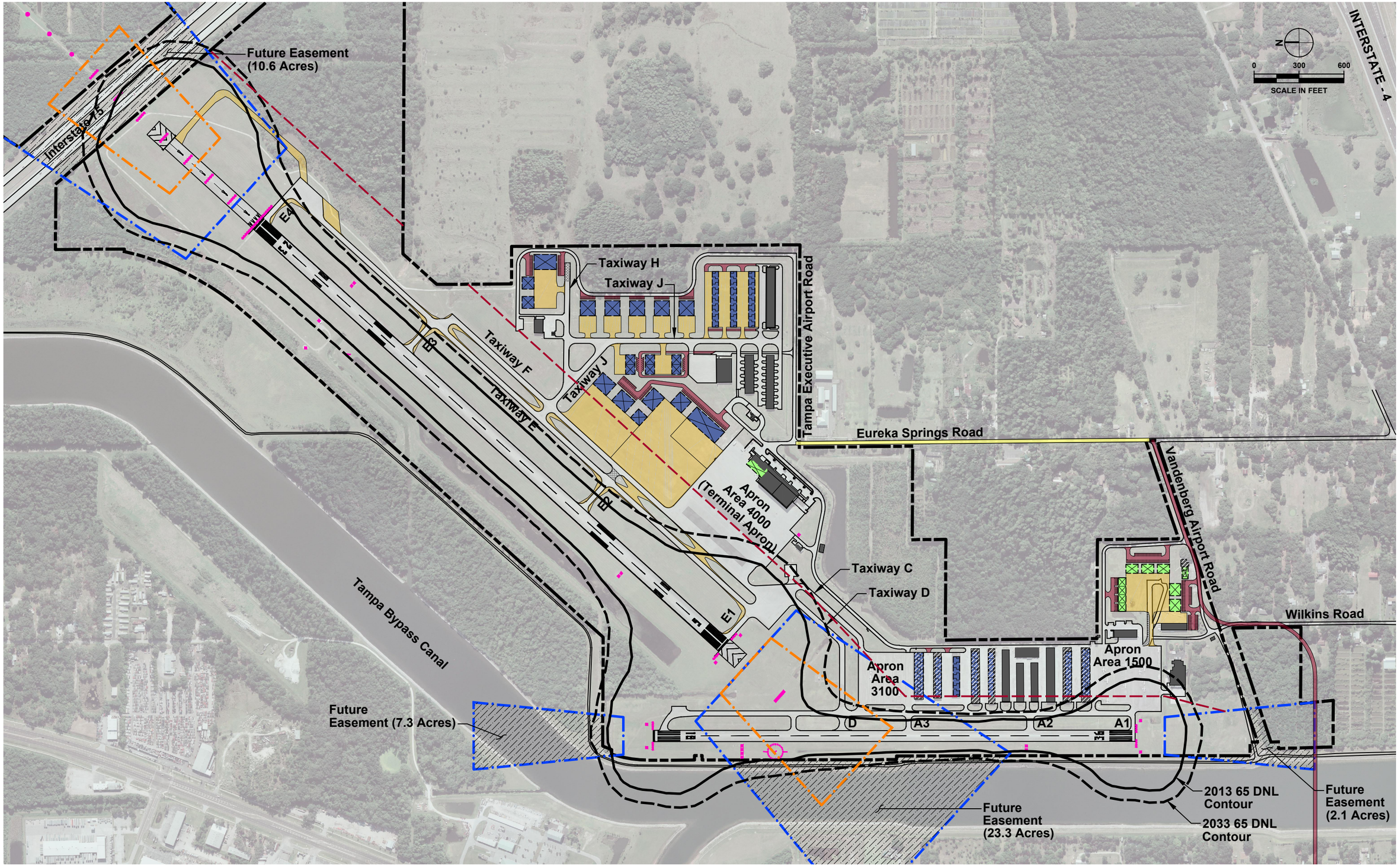

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Figure 6-3 Noise Contours & Land Use Compatibility

Table 6-2 Integrated Noise Model (INM) Inputs				
Aircraft Type	Model	INM Code	2013 Operations	2033 Operations
Single-Engine Piston	Cessna 182	CNA182	77,889	102,272
Multi-Engine Piston	Beechcraft Baron 58	BEC58P	6,377	8,373
Turboprop	Cessna Conquest	CNA441	1,569	10,983
Jet (Small)	Eclipse 500	ECLIPSE500	71	494
Jet (Medium)	Cessna 560XL	CNA560XL	564	3,948
Jet (Large)	Gulfstream IV	GIV	71	494
Helicopter	Bell 407	B407	4,555	7,913
Source: Michael Baker International, Inc., 2015.				

6.4 Potential NEPA Documentation and Environmental Permits

The following sections describe the necessary level of documentation and permitting that would be associated with undertaking the projects proposed within the preferred alternative, and identify potential environmental impacts that would be expected as a result of implementation of those projects.

Potential NEPA Documentation

FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, provides the FAA policies and procedures that are implemented to ensure compliance with the requirements of the National Environmental Policy Act (NEPA) for FAA funded projects and lists the type of NEPA documentation required for each project type. Chapter 5 of FAA Order 1050.1F contains the list of the FAA's categorically excluded actions. Categorically excluded actions are those that meet the stated definition in 40 CFR 1508.4. These actions, under ordinary circumstances, do not require an Environmental Assessment (EA) or Environmental Impact Statement (EIS) and do not individually or cumulatively have a significant effect on the environment. Chapter 3 of FAA Order 1050.1F provides a summary of requirements for Environmental Assessments and findings of no significant impact (FONSI). Chapter 3 explains that actions that normally require an EA include those actions that do not fall within the scope of one of FAA's Categorical Exclusions and actions that would normally be categorically excluded but involve at least one extraordinary circumstance. Chapter 3 also provides a list of 16 examples of types of actions that typically require an Environmental Assessment. Furthermore, Chapter 3 of Order 1050.1F states that an EIS is required when an action would result in significant effects to the quality of the human environment.

All of the proposed projects in the Preferred Alternative are anticipated to meet NEPA requirements under a Categorical Exclusion.

Potential Environmental Regulatory Permits

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

State Environmental Resource Permit (ERP)

An ERP is required if the project meets one of the following criteria:

1. The project proposes work in, on or over wetlands and surface waters.
2. The project proposes to construct more than 4,000 square feet of impervious or semi-pervious surface.
3. The project proposed has an area that is greater than 1 acre.
4. The project proposes impounding greater than 40-acre feet.
5. The project includes construction of a dam that is greater than 10 feet in height.
6. The project is part of a larger development plan.
7. The project is a modification of an existing permit.

National Pollutant Discharge Elimination System (NPDES) Permit for Construction Activity

An NPDES for Construction permit is required from the Florida Department of Environmental Protection (FDEP) if the project area is greater than 1 acre.

Florida Fish and Wildlife Conservation Commission Gopher Tortoise Conservation Permit

This permit may be required if a project is located in undeveloped uplands or other uplands that contain suitable habitat for gopher tortoises, i.e. contains gopher tortoise burrows.

Section 404 Permit or Corps of Engineers (COE) Dredge and Fill Permit

A Section 404 Permit is required if the project proposes to fill or dredge wetlands or other Waters of the United States.

Environmental Protection Commission of Hillsborough County (EPC) permit to Perform Miscellaneous Activities in Wetlands (MAIW)

An EPC MAIW Permit is required for land alteration (including vegetation removal), surface water management, or construction in a wetland or surface water.

EPC Installation of Pollutant Storage Tank Systems and Storage Tank Registration

EPC is under contract with FDEP to regulate and inspect storage tanks containing petroleum or acids. Registration with the EPC is required for new fuel storage tanks.

Preferred Alternative Projects

The projects proposed for the preferred alternative were overlaid on a Florida Land Use, Cover and Forms Classification System (FLUCFCS) map and the most recent aerial photograph to determine if the proposed projects would potentially impact developed areas, wetlands, non-forested uplands, or forested uplands. The projects proposed for the preferred alternative; their potential impact to wetlands, forested uplands, and protected species; the anticipated level of documentation (Categorical Exclusion or Environmental Assessment) that will be required by the FAA to satisfy NEPA requirements; the section of FAA Order 1050.1F that each project falls under; and the regulatory permits that would be anticipated to be required to construct each project are listed in **Table 6-3**.

The projects have been divided into the following:

- Projects with potential protected species impact
- Projects with potential wetland and protected species impact

Projects with Potential Protected Species Impacts

Projects with potential protected species impacts are projects that are located on undeveloped forested and non-forested areas of the airport that have the potential to contain gopher tortoises. The gopher tortoise is a listed species in the State of Florida and impact to this listed species and its habitat requires a Florida Fish and Wildlife Conservation Commission Gopher Tortoise Conservation Permit. Since these projects involve land disturbance activities, an EP MAIW permit is required. Because the projects may be grouped together to form a larger project or may be a modification to an existing system that has an active ERP permit, it was assumed that these projects would require an ERP permit. All projects under this category are categorically excluded per FAA Order 1050.1F.

Projects with Potential Wetland and Protected Species Impacts

Projects that include work in, on, or over wetlands and surface waters are required to have an ERP permit. In the State of Florida there is a memorandum of agreement between the state and the COE for Joint Application such that the ERP application also serves as the application for a Section 404 or COE Dredge and Fill Permit. The required level of NEPA documentation for projects with wetland impacts that require a Section 404 Individual permit is typically an Environmental Assessment. Projects with wetland impacts that can be permitted with a Section 404 Nationwide or General Permit would most likely be categorically excluded.

For planned projects that would eliminate ditches or impact wetlands, there would be potential for impact to wood stork foraging habitat. In such situations, the U.S. Fish and Wildlife Service, which is a commenting agency under the Section 404 permitting process, often requests that the COE require mitigation for impacts to wood stork foraging habitat. To provide for this, an applicant typically seeks to provide wetland mitigation for the wetland impacts that also is suitable for compensation for the impacts to wood stork foraging habitat. The Taxiway E Extension and Run-Up Improvements component of the preferred alternative may fall under this category.

Table 6-3
Preliminary Environmental Review of Preferred Alternative - VDF

Project	Acreage	Noise	Air Quality	Wetland	Upland Forested	Protected Species	NEPA Documentation	1050.1E Reference	State Permit	Federal Permit	County Permit
Maintenance Hangar and Apron	2.08	N	N	N	N	Potential	CatEx	5-6.4.f. 5-6.4.e.	ERP, NPDES	None	MAIW
Apron and Taxiway	5.63	N	N	N	N	Potential	CatEx	5-6.4.e.	ERP, NPDES	None	MAIW
Corporate Hangar and Road/Parking	0.38	N	N	N	N	Potential	CatEx	5-6.4.f. 5-6.4.a.	ERP	None	MAIW
Corporate Hangar and Road/Parking	0.53	N	N	N	N	Potential	CatEx	5-6.4.f. 5-6.4.a.	ERP	None	MAIW
Corporate Hangar and Road/Parking	0.36	N	N	N	N	Potential	CatEx	5-6.4.f. 5-6.4.a.	ERP	None	MAIW
Corporate Hangar and Road/Parking	0.43	N	N	N	N	Potential	CatEx	5-6.4.f. 5-6.4.a.	ERP	None	MAIW
Box Hangar	0.15	N	N	N	N	Potential	CatEx	5-6.4.f.	None	None	None
Apron	2.78	N	N	N	N	Potential	CatEx	5-6.4.e.	ERP, NPDES	None	MAIW
Taxiway Filet Improvements	0.14	N	N	N	N	Potential	CatEx	5-6.4.e.	None	None	None
Taxiway Connector	0.36	N	N	N	N	Potential	CatEx	5-6.4.e.	ERP	None	MAIW
Terminal Building Expansion	0.14	N	N	Y	N	None	CatEx	5-6.4.h.	None	None	None
9 Box Hangars, Apron and Road/Parking	3.47	N	N	Y	N	Potential	CatEx	5-6.4.f. 5-6.4.a.	ERP, NPDES	None	MAIW
Access Road to PAPIs	0.06	N	N	Y	N	Potential	CatEx	5-6.4.a.	None	None	None
Access Road to MALSR	0.28	N	N	Y	N	Potential	CatEx	5-6.4.a.	ERP	None	MAIW
Maintenance Hangar and 2 Box Hangars	1.59	N	N	Y	N	Potential	CatEx	5-6.4.f.	ERP, NPDES	Section 404	MAIW
Box Hangar, Apron and Road/Parking	0.64	N	N	Y	N	Potential	CatEx	5-6.4.f. 5-6.4.e. 5-6.4.a.	ERP	Section 404	MAIW
Box Hangar, Apron and Road/Parking	0.61	N	N	Y	N	Potential	CatEx	5-6.4.f. 5-6.4.e. 5-6.4.a.	ERP	Section 404	MAIW
Box Hangar, Apron and Road/Parking	0.61	N	N	Y	N	Potential	CatEx	5-6.4.f. 5-6.4.e. 5-6.4.a.	ERP	Section 404	MAIW
Box Hangar, Apron and Road/Parking	0.61	N	N	Y	N	Potential	CatEx	5-6.4.f. 5-6.4.e. 5-6.4.a.	ERP	Section 404	MAIW
Box Hangar, Apron and Road/Parking	0.65	N	N	Y	N	Potential	CatEx	5-6.4.f. 5-6.4.e. 5-6.4.a.	ERP	Section 404	MAIW
10-Unit T-Hangar Building	1.17	N	N	Y	N	Potential	CatEx	5-6.4.f.	ERP, NPDES	Section 404	MAIW
10-Unit T-Hangar Building	1.18	N	N	Y	N	Potential	CatEx	5-6.4.f.	ERP, NPDES	Section 404	MAIW
10-Unit T-Hangar Building	1.16	N	N	Y	N	Potential	CatEx	5-6.4.f.	ERP, NPDES	Section 404	MAIW
Taxiway E Extension and Run-Up Improvements	2.21	N	N	Y	N	Potential	CatEx	5-6.4.e.	ERP, NPDES	Section 404	MAIW

Source: Michael Baker International, Inc., 2015.

Chapter 7.0 Implementation Plan

Tampa International Airport

Hillsborough County Aviation Authority

7.0 Implementation Plan

7.1 Background

The primary objective of this chapter is to analyze the financial feasibility of developing the projects included in the Capital Improvement Program (CIP) for VDF. The proposed financial plan was developed after evaluating the financial structure of VDF and identifying potential sources of revenue that may be available to fund capital improvement projects. The funding sources were then matched with projects over an estimated phasing schedule to determine the financial implications of undertaking the recommended capital improvements. The implementation plan presented herein describes the staging of proposed improvements and identifies various means of funding the improvements. It is the intent of this implementation plan to provide general financial guidance to HCAA for making policy decisions regarding the recommended development of the airport over the 20-year planning period. The information in this chapter presents a preliminary review of the CIP and financial structure of VDF. The business plan that was prepared in conjunction with this study provides more detailed recommendations for HCAA to consider to capture additional revenues from the operation and development of VDF and also identifies market opportunities.

7.2 Federal and State Funding Eligibility

The CIP identifies recommended projects and associated cost estimates for the 20-year planning period at VDF. FAA Order 5100.38C, Airport Improvement Program (AIP) Handbook, sets forth the official policy and procedures to be used in the administration of AIP grants. **Table 7-1** lists typical examples of eligible and ineligible AIP projects. Projects eligible for AIP funding at VDF may receive up to 90 percent of the project cost to be covered by the FAA with the Florida Department of Transportation (FDOT) and HCAA responsible for five percent each. HCAA receives $450,000 in entitlement funds from the FAA each year, which are spent on projects at Plant City Airport (PCM) and VDF. Those funds are mostly used for safety, pavement, lighting, and planning/design/environmental projects. If the airport is conducting a larger project that is more expensive, the FAA may provide additional discretionary funding.

The FDOT also has special funding programs that typically cover up to either 80 percent of the project cost for non-revenue generating projects or 50 percent of the project cost for revenue-generating projects. It is noted that these are typical funding shares, but the shares at VDF tend to vary widely based on the individual project, local commitment to conduct projects, and funding availability. Therefore, the shares in the airport's CIP do not necessarily follow a standard funding scenario.

Table 7-1 Examples of Eligible vs. Ineligible AIP Projects	
Eligible Projects	**Ineligible Projects**
Runway construction/rehabilitation	Maintenance equipment and vehicles
Taxiway construction/rehabilitation	Office and office equipment
Apron construction/rehabilitation	Fuel farms*
Airfield lighting	Landscaping
Airfield signage	Artworks
Airfield drainage	Aircraft hangars*
Land acquisition	Industrial park development
Weather observation stations (AWOS)	Marketing plans
NAVAIDs such as REILs and PAPIs	Training
Planning studies	Improvements for commercial enterprises
Environmental studies	Maintenance or repairs of buildings
Safety area improvements	
Airport layout plans (ALPs)	
Access roads only located on airport property	
Removing, lowering, moving, marking, and lighting hazards	
Glycol Recovery Trucks/Glycol Vacuum Trucks**	

Source: FAA AIP Overview, http://www.faa.gov/airports/aip/overview/, accessed September 4, 2015.
*May be eligible. Contact your local Airport District or Regional Office for more information.
**To be eligible, the vehicles must be owned and operated by the Airport and meet the Buy American Preference specified in the AIP grant. Contact your local Airport District or Regional Office for more information.

In addition, the following must also apply for FAA to consider a project for AIP funding:
The project sponsorship requirements have been met.
The project is reasonably consistent with the plans of planning agencies for the development of the area in which the airport is located.
Sufficient funds are available for the portion of the project not paid for by the Federal Government.
The project will be completed without undue delay.
The airport location is included in the current version of the NPIAS.
The project involves more than $25,000 in AIP funds.
The project is depicted on a current airport layout plan approved by FAA.

7.3 Project Costs & Phasing

Project Costs

As shown in **Table 7-2**, a CIP and phasing plan were identified for the 20-year planning period that includes a mixture of the master plan recommendations and HCAA's detailed maintenance program. The CIP planning period is defined as 2015 through 2034. Each project within the CIP was assigned to a particular planning period or development phase (i.e., Phase 1, Phase 2, or Phase 3). The Phase 1 time period extends from 2015 to 2019, the Phase 2 period extends from 2020 to 2024, and the Phase 3 period spans the final 10 year timeframe from 2025 through 2034. A detailed breakdown of costs and phasing was produced for Phase 1 projects; however, the Phase 2 and 3 projects are listed in a more generalized order that should remain flexible. Although this study charts a course for planned development, it must be emphasized that the planning and development of an airport is a continuous process. The rehabilitation of existing facilities and development of new facilities must be predicated on sustained demand, which justifies the costs of improvements. As aviation demand may change at VDF and also specific project requirements and funding mechanisms may change, HCAA should consider the impact on the CIP and the potential need to modify certain elements of the Airport Layout Plan (ALP). For example, although HCAA has paid for hangar construction in the past, the current policy is only to pay for the infrastructure required to access new hangars and to have the actual facility to be privately paid for and constructed, which is why the largest share for future hangar developments is shown in the private column in Table 7-2. Because such policy changes tend to occur over time, they may have the impact not only on who is funding projects, but also on several of the airport's policy documents (e.g., minimum standards).

The estimated cost for each of the recommended airport improvements reflects a preliminary opinion of the probable implementation cost for the project. In addition to the estimated construction costs, anticipated fees for design, inspection, permitting, surveying, testing and administration were also included in the overall estimate where applicable. Each project cost is presented in the base year dollar value and therefore does not reflect unanticipated increases in labor and material costs or changes in environmental legislation. This is done for master planning purposes because the dates of project are generally identified in phases as opposed to specific years. In addition, a contingency was added to the overall costs of some projects to account for unforeseen variables. A detailed environmental analysis may be required to recognize the full scope of environmental and budgetary impacts associated with the proposed development. Some projects may also require mitigation measures to offset impacts to environmentally sensitive areas whereas others may require some level of environmental remediation based on conditions that may or may not have been identified as part of this study. For those reasons, it is important to note that the estimates shown are accurate based on the costs of labor, materials, and anticipated impacts calculated at the time of this writing. As such, it is important to revisit and update costs regularly to ensure that an accurate CIP is maintained.

Project Phasing

Since the airport's actual versus forecast activity levels may vary, it is important for the staging of proposed improvement projects remain sensitive to such variations. Some projects may take precedence over others, depending on their level of priority or due to the availability of funding. Thus, a list of prioritized improvements was established based upon the urgency of need, ease of

implementation, logic of project sequencing, and input from HCAA staff. The objective was to establish an efficient order for project development and implementation that meets or exceeds the forecasted aviation demands at VDF while meeting the needs expressed by HCAA staff and airport stakeholders.

The total cost of the 20-year CIP is estimated at $18,461,986 million in FAA investment (a combination of entitlement and discretionary funds), $5,774,095 million in state investment, $32,952,573 million in HCAA investment, and $46,177,707 million in private investment. Those figures include all studies, infrastructure improvements, and proposed construction costs necessary to achieve the developments shown in the CIP. The CIP for each period presents the improvements slated for implementation during the period, but it does not assume how financially feasible it will be for HCAA to undertake the projects or whether or not funding will be available. Table 7-2 also presents the maintenance intervals for projects.

The funding for many of the projects in Phase 1 has been pre-determined between HCAA, FAA, and FDOT, but can be subject to change on a case-by-case and annual basis. The Phase 2 projects include items that will be necessary based on the forecast demand and to provide anticipated maintenance activities. Many of the Phase 3 projects include routine maintenance and higher price private developments that would likely only be implemented as required by demand at the time. Unlike previous CIPs that have been developed for VDF, this CIP relies heavily on private investment to construct future hangars and also attempts to maximize the ability to obtain additional funds from the FAA and FDOT in the later phases (i.e., illustrates the maximum funding shares that could be received for eligible projects). This will allow HCAA to know the level of funding that may be available for eligible projects throughout the duration of the planning period assuming current authorization levels from the FAA and FDOT. The overall goal was to reduce HCAA's maintenance and development costs by taking advantage of potential funding opportunities and encouraging private facility development.

Consumer Price Index (CPI) Adjustment

The improvements shown in previous tables illustrate the facilities needed at VDF to meet the forecast demands through the end of the 20-year planning period and likely beyond as well. The cost estimates were determined in year 2015 dollars, so as time goes by the values should be reviewed to determine if any project cost adjustments have occurred. Although the costs for construction projects is highly variable due to the fluctuating cost of materials (e.g., asphalt, steel, and energy production), a reasonable estimate of future costs can be calculated by adjusting the 2015 costs by the appropriate Consumer Price Index (CPI) inflation factor. The Bureau of Labor Statistics (BLS) provides an online CPI inflation calculator that may be used to compare historical costs to present day cost and is available on this website (http://www.bls.gov/data/inflation_calculator.htm).

