VOLUME 1

Tampa International Airport

2012 AIRPORT MASTER PLAN
2016 ADDENDUM

SUBMITTED ON: SEPTEMBER 22, 2017

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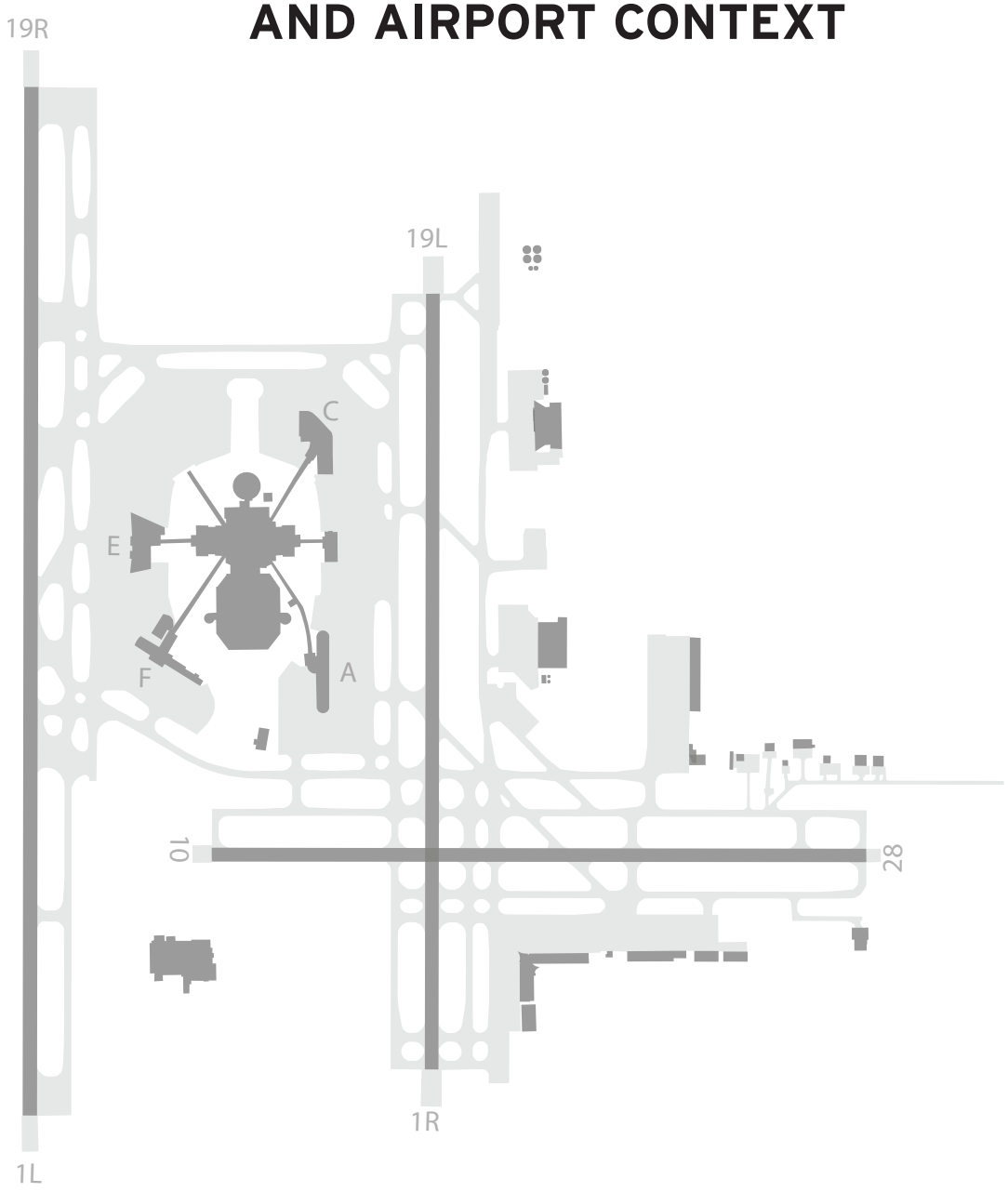


1 Introduction

The 2012 Master Plan Update (2012 MPU) began as a study with emphasis on maximizing the capacity and longevity of the existing main central terminal facilities while ensuring that the high level of service for which Tampa International Airport (TPA) is known. The 2012 MPU was a holistic study of all airport facilities that was developed into a comprehensive 3-phase Capital Improvement Program (CIP):

- Phase 1 – Decongestion
- Phase 2 – Enabling
- Phase 3 – Expansion

The 2012 MPU was completed and approved in April 2013.

In 2016, with Phase 1 construction nearing completion, the Hillsborough County Airport Authority (HCAA), engaged HNTB to validate the Phase 2 and 3 project elements to determine if current conditions in 2016 still match the original findings of the 2012 MPU. The intent was to verify forecasts, capacity needs, and evaluate alternatives for the following key areas:

- Roadway/Curbside
- All Airsides
- Main Terminal

This new study is referred to as the 2012 Master Plan Update – 2016 Addendum and in this document will be described as the "2016 Addendum". The following document serves as the consolidated guiding document representing all studies and validation completed. Not all components of the 2012 MPU were restudied in this 2016 Addendum. The document only includes new specific studies or analysis. If a project component was not restudied, the 2012 MPU remains as the recommendation moving forward and will be referenced as such in the narrative of this document.

Section 1 provides a general overview of the process and updated project component recommendations that are different than the previous 2012 MPU. Sections 2-5 will provide the detailed analysis and process concepts that were studied during the entire 2016 Addendum.

Figure 1.1
Tampa International Airport - Aerial View

1.1 Focus of 2016 Master Plan Addendum

The 2016 Addendum includes alternative Terminal Planning solutions for Phases 2 and 3 of the Tampa International Airport development program. The study was developed as a dialogue between HCAA and HNTB to revalidate the 2012 MPU given new variables in the airline industry and the airports major stakeholder processes:

- Changes in passenger traffic
- Airline Mergers
- Changes in Agency protocols and processes (i.e. US CBP and TSA)
- Flexible airline fleet mixes

New major constraints studied in the 2016 Addendum include maximizing the site for less impact to stakeholders, such as the Marriott Hotel and the FAA Air Traffic Control Tower. The 2016 Addendum focused on concepts that maintain existing infrastructure and buildings whenever possible to maintain current stakeholder operations and reduce the overall cost of the program. A primary driver goal was to reduce the cost of the program, without reducing the assets required to provide added passenger processing and gate capacity.

Given the impact of these new variables, the focus of the 2016 Addendum was identified as the following which represents a refinement of the 2012 MPU goals:

- Validate Forecast - Prepare new airport activity projections taking into consideration the impact of consolidations in the airline industry and actions to enhance international service at TPA
- Validate Plan
  - Evaluate facility capacity with a specific focus on terminal gates, landside capacity and passenger processing facilities.
    - Main Terminal
    - Airside Facilities
    - International Facilities
    - Curbside and roadways facilities
  - Identify facility requirements with a strong focus on the above noted facilities
  - Analyze reasonable alternative development schemes by functional area with a focus on maximizing existing facilities
- Evaluate Phase II and III projects considering cost, convenience and core principles:
    - FAA Tower
    - Consolidated Checkpoint
    - Marriott Hotel
- Develop new phasing and cost estimation
- Ensure the continued provision of the high level of service for which Tampa International Airport has been consistently recognized

Similar to the 2012 MPU, there were guiding principles that the planning team adhered to, including the following:

- Consider economic and airline business industry conditions
- Grow efficiently, thoughtfully and affordably
  - Flexible and Scalable – build only when needed
  - Maximize capacity of existing facilities to reduce need for a future North Terminal
- Maintain a high level of customer service
- Adhere to core aspects of the original terminal design
  - Maintain passenger convenience and comfort
  - Keep walking distances under 700 ft.
  - Expandable
  - Maintain automated people mover concepts
- Grow business and create new revenue opportunities

1.1.1 2016 Master Plan Addendum Process

The 2016 Addendum was developed through ongoing charrette workshops with HCAA and HNTB throughout 2016 starting with a series of "refresher" workshops intended to gather all current information that had changed over the 4 years between study and evaluate needs due to changing variables with technologies, stakeholders and processes.

- Workshop Refresher 1: January 14, 2016
- Workshop Refresher 2: January 26, 2016
- Workshop Refresher 3: February 4, 2016

Upon completion of the "Refresher Workshops", HNTB then led a series of workshops to determine new alternatives for Phase 2 and 3 growth that aligns with the new variables and constraints:

- Alternative Workshop 1: April 11, 2016
- Alternative Workshop 2: May 24, 2016
- Alternative Workshop 3: June 20, 2016
- Alternative Workshop 4: August 9, 2016
- Alternative Workshop 5: September 16, 2016

After developing a preferred alternative in Alternative Workshop 5, HCAA hosted a series of stakeholder workshops with their Airline partners to gain consensus on the overall plan. The following workshops were held:

- Airline Workshop 1: October 12, 2016
- Airline Workshop 2: December 19, 2016

Upon reaching consensus with the Airline partners, workshops were held with the Board of Directors and the Public to gather final input for the 2016 Master Plan Addendum:

- Aviation Authority Board of Directors Workshop: April 18, 2017
- Master Plan Public Meeting: April 27, 2017

1.2 Aviation Forecast

An airport activity forecast was prepared as part of the TPA MPU in early 2012 and approved by the FAA in April 2012. The forecasts were reviewed in early 2016, and it was determined that elements of the MPU forecast should be revisited, especially gate requirements and peak passenger flows, to confirm that the current plan is still adequate to accommodate anticipated demand. The forecast was re-evaluated later in 2016 and it was determined that actual passenger activity levels were tracking with the forecast but actual passenger aircraft operations were lagging behind the forecast (see **Figures 1.2 & 1.3**). Therefore, for the purposes of revalidating the need for and timing of airport facilities, the 2012 MPU passenger forecast was retained but a lower passenger aircraft operations forecast was prepared to reflect the trends for higher load factors and larger average aircraft size that have occurred and are expected to continue.

The main purpose of the forecast re-evaluation was to revise future aviation activity estimates to update projected demand levels by airside, and thereby refine the timing and cost of future improvements. The focus was on passenger flows and passenger aircraft operations, so that the development and phasing of the terminal building, airsides, and associated curbside and access road improvements could be refined. The forecast re-evaluation also included a detailed gate analysis, to identify the types of gates (widebody/narrowbody, domestic/international) that would be required and to develop scenarios for allocating them among airlines and airsides.

In 2016 total passengers came close to the previous 19.1 million passenger peak achieved in 2007, and are projected to continue to increase at a 2.8 percent annual rate to 28.7 million by 2031. International passengers are expected to continue to increase faster than domestic passengers, building upon recent and upcoming new air service. Total operations fell significantly between 2005 and 2009 because of the substitution of smaller aircraft by larger aircraft at fewer frequencies and the movement of some general aviation to other area airports. The decline in operations has since leveled off, and is anticipated to grow at a 1.7 percent annual rate to almost 250,000 operations by 2031.