Table 7-2
Combined Capital Improvement Program for VDF (2015-2034+)

Phase	Facility	Year (if Assigned)	Figure 6-2 ID	Project Title	Estimated Cost	AIP Grants	FDOT Grants	Authority Funds	Private Funds	AIP %	FDOT %	Authority %	Private %	Maintenance Interval
1	2900	2015		Shade Hangar 2900 Clean & Paint	$131,500	$0	$0	$131,500	$0	0.00%	0.00%	100.00%	0.00%	10
1	3000	2015		Shade Hangar 3000 Clean & Paint	$131,500	$0	$0	$131,500	$0	0.00%	0.00%	100.00%	0.00%	3
1	2000	2016		T-Hangar 2000 Clean & Paint	$213,200	$0	$166,000	$47,200	$0	0.00%	77.86%	22.14%	0.00%	10
1	2700	2016		T-Hangar 2700 Panels	$468,500	$150,000	$0	$318,500	$0	32.02%	0.00%	67.98%	0.00%	10
1	4600	2016		T-Hangar 4600 Clean & Paint	$200,700	$150,000	$0	$50,700	$0	74.74%	0.00%	25.26%	0.00%	10
1	4600	2016		T-Hangar 4600 Panels	$440,900	$0	$0	$440,900	$0	0.00%	0.00%	100.00%	0.00%	10
1	AWOS	2016		AWOS Replacement	$282,800	$0	$100,000	$182,800	$0	0.00%	35.36%	64.64%	0.00%	20
1	Trees	2016		RPZ & Approach Areas - Aerial & Tree Trimming	$209,500	$0	$26,300	$183,200	$0	0.00%	12.55%	87.45%	0.00%	3
1	Hangar	2016	A	Maintenance Hangar & Terminal Apron Expansion	$4,458,515	$0	$0	$556,764	$3,901,751	0.00%	0.00%	12.49%	87.51%	10
1	1600	2017		Operations & Maintenance Facility Rehab	$109,900	$0	$0	$109,900	$0	0.00%	0.00%	100.00%	0.00%	10
1	Gates	2017		Automatic Gates Rehab	$203,400	$0	$162,700	$40,700	$0	0.00%	79.99%	20.01%	0.00%	As Needed
1	Generator	2017		Airfield Generator & Transformer Replacement	$33,900	$0	$0	$33,900	$0	0.00%	0.00%	100.00%	0.00%	15
1	Hangar	2017	M	Corporate Hangar Along Taxiway J (1 of 5)	$1,927,051	$0	$0	$156,389	$1,770,662	0.00%	0.00%	8.12%	91.88%	10
1	Taxi-Thru	2017		Taxi-Thru Hangars Panels (2100, 2300, 2400, 2500)	$266,600	$0	$0	$266,600	$0	0.00%	0.00%	100.00%	0.00%	10
1	Taxiway H	2017		Taxiway H Sealcoat	$129,200	$0	$0	$129,200	$0	0.00%	0.00%	100.00%	0.00%	10
1	Taxiway J	2017		Taxiway J Sealcoat	$168,700	$0	$0	$168,700	$0	0.00%	0.00%	100.00%	0.00%	10
1	5300	2018		T-Hangar 5300 Clean & Paint	$176,300	$0	$0	$176,300	$0	0.00%	0.00%	100.00%	0.00%	10
1	Apron A	2018		Apron A Sealcoat	$438,100	$300,000	$69,000	$69,100	$0	68.48%	15.75%	15.77%	0.00%	10
1	Apron B	2018		Apron B Sealcoat	$207,100	$0	$0	$207,100	$0	0.00%	0.00%	100.00%	0.00%	10
1	Apron C	2018		Apron C Overlay	$2,796,800	$0	$0	$2,796,800	$0	0.00%	0.00%	100.00%	0.00%	10
1	Fuel	2018		Fuel System Refurbishment	$40,000	$0	$0	$40,000	$0	0.00%	0.00%	100.00%	0.00%	3
1	MALSR	2018	V, Z	Runway 5-23 MALSR Light Poles Replacement & MALSR/PAPI Access Road	$258,234	$0	$206,587	$51,647	$0	0.00%	80.00%	20.00%	0.00%	7
1	PAPI	2018		Runway 5-23 PAPI Replacement	$207,600	$0	$166,000	$41,600	$0	0.00%	79.96%	20.04%	0.00%	20
1	REIL	2018		Runway 5-23 REIL Replacement	$168,600	$0	$84,300	$84,300	$0	0.00%	50.00%	50.00%	0.00%	20
1	Runway 5-23	2018		Runway 5-23 Overlay	$5,000,000	$4,500,000	$250,000	$250,000	$0	90.00%	5.00%	5.00%	0.00%	10
1	Taxiway C	2018		Taxiway C Overlay	$481,700	$0	$0	$481,700	$0	0.00%	0.00%	100.00%	0.00%	10
1	Taxiway D	2018		Taxiway D Overlay	$215,600	$0	$0	$215,600	$0	0.00%	0.00%	100.00%	0.00%	10
1	Taxiway E	2018	I	Taxiway E Overlay & Fillet Improvements	$1,128,284	$0	$0	$1,128,284	$0	0.00%	0.00%	100.00%	0.00%	10
1	Taxiway F	2018		Taxiway F Overlay	$740,100	$0	$0	$740,100	$0	0.00%	0.00%	100.00%	0.00%	10
1	T-Hangar	2018	R	10-Unit T-Hngar Along Taxiway J (1 of 3)	$2,365,835	$0	$0	$308,339	$2,057,496	0.00%	0.00%	13.03%	86.97%	10
1	4700	2019		T-Hangar 4700 Mechanical & Door Updates	$163,400	$0	$0	$163,400	$0	0.00%	0.00%	100.00%	0.00%	As Needed
1	Fire	2019		Fire Supression System Refurbishment	$400,000	$0	$0	$400,000	$0	0.00%	0.00%	100.00%	0.00%	As Needed
1	Lighting	2019		Runway 5-23 & Associated Taxiway Lighting Refurbishment	$830,000	$0	$415,000	$415,000	$0	0.00%	50.00%	50.00%	0.00%	10
1	Service Roads	2019		Service Roads Rehab (including VDF Airport Road)	$662,800	$450,000	$0	$212,800	$0	67.89%	0.00%	32.11%	0.00%	10
1	Signage	2019		Runway 5-23 & Associated Taxiway Signage Rehab	$877,300	$450,000	$288,600	$138,700	$0	51.29%	32.90%	15.81%	0.00%	20
1	Trees	2019		RPZ & Approach Areas - Aerial & Tree Trimming	$200,000	$0	$0	$200,000	$0	0.00%	0.00%	100.00%	0.00%	3
2	Chiller	2020		Chiller System Replacement	$479,000	$0	$0	$479,000	$0	0.00%	0.00%	100.00%	0.00%	
2	Hangar	2020	N	Corporate Hangar Along Taxiway J (2 of 5)	$1,927,051	$0	$0	$156,389	$1,770,662	0.00%	0.00%	8.12%	91.88%	10
2	Minimums	2020		Runway 23 Approach Minimums / RPZ Assessment	$35,000	$31,500	$1,750	$1,750	$0	90.00%	5.00%	5.00%	0.00%	N/A
2	Terminal Building	2020		Terminal Building Rehab	$355,300	$0	$0	$355,300	$0	0.00%	0.00%	100.00%	0.00%	5
2	3700	2021		Hangar 3700 Panels	$250,000	$0	$0	$250,000	$0	0.00%	0.00%	100.00%	0.00%	10
2	3800	2021		Hangar 3800 Panels	$250,000	$0	$0	$250,000	$0	0.00%	0.00%	100.00%	0.00%	10
2	Fuel	2021		Fuel System Refurbishment	$40,000	$0	$0	$40,000	$0	0.00%	0.00%	100.00%	0.00%	3
2	Hangar	2021	O	Corporate Hangar Along Taxiway J (3 of 5)	$1,927,051	$0	$0	$156,389	$1,770,662	0.00%	0.00%	8.12%	91.88%	10
2	PAPI	2021		Runway 36 PAPI Replacement	$153,300	$137,900	$0	$15,400	$0	89.95%	0.00%	10.05%	0.00%	20
2	REIL	2021		Runway 18-36 REIL Replacement	$200,300	$180,200	$0	$20,100	$0	89.97%	0.00%	10.03%	0.00%	20
2	Taxiway E	2021	K	Taxiway E Extension to Runway 23 End	$579,250	$521,325	$28,963	$28,963	$0	90.00%	5.00%	5.00%	0.00%	10
2	Trees	2022		RPZ & Approach Areas - Aerial & Tree Trimming	$200,000	$0	$0	$200,000	$0	0.00%	0.00%	100.00%	0.00%	3
2	1900	2023		Hangar 1900 Clean & Paint / Enclose	$200,000	$0	$0	$200,000	$0	0.00%	0.00%	100.00%	0.00%	10
2	4800	2023		Bulk Hangar 4800 Panels	$154,700	$0	$0	$154,700	$0	0.00%	0.00%	100.00%	0.00%	10
2	1800	2024		Hangar 1800 Panels / Enclose	$250,000	$0	$0	$250,000	$0	0.00%	0.00%	100.00%	0.00%	10
2	4700	2024		T-Hangar 4700 Panels	$319,100	$0	$0	$319,100	$0	0.00%	0.00%	100.00%	0.00%	10
2	Apron	2024	B, J	Terminal Apron Expansion 1 & New Connections to Taxiway E	$2,157,790	$1,942,011	$107,890	$107,890	$0	90.00%	5.00%	5.00%	0.00%	10
2	Fuel	2024		Fuel System Refurbishment	$40,000	$0	$0	$40,000	$0	0.00%	0.00%	100.00%	0.00%	3

Table 7-2
Combined Capital Improvement Program for VDF (2015-2034+)

Phase	Facility	Year (if Assigned)	Figure 6-2 ID	Project Title	Estimated Cost	AIP Grants	FDOT Grants	Authority Funds	Private Funds	AIP %	FDOT %	Authority %	Private %	Maintenance Interval
2	Hangar	2024	C	Corporate Hangar on Expanded Terminal Apron (10,000 SF)	$2,166,566	$0	$0	$57,815	$2,108,751	0.00%	0.00%	2.67%	97.33%	10
2	Lighting	2024		Runway 18-36 Lighting Circuits Rehab	$730,000	$0	$0	$730,000	$0	0.00%	0.00%	100.00%	0.00%	15
2	Parking	2024		Parking Lot Overlay	$241,400	$0	$0	$241,400	$0	0.00%	0.00%	100.00%	0.00%	10
2	Runway 18-36	2024		Runway 18-36 Overlay	$2,057,600	$0	$401,400	$1,656,200	$0	0.00%	19.51%	80.49%	0.00%	10
2	Taxilanes	2024		Hangar Taxilanes Overlay	$3,212,000	$0	$0	$3,212,000	$0	0.00%	0.00%	100.00%	0.00%	10
2	Taxiway A	2024		Taxiway A Overlay	$884,200	$450,000	$0	$434,200	$0	50.89%	0.00%	49.11%	0.00%	10
2	T-Hangar	2024	AA	7-Unit T-Hangar in Area 2800	$1,000,000	$0	$0	$0	$1,000,000	0.00%	0.00%	0.00%	100.00%	10
3	2900	2025	Y	Shade Hangar 2900 Panels / Enclose	$380,350	$0	$0	$380,350	$0	0.00%	0.00%	100.00%	0.00%	10
3	3000	2025	X	Shade Hangar 3000 Panels / Enclose	$362,285	$0	$0	$362,285	$0	0.00%	0.00%	100.00%	0.00%	10
3	MALSR	2025		Runway 5-23 MALSR Light Poles Replacement	$189,100	$0	$151,280	$37,820	$0	0.00%	80.00%	20.00%	0.00%	7
3	Terminal Building	2025		Terminal Building Rehab	$405,900	$0	$0	$405,900	$0	0.00%	0.00%	100.00%	0.00%	5
3	Trees	2025		RPZ & Approach Areas - Aerial & Tree Trimming	$200,000	$0	$0	$200,000	$0	0.00%	0.00%	100.00%	0.00%	3
3	2000	2026		T-Hangar 2000 Panels	$312,300	$0	$0	$312,300	$0	0.00%	0.00%	100.00%	0.00%	10
3	2700	2026		T-Hangar 2700 Clean & Paint	$213,200	$150,000	$0	$63,200	$0	70.36%	0.00%	29.64%	0.00%	10
3	1600	2027		Operations & Maintenance Facility Rehab	$161,000	$0	$0	$161,000	$0	0.00%	0.00%	100.00%	0.00%	10
3	Fuel	2027		Fuel System Refurbishment	$40,000	$0	$0	$40,000	$0	0.00%	0.00%	100.00%	0.00%	3
3	Taxi-Thru	2027		Taxi-Thru Hangars Clean & Paint (2100, 2300, 2400, 2500)	$167,300	$150,000	$0	$17,300	$0	89.66%	0.00%	10.34%	0.00%	10
3	Taxiway H	2027		Taxiway H Overlay	$483,100	$0	$0	$483,100	$0	0.00%	0.00%	100.00%	0.00%	10
3	Taxiway J	2027		Taxiway J Overlay	$648,800	$150,000	$0	$498,800	$0	23.12%	0.00%	76.88%	0.00%	10
3	Wash Rack	2027		Aircraft Wash Rack Rehab	$283,000	$0	$226,400	$56,600	$0	0.00%	80.00%	20.00%	0.00%	20
3	5300	2028		T-Hangar 5300 Panels	$387,400	$0	$0	$387,400	$0	0.00%	0.00%	100.00%	0.00%	10
3	Apron A	2028		Apron A Overlay	$1,679,700		$548,100	$1,131,600	$0	0.00%	32.63%	67.37%	0.00%	10
3	Apron B	2028		Apron B Overlay	$793,800	$300,000	$0	$493,800	$0	37.79%	0.00%	62.21%	0.00%	10
3	Apron C	2028		Apron C Sealcoat	$972,000	$300,000	$0	$672,000	$0	30.86%	0.00%	69.14%	0.00%	10
3	Runway 5-23	2028		Runway 5-23 Overlay	$4,006,200	$3,605,500	$0	$400,700	$0	90.00%	0.00%	10.00%	0.00%	10
3	Taxiway C	2028		Taxiway C Sealcoat	$118,000	$0	$0	$118,000	$0	0.00%	0.00%	100.00%	0.00%	10
3	Taxiway D	2028		Taxiway D Sealcoat	$96,000	$0	$0	$96,000	$0	0.00%	0.00%	100.00%	0.00%	10
3	Taxiway E	2028		Taxiway E Sealcoat	$598,000	$0	$0	$598,000	$0	0.00%	0.00%	100.00%	0.00%	10
3	Taxiway F	2028		Taxiway F Sealcoat	$372,000	$0	$0	$372,000	$0	0.00%	0.00%	100.00%	0.00%	10
3	Trees	2028		RPZ & Approach Areas - Aerial & Tree Trimming	$200,000	$0	$0	$200,000	$0	0.00%	0.00%	100.00%	0.00%	3
3	Fire	2029		Fire Supression System Refurbishment	$196,400	$0	$0	$196,400	$0	0.00%	0.00%	100.00%	0.00%	3
3	Lighting	2029		Runway 5-23 & Associated Taxiway Lighting Refurbishment	$3,149,400	$2,834,400	$0	$315,000	$0	90.00%	0.00%	10.00%	0.00%	10
3	Service Roads	2029		Service Roads Rehab (including VDF Airport Road)	$662,800	$450,000	$0	$212,800	$0	67.89%	0.00%	32.11%	0.00%	10
3	Fuel	2030		Fuel System Refurbishment	$40,000	$0	$0	$40,000	$0	0.00%	0.00%	100.00%	0.00%	3
3	Terminal Building	2030	U	Terminal Building Expansion	$2,690,741	$0	$2,152,593	$538,148	$0	0.00%	80.00%	20.00%	0.00%	5
3	3700	2031		Hangar 3700 Clean & Paint	$150,000	$0	$0	$150,000	$0	0.00%	0.00%	100.00%	0.00%	10
3	3800	2031		Hangar 3800 Clean & Paint	$150,000	$0	$0	$150,000	$0	0.00%	0.00%	100.00%	0.00%	10
3	Trees	2031		RPZ & Approach Areas - Aerial & Tree Trimming	$200,000	$0	$0	$200,000	$0	0.00%	0.00%	100.00%	0.00%	3
3	Generator	2032		Airfield Generator & Transformer Replacement	$33,900	$0	$0	$33,900	$0	0.00%	0.00%	100.00%	0.00%	15
3	MALSR	2032		Runway 5-23 MALSR Light Poles Replacement	$189,100	$0	$151,280	$37,820	$0	0.00%	80.00%	20.00%	0.00%	7
3	Fuel	2033		Fuel System Refurbishment	$40,000	$0	$0	$40,000	$0	0.00%	0.00%	100.00%	0.00%	3
3	Apron	MPU	H	Terminal Apron Expansion 2	$999,056	$899,150	$49,953	$49,953	$0	90.00%	5.00%	5.00%	0.00%	10
3	Hangar	MPU	D	Corporate Hangar on Expanded Terminal Apron (12,000 SF)	$2,507,003	$0	$0	$57,129	$2,449,874	0.00%	0.00%	2.28%	97.72%	10
3	Hangar	MPU	AB	2 Box Hangars Along Taxiway J	$1,500,000	$0	$0	$150,000	$1,350,000	0.00%	0.00%	10.00%	90.00%	10
3	Hangar	MPU	AC	4 Box Hangars Along Taxiway J	$2,500,000	$0	$0	$175,000	$2,325,000	0.00%	0.00%	7.00%	93.00%	10
3	Hangar	MPU	P	Corporate Hangar Along Taxiway J (4 of 5)	$1,927,051	$0	$0	$156,389	$1,770,662	0.00%	0.00%	8.12%	91.88%	10
3	Hangar	MPU	Q	Corporate Hangar Along Taxiway J (5 of 5)	$1,927,051	$0	$0	$156,389	$1,770,662	0.00%	0.00%	8.12%	91.88%	10
3	Hangar	MPU	L	Corporate Hangars Along Taxiway H (3)	$4,987,490	$0	$0	$598,998	$4,388,492	0.00%	0.00%	12.01%	87.99%	10
3	Hangar	MPU	E	Corporate Hangar on Expanded Terminal Apron (12,000 SF)	$2,480,129	$0	$0	$29,403	$2,450,726	0.00%	0.00%	1.19%	98.81%	10
3	Hangar	MPU	F	Corporate Hangar on Expanded Terminal Apron (12,000 SF)	$2,507,839	$0	$0	$57,113	$2,450,726	0.00%	0.00%	2.28%	97.72%	10
3	Hangar	MPU	G	Corporate Hangar on Expanded Terminal Apron (6,400 SF)	$1,248,309	$0	$0	$0	$1,248,309	0.00%	0.00%	0.00%	100.00%	10
3	Planning	MPU		Master Plan Update	$400,000	$360,000	$20,000	$20,000	$0	90.00%	5.00%	5.00%	0.00%	10
3	Reserved Area	MPU	W	Special Use Area Along Vandenberg Airport Road	$8,537,555	$0	$0	$1,060,132	$7,477,423	0.00%	0.00%	12.42%	87.58%	10
3	T-Hangar	MPU	S	10-Unit T-Hangar Along Taxiway J (2 of 3)	$2,367,054	$0	$0	$309,558	$2,057,496	0.00%	0.00%	13.08%	86.92%	10
3	T-Hangar	MPU	T	10 Unit T-Hangar Along Taxiway J (3 of 3)	$2,362,821	$0	$0	$304,468	$2,058,353	0.00%	0.00%	12.89%	87.11%	10

Table 7-2
Combined Capital Improvement Program for VDF (2015-2034+)

Phase	Facility	Year (if Assigned)	Figure 6-2 ID	Project Title	Estimated Cost	AIP Grants	FDOT Grants	Authority Funds	Private Funds	AIP %	FDOT %	Authority %	Private %	Maintenance Interval
1	2900	2015		Shade Hangar 2900 Clean & Paint	$131,500	$0	$0	$131,500	$0	0.00%	0.00%	100.00%	0.00%	10
				Total All	**$103,366,361**	**$18,461,986**	**$5,774,095**	**$32,952,573**	**$46,177,707**					
				Total Phase 1 (2015-2019)	$26,733,619	$6,000,000	$1,934,487	$11,069,223	$7,729,909					
				Total Phase 2 (2020-2024)	$19,809,608	$3,262,936	$540,002	$9,356,595	$6,650,075					
				Total Phase 3 (2025+)	$56,823,134	$9,199,050	$3,299,606	$12,526,755	$31,797,723					
				Previous CIP Total	$77,291,600	$13,971,900	$5,837,300	$57,482,400	$0					
				Previous CIP Horizon 1	$17,695,400	$4,237,100	$3,707,800	$9,750,500	$0					
				Previous CIP Horizon 2	$22,278,900	$1,800,000	$1,355,000	$19,123,900	$0					
				Previous CIP Horizon 3	$37,317,300	$7,934,800	$774,500	$28,608,000	$0					
				Difference Total	33.74%	32.14%	-1.08%	-42.67%						
				Difference Horizon 1 (Previous to New)	51.08%	41.61%	-47.83%	13.52%						
				Difference Horizon 2 (Previous to New)	-11.08%	81.27%	-60.15%	-51.07%						
				Difference Horizon 3 (Previous to New)	52.27%	15.93%	326.03%	-56.21%						
				Difference Total (New to Previous)	$26,074,761	$4,490,086	-$63,205	-$24,529,827	$46,177,707					
				Difference Horizon 1 (New to Previous)	$9,038,219	$1,762,900	-$1,773,313	$1,318,723	$7,729,909					
				Difference Horizon 2 (New to Previous)	-$2,469,292	$1,462,936	-$814,998	-$9,767,305	$6,650,075					
				Difference Horizon 3 (New to Previous)	$19,505,834	$1,264,250	$2,525,106	-$16,081,245	$31,797,723					

Source: Michael Baker International, Inc., 2015.

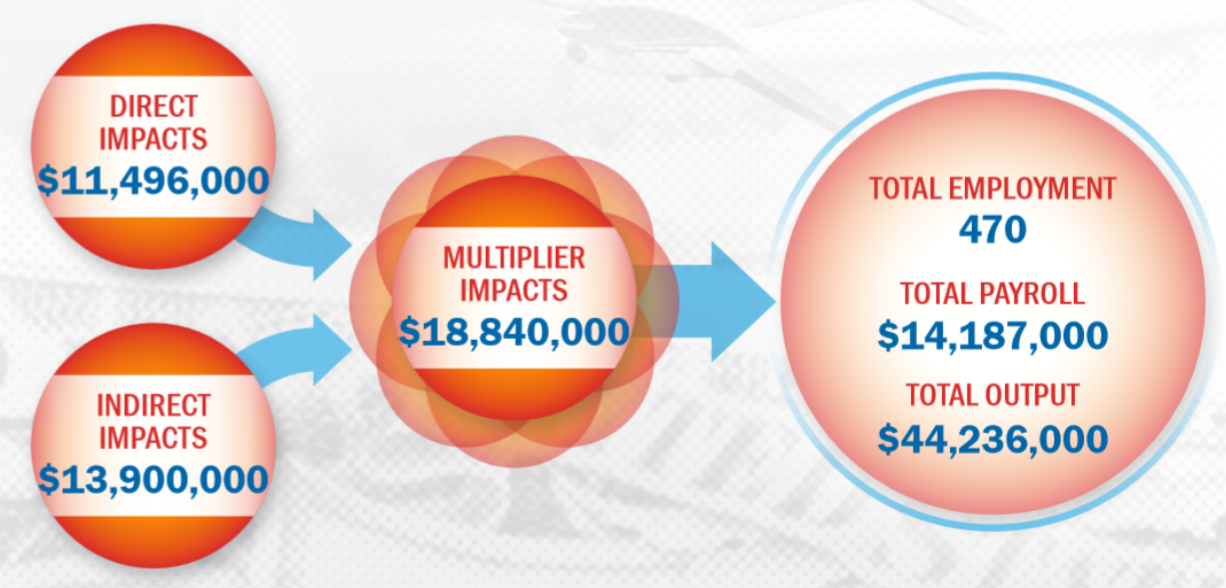
7.4 Airport Financial Structure

This section presents the historical revenues and expenses that were generated from HCAA's operation of VDF, as well as a forecast of revenues and expenses and a projection of annual cash outlays that will be required by HCAA after capital improvements are accounted for. The information in this chapter represents baseline conditions only and does not include strategies for increasing the revenues of VDF or decreasing HCAA's annual investment into the airport. Such strategies are considered in the business plan that was conducted in conjunction with this study.

Historical & Forecast Revenues & Expenses

In the most recent fiscal year ending September 30, 2014, VDF generated $451,512 in revenues for HCAA. Principle sources of revenue include space rental, reimbursements for utilities, and a fuel flowage fee of $0.05 per gallon. During the same fiscal year, HCAA expenses were $589,405, which resulted in a gross profit of ($138,099). That negative gross profit is prior to the consideration of HCAA's annual contributions for capital improvements, which as previously shown in Table 7-2, can be several hundred thousand dollars to several million dollars per year. Assuming a status quo scenario in which no major policy or revenue-enhancing changes are implemented, VDF would likely continue to operate in a deficit between 2015 and 2019 (refer to **Table 7-3**). It is not uncommon for general aviation airports to operate in a deficit and many airport sponsors are willing contribute funds for their operations and maintenance because of their importance to the overall economy and aviation system. For example, the August 2014 Florida Statewide Aviation Economic Impact Study Update indicates that VDF results in a total annual employment of 470 positions and a total annual output of $44,236,000 (refer to **Figure 7-1**). Therefore, the airport is an asset to the local economy that produces several hard-to-quantify benefits that are not discernable from a profit and loss statement. However, unlike many airport sponsors which are taxation authorities (e.g., cities and counties), HCAA does not collect any taxes associated with the total output of the airport (from businesses that are created because of the airport, sales of goods and services, employment, and other property development). HCAA must therefore allocate funds that are generated from revenues at Tampa International Airport (TPA) to cover losses and pay for capital improvements at VDF.

Figure 7-1
Annual Economic Impact of VDF



Source: FDOT Florida Statewide Aviation Economic Impact Study Update, August 2014.

Annual Capital Outlays

The bottom rows of Table 7-3 identify HCAA's annual cost for capital projects and the total capital outlays that can be expected between 2015 and 2019. After operating costs and capital costs are accounted for, HCAA can be expected to outlay between $401,099 and $6,737,525 per year during that time. Opportunities for enhancing revenues and reducing expenses are presented in the business plan.

7.5 Summary

As presented in Table 7-2, the total cost of the airport's CIP is anticipated to be $103,366,361 between 2015 and 2034, with HCAA contributions totaling $32,952,573 during that time. It must be reiterated that the proposed CIP, including the sequence of project development and anticipated funding, is preliminary in nature and may change based on a variety of factors; however, the projects in Phase 1 are more likely to occur in the order shown because of prior funding arrangements with FAA and FDOT. Unlike previous CIPs that have been developed for VDF, this CIP shows all future hangar construction as being privately funded and subsequently may require some policy changes on behalf of HCAA to make that possible and affordable for prospective developers. Furthermore, this CIP attempts to maximize the funding that may be available from FAA and FDOT in future years, thereby reducing the outlay that may be required by HCAA. The overall goal was to capitalize on other funding and development opportunities in an effort to make the airport more financially self-sustainable. The business plan explores these concepts in greater detail.

Table 7-3
Historical & Forecast Revenues & Expenses for VDF

Item	Actual Revenue & Expenses for Fiscal Year Ending September 30					Projected Revenue & Expenses for Fiscal Year Ending September 30					Average Annual Growth		CPI		Operations
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2010-2014	2014-2019	2015	2016-2019	Growth
Operating Revenues															
Fuel Flowage	$12,783	$13,293	$11,750	$12,442	$14,086	$14,335	$14,589	$14,847	$15,110	$15,378	2.5%	1.8%	NA	NA	1.8%
FBO Concessions	$379,656	$377,446	$347,608	$359,835	$394,369	$395,552	$403,464	$411,533	$419,763	$428,159	1.0%	1.7%	0.3%	2.0%	
Other GA Revenue	$53,823	$46,745	$38,687	$39,193	$43,057	$43,186	$44,050	$44,930	$45,829	$46,746	-5.4%	1.7%	0.3%	2.0%	
Total Operating Revenue	**$446,262**	**$437,484**	**$398,045**	**$411,470**	**$451,512**	**$453,074**	**$462,102**	**$471,311**	**$480,703**	**$490,282**	**0.3%**	**1.7%**			
Direct Operating Expenses															
Salaries & Benefits	$243,310	$242,241	$195,259	$155,520	$177,186	$177,717	$181,272	$184,897	$188,595	$192,367	-7.6%	1.7%	0.3%	2.0%	
Contracted Maintenance	$166,937	$193,012	$153,812	$142,848	$108,528	$108,854	$111,031	$113,251	$115,516	$117,827	-10.2%	1.7%	0.3%	2.0%	
Supplies & Materials	$59,941	$48,242	$56,693	$43,162	$75,357	$75,583	$77,095	$78,637	$80,209	$81,813	5.9%	1.7%	0.3%	2.0%	
Utilities	$135,362	$115,620	$110,116	$106,159	$114,900	$115,244	$117,549	$119,900	$122,298	$124,744	-4.0%	1.7%	0.3%	2.0%	
Insurance	$37,229	$49,283	$48,967	$51,000	$48,300	$48,445	$49,414	$50,402	$51,410	$52,438	6.7%	1.7%	0.3%	2.0%	
Other Expenses	$10,233	$10,376	$9,992	$11,366	$9,541	$9,569	$9,761	$9,956	$10,155	$10,358	-1.7%	1.7%	0.3%	2.0%	
Total Direct Operating Expenses	**$653,013**	**$658,774**	**$574,838**	**$510,055**	**$533,811**	**$535,412**	**$546,121**	**$557,043**	**$568,184**	**$579,548**	**-4.9%**	**1.7%**	**0.3%**	**2.0%**	
Administration Expense Allocation	**$43,416**	**$45,579**	**$40,796**	**$46,148**	**$55,594**	**$55,761**	**$56,876**	**$58,014**	**$59,174**	**$60,357**	**6.4%**	**1.7%**	**0.3%**	**2.0%**	
Gross Profit (Before Capital Outlays)															
Gross Profit Before Capital Outlays	($250,167)	($266,869)	($217,589)	($144,733)	($137,893)	($138,099)	($140,894)	($143,746)	($146,655)	($149,623)	**13.8%**	**1.6%**			
Gross Profit (After Capital Outlays)															
Capital Outlays	**Only Forecast Information is Provided**					$263,000	$1,780,064	$905,389	$6,590,870	$1,529,900					
Gross Profit After Capital Outlays						($401,099)	($1,920,958)	($1,049,135)	($6,737,525)	($1,679,523)					

Source: VDF Business Plan.

Chapter 8.0
Airport Layout Plan

Tampa International Airport

Hillsborough County Aviation Authority

8.0 Airport Layout Plan

8.1 Introduction

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

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

The ALP drawing set includes the following individual drawing sheets which are provided at the end of this chapter in reduced-size format:

- Title Sheet (Sheet 1)
- Airport Data Sheet (Sheet 2)
- Airport Layout Plan Drawing (Sheet 3)
- Airport Airspace Drawings (Sheets 4 and 5)
- Airport Airspace Approach Profiles (Sheets 6 and 7)
- Inner Portion of the Approach Surface Drawings (Sheets 8, 9, and 11)
- Runway Departure Surface Drawings (Sheets 10 and 12)
- Terminal Area Drawings (Sheets 13 and 14)
- Land Use Drawing (Sheet 15)
- Exhibit "A" Property Map (Stand-Alone Document)

8.2 Title Sheet (Sheet 1)

The Title Sheet serves as the introduction to the ALP drawing set. It includes the airport name, a location map, vicinity map, and an index of drawings included in the ALP drawing set. Also highlighted on the Title Sheet are the project name, sponsor's name, and the FAA grant number.

8.3 Airport Data Sheet (Sheet 2)

The Airport Data Sheet summarizes key elements that are depicted on the Airport Layout Plan Drawing such as airport coordinates, runway end elevations, runway high and low points, and true azimuths for each runway. Supplemental tables, as required by the FAA ALP Review Checklist, are depicted on the Airport Data Sheet including the airport data table and runway data table.

8.4 Airport Layout Plan Drawing (Sheet 3)

The Airport Layout Plan Drawing, also referred to as the ALP, depicts all existing facilities and proposed developments planned over the 20-year planning period at VDF. These plans are reviewed by and must be approved by the FAA prior to authorizing federal funding for future improvement projects. The ALP provides clearance and dimensional information required to show conformance with applicable FAA design standards as outlined in FAA AC 150/5300-13A, *Airport Design*. The ALP also reflects planned changes to physical features on the airport property and critical land use changes near the airport property that may impact navigable airspace or the ability of the airport to operate. The features of the ALP include, but are not limited to: the runway, taxiways, lighting, navigational aids, terminal facilities, hangars, other airport buildings, aircraft parking areas, automobile parking, and airport access elements.

Key dimensional criteria for Runway 5-23 was based on Runway Design Code (RDC) B/II/4000 (RW 5) and B/II/5000 9 (RW23). The RDC for Runway 18-36 was based on RDC B/I/(S)/5000 (RW18) and B/I/(S)/VIS (RW36). The RDC and other runway approach factors are used to determine the physical characteristics of the runways (e.g., length, width, and strength), taxiway widths, and dimensions for the Runway Safety Area (RSA), Runway Object Free Area (ROFA), Building Restriction Line (BRL), clearance areas around navigational aids, etc.

8.5 Airport Airspace Drawings (Sheets 4 and 5)

Federal Aviation Regulations (FAR) Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*, prescribes airspace standards, which establish criteria for evaluating navigable airspace. Airport imaginary surfaces are established relative to the airport runways and types of approaches they provide. The size of each imaginary surface is based on the runway category with respect to the existing and proposed visual, non-precision, or precision approaches for that runway. The slope and dimensions of the respective approach surfaces are determined by the most demanding, existing or proposed, approach for each runway. For Runway 5-23 at VDF, the dimensions of the imaginary surfaces are applicable to the precision Instrument Landing System (ILS) approach to the Runway 23 end with one mile horizontal visibility minimums and the non-precision GPS approach to the Runway 5 end with 7/8 mile horizontal visibility minimums. For Runway 18-36, the dimensions of the imaginary surfaces are applicable to the non-precision GPS approaches to Runway 18 with one mile horizontal visibility minimums and the visual approach to Runway 36.

- Primary Surface – A rectangular area symmetrically located about the runway centerline and extending a distance of 200 feet beyond each runway end. Its elevation is the same as the nearest point along the runway edge. The primary surface for Runway 5-23 is 1,000 feet wide and the primary surface for Runway 18-36 is 500 feet wide.

- Horizontal Surface – An oval shaped, flat area situated 150 feet above the published airport elevation of 21.1 feet Above Mean Sea Level (AMSL) at VDF. Its dimensions are determined by connecting 10,000-foot arcs starting 200 feet beyond the future runway ends. The horizontal surface elevation for VDF is 171.1 feet AMSL.

- Conical Surface – A sloping area whose inner perimeter conforms to the shape of the horizontal surface. It extends outward for a distance of 4,000 feet measured horizontally, and slopes upward at a 20:1 ratio. At VDF, the conical surface extends upward to an elevation of 371.1 feet AMSL.

- Transitional Surface – A sloping area beginning at the edges of the primary and approach surfaces and sloping upward and outward at a ratio of 7:1.

- Approach Surface – This surface begins at the ends of the primary surface and slopes upward at a predetermined ratio while at the same time flaring out horizontally. The width and elevation of the inner ends conform to that of the primary surface, while the slope, length, and outer width are determined by the runway service category and existing or proposed instrument approach procedures.

8.6 Inner Portion of the Approach Surface Drawings (Sheets 8, 9 and 11)

The Inner Portion of the Approach Surface Drawings show both plan and profile views of the approach surfaces beyond each runway end. The purpose of these drawings is to locate and document existing objects which represent obstructions to navigable airspace within the existing and proposed approach slopes for each runway. Additionally, the drawings show the ground profile and terrain features along the extended centerline of each runway end.

Any controlling structures, such as roadways, natural ground elevations, and trees, are also shown on the Inner Portion of the Approach Surface Drawings, if applicable. Additionally, fixed objects located along the extended runway centerlines are also illustrated on the sheets to provide an indication of the relative distance to the approach surfaces. As applicable, obstructions to navigable airspace are listed in an obstruction data table along with a recommended action for each obstruction.

8.7 Runway Departure Surface Drawings (Sheets 10 and 12)

The Runway Departure Surfaces Drawing consists of large scale plan views of departure surfaces for all runway ends at VDF. The Departure Surfaces Drawing depicts the ground contour along the extended runway centerline plus any significant natural or non-natural objects located along the extended runway centerline and also provides a top elevation for those objects. Commonly shown objects include buildings, roads, ditches, and trees. Surface penetration and disposition information is included in the associated obstruction data tables.

8.8 Terminal Area Drawings (Sheets 13 and 14)

The Terminal Area Drawings presents an enlarged view of the Fixed Base Operator (FBO) area and hangar areas adjacent to each runway at VDF and therefore provides additional dimensional details such as apron areas (existing and proposed) that are not easily visible on the ALP. These drawings denote the short and long-term developments and improvements within the vicinity of the FBO complex at VDF and also illustrates many of the surrounding landside development recommendations. Existing and proposed automobile access and parking improvements are also included.

8.9 Land Use Drawing (Sheet 15)

The Land Use Drawing designates various sectors of the property for specific uses and also shows an aerial view of the land surrounding VDF. Additionally, the 2013 and 2033 noise contours developed as a component of this study have been superimposed on the drawing to ensure that appropriate aviation-compatible zoning is maintained. The FAA has established national guidelines for land use compatibility related to airport-generated noise impacts. In most cases, noise sensitive land uses are considered incompatible if they are exposed to Day-Night Average Sound Levels (DNL) of 65 decibels or higher, unless noise mitigation measures are undertaken.

8.10 Exhibit "A" Property Map (Stand-Alone Document)

In order to comply with FAA grant requirements, airport owners must demonstrate that they hold "good title, satisfactory to the Secretary, to the landing area of the airport or site thereof, or will give assurance satisfactory to the Secretary that good title will be acquired." In order to meet the FAA's grant assurances, a sponsors' title must be free and clear of any reversionary interest, lien, easement, lease, or other encumbrance that would create undue risk that might deprive the sponsor of control or possession, interfere with its use for public airport purposes, or make it impossible for the sponsor to carry out the obligations and covenants in the grant agreement. Per Appendix 4 of AC 150/5100-17, satisfactory evidence of title is demonstrated through the development of an Exhibit "A" Airport Property map which is accompanied by an attorney's title opinion which is often referred to as the Exhibit "C".

For this effort, a boundary survey was integrated with newly acquired title search data and reflected on a stand-alone map which complies with the FAA's most recent guidance – Standard Operating Procedure (SOP) for FAA Review of Exhibit "A" Airport Property Inventory Maps (ARP SOP 3.00).

The purpose of the drawing and associated tables is to identify how property and easements have been acquired in the past as well as to illustrate properties and easements that should be obtained in the future as necessary to accommodate the proposed development plan.

8.11 Summary

The ALP Drawing Set is intended to depict VDF's capital development program in graphical form. Prior to incorporating the developments herein, preliminary plans were presented to the Hillsborough County Aviation Authority (HCAA) Board, Master Plan Committee, FAA, and to

the public for their review and approval. Thus, this plan set accurately reflects the goals and intentions of airport management and the adjacent community throughout the 20-year planning period.

AIRPORT LAYOUT PLAN SET

TAMPA EXECUTIVE AIRPORT

TAMPA, FLORIDA

LOCATION MAP
NOT TO SCALE

VICINITY MAP
NOT TO SCALE

NOTE:
DO NOT SCALE DRAWINGS. ACTUAL SIZE MAY HAVE BEEN MODIFIED DURING REPRODUCTION.

AUGUST 2017

PREPARED FOR:
HILLSBOROUGH COUNTY AVIATION AUTHORITY

Tampa International Airport

PREPARED BY:

URS
URS Corporation Southern
7650 West Courtney
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IN ASSOCIATION WITH:

Michael Baker
INTERNATIONAL

HILLSBOROUGH COUNTY AVIATION AUTHORITY

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COUNTY COMMISSIONER VICTOR D. CRIST - SECRETARY

CHIEF EXECUTIVE OFFICER

MR. JOSEPH LOPANO

DRAWING INDEX

NO.	TITLE
1	COVER SHEET
2	AIRPORT DATA SHEET
3	AIRPORT LAYOUT PLAN DRAWING
4	AIRPORT AIRSPACE DRAWING - INNER PORTION
5	AIRPORT AIRSPACE DRAWING - OUTER PORTION
6	AIRPORT AIRSPACE PROFILES - RUNWAY 5/23
7	AIRPORT AIRSPACE PROFILES - RUNWAY 18/36
8	INNER PORTION OF THE APPROACH SURFACE DRAWING - RUNWAY 5
9	INNER PORTION OF THE APPROACH SURFACE DRAWING - RUNWAY 23
10	RUNWAY DEPARTURE SURFACES PLAN & PROFILE - RUNWAY 5/23
11	INNER PORTION OF THE APPROACH SURFACE DRAWING - RUNWAY 18/36
12	RUNWAY DEPARTURE SURFACES PLAN & PROFILE - RUNWAY 18/36
13	TERMINAL AREA DRAWING - RUNWAY 5/23
14	TERMINAL AREA DRAWING - RUNWAY 18/36
15	LAND USE DRAWING

NOTE: PROPERTY MAP INFORMATION INCORPORATED INTO STAND-ALONE EXHIBIT "A" PROPERTY MAP, DATED 6/24/2015

Drawing Number: 1

REVISIONS

NO.	DESCRIPTION	DATE	BY

CONSTRUCTION DATA

PRIME CONTRACTOR ______

WORK: COMMENCED ______ , COMPLETED ______

COST: BID $ ______ FINAL $ ______

PROJECT ENGINEER/INSPECTORS: ______

MAJOR SUBCONTRACTORS AND/OR SUPPLIERS ______

ALL CONSTRUCTION PERFORMED UNDER THIS CONTRACT WAS COMPLETED IN SUBSTANTIAL CONFORMITY WITH THE DRAWINGS, NOTES AND SPECIFICATIONS CONTAINED IN THESE PLANS. ALL CHANGES FROM THE PLANS AS BID, HAVE BEEN NOTED TO THE BEST OF OUR KNOWLEDGE.

(CERTIFIED) ______ PROJECT ENGINEER ______ DATE

FEDERAL AVIATION ADMINISTRATION

APPROVED ______ DATE ______

FLORIDA DEPT. OF TRANSPORTATION

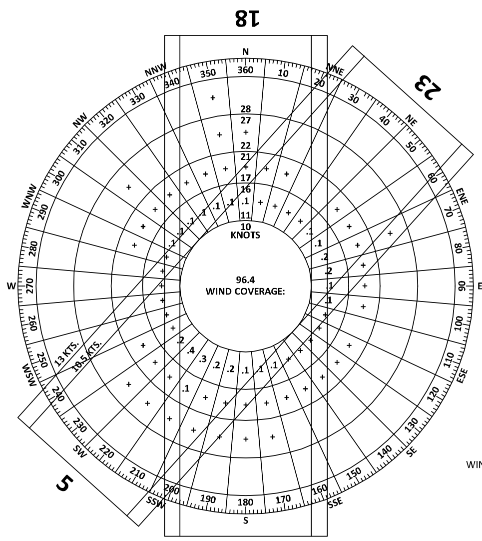
APPROVED ______ DATE ______

HILLSBOROUGH COUNTY AVIATION AUTHORITY
TAMPA, FLORIDA

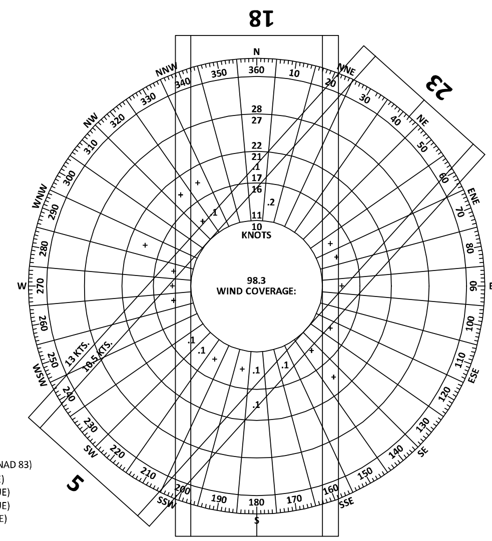
APPROVED ______ DATE ______

A/E - CONSULTANT
CITY, STATE

SUBMITTED ______ DATE ______
P.E. No. ______



ALL WEATHER WIND ROSE



IMC WEATHER WIND ROSE

WIND ROSE DEPICTED RELATIVE TO TRUE NORTH (NAD 83)
RUNWAY 5 ORIENTATION: 42°24'28.8" (TRUE)
RUNWAY 23 ORIENTATION: 222°24'46.8" (TRUE)
RUNWAY 18 ORIENTATION: 180°11'02.4" (TRUE)
RUNWAY 36 ORIENTATION: 00°11'02.4" (TRUE)
MAGNETIC DECLINATION: 5°23' W

METEOROLOGICAL CONDITION	RUNWAY	RUNWAY WIND COVERAGE BY PERCENT		
		10.5 KNOTS (12 MPH)	13 KNOTS (15 MPH)	OBSERVATIONS
ALL-WEATHER	5/23	98.95	99.51	239,042
ALL-WEATHER	18/36	98.62	99.40	
ALL-WEATHER	COMBINED	99.55	99.98	

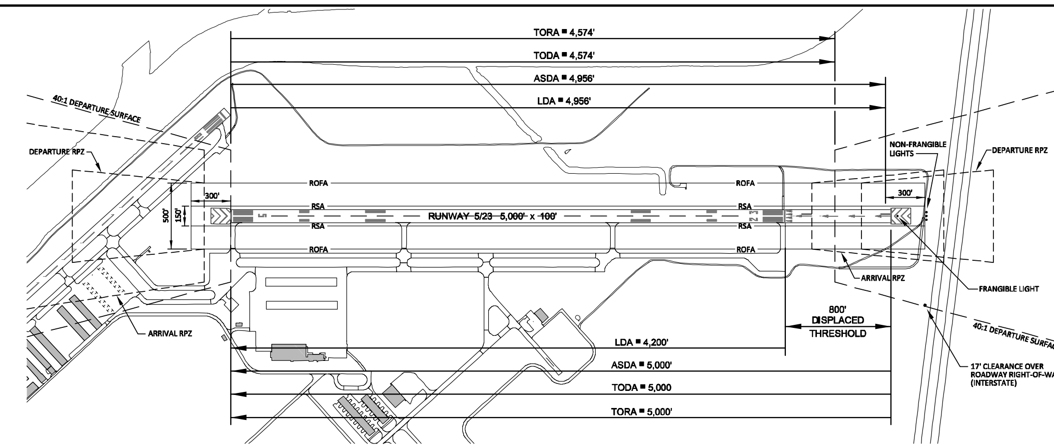
METEOROLOGICAL CONDITION	RUNWAY	RUNWAY WIND COVERAGE BY PERCENT		
		10.5 KNOTS (12 MPH)	13 KNOTS (15 MPH)	OBSERVATIONS
IMC (LOWEST MIN.)	5/23	99.18	99.53	2,014
IMC (LOWEST MIN.)	18/36	99.43	99.74	
IMC (LOWEST MIN.)	COMBINED	99.72	99.90	

SOURCES:
U.S DEPARTMENT OF COMMERCE; NATIONAL CLIMATIC DATA CENTER (NCDC) ASHEVILLE, NORTH CAROLINA,
SURFACE OBSERVATION DATA OBTAINED FOR WEATHER STATION: VANDENBERG
STATION NO.: 722021
RECORD PERIOD: 2004-2013
SURFACE OBSERVATION DATA COMPILED BY URS, 2014.

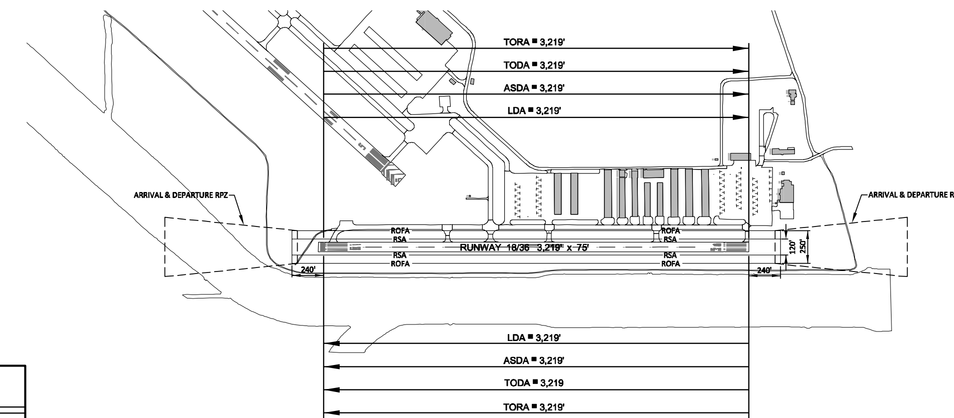
NOTES:
1. THIS GRAPHICAL CHART PLOTS, FOR THE DATA PERIOD LISTED, THE RECORDED OCCURRENCES (IN PERCENT) OF WIND BY DIRECTION AND SPEED WHILE THE RECTANGULAR BOXES REPRESENT COMPONENTS OF 10.5 KNOTS FOR RUNWAY 18/36 BASED ON (ARC B-I SMALL) AIRCRAFT DESIGN AND CROSSWIND LIMITATIONS AND 13 KNOTS FOR RUNWAY 5/23 BASED ON (ARC B-II) AIRCRAFT DESIGN AND CROSSWIND LIMITATIONS. THE AIRFIELD COVERAGE CAPABILITY IS THUS DETERMINED BY TOTALING ALL OCCURRENCES FALLING WITHIN THE RECTANGLE.
2. RUNWAYS ARE NUMBERED USING MAGNETIC HEADINGS WHILE WIND DATA IS PRESENTED USING TRUE HEADINGS. THEREFORE, THERE IS A 5°23' W DIFFERENCE BETWEEN THE RUNWAY HEADINGS AND THE WIND ROSE HEADINGS.