Figure 1.2
Forecast of Total Passengers

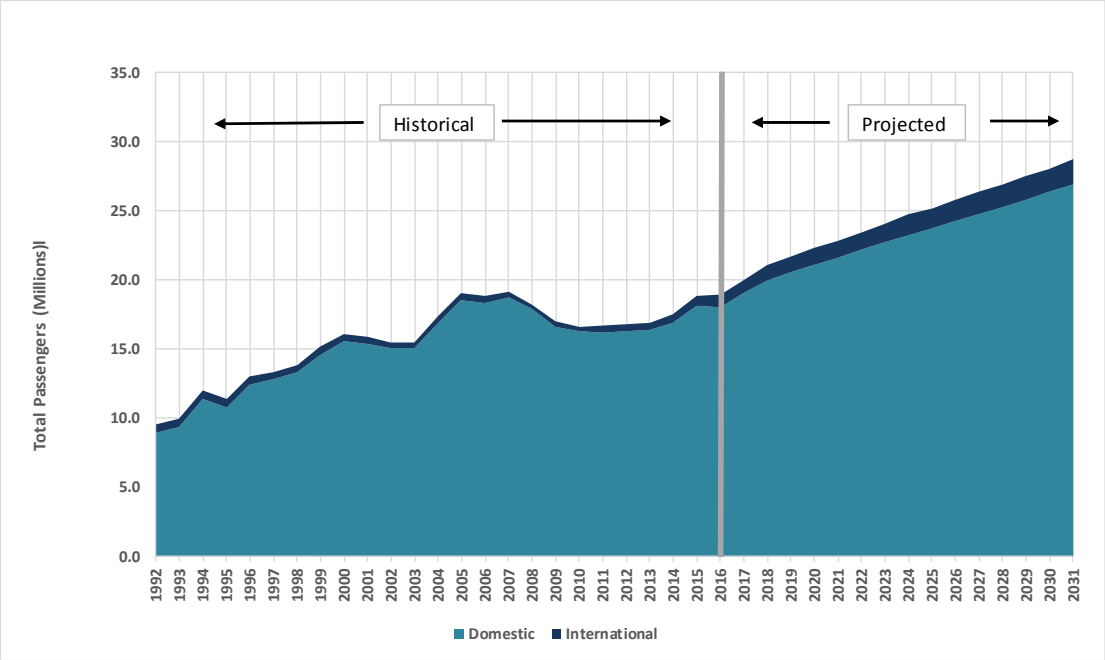
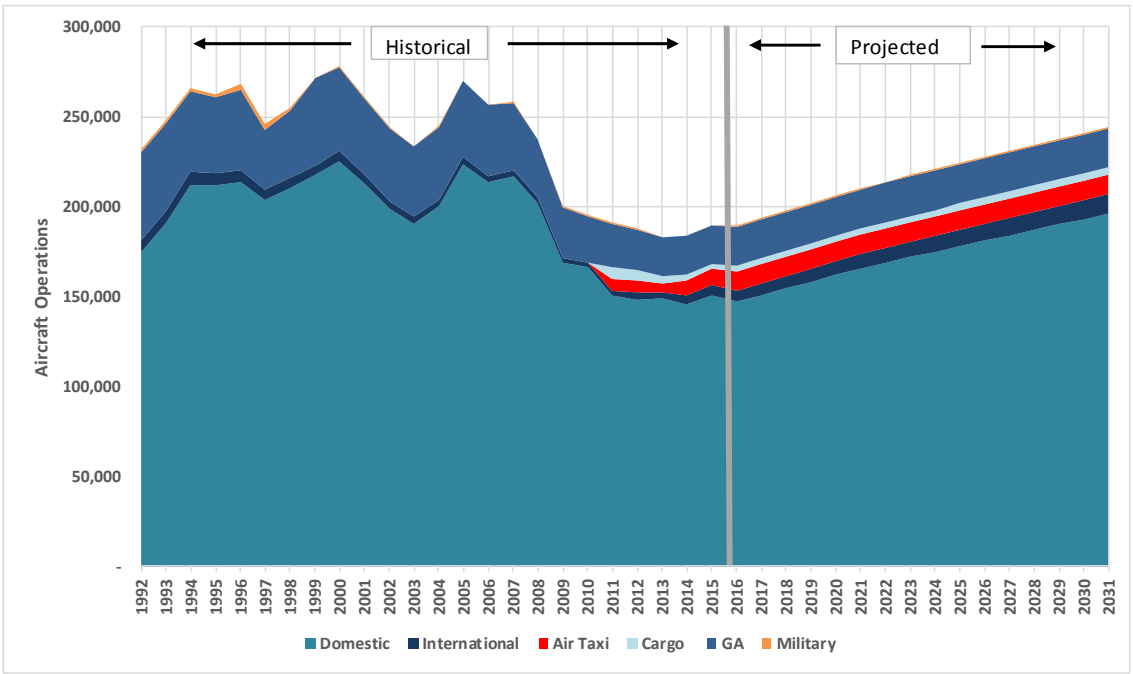


Figure 1.3
Forecast of Aircraft Operations



1.3 Development Plan

The 2016 Master Plan Addendum **Terminal Development Plan** includes revised preferred alternatives that solve multiple issues within the existing complex while deferring the need to construct a new North Terminal Complex. The 2012 MPU focused on the entire airport campus, which resulted in a three phase Recommended Capital Improvement Program (Phase1 - Decongestion, Phase 2 - Enabling, and Phase 3 - Expansion). The new planning effort focused primarily on the Terminal Development Area of the Central Core Planning Area, which includes several projects under Phases 2 & 3, as the projects of Phase 1 of the Airport Master Plan Update were near completion.

Phase 1 projects included:

- Consolidated Rental Car Facility
- Automated People Mover
- Main Terminal Expansion and Concessions Redevelopment
- Taxiway J Bridge Reconstruction
- South Terminal Support Area Roadway Improvements
- Concessions Warehouse
- Reclaim Levels 1 and 2 in the Long-Term Parking Garage
- Common Use Implementation

While the 2012 MPU focused on the entire airport campus, the 2016 Addendum only focused on elements within the Central Core Planning Area, and specifically in the Terminal Development Area, as represented in **Figure 1.4**.