RUNWAY DATA TABLE

ITEM		RUNWAY 5/23 EXISTING		RUNWAY 5/23 FUTURE		RUNWAY 18/36 EXISTING		RUNWAY 18/36 FUTURE	
RUNWAY LENGTH/WIDTH (FT.)		5,000/100		SAME		3,219/75		SAME	
APPROACH REFERENCE CODE (APRC)		B/III/4000, D/II/4000 (RW5) B/III/5000, D/II/5000 (RW23)		B/III/4000, D/II/4000 (RW5) B/III/4000, D/II/4000 (RW23)		B/I(S)/5000 (RW18) B/I(S)/VIS (RW36)		SAME	
DEPARTURE REFERENCE CODE (DPRC)		B/III, D/II		SAME		B/I(S)		SAME	
RUNWAY DESIGN CODE (RDC)		B/II/4000 (RW5) B/II/5000 (RW23)		B/II/4000 (RW5) B/II/2400 (RW23)		B/I/(S)/5000 (RW18) B/I/(S)/VIS (RW36		SAME	
CRITICAL DESIGN AIRCRAFT		CESSNA CITATION 560XL		SAME		BEECHCRAFT KING AIR 200		SAME	
EFFECTIVE GRADIENT (%) / (MAXIMUM)		0.036/(0.06)		SAME		0.003/(0.52)		SAME	
% WIND COVERAGE (ALL WEATHER) (13 KTS.)		99.51		SAME		99.40		SAME	
RUNWAY PAVEMENT	STRENGTH (000 lbs.)	34 SG, 52 DG		SAME		59 SG, 84 DG		SAME	
	PCN	9/21/A/Y/T		TBD		21/F/B/X/T		TBD	
	SURFACE TYPE/FRICTION	CONCRETE/ASPHALT		SAME		ASPHALT		SAME	
MAXIMUM RUNWAY ELEVATION (ABOVE MSL)		21.1		SAME		18.9		SAME	
RUNWAY LIGHTING		MIRL		SAME		MIRL		SAME	
RUNWAY MARKING		PRECISION		SAME		NON–PRECISION		SAME	
RUNWAY ENDS		5	23	5	23	18	36	18	36
END ELEVATIONS (NAVD 88) (MSL)		19.2	21.0	SAME	SAME	18.4	18.5	SAME	SAME
END COORDINATES (NAD 83)	LATITUDE	28°00'43.6395"N	28°01'20.1890"N	SAME	SAME	28°00'48.3372"N	28°00'16.4631"N	SAME	SAME
	LONGITUDE	082°20'51.7276"W	082°20'14.1060"W	SAME	SAME	082°20'58.4278"W	082°20'58.5440"W	SAME	SAME
DISPLACED THRESHOLD ELEVATIONS (NAVD 88) (MSL)		N/A	21.0	SAME	SAME	N/A	N/A	SAME	SAME
DISPLACED THRESHOLD COORDINATES (NAD 83)	LATITUDE	N/A	28°01'14.3413"N	SAME	SAME	N/A	N/A	SAME	SAME
	LONGITUDE	N/A	082°20'20.1277"W	SAME	SAME	N/A	N/A	SAME	SAME
DATUM	HORIZONTAL	NAD83	NAD83	SAME	SAME	NAD83	NAD83	SAME	SAME
	VERTICAL	NAVD88	NAVD88	SAME	SAME	NAVD88	NAVD88	SAME	SAME
RUNWAY PROTECTION ZONE (RPZ)	LENGTH	1,700'	1,000'	SAME	1,700'	1,000'	1,000'	SAME	SAME
	WIDTH-INNER/OUTER	1,000'/1,510'	500'/700'	SAME	1,000'/1,510'	250'/450'	250'/450'	SAME	SAME
APPROACH LIGHTING		NONE	MALSR	SAME	SAME	NONE	NONE	SAME	SAME
RUNWAY TOUCH DOWN ZONE ELEVATIONS (MSL)		21.0	21.1	SAME	SAME	18.9	18.9	SAME	SAME
C.F.R. PART 77 IMAGINARY AIRSPACE SURFACES	APPROACH CATEGORY	NON-PRECISION	PRECISION	SAME	SAME	NON-PRECISION	VISUAL	SAME	SAME
	APPROACH SURFACE SLOPES	34:1	50:1	SAME	SAME	20:1	20:1	SAME	SAME
RUNWAY DEPARTURE SURFACE		YES	YES	SAME	SAME	YES	YES	SAME	SAME
THRESHOLD SITING SURFACE		YES	YES	SAME	SAME	YES	YES	SAME	SAME
NAVAIDS	ELECTRONIC NAVIGATION AIDS	GPS	ILS/GPS	SAME	SAME	GPS	NONE	SAME	SAME
	VISUAL APPROACH AIDS	PAPI-2/REILS	PAPI-2	SAME	SAME	PAPI-4/REILS	PAPI-2/REILS	SAME	SAME
TYPE OF INSTRUMENT APPROACH		RNAV(GPS)	ILS/RNAV(GPS)/LOC	SAME	SAME	RNAV(GPS)	N/A	SAME	SAME
TYPE OF SURVEY REQUIRED		VERTICALLY GUIDED	VERTICALLY GUIDED	SAME	SAME	NOT VERT. GUIDED	N/A	SAME	SAME
APPROACH VISIBILITY MINIMUMS		RVR 4000	RVR 5000	SAME	RVR 4000	RVR 5000	VISUAL	SAME	SAME
RUNWAY SAFETY AREA (RSA) W=WIDTH BRE=BEYOND RUNWAY END		W=150'		SAME		W=120'		SAME	
		BRE=300'		SAME		BRE=240'		SAME	
RUNWAY OBJECT FREE AREA (ROFA) W=WIDTH BRE=BEYOND RUNWAY END		W=500'		SAME		W=250'		SAME	
		BRE=300'		SAME		BRE=240'		SAME	
RUNWAY OBSTACLE FREE ZONE (OFZ) W=WIDTH BRE=BEYOND RUNWAY END		W=400'		SAME		W=250'		SAME	
		BRE=200'		SAME		BRE=200'		SAME	



RUNWAY 5/23 DECLARED DISTANCES



RUNWAY 18/36 DECLARED DISTANCES

TAXIWAY DATA TABLE

TAXIWAY	WIDTH	T.S.A	T.O.F.A.	LIGHTING
A (EXISTING)	35'	79'	131'	MITL
A1 (EXISTING)	25'	79'	131'	MITL
A2 (EXISTING)	35'	79'	131'	MITL
A3 (EXISTING)	30'	79'	131'	MITL
A4 (EXISTING)	35'	79'	131'	MITL
A5 (EXISTING)	32'	79'	131'	MITL
A6 (EXISTING)	32'	79'	131'	MITL
E (EXISTING)	35'	79'	131'	MITL
E (FUTURE)	35'	79'	131'	MITL
E1 (EXISTING)	35'	79'	131'	MITL
E2 (EXISTING)	35'	79'	131'	MITL
E3 (EXISTING)	35'	79'	131'	MITL
E4 (EXISTING)	35'	79'	131'	MITL
F (EXISTING)	35'	79'	131'	MITL
H (EXISTING)	35'	79'	131'	MITL
J (EXISTING)	35'	79'	131'	MITL

AIRPORT DATA TABLE

		EXISTING	FUTURE
AIRPORT REFERENCE CODE		B-II	SAME
MEAN MAX. TEMPERATURE - HOTTEST MONTH		90.2° (AUGUST)	SAME
ESTABLISHED AIRPORT ELEVATION (NAVD 88)		21.1 (MSL)	SAME
AIRPORT NAVIGATIONAL AIDS		ROTATING BEACON	SAME
AIRPORT REFERENCE POINT (ARP) COORDINATES (NAD 83)	LATITUDE	28°00'50.354"N	SAME
	LONGITUDE	082°20'42.932"W	SAME
MISCELLANEOUS FACILITIES		AWOS	SAME
AIRPORT REFERENCE CODE		B-II	SAME
CRITICAL AIRCRAFT		CESSNA CITATION 560XL	SAME
MAGNETIC VARIATION		5°23'W	ANNUAL RATE OF CHANGE 0°6'W/YR.
DATE OF MAGNETIC VARIATION		01/01/2015	SAME
AIRPORT ROLE (NPIAS/ASSET)		PU/GA/REGIONAL	SAME
AIRPORT ACREAGE (EXHIBIT "A", 6/24/15)		411.236 AC.	SAME

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FDOT AVIATION AND SPACEPORTS OFFICE ACCEPTANCE

THIS AIRPORT DRAWING IS APPROVED BY:

(SIGNATURE) ______________________ DATE: ________

NAME: ______________________

TITLE: ______________________

FAA APPROVAL BLOCK

AIRPORT SPONSOR APPROVAL

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(SIGNATURE) ______________________ DATE: ________

NAME: ______________________

TITLE: ______________________

DECLARED DISTANCES

RUNWAY	TORA	TODA	ASDA	LDA
5	4,574'	4,574'	4,956'	4,956'
23	5,000'	5,000'	5,000'	4,200'
18	3,219'	3,219'	3,219'	3,219'
36	3,219'	3,219'	3,219'	3,219'

SURVEY MONUMENTS

DESIGNATION	TYPE	LATITUDE	LONGITUDE	ELEVATION
VANDPORT	PACS	28°00'17.11961" N	082°20'57.55918" W	17.26
VANDPORT AZ MK	SACS	28°00'38.45631" N	082°20'57.48066" W	16.57
VCN A	SACS	28°00'46.96667" N	082°20'57.61052" W	17.21

MODIFICATION TO STANDARDS

NONE TO DATE

NOTES:

1. ALL ELEVATIONS ARE IN FEET (MSL).
2. HORIZONTAL DATUM NAD 83, VERTICAL DATUM NAVD 88.
3. DRAWING PREPARED IN FLORIDA STATE PLANE, WEST (0902), US FOOT.

BY	REVISIONS	DATE

URS Corporation Southern
7650 West Courtney
Campbell Causeway
Tampa, FL 33607-1462

Michael Baker INTERNATIONAL

Tampa International Airport

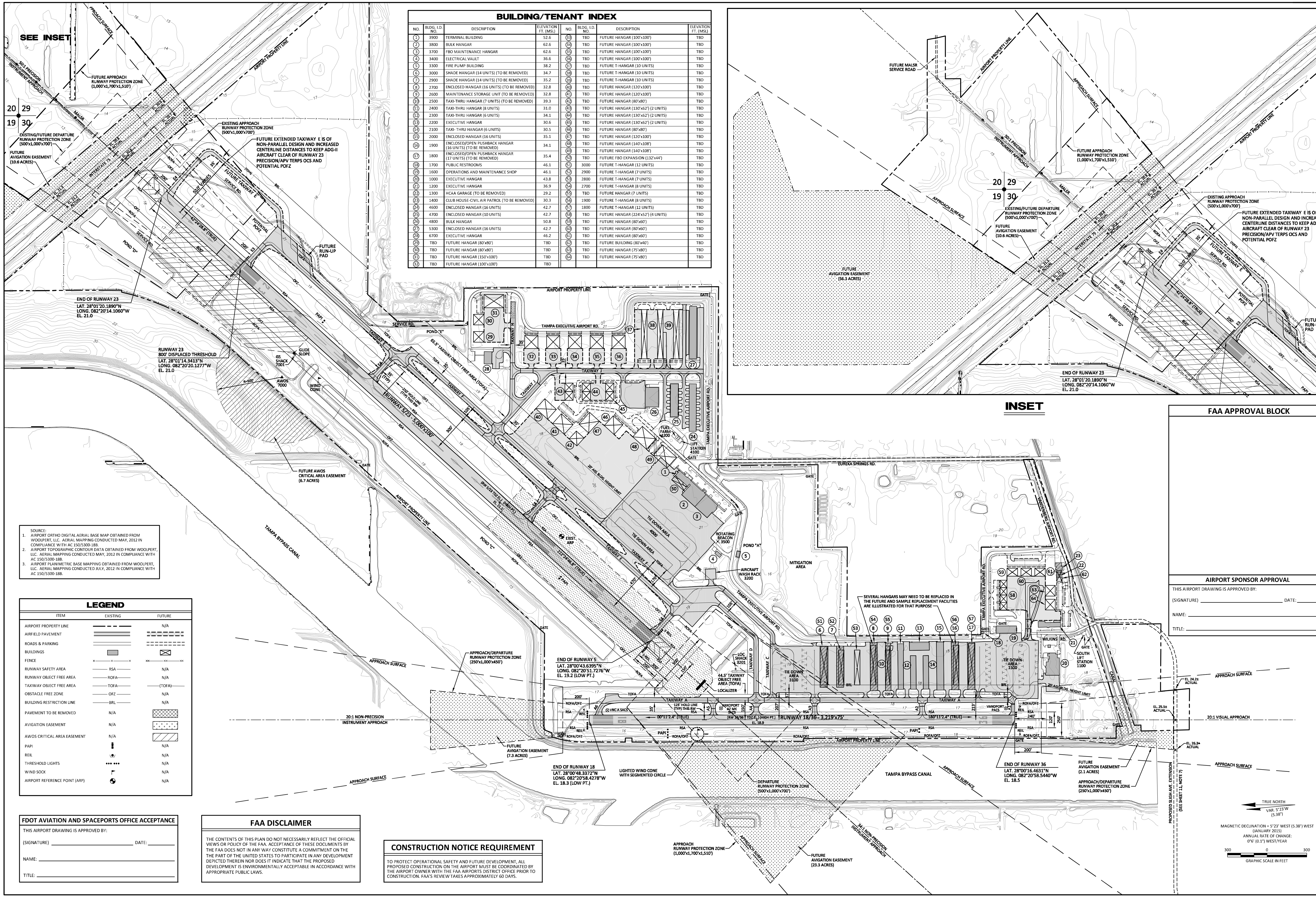
PROJECT NAME
MASTER PLAN UPDATE
TAMPA EXECUTIVE AIRPORT
Tampa, Florida

SHEET TITLE
AIRPORT DATA SHEET

HCAA NO.: 6255 14
FDOT NO.: 415760-1

DESIGNED: MJK
DRAWN: RJM
CHECKED: MLT
DATE: AUGUST 2017

Drawing Number:
2



BUILDING/TENANT INDEX

NO.	BLDG. I.D. NO.	DESCRIPTION	ELEVATION FT. (MSL)	NO.	BLDG. I.D. NO.	DESCRIPTION	ELEVATION FT. (MSL)
1	3900	TERMINAL BUILDING	52.6	33	TBD	FUTURE HANGAR (100'x100')	TBD
2	3800	BULK HANGAR	62.6	34	TBD	FUTURE HANGAR (100'x100')	TBD
3	3700	FBO MAINTENANCE HANGAR	62.6	35	TBD	FUTURE HANGAR (100'x100')	TBD
4	3400	ELECTRICAL VAULT	36.6	36	TBD	FUTURE HANGAR (100'x100')	TBD
5	3300	FIRE PUMP BUILDING	38.2	37	TBD	FUTURE T-HANGAR (10 UNITS)	TBD
6	3000	SHADE HANGAR (14 UNITS) (TO BE REMOVED)	34.7	38	TBD	FUTURE T-HANGAR (10 UNITS)	TBD
7	2900	SHADE HANGAR (14 UNITS) (TO BE REMOVED)	35.2	39	TBD	FUTURE T-HANGAR (10 UNITS)	TBD
8	2700	ENCLOSED HANGAR (16 UNITS) (TO BE REMOVED)	32.8	40	TBD	FUTURE HANGAR (120'x100')	TBD
9	2600	MAINTENANCE STORAGE UNIT (TO BE REMOVED)	32.8	41	TBD	FUTURE HANGAR (120'x100')	TBD
10	2500	TAXI-THRU HANGAR (7 UNITS) (TO BE REMOVED)	39.3	42	TBD	FUTURE HANGAR (80'x80')	TBD
11	2400	TAXI-THRU HANGAR (8 UNITS)	31.0	43	TBD	FUTURE HANGAR (130'x62') (2 UNITS)	TBD
12	2300	TAXI-THRU HANGAR (6 UNITS)	34.1	44	TBD	FUTURE HANGAR (130'x62') (2 UNITS)	TBD
13	2200	EXECUTIVE HANGAR	30.6	45	TBD	FUTURE HANGAR (130'x62') (2 UNITS)	TBD
14	2100	TAXI- THRU HANGAR (6 UNITS)	30.5	46	TBD	FUTURE HANGAR (80'x80')	TBD
15	2000	ENCLOSED HANGAR (16 UNITS)	35.1	47	TBD	FUTURE HANGAR (120'x100')	TBD
16	1900	ENCLOSED/OPEN PUSHBACK HANGAR (16 UNITS) (TO BE REMOVED)	34.1	48	TBD	FUTURE HANGAR (140'x108')	TBD
				49	TBD	FUTURE HANGAR (140'x108')	TBD
17	1800	ENCLOSED/OPEN PUSHBACK HANGAR (17 UNITS) (TO BE REMOVED)	35.4	50	TBD	FUTURE FBO EXPANSION (132'x44')	TBD
18	1700	PUBLIC RESTROOMS	46.1	51	3000	FUTURE T-HANGAR (12 UNITS)	TBD
19	1600	OPERATIONS AND MAINTENANCE SHOP	46.1	52	2900	FUTURE T-HANGAR (7 UNITS)	TBD
20	1000	EXECUTIVE HANGAR	43.8	53	2800	FUTURE T-HANGAR (7 UNITS)	TBD
21	1200	EXECUTIVE HANGAR	36.9	54	2700	FUTURE T-HANGAR (8 UNITS)	TBD
22	1300	HCAA GARAGE (TO BE REMOVED)	29.2	55	TBD	FUTURE HANGAR (7 UNITS)	TBD
23	1400	CLUB HOUSE-CIVIL AIR PATROL (TO BE REMOVED)	30.3	56	1900	FUTURE T-HANGAR (8 UNITS)	TBD
24	4600	ENCLOSED HANGAR (16 UNITS)	42.7	57	1800	FUTURE T-HANGAR (12 UNITS)	TBD
25	4700	ENCLOSED HANGAR (10 UNITS)	42.7	58	TBD	FUTURE HANGAR (224'x52') (4 UNITS)	TBD
26	4800	BULK HANGAR	50.8	59	TBD	FUTURE HANGAR (80'x60')	TBD
27	5300	ENCLOSED HANGAR (16 UNITS)	42.7	60	TBD	FUTURE HANGAR (80'x60')	TBD
28	6700	EXECUTIVE HANGAR	46.2	61	TBD	FUTURE HANGAR (80'x60')	TBD
29	TBD	FUTURE HANGAR (80'x80')	TBD	62	TBD	FUTURE BUILDING (80'x40')	TBD
30	TBD	FUTURE HANGAR (80'x80')	TBD	63	TBD	FUTURE HANGAR (75'x80')	TBD
31	TBD	FUTURE HANGAR (150'x100')	TBD	64	TBD	FUTURE HANGAR (75'x80')	TBD
32	TBD	FUTURE HANGAR (100'x100')	TBD				

INSET

SOURCE:
1. AIRPORT ORTHO DIGITAL AERIAL BASE MAP OBTAINED FROM WOOLPERT, LLC. AERIAL MAPPING CONDUCTED MAY, 2012 IN COMPLIANCE WITH AC 150/5300-18B.
2. AIRPORT TOPOGRAPHIC CONTOUR DATA OBTAINED FROM WOOLPERT, LLC. AERIAL MAPPING CONDUCTED MAY, 2012 IN COMPLIANCE WITH AC 150/5300-18B.
3. AIRPORT PLANIMETRIC BASE MAPPING OBTAINED FROM WOOLPERT, LLC. AERIAL MAPPING CONDUCTED JULY, 2012 IN COMPLIANCE WITH AC 150/5300-18B.

LEGEND

ITEM	EXISTING	FUTURE
AIRPORT PROPERTY LINE		N/A
AIRFIELD PAVEMENT		
ROADS & PARKING		
BUILDINGS		
FENCE		
RUNWAY SAFETY AREA	RSA	N/A
RUNWAY OBJECT FREE AREA	ROFA	N/A
TAXIWAY OBJECT FREE AREA	TOFA	(TOFA)
OBSTACLE FREE ZONE	OFZ	N/A
BUILDING RESTRICTION LINE	BRL	N/A
PAVEMENT TO BE REMOVED	N/A	
AVIGATION EASEMENT	N/A	
AWOS CRITICAL AREA EASEMENT	N/A	
PAPI		N/A
REIL		N/A
THRESHOLD LIGHTS		N/A
WIND SOCK		N/A
AIRPORT REFERENCE POINT (ARP)		N/A

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NAME: ______________________

TITLE: ______________________

TRUE NORTH
VAR. 5°23'W (5.38°)

MAGNETIC DECLINATION = 5°23' WEST (5.38°) WEST (JANUARY 2015)
ANNUAL RATE OF CHANGE: 0°6' (0.1°) WEST/YEAR

300 0 300
GRAPHIC SCALE IN FEET

REVISIONS | DATE | BY

URS Corporation Southern
Tampa International Airport

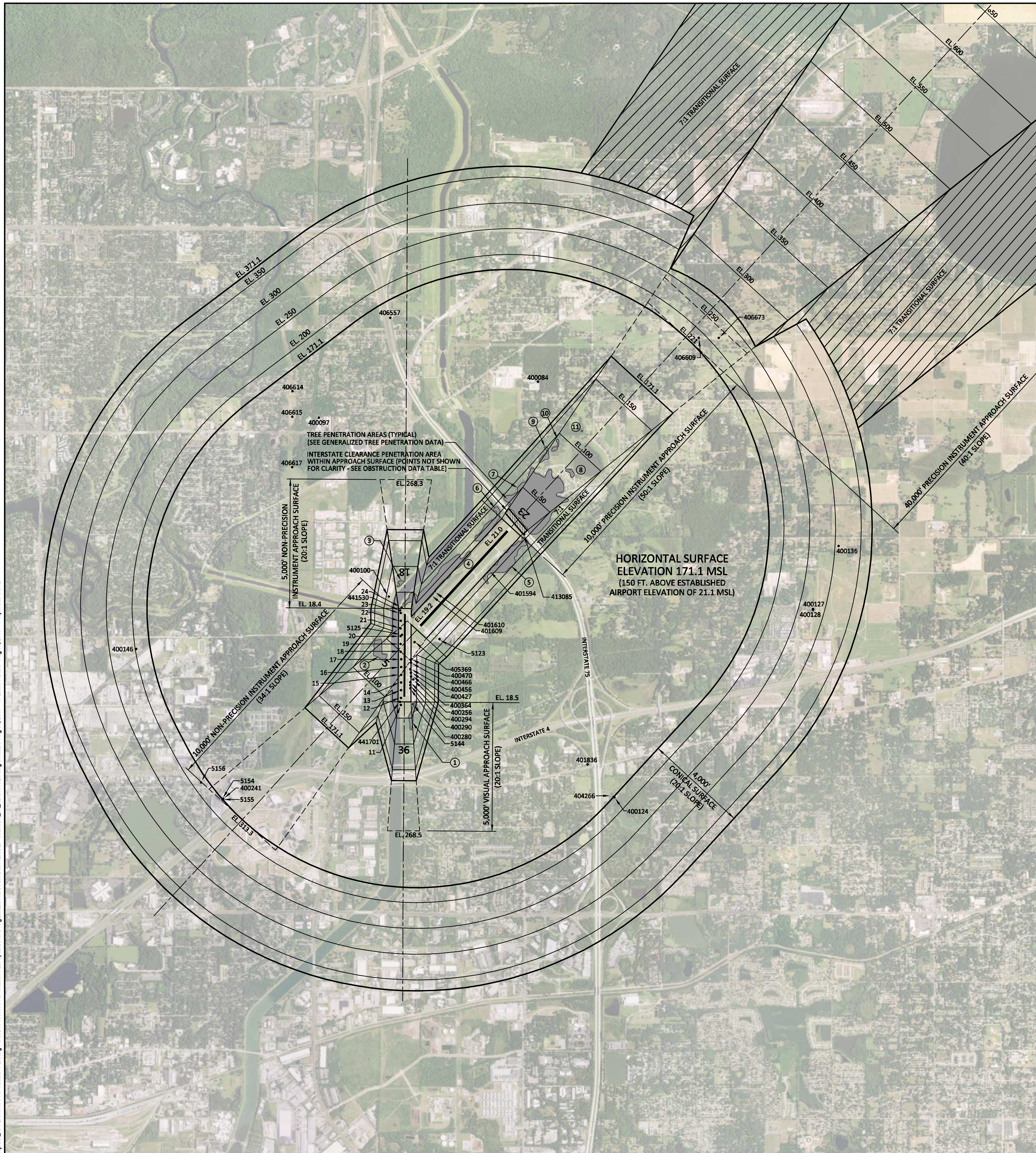
PROJECT NAME: MASTER PLAN UPDATE, TAMPA EXECUTIVE AIRPORT, Tampa, Florida

SHEET TITLE: AIRPORT LAYOUT PLAN DRAWING

HCAA NO.: 6255 14
FDOT NO.: 415760-1

DESIGNED: MJK
DRAWN: RJM
CHECKED: MLT
DATE: AUGUST 2017

Drawing Number: 3



OBSTRUCTION DATA TABLE

RW End App/Tran/Hor/Con	Object ID No.	Object Description	Object Elevation [MSL]	P77 Surface Penetrated	P77 Surface Penetration (Feet)	Existing / Proposed Disposition of Obstruction	RW End App/Tran/Hor/Con	Object ID No.	Object Description	Object Elevation [MSL]	P77 Surface Penetrated	P77 Surface Penetration (Feet)	Existing / Proposed Disposition of Obstruction
RW 5/23	5125	OL WSK	37.1650	PRIMARY	2.3143	NONE	RW 23	413342	INTERSTATE	37.7820	APPROACH	9.7951	NONE
RW 23	413348	INTERSTATE	37.9870	APPROACH	9.7859	NONE	RW 23	413344	INTERSTATE	37.8630	APPROACH	9.8089	NONE
RW 23	413349	INTERSTATE	37.9980	APPROACH	9.7561	NONE	RW 23	413346	INTERSTATE	37.9370	APPROACH	9.8118	NONE
RW 23	413354	INTERSTATE	37.9790	APPROACH	9.5090	NONE	RW 36	441701	BOLLARD	23.8090	APPROACH	5.1590	NONE
RW 23	413360	INTERSTATE	38.0310	APPROACH	9.3049	NONE	PRIMARY	400280	BUILDING	35.0200	PRIMARY	16.5300	TO BE LIGHTED
RW 23	413368	INTERSTATE	38.2910	APPROACH	9.2860	NONE	PRIMARY	400290	BUILDING	34.7670	PRIMARY	16.2840	NONE
RW 5	405369	DME 23	39.1940	APPROACH	7.8677	NONE	PRIMARY	400294	BUILDING	35.0200	PRIMARY	16.5370	TO BE LIGHTED
RW 23	413092	INTERSTATE	37.7300	APPROACH	13.6488	NONE	PRIMARY	400427	BUILDING	37.1500	PRIMARY	18.6790	NONE
RW 23	413099	INTERSTATE	37.7980	APPROACH	13.4688	NONE	PRIMARY	400456	BUILDING	35.8460	PRIMARY	17.3830	TO BE LIGHTED
RW 23	413107	INTERSTATE	37.8350	APPROACH	13.2591	NONE	PRIMARY	400466	BUILDING	33.9780	PRIMARY	15.5210	NONE
RW 23	413111	INTERSTATE	37.8410	APPROACH	13.1793	NONE	PRIMARY	400470	BUILDING	34.3820	PRIMARY	15.9250	TO BE LIGHTED
RW 23	413114	INTERSTATE	37.8400	APPROACH	13.1225	NONE	PRIMARY	441530	BOLLARD	24.2280	PRIMARY	5.8300	NONE
RW 23	413116	INTERSTATE	37.8370	APPROACH	13.0765	NONE	TRANSITIONAL	5123	OL APBN	80.1280	TRANS	5.0584	NONE
RW 23	413118	INTERSTATE	37.8310	APPROACH	13.0165	NONE	TRANSITIONAL	5144	OL WSK	55.4620	TRANS	21.1396	NONE
RW 23	413120	INTERSTATE	37.8220	APPROACH	12.9424	NONE	TRANSITIONAL	413085	INTERSTATE	37.6740	TRANS	7.5381	NONE
RW 23	413122	INTERSTATE	37.8090	APPROACH	12.8585	NONE	TRANSITIONAL	400100	ANTENNA	98.0130	TRANS	12.1395	NONE
RW 23	413124	INTERSTATE	37.7970	APPROACH	12.7759	NONE	TRANSITIONAL	401594	FENCE	25.5210	TRANS	1.0776	NONE
RW 23	413126	INTERSTATE	37.7870	APPROACH	12.7013	NONE	TRANSITIONAL	401609	FENCE	24.5980	TRANS	3.7975	NONE
RW 23	413128	INTERSTATE	37.7810	APPROACH	12.6422	NONE	TRANSITIONAL	401610	FENCE	25.4560	TRANS	4.3901	NONE
RW 23	413130	INTERSTATE	37.7770	APPROACH	12.5960	NONE	TRANSITIONAL	400256	BUILDING	34.6750	TRANS	3.4476	LIGHT
RW 23	413133	INTERSTATE	37.7740	APPROACH	12.5392	NONE	TRANSITIONAL	400364	BUILDING	34.3080	TRANS	15.2235	LIGHT
RW 23	413136	INTERSTATE	37.7800	APPROACH	12.4881	NONE	HORIZONTAL	5154	OL BLDG	204.1680	HORIZ	33.0680	NONE
RW 23	413138	INTERSTATE	37.7900	APPROACH	12.4503	NONE	HORIZONTAL	401836	FLAGPOLE	174.6540	HORIZ	3.5540	LIGHT
RW 23	413140	INTERSTATE	37.8100	APPROACH	12.4138	NONE	HORIZONTAL	400241	BUILDING	201.5730	HORIZ	30.4730	LIGHT
RW 23	413142	INTERSTATE	37.8350	APPROACH	12.3784	NONE	HORIZONTAL	406617	POWER LINE	177.8480	HORIZ	6.7480	LIGHT
RW 23	413144	INTERSTATE	37.8590	APPROACH	12.3431	NONE	HORIZONTAL	406615	POWER LINE	180.8500	HORIZ	9.7500	LIGHT
RW 23	413146	INTERSTATE	37.8790	APPROACH	12.3099	NONE	HORIZONTAL	400097	ANTENNA	223.3100	HORIZ	52.2100	LIGHT
RW 23	413148	INTERSTATE	37.8890	APPROACH	12.2780	NONE	HORIZONTAL	406614	POWER LINE	187.1660	HORIZ	16.0660	LIGHT
RW 23	413151	INTERSTATE	37.8830	APPROACH	12.2320	NONE	HORIZONTAL	406557	POLE	171.9490	HORIZ	0.8490	LIGHT
RW 23	413155	INTERSTATE	37.8740	APPROACH	12.1745	NONE	HORIZONTAL	400084	ANTENNA	176.0040	HORIZ	4.9040	LIGHT
RW 23	413157	INTERSTATE	37.8850	APPROACH	12.1459	NONE	CONICAL	5156	OL TWR	184.9170	CONICAL	1.3336	NONE
RW 23	413161	INTERSTATE	37.9570	APPROACH	12.0959	NONE	CONICAL	5155	ANTENNA	216.8740	CONICAL	45.7185	LIGHT
RW 23	413168	INTERSTATE	38.1020	APPROACH	11.9922	NONE	CONICAL	404266	TOP GUY WIRE MOUNT	352.9630	CONICAL	181.8092	LIGHT
RW 23	413176	INTERSTATE	38.1800	APPROACH	11.8117	NONE	CONICAL	400124	ANTENNA	449.0180	CONICAL	276.3035	LIGHT
RW 23	413290	INTERSTATE	37.8800	APPROACH	11.4601	NONE	CONICAL	400146	ANTENNA	368.7550	CONICAL	170.6647	LIGHT
RW 23	413298	INTERSTATE	37.7840	APPROACH	11.1010	NONE	CONICAL	406609	POWER LINE	194.3900	CONICAL	6.5042	LIGHT
RW 23	413306	INTERSTATE	37.9670	APPROACH	11.0353	NONE	CONICAL	400128	ANTENNA	374.4090	CONICAL	96.5311	LIGHT
RW 23	413314	INTERSTATE	37.8630	APPROACH	10.7420	NONE	CONICAL	400127	ANTENNA	375.4620	CONICAL	98.1000	LIGHT
RW 23	413316	INTERSTATE	37.8120	APPROACH	10.6454	NONE	CONICAL	400136	ANTENNA	467.7210	CONICAL	160.8621	LIGHT
RW 23	413317	INTERSTATE	37.7940	APPROACH	10.6016	NONE	CONICAL	406673	POWER TRANSMISSION POLE	220.1040	CONICAL	4.2321	LIGHT
RW 23	413318	INTERSTATE	37.7840	APPROACH	10.5628	NONE	RW 36	11	OL FENCE	24.00	APPROACH	6.00	LIGHTED
RW 23	413320	INTERSTATE	37.7900	APPROACH	10.5010	NONE	PRIMARY	12	OL FENCE	25.00	PRIMARY	6.00	LIGHTED
RW 23	413322	INTERSTATE	37.8170	APPROACH	10.4506	NONE	PRIMARY	13	OL FENCE	26.00	PRIMARY	6.00	LIGHTED
RW 23	413323	INTERSTATE	37.8350	APPROACH	10.4281	NONE	PRIMARY	14	OL FENCE	26.00	PRIMARY	6.00	LIGHTED
RW 23	413324	INTERSTATE	37.8520	APPROACH	10.4045	NONE	PRIMARY	15	OL FENCE	26.00	PRIMARY	6.00	LIGHTED
RW 23	413325	INTERSTATE	37.8680	APPROACH	10.3805	NONE	PRIMARY	16	OL FENCE	26.00	PRIMARY	6.00	LIGHTED
RW 23	413327	INTERSTATE	37.8860	APPROACH	10.3232	NONE	PRIMARY	17	OL FENCE	26.00	PRIMARY	6.00	LIGHTED
RW 23	413329	INTERSTATE	37.8750	APPROACH	10.2478	NONE	PRIMARY	18	OL FENCE	26.00	PRIMARY	6.00	LIGHTED
RW 23	413331	INTERSTATE	37.8310	APPROACH	10.1493	NONE	PRIMARY	19	OL FENCE	25.00	PRIMARY	6.00	LIGHTED
RW 23	413332	INTERSTATE	37.8020	APPROACH	10.0952	NONE	PRIMARY	20	OL FENCE	24.00	PRIMARY	6.00	LIGHTED
RW 23	413333	INTERSTATE	37.7710	APPROACH	10.0398	NONE	PRIMARY	21	OL FENCE	24.00	PRIMARY	6.00	LIGHTED
RW 23	413335	INTERSTATE	37.7160	APPROACH	9.9361	NONE	PRIMARY	22	OL FENCE	23.00	PRIMARY	6.00	LIGHTED
RW 23	413337	INTERSTATE	37.6840	APPROACH	9.8516	NONE	PRIMARY	23	OL FENCE	23.00	PRIMARY	6.00	LIGHTED
RW 23	413339	INTERSTATE	37.6940	APPROACH	9.8021	NONE	RW 18	24	OL FENCE	24.00	APPROACH	6.00	LIGHTED
RW 23	413341	INTERSTATE	37.7460	APPROACH	9.7915	NONE							

NOTES:

1. LOCAL ZONING IS CODIFIED AND ENFORCED VIA HCAA RESOLUTION 2017-37, AIRPORT ZONING REGULATIONS, UNDER THE PROVISIONS OF CHAPTER 333, FLORIDA STATUTES AND CHAPTER 2003-370, LAWS OF FLORIDA AS ADOPTED ON JUNE 1, 2017 FOR TPA, PCM, TPF AND VDF.
2. AIRPORT DISTRICT "SPI-AP" ESTABLISHED BY HILLSBOROUGH COUNTY.
3. SEE AIRPORT HEIGHT ZONING MAP "ZONE "A".
4. THE VERTICAL CLEARANCE (V.C.) OVER ROADS PER CODE OF FEDERAL REGULATIONS IS 17 FEET FOR INTERSTATE HIGHWAYS, 15 FEET FOR ANY OTHER PUBLIC ROADWAY, AND 10 FEET FOR A PRIVATE ROAD. THE VERTICAL CLEARANCE OVER A RAILROAD IS 23 FEET.
5. VERTICAL CLEARANCES (V.C.) FOR ROADS/ RAILROADS ARE CALCULATED USING THE ELEVATION OF THE ROAD/RAILROAD AT THAT POINT MEASURING VERTICALLY TO THE INTERSECTION OF THE SPECIFIC SURFACE. ROAD ELEVATIONS ARE ESTIMATED.
6. AERIAL BASE MAP IS FROM

GENERALIZED TREE PENETRATION DATA

GROUPING	RANGE OF PENETRATION
1	0 FT. - 20 FT.
2	0 FT. - 20 FT.
3	0 FT. - 9 FT.
4	0 FT. - 62 FT.
5	2 FT. - 52 FT.
6	2 FT. - 33 FT.
7	0 FT. - 47 FT.
8	0 FT. - 12 FT.
9	5 FT. - 38 FT.
10	21 FT. - 45 FT.
11	2 FT.

LEGEND

- GENERALIZED TREE PENETRATION AREA APPROACH / TRANSITIONAL SURFACE
- INTERSTATE CLEARANCE PENETRATION AREA

SOURCE:
VDF:
Derived from eALP 150/5300-18b Survey
Verify Date - 0162012

TRUE NORTH
VAR. 5°23'W (5.38°)

MAGNETIC DECLINATION = 5°23' WEST (5.38°) WEST
(JANUARY 2015)
ANNUAL RATE OF CHANGE:
0°6' (0.1°) WEST/YEAR

2000 0 2000
HORIZONTAL SCALE IN FEET

BY	REVISIONS	DATE

PROJECT NAME

URS Corporation Southern

Michael Baker INTERNATIONAL

Tampa International Airport

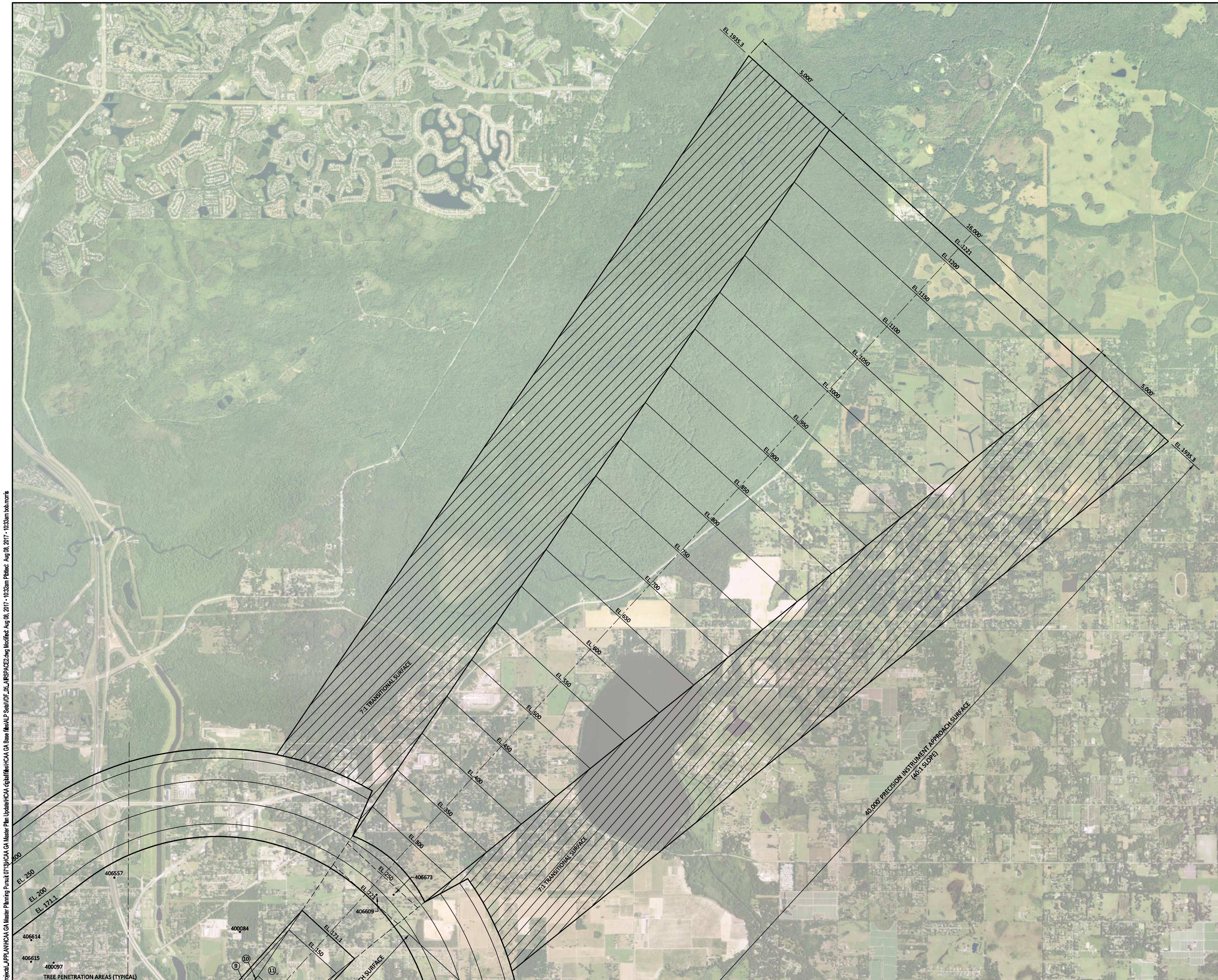
MASTER PLAN UPDATE
TAMPA EXECUTIVE AIRPORT
Tampa, Florida

SHEET TITLE
AIRPORT AIRSPACE DRAWING
INNER PORTION

HCAA NO.: 6255 14
FDOT NO.: 415760-1

DESIGNED: MJK
DRAWN: RJM
CHECKED: MLT
DATE: AUGUST 2017

Drawing Number:
4



NOTES:

1. LOCAL ZONING IS CODIFIED AND ENFORCED VIA HCAA RESOLUTION 2017-37, AIRPORT ZONING REGULATIONS, UNDER THE PROVISIONS OF CHAPTER 333, FLORIDA STATUTES AND CHAPTER 2003-370, LAWS OF FLORIDA AS ADOPTED ON JUNE 1, 2017 FOR TPA, PCM, TPF AND VDF.
2. AIRPORT DISTRICT "SPI-AP" ESTABLISHED BY HILLSBOROUGH COUNTY.
3. SEE AIRPORT HEIGHT ZONING MAP "ZONE "A".
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6. AERIAL BASE MAP IS FROM

GENERALIZED TREE PENETRATION DATA

GROUPING	RANGE OF PENETRATION
9	5 FT. - 38 FT.
10	21 FT. - 45 FT.
11	2 FT.

LEGEND

GENERALIZED TREE PENETRATION AREA APPROACH / TRANSITIONAL SURFACE

SOURCE:

VDF:
Derived from eALP 150/5300-18b Survey
Verify Date - 0162012

MAGNETIC DECLINATION = 5°23' WEST (5.38°) WEST (JANUARY 2015)
ANNUAL RATE OF CHANGE: 0°6' (0.1°) WEST/YEAR

2000 0 2000
HORIZONTAL SCALE IN FEET

DATE	REVISIONS	BY

URS Corporation Southern
7650 West Courtney Campbell Causeway
Tampa, FL 33607-1462

Michael Baker INTERNATIONAL

Tampa International Airport

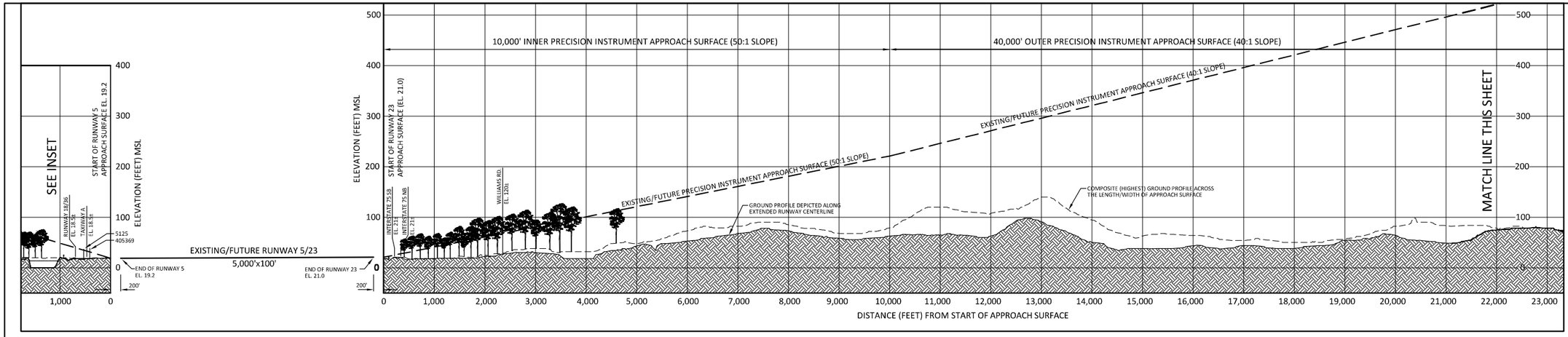
PROJECT NAME
MASTER PLAN UPDATE
TAMPA EXECUTIVE AIRPORT
Tampa, Florida

SHEET TITLE
AIRPORT AIRSPACE DRAWING
OUTER PORTION

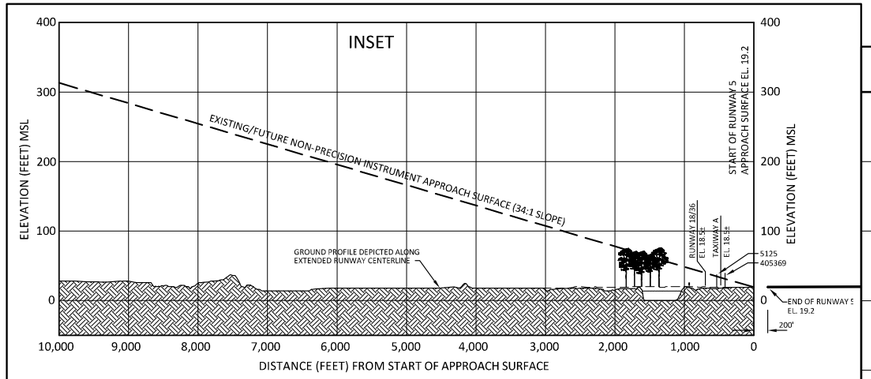
HCAA NO.: 6255 14
FDOT NO.: 415760-1

DESIGNED: MJK
DRAWN: RJM
CHECKED: MLT
DATE: AUGUST 2017

Drawing Number:
5



RUNWAY 23 APPROACH PROFILE VIEW



RUNWAY 5 APPROACH PROFILE VIEW

RUNWAY 23 APPROACH PROFILE VIEW

1000 0 1000
HORIZONTAL SCALE IN FEET
100 0 100
VERTICAL SCALE IN FEET

BY | REVISIONS | DATE

URS Corporation Southern
7650 Courtney Campbell Causeway
Tampa, FL 33607-1462

Michael Baker INTERNATIONAL

Tampa International Airport

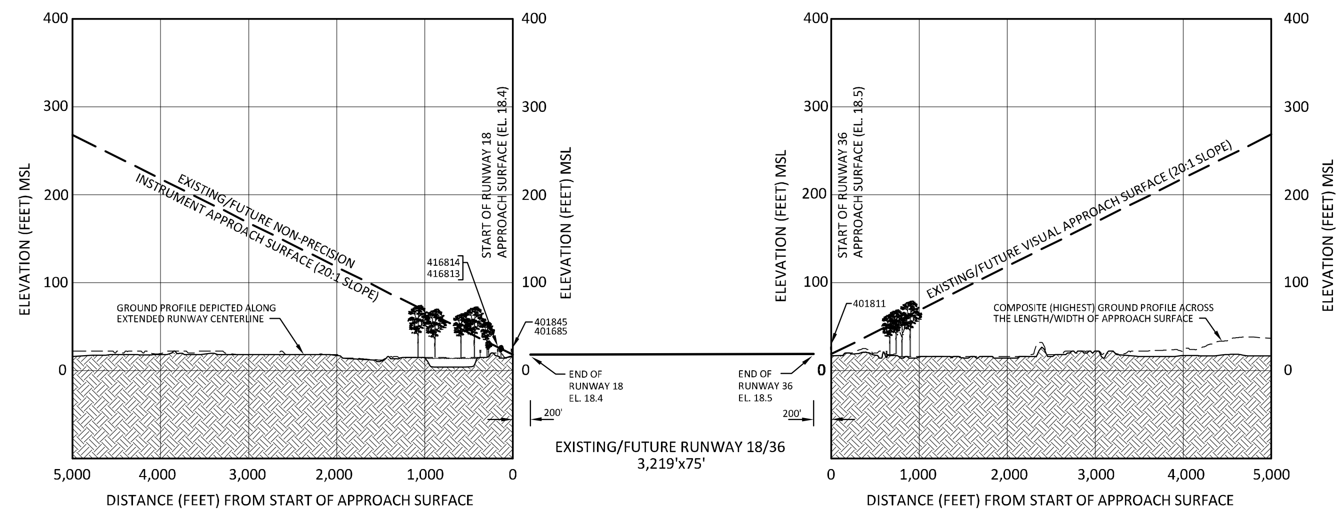
PROJECT NAME
MASTER PLAN UPDATE
TAMPA EXECUTIVE AIRPORT
Tampa, Florida

SHEET TITLE
AIRPORT AIRSPACE PROFILES
RUNWAY 5/23

HCAA NO.: 6255.14
FDOT NO.: 415760-1

DESIGNED: MJK
DRAWN: RJM
CHECKED: MLT
DATE: AUGUST 2017

Drawing Number: 6



RUNWAY 18/36 PROFILE VIEW

HORIZONTAL SCALE IN FEET: 1000 0 1000

VERTICAL SCALE IN FEET: 100 0 100

DATE	REVISIONS	BY

URS Corporation Southern
7650 West Courtney Campbell Causeway
Tampa, FL 33607-1462