Figure 1.4
Airport Sectors

1.4 Airside Improvements

The 2012 Master Plan Update recommended the need for additional gate capacity and was then validated in the 2016 Addendum. Further detail of the forecast and gating analysis is included in Section 2 of this document. To accommodate this additional gate capacity, the recommended alternative is to build a new Airside D building that can accommodate 16 new gates similar to the 2012 MPU.

Airside D:

The 2012 recommended plan included a new Airside D with 16 gates. Only 10 of those gates were international capable. The 2012 also assumed that a new consolidated security checkpoint and FIS building would be built immediately north of the landside building on the current site of the Marriott Hotel and FAA Air Traffic Control Tower.

As one of the primary goals of the 2016 Addendum, the planning team studied all options to maintain current stakeholder operations/facilities and reduce overall program cost. The recommended 2016 Addendum plan maintains the existing Marriott Hotel and both current and future Air Traffic Control Tower sites by placing the security checkpoint and FIS within the footprint of the Airside D building. This greatly reduces the overall cost to the program and construction impact to stakeholders and passengers.

The recommended concept for Airside D maximizes the number of gates that that can be developed in the Terminal Development Area and will provide 16 domestic/international swing gates. All 16 gates will have access to vertical circulation cores connecting international arriving passengers to a mezzanine level sterile system. The ability for all 16 gates to be international capable is a large benefit of the 2016 Addendum over the 2012 MPU. The Airside D facility includes a new CBP facility located on the upper sterile level and accommodates airline clubs on its mezzanine level.

The Departure level includes a new passenger screening checkpoint that brings passengers directly into the center of the building that will include a central concession core. From the center of this core, passengers will have direct line-of-sight to all gates with minimal walking distances. The departure level also includes a new Airport People Mover (APM) station that will connect non-secure passengers back to the Main Terminal at the Transfer level. The APM stations sizes and projected number of APM cars considers the demand of international passengers with bags being transported back to the central terminal processor after clearing the US CBP facility in Airside D.

The Airside D ramp level will contain baggage make-up devices, inbound baggage drop-off belts, airline operations areas, checked baggage inspection system (CBIS), and loading dock.

Figure 1.5
Airside D – Master Plan Aerial

Figure 1.6
Airside D – CBP Level

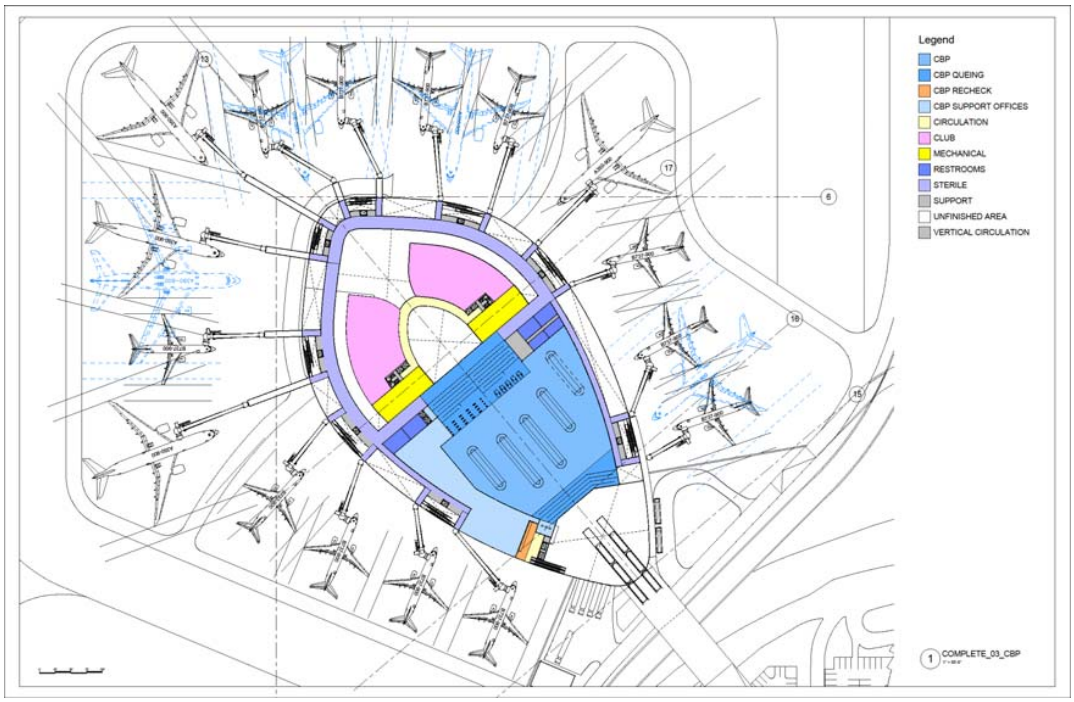


Figure 1.7
Airside D – Departure Level

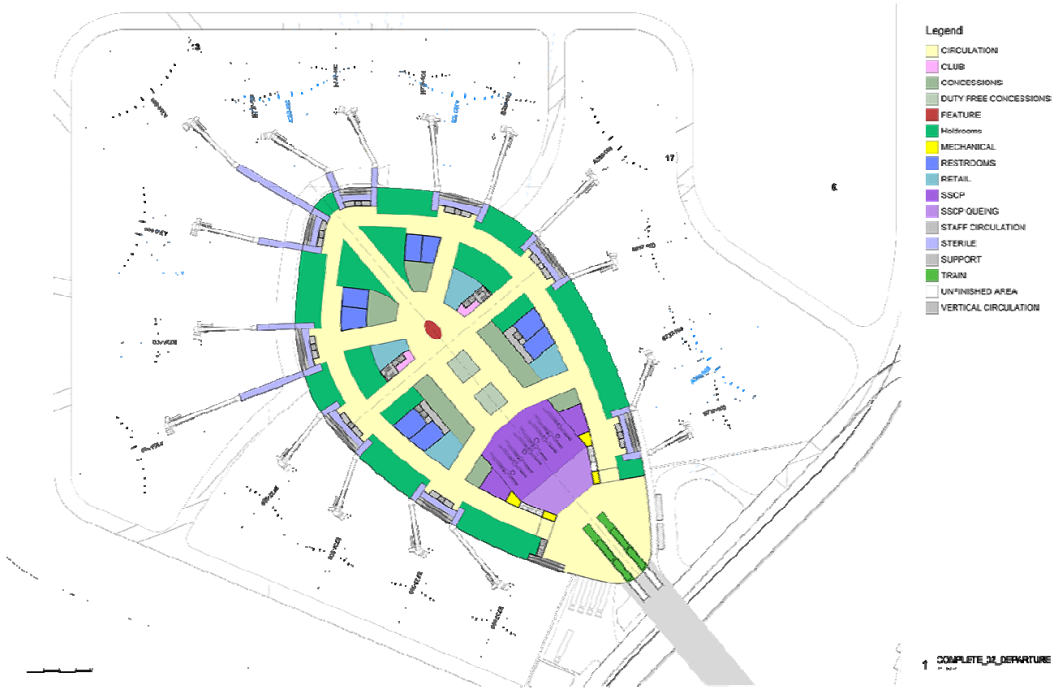
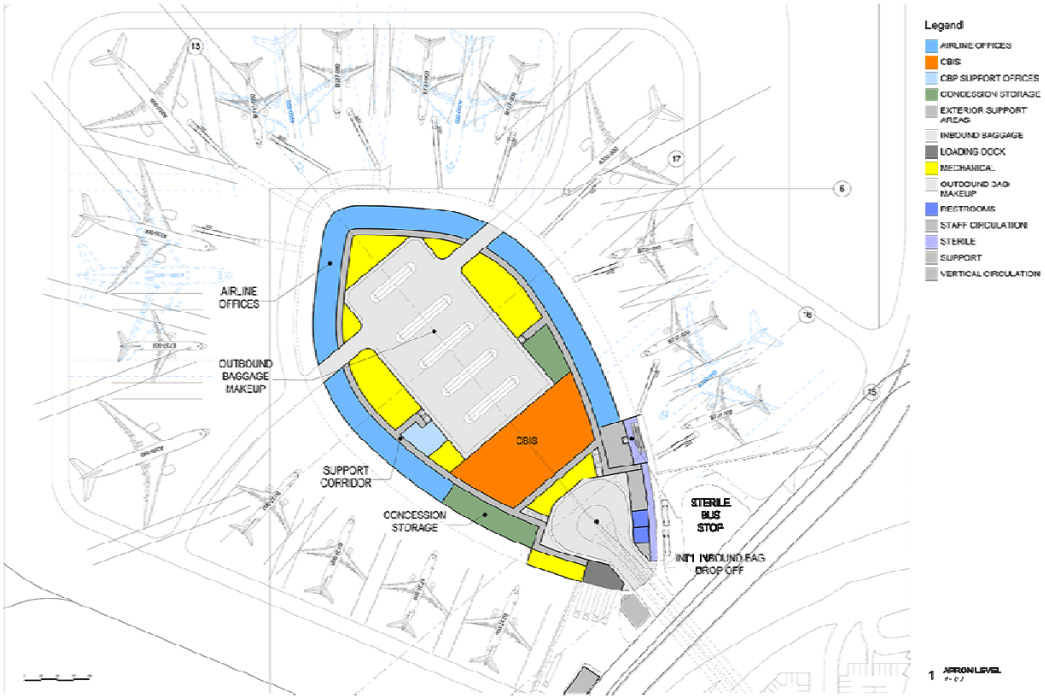


Figure 1.8
Airside D – Apron Level



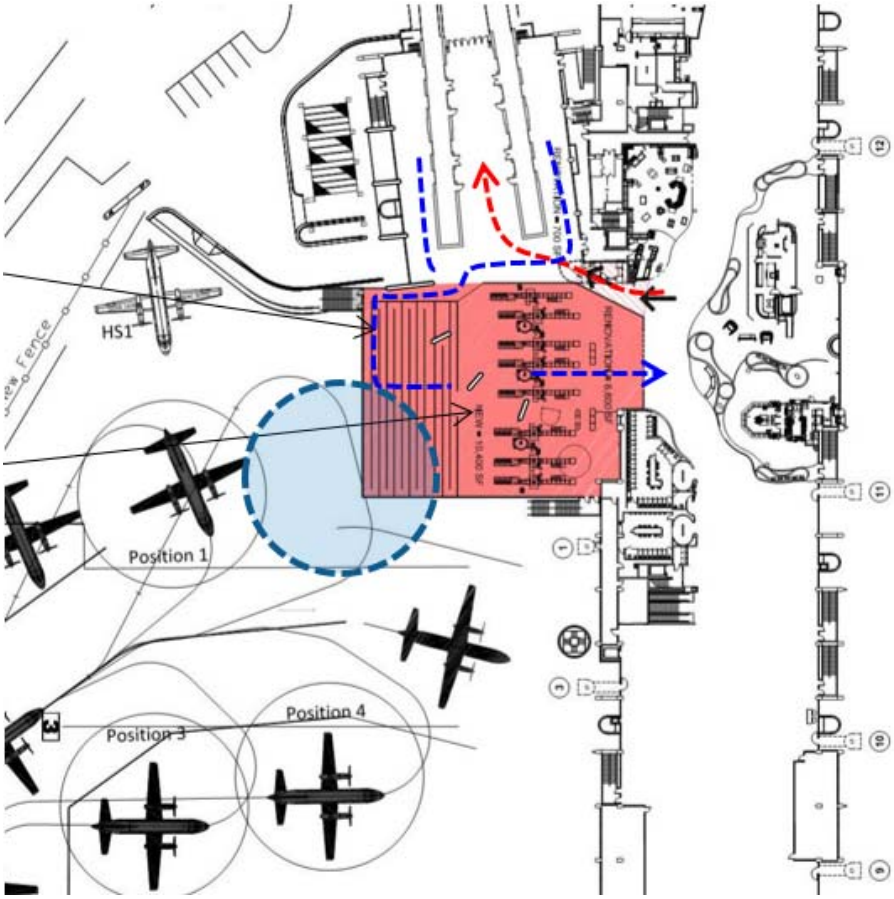
Based on analysis of the updated forecast and facility requirements, a new Airside D with 16 gates will provide the airside gate capacity required during the planning horizon and beyond. As part of the 2016 Addendum, all airsides were studied to understand the programmatic, capacity and functional issues of the existing facilities. If Airside D is not completed in time, the existing Airsides will need improvements to sustain an acceptable level of service. While many concepts were developed (and described in Section 5), the following represents the recommended improvements to satisfy the level of service requirements at the existing Airsides in the scenario Airside D does not move forward in time.