Michael Baker INTERNATIONAL

Tampa International Airport

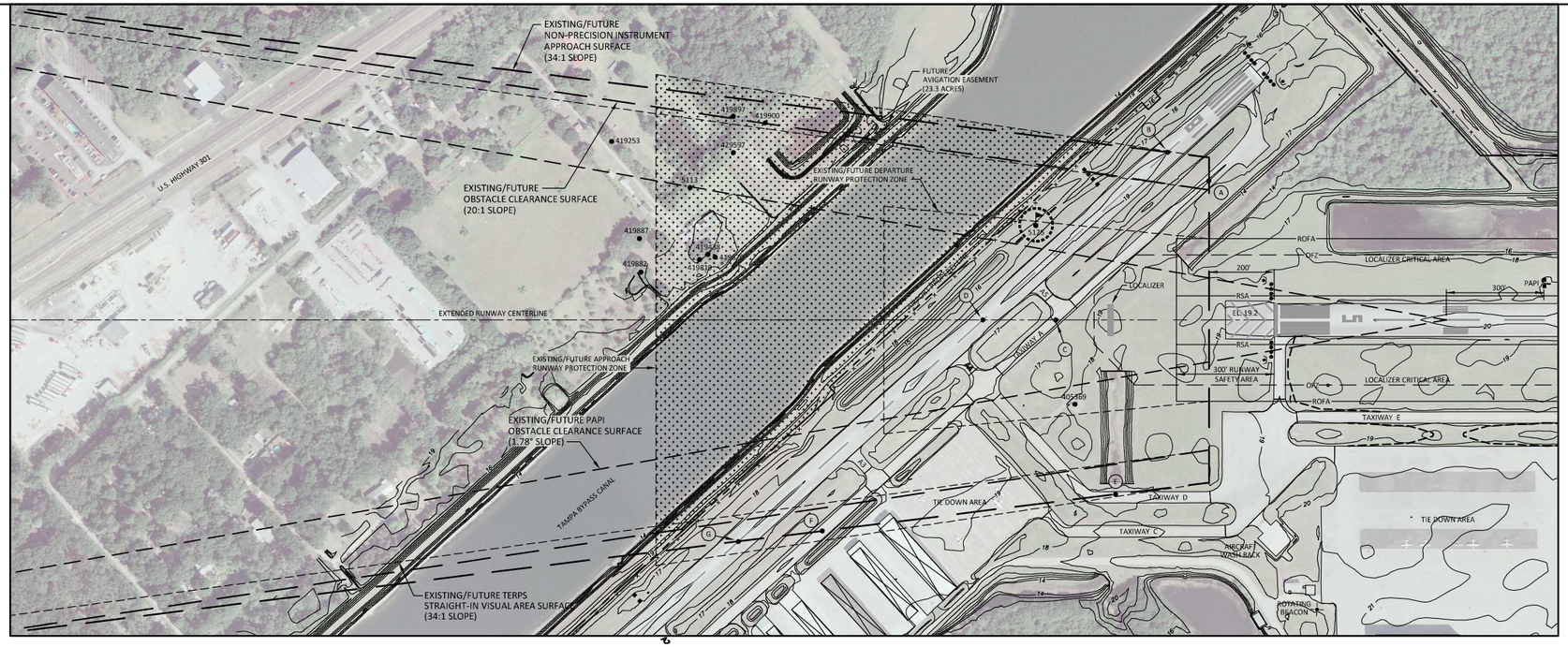
PROJECT NAME: MASTER PLAN UPDATE
TAMPA EXECUTIVE AIRPORT
Tampa, Florida

SHEET TITLE: AIRPORT AIRSPACE PROFILES
RUNWAY 18/36

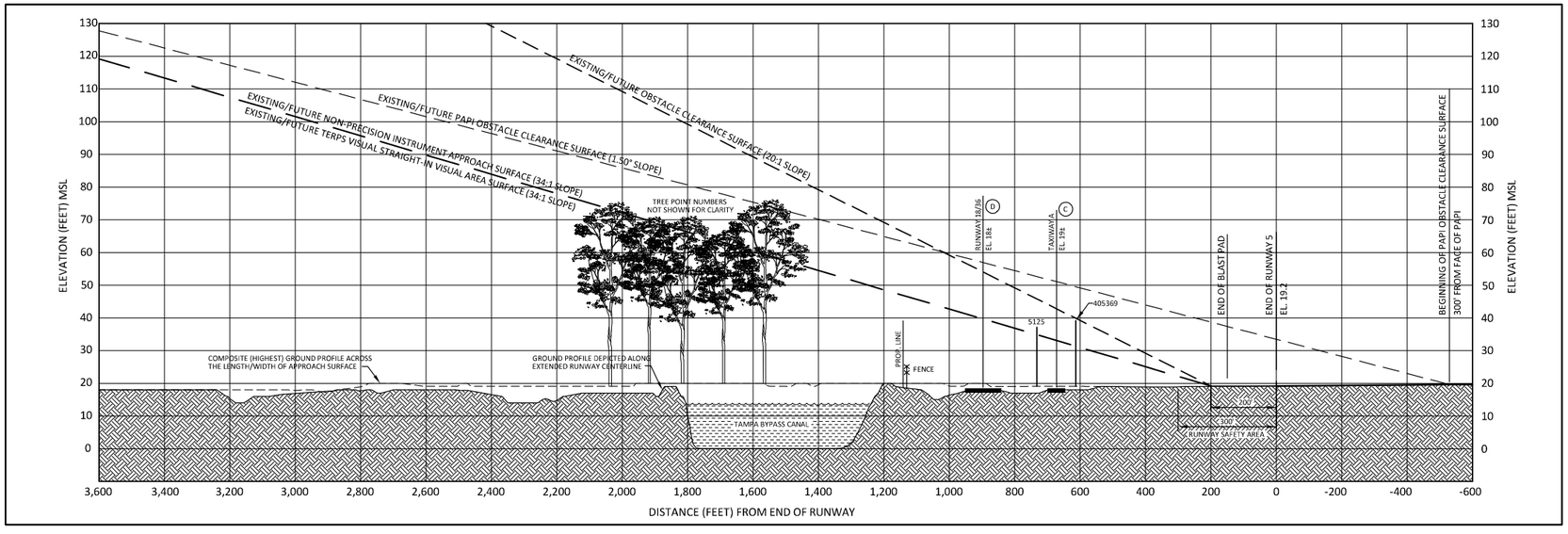
HCAA NO.: 6255 14
FDOT NO.: 415760-1

DESIGNED: MJK
DRAWN: RJM
CHECKED: MLT
DATE: AUGUST 2017

Drawing Number: 7



RUNWAY 5 INNER APPROACH SURFACE PLAN VIEW



RUNWAY 5 INNER APPROACH SURFACE PROFILE VIEW

OBSTRUCTION DATA TABLE

RW End	Object ID No.	Object Description	Object Elevation [MSL]	Approach Surface Penetration (Feet)	Existing / Proposed Disposition of Obstruction	Triggering Event	RW End	Object ID No.	Object Description	Object Elevation [MSL]	Approach Surface Penetration (Feet)	Existing / Proposed Disposition of Obstruction	Triggering Event
RW5	5113*	TREE	71.20	5.08	TRIM OR REMOVE	NONE	RW5	419897*	TREE	70.88	8.67	TRIM OR REMOVE	NONE
RW5	419253*	TREE	74.92	1.71	TRIM OR REMOVE	NONE	RW5	419900*	TREE	76.55	17.23	TRIM OR REMOVE	NONE
RW5	419438*	TREE	66.20	1.68	TRIM OR REMOVE	NONE	RW5	429597*	TREE	43.76	7.58	TRIM OR REMOVE	NONE
RW5	419819*	TREE	67.24	1.96	TRIM OR REMOVE	NONE	RW5	5125	OL WIND SOCK	37.17	2.31	NONE	NONE
RW5	419820*	TREE	64.20	0.33	TRIM OR REMOVE	NONE	RW5	405369	DME RW 23	39.19	7.87	NONE	NONE
RW5	419882*	TREE	73.32	2.75	TRIM OR REMOVE	NONE							
RW5	419887*	TREE	70.93	0.22	TRIM OR REMOVE	NONE							

* TREE PENETRATION POINTS NOT DEPICTED IN PROFILE FOR CLARITY

NOTES:
1. LOCAL ZONING IS CODIFIED AND ENFORCED VIA HCAA RESOLUTION 2010-54, AIRPORT ZONING REGULATIONS, UNDER THE PROVISIONS OF CHAPTER 333, FLORIDA STATUTES AND CHAPTER 2003-370, LAWS OF FLORIDA AS ADOPTED ON MARCH 1, 2010 FOR TPA, PCM, TPF AND VDF.
2. AIRPORT DISTRICT "SPI-AP" ESTABLISHED BY HILLSBOROUGH COUNTY.
3. SEE AIRPORT HEIGHT ZONING MAP "ZONE "A".
4. THE VERTICAL CLEARANCE (V.C.) OVER ROADS PER CODE OF FEDERAL REGULATIONS IS 17 FEET FOR INTERSTATE HIGHWAYS, 15 FEET FOR ANY OTHER PUBLIC ROADWAY, AND 10 FEET FOR A PRIVATE ROAD. THE VERTICAL CLEARANCE OVER A RAILROAD IS 23 FEET.
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6. BASE IS FROM AERIAL PHOTOGRAPHY FLOWN IN 2014.

CFR PART 77
APPROACH SURFACE
ROAD CLEARANCES

- (A) TAXIWAY A EL. 19‡ (ACTUAL) V.C.=7' (8' PENETRATION)
- (B) RUNWAY 18/36 EL. 18‡ (ACTUAL) V.C.=6' (9' PENETRATION)
- (C) TAXIWAY A EL. 18‡ (ACTUAL) V.C.=5' (10' PENETRATION)
- (D) RUNWAY 18/36 EL. 19‡ (ACTUAL) V.C.=5' (10' PENETRATION)
- (E) TAXIWAY C EL. 19‡ (ACTUAL) V.C.=5' (10' PENETRATION)
- (F) TAXIWAY A EL. 19‡ (ACTUAL) V.C.=5' (10' PENETRATION)
- (G) RUNWAY 18/36 EL. 19‡ (ACTUAL) V.C.=5' (10' PENETRATION)

LEGEND
FUTURE AVIGATION EASEMENT

SOURCE:
VDF:
Derived from eALP 150/5300-18b Survey
Verify Date - 0162012

(5.38°) VAR 5°23'W TRUE NORTH

MAGNETIC DECLINATION = 5°23' WEST (5.38°) WEST (JANUARY 2015)
ANNUAL RATE OF CHANGE: 0°6' (0.1°) WEST/YEAR

200 0 200
HORIZONTAL SCALE IN FEET

20 0 20
VERTICAL SCALE IN FEET

BY	REVISIONS	DATE

URS Corporation Southern
3034 Rocky Point Drive
Carrollwood Causeway
Tampa FL 33607-1462

Michael Baker INTERNATIONAL

Tampa International Airport

PROJECT NAME
MASTER PLAN UPDATE
TAMPA EXECUTIVE AIRPORT
Tampa, Florida

SHEET TITLE
INNER PORTION OF THE
APPROACH SURFACE DRAWING
RUNWAY 5

HCAA NO.: 6255 14
FDOT NO.: 415760-1

DESIGNED: MJK
DRAWN: RJM
CHECKED: MLT
DATE: AUGUST 2017

Drawing Number: 8

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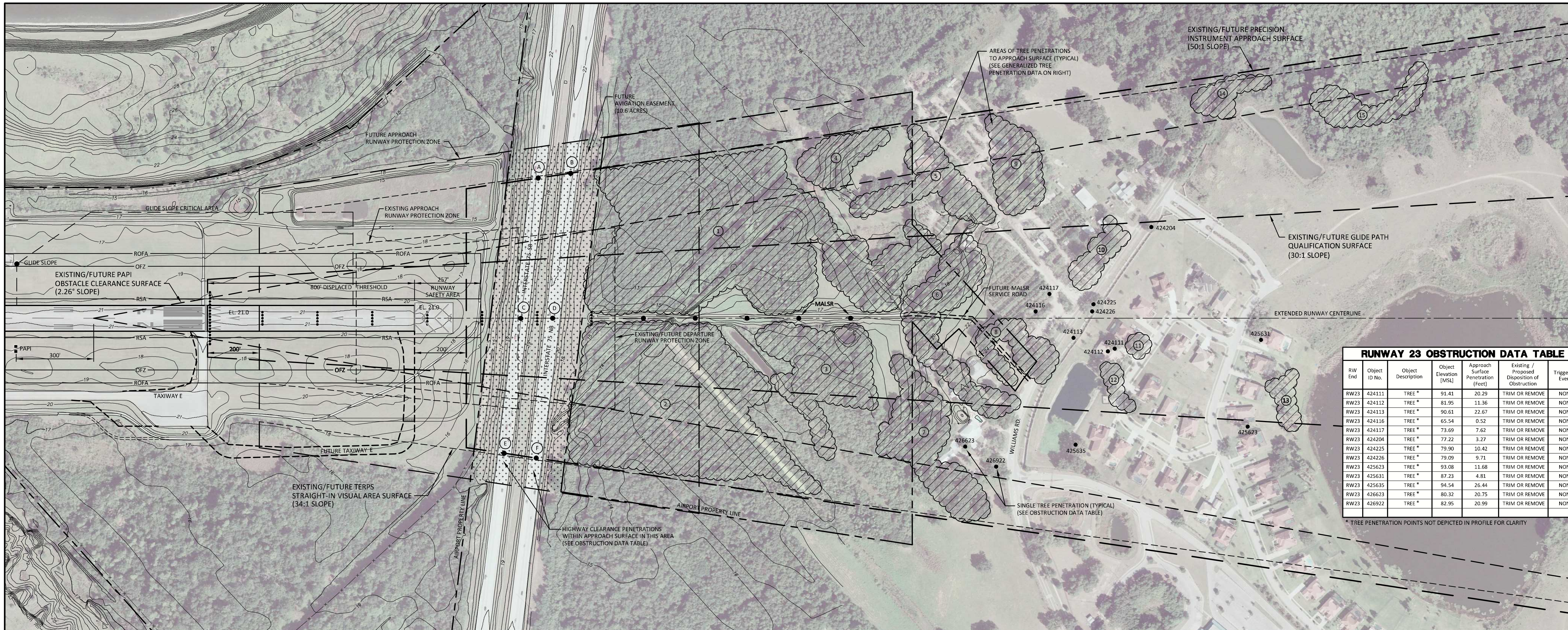
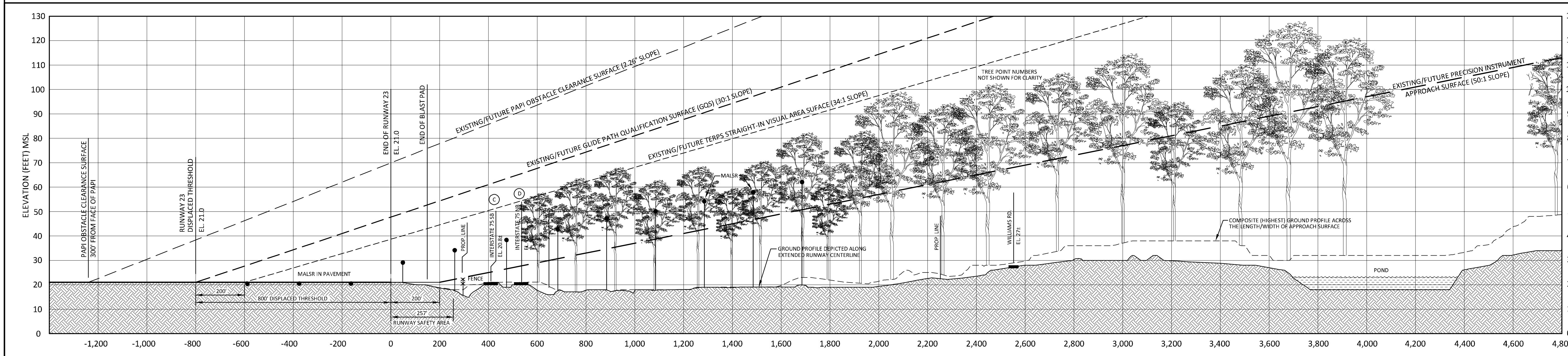


RUNWAY 23 OBSTRUCTION DATA TABLE

RW End	Object ID No.	Object Description	Object Elevation [MSL]	Approach Surface Penetration (Feet)	Existing / Proposed Disposition of Obstruction	Triggering Event
RW23	424111	TREE *	91.41	20.29	TRIM OR REMOVE	NONE
RW23	424112	TREE *	81.95	11.36	TRIM OR REMOVE	NONE
RW23	424113	TREE *	90.61	22.67	TRIM OR REMOVE	NONE
RW23	424116	TREE *	65.54	0.52	TRIM OR REMOVE	NONE
RW23	424117	TREE *	73.69	7.62	TRIM OR REMOVE	NONE
RW23	424204	TREE *	77.22	3.27	TRIM OR REMOVE	NONE
RW23	424225	TREE *	79.90	10.42	TRIM OR REMOVE	NONE
RW23	424226	TREE *	79.09	9.71	TRIM OR REMOVE	NONE
RW23	425623	TREE *	93.08	11.68	TRIM OR REMOVE	NONE
RW23	425631	TREE *	87.23	4.81	TRIM OR REMOVE	NONE
RW23	425635	TREE *	94.54	26.44	TRIM OR REMOVE	NONE
RW23	426623	TREE *	80.32	20.75	TRIM OR REMOVE	NONE
RW23	426922	TREE *	82.95	20.99	TRIM OR REMOVE	NONE

* TREE PENETRATION POINTS NOT DEPICTED IN PROFILE FOR CLARITY

RUNWAY 23 INNER APPROACH SURFACE PLAN VIEW



RUNWAY 23 INNER APPROACH SURFACE PROFILE VIEW

SOURCE:
VDF:
Derived from eALP 150/5300-18b Survey
Verify Date - 0162012

MAGNETIC DECLINATION = 5°23' WEST (5.38°) WEST (JANUARY 2015)
ANNUAL RATE OF CHANGE: 0°6' (0.1°) WEST/YEAR

HORIZONTAL SCALE IN FEET
VERTICAL SCALE IN FEET

NOTES:

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GENERALIZED TREE PENETRATION DATA

GROUPING	RANGE OF PENETRATION
1	0 FT. - 47 FT.
2	0 FT. - 39 FT.
3	0 FT. - 16 FT.
4	33 FT. - 45 FT.
5	14 FT. - 42 FT.
6	0 FT. - 39 FT.
7	7 FT. - 42 FT.
8	2 FT. - 27 FT.
9	17 FT. - 38 FT.
10	0 FT. - 43 FT.
11	7 FT. - 23 FT.
12	3 FT. - 19 FT.
13	0 FT. - 8 FT.
14	29 FT. - 38 FT.
15	21 FT. - 45 FT.

CFR PART 77
APPROACH SURFACE
ROAD CLEARANCES

- (A) INTERSTATE 75 SOUTH, EL. 21.2± (ACTUAL), V.C.=7' (8' PENETRATION)
- (B) INTERSTATE 75 NORTH, EL. 21.3± (ACTUAL), V.C.=6' (9' PENETRATION)
- (C) INTERSTATE 75 SOUTH, EL. 20.8± (ACTUAL), V.C.=5' (10' PENETRATION)
- (D) INTERSTATE 75 NORTH, EL. 20.8± (ACTUAL), V.C.=5' (10' PENETRATION)
- (E) INTERSTATE 75 SOUTH, EL. 20.7± (ACTUAL), V.C.=5' (10' PENETRATION)
- (F) INTERSTATE 75 NORTH, EL. 20.9± (ACTUAL), V.C.=5' (10' PENETRATION)

LEGEND

- TREE PENETRATION AREA APPROACH SURFACE
- FUTURE AVIGATION EASEMENT

BY	REVISIONS	DATE

URS
Michael Baker INTERNATIONAL
Tampa International Airport

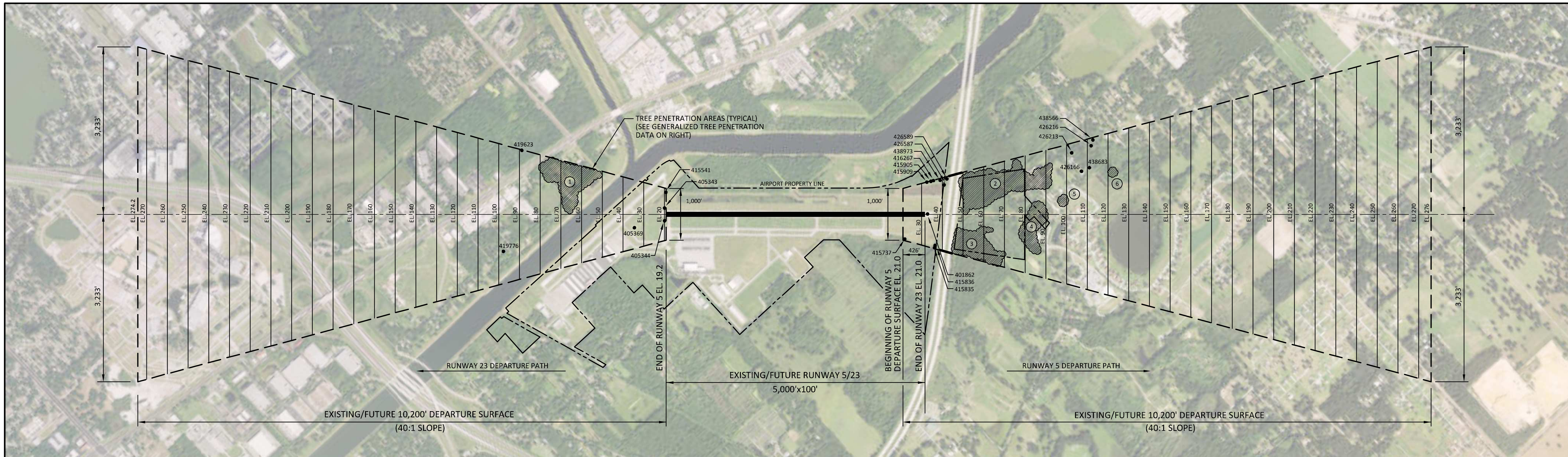
PROJECT NAME: MASTER PLAN UPDATE
TAMPA EXECUTIVE AIRPORT
Tampa, Florida

SHEET TITLE: INNER PORTION OF THE APPROACH SURFACE DRAWING
RUNWAY 23

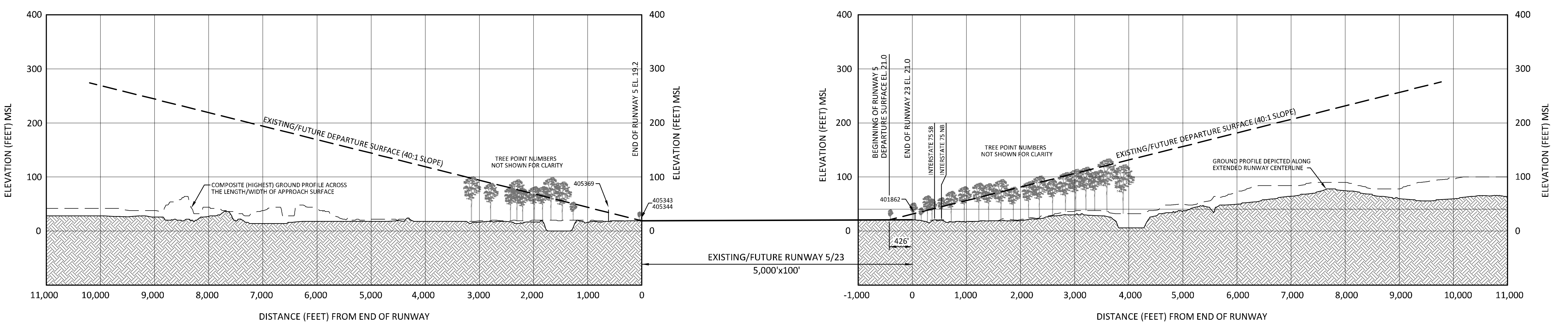
HCAA NO.: 6255 14
FDOT NO.: 415760-1

DESIGNED: MJK
DRAWN: RJM
CHECKED: MLT
DATE: AUGUST 2017

Drawing Number: 9



RUNWAY 5/23 DEPARTURE SURFACE PLAN VIEW



RUNWAY 5/23 DEPARTURE SURFACE PROFILE VIEW

OBSTRUCTION DATA TABLE

RW End	Object ID No.	Object Description	Object Elevation [MSL]	Departure Surface Penetration (Feet)	Existing / Proposed Disposition of Obstruction	RW End	Object ID No.	Object Description	Object Elevation [MSL]	Departure Surface Penetration (Feet)	Existing / Proposed Disposition of Obstruction	RW End	Object ID No.	Object Description	Object Elevation [MSL]	Departure Surface Penetration (Feet)	Existing / Proposed Disposition of Obstruction
5	405343	REIL 05	21.60	1.64	NONE	23	401862	MALSR LT	33.70	11.45	NONE	23	415737	TREE*	39.06	17.23	TRIM OR REMOVE
5	405344	REIL 05	21.60	1.65	NONE	23	426589	TREE*	63.78	21.55	TRIM OR REMOVE	23	415836	TREE*	63.48	26.98	TRIM OR REMOVE
5	405369	DME 23	39.19	4.69	NONE	23	426587	TREE*	59.52	29.25	TRIM OR REMOVE	23	415835	TREE*	70.79	34.54	TRIM OR REMOVE
5	419623	TREE*	88.90	0.04	TRIM OR REMOVE	23	438973	TREE*	65.32	26.34	TRIM OR REMOVE	23	438566	TREE*	115.80	3.09	TRIM OR REMOVE
5	419776	TREE*	100.87	3.13	TRIM OR REMOVE	23	416267	TREE*	40.91	5.19	TRIM OR REMOVE	23	426216	TREE*	117.54	5.69	TRIM OR REMOVE
5	415541	TREE*	35.49	16.19	TRIM OR REMOVE	23	415905	TREE*	53.13	18.64	TRIM OR REMOVE	23	426213	TREE*	108.04	5.56	TRIM OR REMOVE
						23	415909	TREE*	51.74	19.19	TRIM OR REMOVE	23	426166	TREE*	111.67	4.45	TRIM OR REMOVE
												23	438683	TREE*	118.01	7.01	TRIM OR REMOVE

* TREE PENETRATION POINTS NOT DEPICTED IN PROFILE FOR CLARITY

SOURCE:
VDF:
Derived from eALP 150/5300-18b Survey
Verify Date - 0162012

MAGNETIC DECLINATION = 5°23' WEST (5.38°) WEST
(JANUARY 2015)
ANNUAL RATE OF CHANGE:
0°6' (0.1°) WEST/YEAR

HORIZONTAL SCALE IN FEET
VERTICAL SCALE IN FEET

NOTES:

1. LOCAL ZONING IS CODIFIED AND ENFORCED VIA HCAA RESOLUTION 2010-54, AIRPORT ZONING REGULATIONS, UNDER THE PROVISIONS OF CHAPTER 333, FLORIDA STATUTES AND CHAPTER 2003-370, LAWS OF FLORIDA AS ADOPTED ON MARCH 1, 2010 FOR TPA, PCM, TPF AND VDF.
2. AIRPORT DISTRICT "SPI-AP" ESTABLISHED BY HILLSBOROUGH COUNTY.
3. SEE AIRPORT HEIGHT ZONING MAP "ZONE "A".
4. THE VERTICAL CLEARANCE (V.C.) OVER ROADS PER CODE OF FEDERAL REGULATIONS IS 17 FEET FOR INTERSTATE HIGHWAYS, 15 FEET FOR ANY OTHER PUBLIC ROADWAY, AND 10 FEET FOR A PRIVATE ROAD. THE VERTICAL CLEARANCE OVER A RAILROAD IS 23 FEET.
5. VERTICAL CLEARANCES (V.C.) FOR ROADS/ RAILROADS ARE CALCULATED USING THE ELEVATION OF THE ROAD/RAILROAD AT THAT POINT MEASURING VERTICALLY TO THE INTERSECTION OF THE SPECIFIC SURFACE. ROAD ELEVATIONS ARE ESTIMATED.
6. BASE MAP IS FROM 7.5° USGS QUADANGLE MAPS DATED 2014.