Airside A:

Airside A major improvements include the following:

- Security Screening Checkpoint (SSCP)
    - Additional queue area is required as well as an improved circulation from the Airside A APM station to the SSCP queue. The current building configuration creates issues for expansion due to the large columns and the current checkpoint is placed into a constrained site.
- Baggage Make-up Area – Additional Baggage Make-up is required to accommodate the projected growth of the Airside A airlines

Figure 1.9
Airside A Improvements

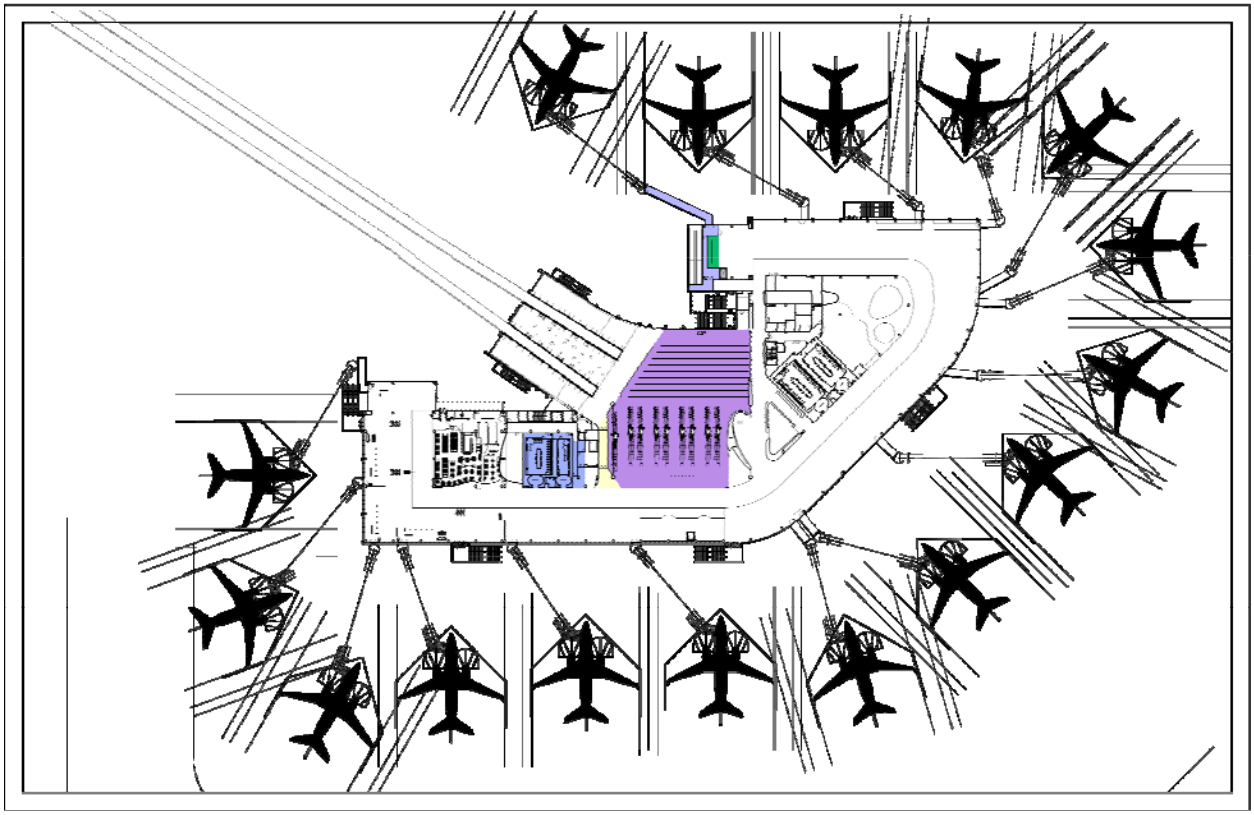


Airside C:

Airside C major improvements include the following:

- Restrooms
  - The current restrooms regularly include queue out the restroom entry during the peak hour.
- Baggage Make-up Area
  - With continued growth, the baggage make-up is constrained with a lower level of service. The apron does not have underutilized space to accommodate this growth.

Figure 1.10
Airside C Improvements

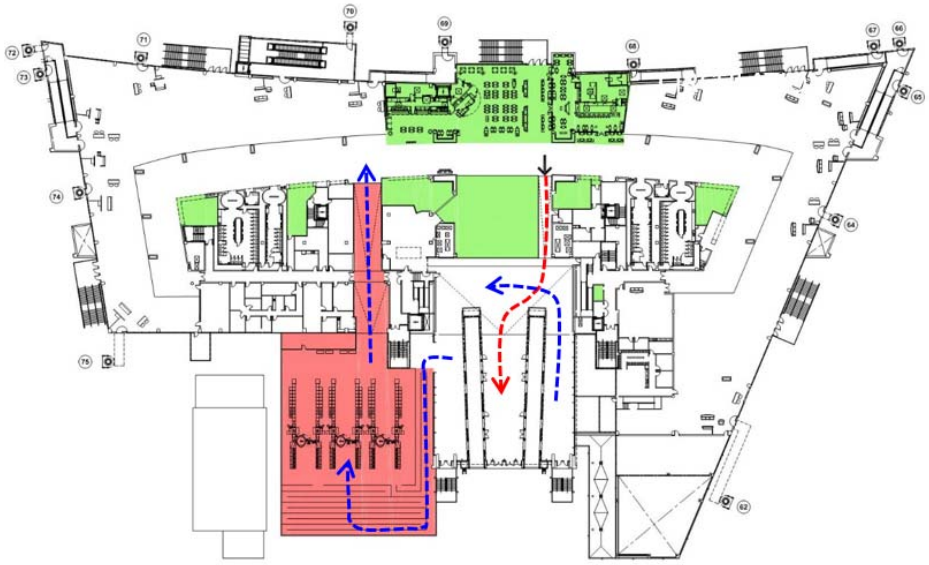


Airside E:

Airside E major improvements include the following:

- Security Screening Checkpoint
    - While the quantity of lanes is sufficient, the proximity of the APM station to the SSCP is problematic. The current SSCP does not allow for sufficient queue area and intuitive wayfinding/circulation. Since the location also contains a sloped floor due to the vertical elevation issues from the APM station to the Airside departure floor, the majority of the SSCP lanes are not optimal due to the slope.

Figure 1.11
Airside E Improvements

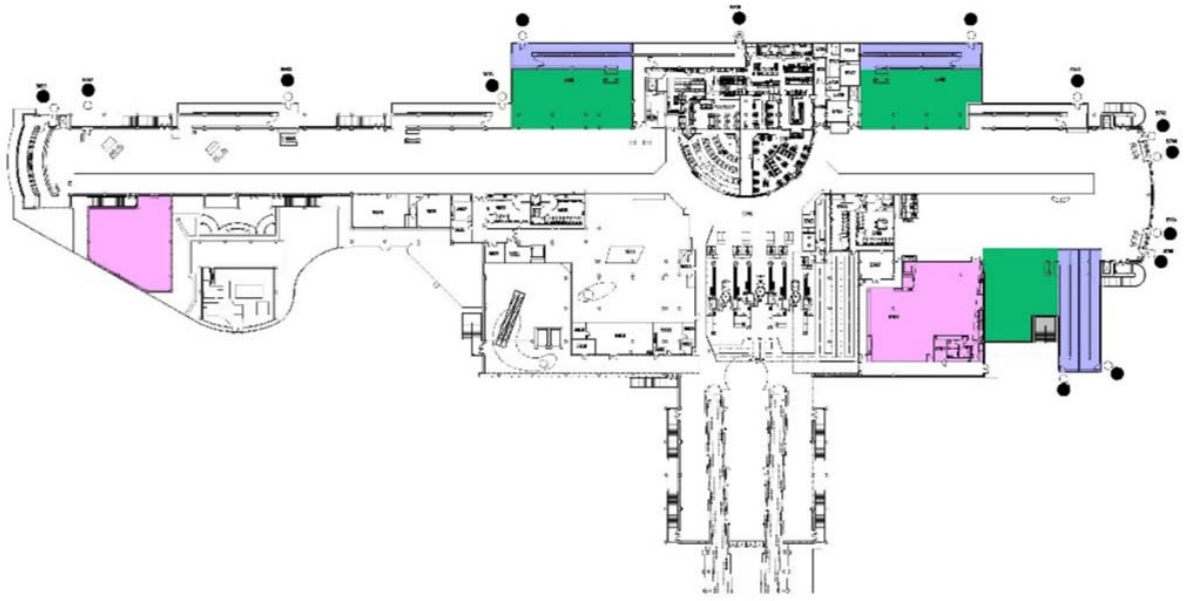


Airside F:

Airside F major improvements include the following:

- Holdrooms
    - International growth is requiring additional holdrooms with larger area to accommodate larger aircraft.
- Customs and Border Protection (CBP)
    - International growth requires additional primary processing queue and baggage claim unit.
- Clubs
    - The existing building does not currently accommodate enough SF area for passenger clubs. If Airside D is not developed, the need for additional club space creates issues for Level of Service.
- Baggage Make-up Area
    - Apron level is already constrained and with the CBP also requiring additional area, it does not allow for ample growth.

Figure 1.12
Airside F Improvements



1.5 Terminal / Curbside Improvements

The 2016 Master Plan Addendum was motivated in part by evolving conditions affecting the ease of landside access to the terminal complex. A major consideration was the trend of growing traffic congestion on the terminal curb roadways over the past several years. The congestion was increasing despite pro-active operational changes that mandated adherence to the "active loading and unloading only signs" on all four curbs that had, with its implementation in late 2012, significantly reduced queues at the arrivals curbs by reducing the previously observed very long dwell times. While this helped to reduce the dwell times, the capacity was still an issue as the vehicles that would have dwelled are now driving in recirculating loops until their passenger arrives on the curb. These added recirculating loops by vehicles further congest the whole roadway network around the central terminal.