GENERALIZED TREE PENETRATION DATA

GROUPING	RANGE OF PENETRATION
1	0 FT. - 37 FT.
2	0 FT. - 38 FT.
3	0 FT. - 38 FT.
4	0 FT. - 38 FT.
5	3 FT. - 9 FT.
6	3 FT. - 12 FT.

LEGEND

TREE PENETRATION AREA DEPARTURE SURFACE

REVISIONS | DATE | BY

Michael Baker INTERNATIONAL

Tampa International Airport

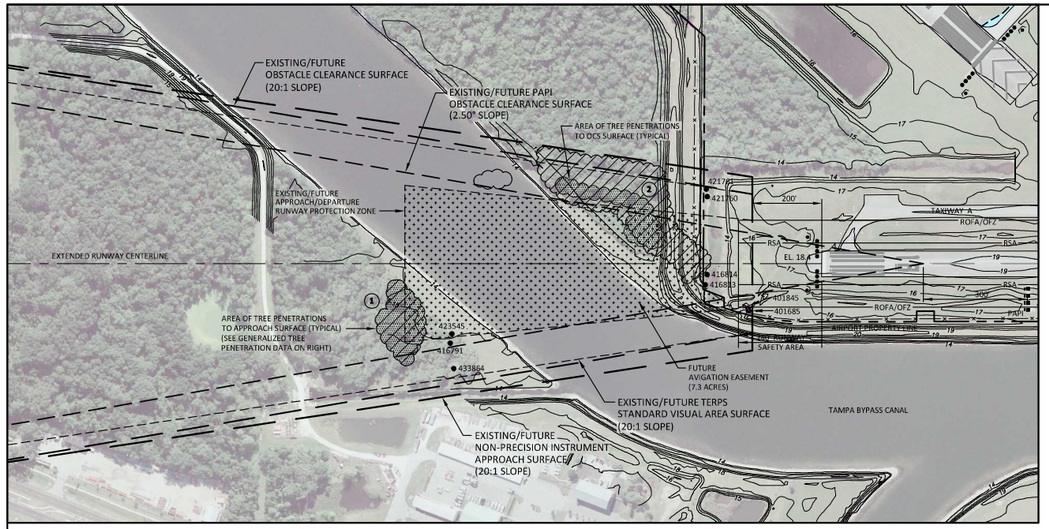
PROJECT NAME: MASTER PLAN UPDATE
TAMPA EXECUTIVE AIRPORT
Tampa, Florida

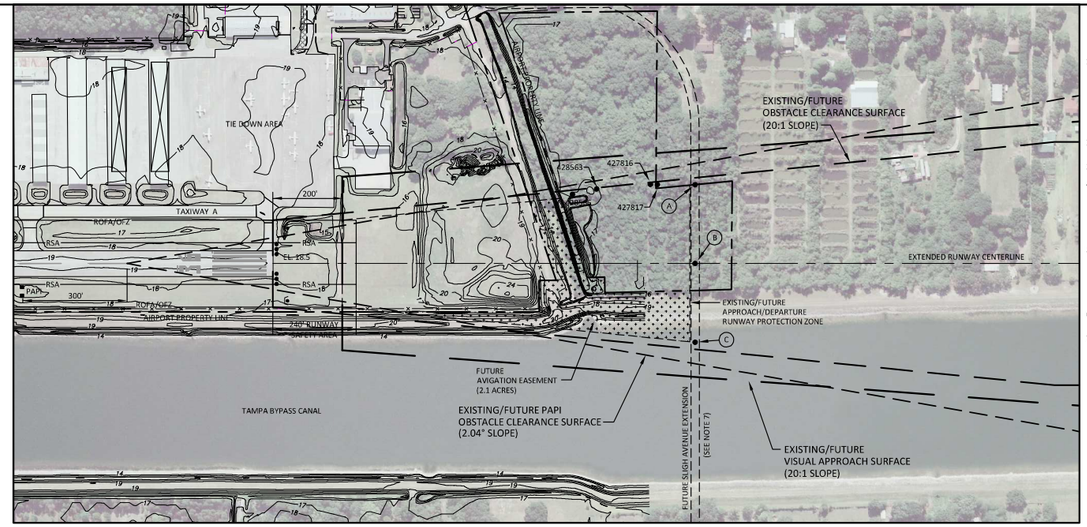
SHEET TITLE: RUNWAY DEPARTURE SURFACES
PLAN AND PROFILE
RUNWAY 5/23

HCAA NO.: 6255 14
FDOT NO.: 415760-1

DESIGNED: MJK
DRAWN: RJM
CHECKED: MLT
DATE: AUGUST 2017

Drawing Number: 10





RUNWAY 18/36 INNER APPROACH SURFACE PLAN VIEW

NOTES:

1. LOCAL ZONING IS CODIFIED AND ENFORCED VIA HCAA RESOLUTION 2010-54, AIRPORT ZONING REGULATIONS, UNDER THE PROVISIONS OF CHAPTER 333, FLORIDA STATUTES AND CHAPTER 2003-370, LAWS OF FLORIDA AS ADOPTED ON MARCH 1, 2010 FOR TPA, PCM, TPF AND VDF.
2. AIRPORT DISTRICT "SPI-AP" ESTABLISHED BY HILLSBOROUGH COUNTY.
3. SEE AIRPORT HEIGHT ZONING MAP "ZONE "A".
4. THE VERTICAL CLEARANCE (V.C.) OVER ROADS PER CODE OF FEDERAL REGULATIONS IS 17 FEET FOR INTERSTATE HIGHWAYS, 15 FEET FOR ANY OTHER PUBLIC ROADWAY, AND 10 FEET FOR A PRIVATE ROAD. THE VERTICAL CLEARANCE OVER A RAILROAD IS 23 FEET.
5. VERTICAL CLEARANCES (V.C.) FOR ROADS/RAILROADS ARE CALCULATED USING THE ELEVATION OF THE ROAD/RAILROAD AT THAT POINT MEASURING VERTICALLY TO THE INTERSECTION OF THE SPECIFIC SURFACE. ROAD ELEVATIONS ARE ESTIMATED.
6. BASE IS FROM AERIAL PHOTOGRAPHY FLOWN IN 2014.
7. SLIGH AVENUE EXTENSION BRIDGE ROADWAY ROADWAY ELEVATION OF 26.25 MSL PER 30% DESIGN DOCUMENTATION, OWEN AYERS & ASSOCIATES, INC., FEBRUARY 2003, SHEET 1 OF 7 AND 2 OF 7.

GENERALIZED TREE PENETRATION DATA

GROUPING	RANGE OF PENETRATION
1	8 FT. - 14 FT.
2	1 FT. - 12 FT.

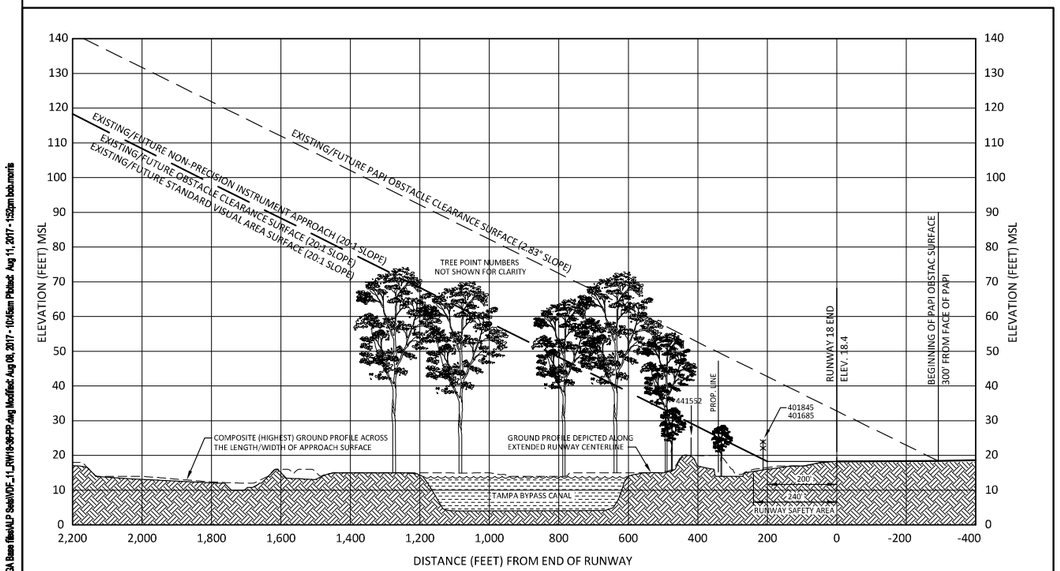
CFR PART 77
APPROACH SURFACE
ROAD CLEARANCES
(SEE NOTE 7 ABOVE)

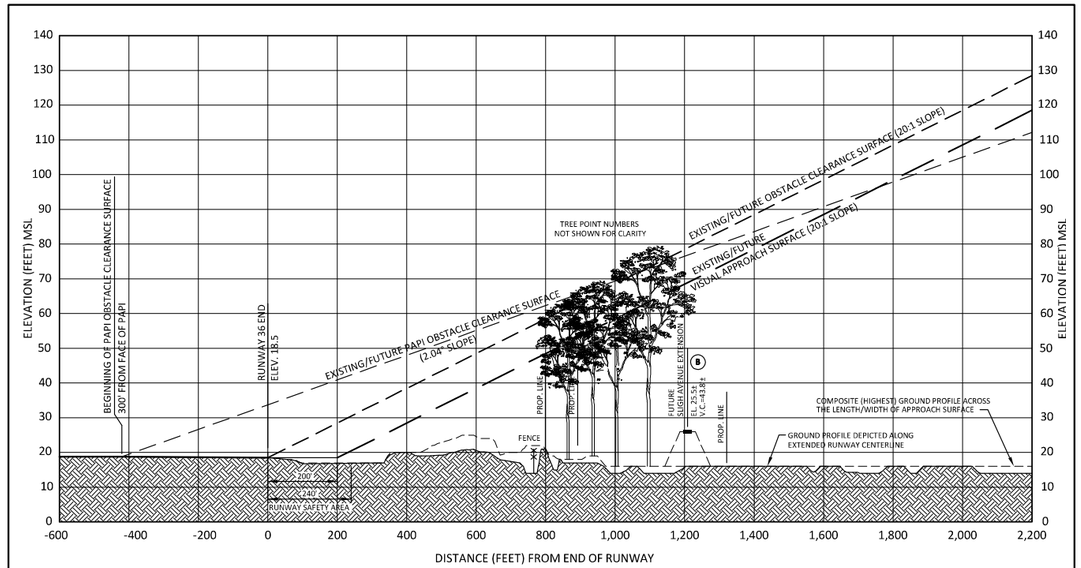
(A) FUTURE AIRPORT ACCESS ROAD EL. 24.2± (ACTUAL) V.C.= 45.1'±

(B) FUTURE AIRPORT ACCESS ROAD EL. 25.5± (ACTUAL) V.C.= 43.8'±

(C) FUTURE AIRPORT ACCESS ROAD EL. 26.3± (ACTUAL) V.C.= 43.0'±

LEGEND
- TREE PENETRATION AREA APPROACH SURFACE
- TREE PENETRATION AREA OCS SURFACE
- FUTURE AVIGATION EASEMENT





RUNWAY 18/36 INNER APPROACH SURFACE PROFILE VIEW

OBSTRUCTION DATA TABLE

RW End	Object ID No.	Object Description	Object Elevation [MSL]	Approach Surface Penetration (Feet)	Existing / Proposed Disposition of Obstruction	Triggering Event
RW18	416791	TREE *	66.59	4.70	TRIM OR REMOVE	NONE
RW18	416813	TREE *	28.37	3.60	TRIM OR REMOVE	NONE
RW18	416814	TREE *	25.35	.083	TRIM OR REMOVE	NONE
RW18	423545	TREE *	65.35	3.70	TRIM OR REMOVE	NONE
RW18	433864	TREE *	69.50	8.11	TRIM OR REMOVE	NONE
RW36	427816	TREE *	77.46	14.63	TRIM OR REMOVE	NONE
RW36	427817	TREE *	74.50	10.65	TRIM OR REMOVE	NONE
RW36	428563	TREE *	68.13	13.03	TRIM OR REMOVE	NONE
RW36	428566	TREE *	63.25	11.64	TRIM OR REMOVE	NONE

* TREE PENETRATION POINTS NOT DEPICTED IN PROFILE FOR CLARITY

OBSTRUCTION DATA TABLE

RW END	Object ID No.	Object Description	Object Elevation [MSL]	TERPS OCS Penetrated	TERPS OCS Penetration (Feet)	Existing / Proposed Disposition of Obstruction
RW18 OCS	401685	FENCE	24.56	YES	6.05	NONE
RW18 OCS	401845	GATE	24.56	YES	5.95	NONE
RW18 OCS	416813	TREE *	28.37	YES	3.60	TRIM OR REMOVE
RW18 OCS	416814	TREE *	25.35	YES	0.83	TRIM OR REMOVE
RW18 OCS	421760	TREE *	26.77	YES	2.27	TRIM OR REMOVE
RW18 OCS	421761	TREE *	25.16	YES	0.52	TRIM OR REMOVE
RW18 OCS	433864	TREE *	69.50	YES	8.51	TRIM OR REMOVE

RW END	Object ID No.	Object Description	Object Elevation [MSL]	TERPS OCS Penetrated	TERPS OCS Penetration (Feet)	Existing / Proposed Disposition of Obstruction
RW36 OCS	427816	TREE *	77.46	YES	4.63	TRIM OR REMOVE
RW36 OCS	427817	TREE *	74.50	YES	0.65	TRIM OR REMOVE
RW36 OCS	428563	TREE *	68.13	YES	3.03	TRIM OR REMOVE
RW36 OCS	428566	TREE *	63.25	YES	1.64	TRIM OR REMOVE

* TREE PENETRATION POINTS NOT DEPICTED IN PROFILE FOR CLARITY

SOURCE:
VDF:
Derived from eALP 150/5300-18b Survey
Verify Date - 0162012

TRUE NORTH
VAR. 5°23'W (5.38')

MAGNETIC DECLINATION = 5°23' WEST (5.38') WEST (JANUARY 2015)
ANNUAL RATE OF CHANGE: 0°6' (0.1') WEST/YEAR

HORIZONTAL SCALE IN FEET: 200 0 200
VERTICAL SCALE IN FEET: 20 0 20

BY | REVISIONS | DATE

URS Corporation Southern
5426 Bay Center Drive
Suite 260
Tampa, FL 33609-1462

Michael Baker INTERNATIONAL

Tampa International Airport

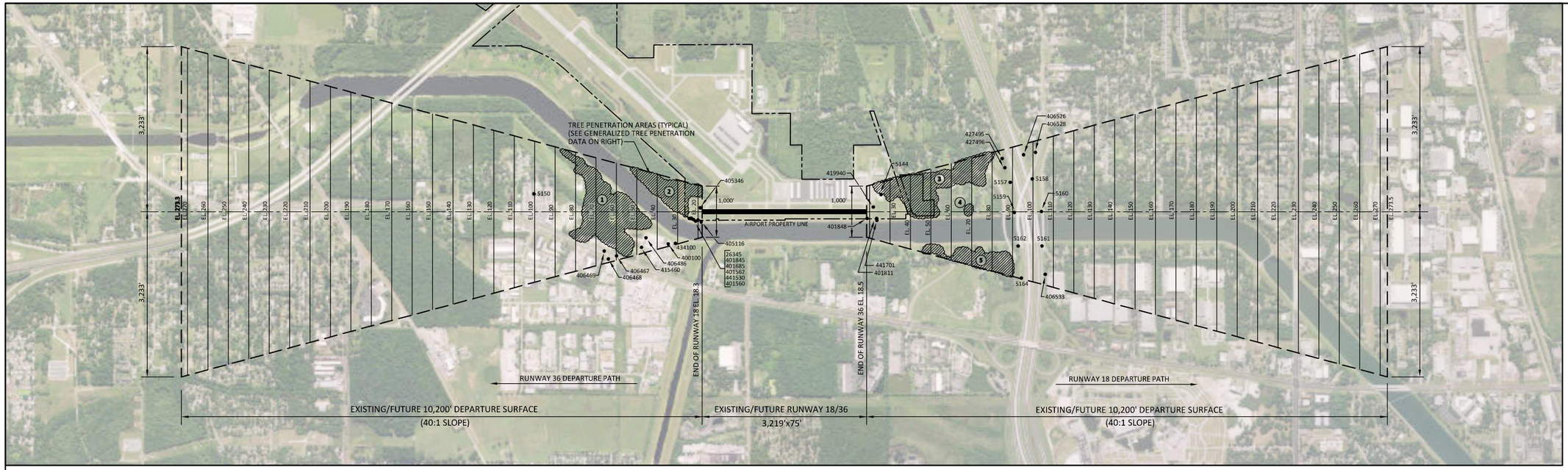
PROJECT NAME
MASTER PLAN UPDATE
TAMPA EXECUTIVE AIRPORT
Tampa, Florida

SHEET TITLE
INNER PORTION OF THE APPROACH SURFACE DRAWING
RUNWAY 18/36

HCAA NO.: 6255 14
FDOT NO.: 415760-1

DESIGNED: MJK
DRAWN: RJM
CHECKED: MLT
DATE: AUGUST 2017

Drawing Number: 11

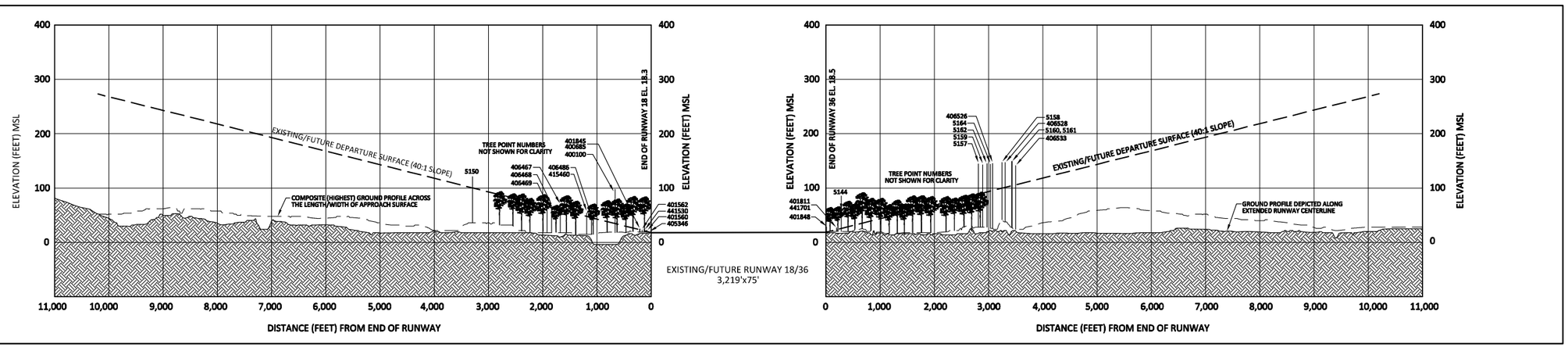


GENERALIZED TREE PENETRATION DATA

GROUPING	RANGE OF PENETRATION
1	0 FT. - 35 FT.
2	0 FT. - 63 FT.
3	0 FT. - 58 FT.
4	0 FT. - 10 FT.
5	0 FT. - 29 FT.

LEGEND
TREE PENETRATION AREA
DEPARTURE SURFACE

RUNWAY 18/36 DEPARTURE SURFACE PLAN VIEW



RUNWAY 18/36 DEPARTURE SURFACE PROFILE VIEW

OBSTRUCTION DATA TABLE

RW End	Object ID No.	Object Description	Object Elevation [MSL]	Departure Surface Penetration [Feet]	Existing / Proposed Disposition of Obstruction
18	400100	ANTENNA	98.01	63.36	LIGHT
18	401560	FENCE	22.66	2.64	NONE
18	401562	FENCE	22.92	0.63	NONE
18	401685	FENCE	24.56	1.31	NONE
18	401845	GATE	24.56	1.25	NONE
18	405346	REIL 18	19.69	0.71	NONE
18	406467	POLE	70.40	10.48	LIGHT
18	406468	POLE	68.34	4.41	LIGHT

RW End	Object ID No.	Object Description	Object Elevation [MSL]	Departure Surface Penetration [Feet]	Existing / Proposed Disposition of Obstruction
18	406469	POLE	68.69	2.73	LIGHT
18	406486	POLE	46.65	1.09	LIGHT
18	415460	TELEPHONE PYLON/POLE	54.35	6.61	LIGHT
18	441530	BOLLARD	24.23	3.05	NONE
18	5150	OL TWR	120.91	20.52	NONE
18	405116	GROUND	19.91	1.41	NONE
18	434100	TREE	60.12	29.00	TRIM OR REMOVE

RW End	Object ID No.	Object Description	Object Elevation [MSL]	Departure Surface Penetration (Feet)	Existing / Proposed Disposition of Obstruction
36	401811	FENCE	26.93	3.48	NONE
36	401848	GATE	28.42	9.62	NONE
36	406526	POLE	145.34	49.97	LIGHT
36	406528	POLE	147.26	46.05	LIGHT
36	406533	POLE	141.09	35.09	LIGHT
36	441701	BOLLARD	23.81	0.23	NONE
36	5144	OL WSK	55.46	29.85	NONE
36	5157	OL LP	144.63	55.77	NONE

RW End	Object ID No.	Object Description	Object Elevation [MSL]	Departure Surface Penetration (Feet)	Existing / Proposed Disposition of Obstruction
36	5159	OL LP	142.79	51.96	NONE
36	5160	OL LP	149.02	44.86	NONE
36	5161	OL LP	149.07	44.69	NONE
36	5162	OL LP	144.85	52.12	NONE
36	5164	LP	143.86	49.52	LIGHT
36	419940	TREE*	23.80	2.02	TRIM OR REMOVE
36	427495	TREE*	85.28	0.37	TRIM OR REMOVE
36	427496	TREE*	86.49	0.24	TRIM OR REMOVE
36	5158	OL LP	147.16	47.49	NONE

* TREE PENETRATION POINTS NOT DEPICTED IN PROFILE FOR CLARITY

SOURCE:
VDF:
Derived from eALP 150/5300-18b Survey
Verify Date - 0162012

TRUE NORTH
VAR. 5°23'W (5.38°)
MAGNETIC DECLINATION = 5°23' WEST (5.38°) WEST (JANUARY 2015)
ANNUAL RATE OF CHANGE: 0°6' (0.1°) WEST/YEAR
HORIZONTAL SCALE IN FEET: 1000 0 1000
VERTICAL SCALE IN FEET: 100 0 100

BY | REVISIONS | DATE

URS Corporation Southern
7650 W. Courtney Campbell Causeway
Tampa, FL 33607-1462

Michael Baker INTERNATIONAL

Tampa International Airport

PROJECT NAME
MASTER PLAN UPDATE
TAMPA EXECUTIVE AIRPORT
Tampa, Florida

SHEET TITLE
RUNWAY DEPARTURE SURFACES
PLAN AND PROFILE
RUNWAY 18/36

HCAA NO.: 6255 14
FDOT NO.: 415760-1

DESIGNED: MJK
DRAWN: RJM
CHECKED: MLT
DATE: AUGUST 2017

Drawing Number:
12

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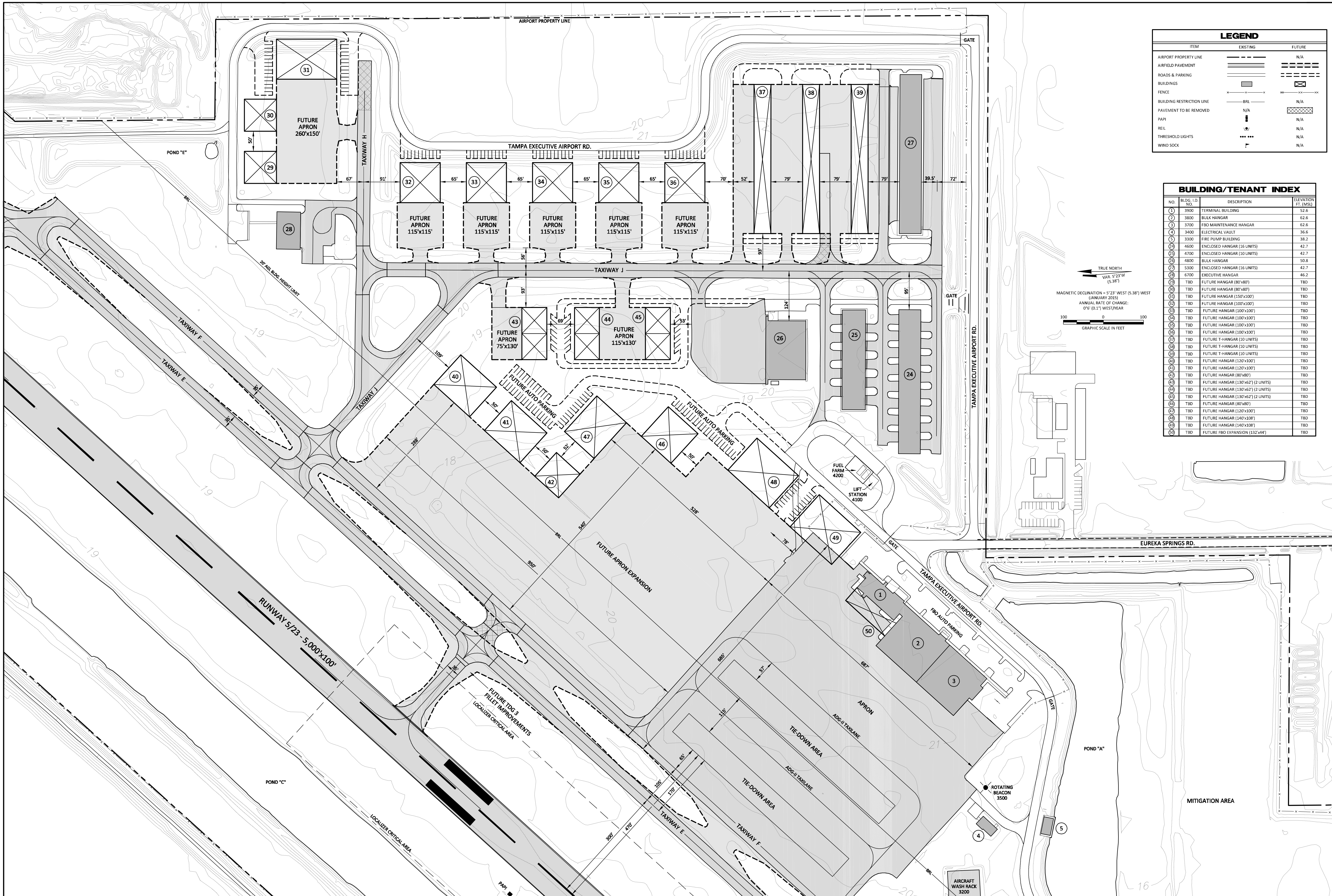


LEGEND

ITEM	EXISTING	FUTURE
AIRPORT PROPERTY LINE		N/A
AIRFIELD PAVEMENT		
ROADS & PARKING		
BUILDINGS		
FENCE		
BUILDING RESTRICTION LINE	BRL	N/A
PAVEMENT TO BE REMOVED	N/A	
PAPI		N/A
REIL		N/A
THRESHOLD LIGHTS		N/A
WIND SOCK		N/A

BUILDING/TENANT INDEX

NO.	BLDG. I.D. NO.	DESCRIPTION	ELEVATION FT. (MSL)
1	3900	TERMINAL BUILDING	52.6
2	3800	BULK HANGAR	62.6
3	3700	FBO MAINTENANCE HANGAR	62.6
4	3400	ELECTRICAL VAULT	36.6
5	3300	FIRE PUMP BUILDING	38.2
24	4600	ENCLOSED HANGAR (16 UNITS)	42.7
25	4700	ENCLOSED HANGAR (10 UNITS)	42.7
26	4800	BULK HANGAR	50.8
27	5300	ENCLOSED HANGAR (16 UNITS)	42.7
28	6700	EXECUTIVE HANGAR	46.2
29	TBD	FUTURE HANGAR (80'x80')	TBD
30	TBD	FUTURE HANGAR (80'x80')	TBD
31	TBD	FUTURE HANGAR (150'x100')	TBD
32	TBD	FUTURE HANGAR (100'x100')	TBD
33	TBD	FUTURE HANGAR (100'x100')	TBD
34	TBD	FUTURE HANGAR (100'x100')	TBD
35	TBD	FUTURE HANGAR (100'x100')	TBD
36	TBD	FUTURE HANGAR (100'x100')	TBD
37	TBD	FUTURE T-HANGAR (10 UNITS)	TBD
38	TBD	FUTURE T-HANGAR (10 UNITS)	TBD
39	TBD	FUTURE T-HANGAR (10 UNITS)	TBD
40	TBD	FUTURE HANGAR (120'x100')	TBD
41	TBD	FUTURE HANGAR (120'x100')	TBD
42	TBD	FUTURE HANGAR (80'x80')	TBD
43	TBD	FUTURE HANGAR (130'x62') (2 UNITS)	TBD
44	TBD	FUTURE HANGAR (130'x62') (2 UNITS)	TBD
45	TBD	FUTURE HANGAR (130'x62') (2 UNITS)	TBD
46	TBD	FUTURE HANGAR (80'x80')	TBD
47	TBD	FUTURE HANGAR (120'x100')	TBD
48	TBD	FUTURE HANGAR (140'x108')	TBD
49	TBD	FUTURE HANGAR (140'x108')	TBD
50	TBD	FUTURE FBO EXPANSION (132'x44')	TBD

BY | REVISIONS | DATE

URS Corporation Southern
7650 West Courtney Campbell Causeway
Tampa, FL 33607-1462

Michael Baker INTERNATIONAL

Tampa International Airport

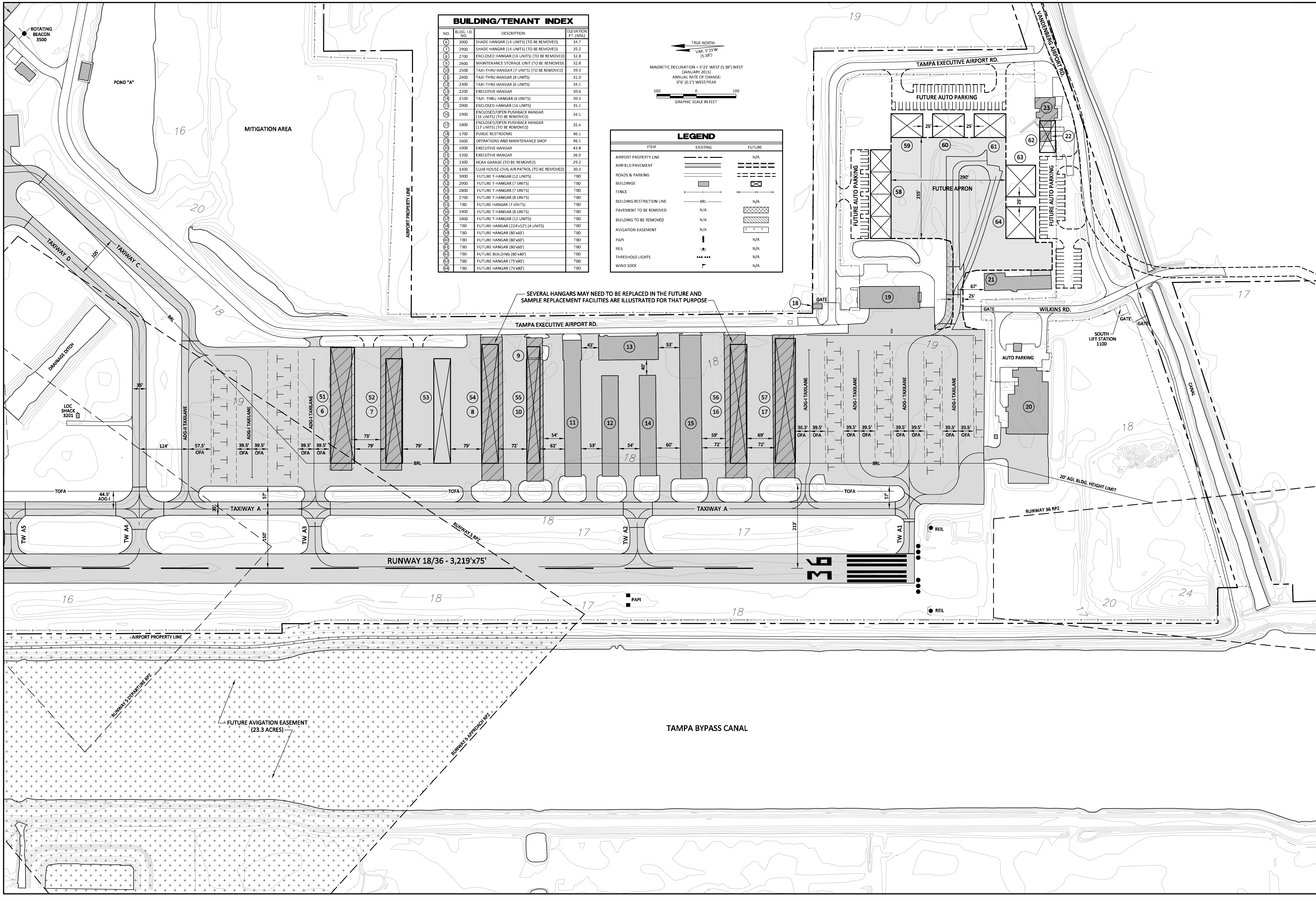
PROJECT NAME
MASTER PLAN UPDATE
TAMPA EXECUTIVE AIRPORT
Tampa, Florida

SHEET TITLE
TERMINAL AREA DRAWING
RUNWAY 5/23

HCAA NO.: 6255 14
FDOT NO.: 415760-1

DESIGNED: MJK
DRAWN: RJM
CHECKED: MLT
DATE: AUGUST 2017

Drawing Number: 13



BUILDING/TENANT INDEX

NO.	BLDG. I.D. NO.	DESCRIPTION	ELEVATION FT. (MSL)
6	3000	SHADE HANGAR (14 UNITS) (TO BE REMOVED)	34.7
7	2900	SHADE HANGAR (14 UNITS) (TO BE REMOVED)	35.2
8	2700	ENCLOSED HANGAR (16 UNITS) (TO BE REMOVED)	32.8
9	2600	MAINTENANCE STORAGE UNIT (TO BE REMOVED)	32.8
10	2500	TAXI-THRU HANGAR (7 UNITS) (TO BE REMOVED)	39.3
11	2400	TAXI-THRU HANGAR (8 UNITS)	31.0
12	2300	TAXI-THRU HANGAR (6 UNITS)	34.1
13	2200	EXECUTIVE HANGAR	30.6
14	2100	TAXI- THRU HANGAR (6 UNITS)	30.5
15	2000	ENCLOSED HANGAR (16 UNITS)	35.1
16	1900	ENCLOSED/OPEN PUSHBACK HANGAR (16 UNITS) (TO BE REMOVED)	34.1
17	1800	ENCLOSED/OPEN PUSHBACK HANGAR (17 UNITS) (TO BE REMOVED)	35.4
18	1700	PUBLIC RESTROOMS	46.1
19	1600	OPERATIONS AND MAINTENANCE SHOP	46.1
20	1000	EXECUTIVE HANGAR	43.8
21	1200	EXECUTIVE HANGAR	36.9
22	1300	HCAA GARAGE (TO BE REMOVED)	29.2
23	1400	CLUB HOUSE-CIVIL AIR PATROL (TO BE REMOVED)	30.3
51	3000	FUTURE T-HANGAR (12 UNITS)	TBD
52	2900	FUTURE T-HANGAR (7 UNITS)	TBD
53	2800	FUTURE T-HANGAR (7 UNITS)	TBD
54	2700	FUTURE T-HANGAR (8 UNITS)	TBD
55	TBD	FUTURE HANGAR (7 UNITS)	TBD
56	1900	FUTURE T-HANGAR (8 UNITS)	TBD
57	1800	FUTURE T-HANGAR (12 UNITS)	TBD
58	TBD	FUTURE HANGAR (224'x52') (4 UNITS)	TBD
59	TBD	FUTURE HANGAR (80'x60')	TBD
60	TBD	FUTURE HANGAR (80'x60')	TBD
61	TBD	FUTURE HANGAR (80'x60')	TBD
62	TBD	FUTURE BUILDING (80'x40')	TBD
63	TBD	FUTURE HANGAR (75'x80')	TBD
64	TBD	FUTURE HANGAR (75'x80')	TBD

LEGEND

ITEM	EXISTING	FUTURE
AIRPORT PROPERTY LINE		N/A
AIRFIELD PAVEMENT		
ROADS & PARKING		
BUILDINGS		
FENCE		
BUILDING RESTRICTION LINE	BRL	N/A
PAVEMENT TO BE REMOVED	N/A	
BUILDING TO BE REMOVED	N/A	
AVIGATION EASEMENT	N/A	
PAPI		N/A
REIL		N/A
THRESHOLD LIGHTS		N/A
WIND SOCK		N/A

DATE | REVISIONS | BY

URS Corporation Southern
7650 West Courtney Campbell Causeway
Tampa, FL 33607-1462

Michael Baker INTERNATIONAL

Tampa International Airport

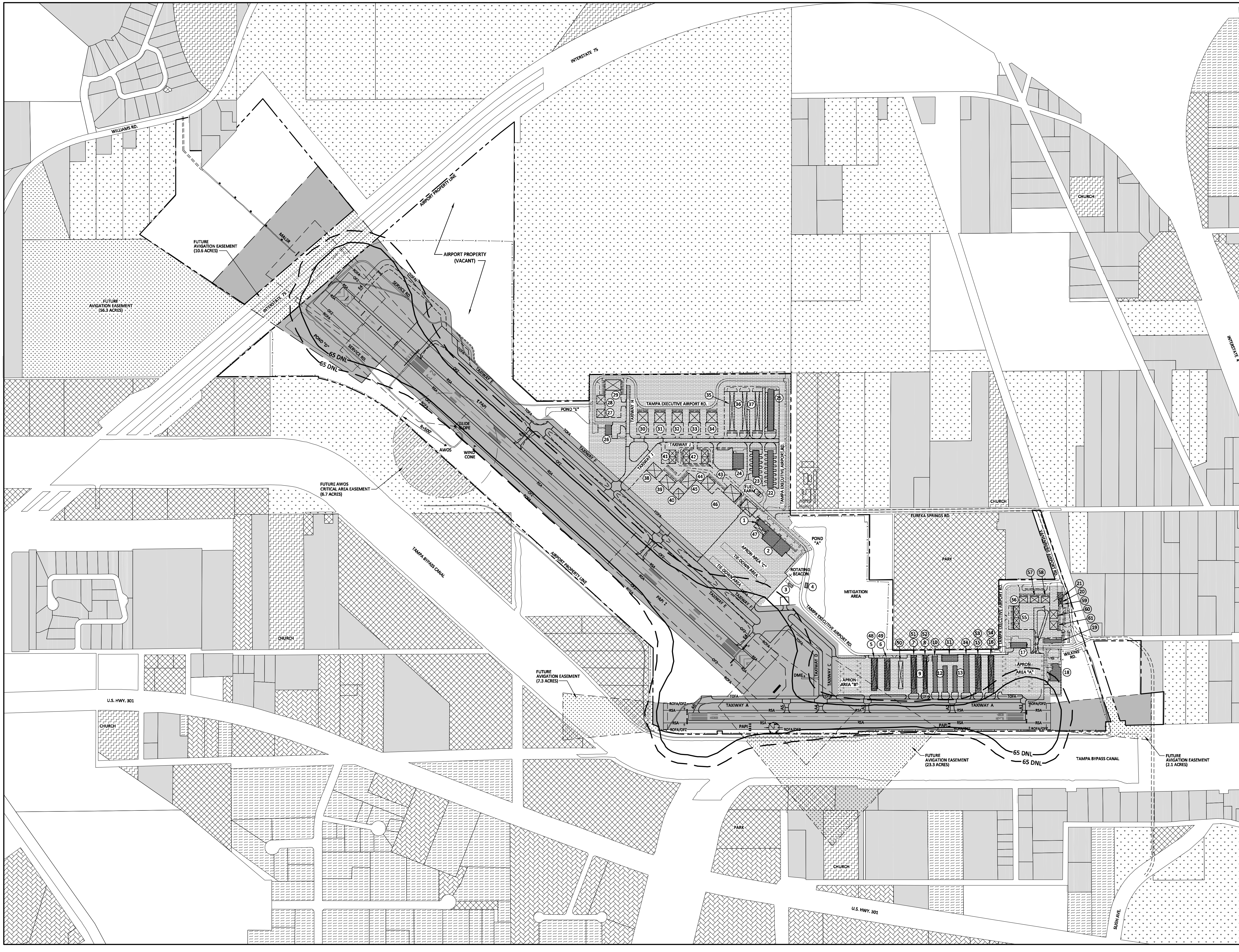
PROJECT NAME
MASTER PLAN UPDATE
TAMPA EXECUTIVE AIRPORT
Tampa, Florida

SHEET TITLE
TERMINAL AREA DRAWING
RUNWAY 18/36

HCAA NO.: 6255 14
FDOT NO.: 415760-1

DESIGNED: MJK
DRAWN: RJM
CHECKED: MLT
DATE: AUGUST 2017

Drawing Number: 14



BUILDING/TENANT INDEX

NO.	DESCRIPTION	ELEVATION FT. (MSL)
1	TERMINAL BUILDING	52.6
2	BULK HANGAR/FBO MAINTENANCE HANGAR	62.6
3	ELECTRICAL VAULT	36.6
4	FIRE PUMP BUILDING	38.2
5	SHADE HANGAR (14 UNITS) (TO BE REMOVED)	34.7
6	SHADE HANGAR (14 UNITS) (TO BE REMOVED)	35.2
7	ENCLOSED HANGAR (16 UNITS) (TO BE REMOVED)	32.8
8	MAINTENANCE STORAGE UNIT (TO BE REMOVED)	32.8
9	TAXI-THRU HANGAR (7 UNITS) (TO BE REMOVED)	39.3
10	TAXI-THRU HANGAR (8 UNITS)	31.0
11	BUSINESS HANGAR	34.1
12	TAXI-THRU HANGAR (6 UNITS)	30.6
13	TAXI- THRU HANGAR (6 UNITS)	30.5
14	ENCLOSED HANGAR (16 UNITS)	35.1
15	ENCLOSED/OPEN PUSHBACK HANGAR (16 UNITS) (TO BE REMOVED)	34.1
16	ENCLOSED/OPEN PUSHBACK HANGAR (17 UNITS) (TO BE REMOVED)	35.4
17	OPERATIONS AND MAINTENANCE SHOP	46.1
18	BUSINESS HANGAR	43.8
19	BUSINESS HANGAR	36.9
20	HCAA GARAGE (TO BE REMOVED)	29.2
21	CLUB HOUSE-CIVIL AIR PATROL (TO BE REMOVED)	30.3
22	ENCLOSED HANGAR (16 UNITS)	42.7
23	ENCLOSED HANGAR (10 UNITS)	42.7
24	BULK HANGAR	50.8
25	ENCLOSED HANGAR (16 UNITS)	42.7
26	BUSINESS HANGAR	46.2
27	FUTURE HANGAR (80'x80')	TBD
28	FUTURE HANGAR (80'x80')	TBD
29	FUTURE HANGAR (150'x100')	TBD
30	FUTURE HANGAR (100'x100')	TBD
31	FUTURE HANGAR (100'x100')	TBD
32	FUTURE HANGAR (100'x100')	TBD
33	FUTURE HANGAR (100'x100')	TBD
34	FUTURE HANGAR (100'x100')	TBD
35	FUTURE T-HANGAR (10 UNITS)	TBD
36	FUTURE T-HANGAR (10 UNITS)	TBD
37	FUTURE T-HANGAR (10 UNITS)	TBD
38	FUTURE HANGAR (120'x100')	TBD
39	FUTURE HANGAR (120'x100')	TBD
40	FUTURE HANGAR (80'x80')	TBD
41	FUTURE HANGAR (130'x62') (2 UNITS)	TBD
42	FUTURE HANGAR (130'x62') (2 UNITS)	TBD
43	FUTURE HANGAR (130'x62') (2 UNITS)	TBD
44	FUTURE HANGAR (80'x80')	TBD
45	FUTURE HANGAR (120'x100')	TBD
46	FUTURE HANGAR (250'x100')	TBD
47	FUTURE FBO EXPANSION (132'x44')	TBD
48	FUTURE T-HANGAR (12 UNITS)	TBD
49	FUTURE T-HANGAR (7 UNITS)	TBD
50	FUTURE T-HANGAR (7 UNITS)	TBD
51	FUTURE T-HANGAR (8 UNITS)	TBD
52	FUTURE HANGAR (7 UNITS)	TBD
53	FUTURE T-HANGAR (8 UNITS)	TBD
54	FUTURE T-HANGAR (12 UNITS)	TBD
55	FUTURE HANGAR (224'x52') (4 UNITS)	TBD
56	FUTURE HANGAR (80'x60')	TBD
57	FUTURE HANGAR (80'x60')	TBD
58	FUTURE HANGAR (80'x60')	TBD
59	FUTURE BUILDING (80'x40')	TBD
60	FUTURE HANGAR (75'x80')	TBD
61	FUTURE HANGAR (75'x80')	TBD

NOTES:

1. LOCAL ZONING IS CODIFIED AND ENFORCED VIA HCAA RESOLUTION 2010-54, AIRPORT ZONING REGULATIONS, UNDER THE PROVISIONS OF CHAPTER 333, FLORIDA STATUTES AND CHAPTER 2003-370, LAWS OF FLORIDA AS ADOPTED ON MARCH 1, 2010 FOR TPA, PCM, TPF AND VDF.
2. AIRPORT DISTRICT "SPI-AP" ESTABLISHED BY HILLSBOROUGH COUNTY.
3. SEE AIRPORT HEIGHT ZONING MAP "ZONE "A".

LEGEND

- AOA
- TERMINAL AREA
- RESIDENTIAL
- COMMERCIAL
- INDUSTRIAL
- INSTITUTIONAL
- AGRICULTURAL
- GOVERNMENTAL
- FUTURE AVIGATION EASEMENT
- VACANT
- 2013 65 DNL NOISE CONTOUR
- 2033 65 DNL NOISE CONTOUR
- EXISTING BUILDING
- FUTURE BUILDING
- FUTURE PAVEMENT
- PAVEMENT TO BE REMOVED

TRUE NORTH
VAR. 5°23'W (5.38°)

MAGNETIC DECLINATION = 5°23' WEST (5.38°) WEST (JANUARY 2015)
ANNUAL RATE OF CHANGE: 0°6' (0.1°) WEST/YEAR

400 0 400
GRAPHIC SCALE IN FEET

PROJECT NAME: MASTER PLAN UPDATE
TAMPA EXECUTIVE AIRPORT
Tampa, Florida

SHEET TITLE: LAND USE DRAWING

HCAA NO.: 6255 14
FDOT NO.: 415760-1

DESIGNED: MJK
DRAWN: RJM
CHECKED: MLT
DATE: AUGUST 2017

Drawing Number: 15