A new issue since the 2012 MPU has been the introduction of Transportation Network Companies (TNC's), such as Uber and Lyft. The introduction of these companies have resulted in curbs that are more crowded than originally anticipated in the 2012 MPU analysis.

In addition, the peak number of airline seats has increased at the noon peak hour when compared to the 2012 MPU. This higher amount of peak traffic has also contributed to significant congestion at the curbs.

With capacity still an issue, impacts were being felt on the circulation roadways around the terminal complex. The 2012 Master Plan proposed to only add a fifth lane to the four-lane curbs. Traffic analyses (see Section 4) showed that to be inadequate, leading to the improvements described below.

1.5.1 Curbside Improvements

New curbside length for unloading and loading of passengers and new roadway lanes are required to meet the future demand of passengers and thus the vehicles which bring them to the terminal. The solution is to create an outer roadway (express lanes) for both the departure level and the arrival level for both the blue and red sides of the terminal. With pedestrian safety and curbfront capacity as the primary goals, the express lanes were developed independently from the existing curbside (4 lanes) to eliminate pedestrians from crossing the existing roadway. This helps the safety of pedestrians and the capacity is increased since the vehicles do not need to stop as frequently at multiple crosswalks. The express curbside concept gives travelers that already have their boarding passes, and are not checking baggage, a quicker and more direct route to their gates by providing faster access to the transfer level by passing the ticket lobby. The benefit will also be felt by arriving passengers that will no longer have to interact with passengers that need to wait on luggage; they will be able to proceed directly to the express lanes for pickup. The new express curbsides will provide the additional lane capacity needed to keep the curbsides operating at an acceptable level of service well into the future.

Blue Side:

The new express blue curbside will be constructed directly south of the existing blue curbside lanes. The blue express curbside will be constructed on the space that is currently occupied by the rental car facilities and will be demolished once the new Consolidated Rental Car Facility opens. A new 3 story vertical circulation lobby building will be constructed between the new express curbside and the existing curbside. The approximately 50' deep by 600' long building allows for Express drop-off passengers to go directly up to the Transfer Level. Arriving passengers can also utilize this new building to go directly down from the Transfer level to the new 4 lane curbfront for additional capacity. The project includes a new canopy to be located above all lanes of new traffic on the Departures level.

Figure 1.13
Blue Side Curb Improvements

Red Side:

The new express Red curbside will be constructed directly north of the existing Red curbside lanes. The Red express curbside will be constructed on the space that is currently occupied by the existing Central Energy Plant, HCAA Administration offices and Red Rental Car Facilities which will be demolished as part of this program. A new 3 story vertical circulation lobby building will be constructed between the new express curbside and the existing curbside. The approximately 50' deep building allows for Express drop-off passengers to go directly up to the Transfer Level along the existing Marriott Hotel gallery bridge. Arriving international passengers from future Airside D can also utilize this new building to go directly down from the Transfer level to the new 4 lane curbfront for additional capacity. The project includes a new canopy to be located above all lanes of new traffic on the Departures level.

To enable a new 4 lane roadway below without obstructions, the existing Marriott bridge will require reconstruction to eliminate the column that would fall in the middle of the new planned Red Express lanes and thus resulting in a new 60' span. The current column bays are 30' in the north-south direction. It is anticipated that the 2 structural bays will need to be demolished and rebuilt with the longer span.

Figure 1.14
Red Side Curb Improvements

1.5.2 Other Landside Improvements

- Demolish existing Administration Building
  - To enable the new Red Curbfront project to move forward, the existing HCAA Administration building will be demolished. The building to be demolished also includes the existing Central Energy Plant, Airport loading dock and concessions support areas and Red Rental Car lobby. HCAA Administration will move to the new office building located in the Gateway Development Area located adjacent to the new Rental Car Facility.
- New Loading Dock & Commissary Building
  - A new 2 story building to be built directly under the existing Marriott Gallery bridge and connected to the Transfer level via new service elevators.
  - The existing loading dock will be demolished for the Red Curbfront project. The new loading dock will be located between the new Red Curbfront and the existing Marriott hotel. The existing Marriott loading dock is maintained and 7 new Airport truck docks plus location for trash/recycling is collocated in the area.
  - The existing concessions commissary will also be demolished which will require relocation. This will be built on the second level directly above the loading dock.
  - Two new service elevators will be built on the side of the Marriott bridge to vertically connect the Transfer Level and loading dock. This enables new products to be loaded into the existing terminal building and rubbish to be removed out of the building.
  - New electrical and utility building to serve the Main Terminal.
- New FAA Parking Lot
  - Reconfiguration of the existing FAA parking lot to allow for other landside improvements.
- New Central Energy Plant
  - The existing Central Energy Plant is located on the Red Side and within the same building as the HCAA Administration offices. This will be demolished to allow for the new Red Curbfront project. A new 3 story Central Energy Plant will be constructed west of the Airside C APM and include an underground utility tunnel to connect the utilities from the existing location to the new Central Energy Plant building. This project will accommodate the required heating, cooling and power for the Main Terminal. Refer to **Appendix O – Utilities and CEP** for the energy plant study.

1.6 Roadway Improvements

Vehicular traffic has increased along the George J. Bean Parkway by approximately 19% for inbound traffic and 24% for outbound traffic since the 2012 Master Plan Update data was obtained. This is due to increased passenger activity, higher traffic peaks due to up-gauging of aircraft in during the peak hours, motorists not utilizing the cell phone waiting lot and 1-hour free short term parking as previously predicted, and the introduction of Transportation Network Companies (TNC's) such as Uber and Lyft. Due to this increased vehicular traffic, portions of the Parkway will be widened to increase vehicular capacity and to improve the level of service along the Parkway. Some of these Parkway improvements were previously recommended in the 2012 Master Plan Update, however some additional improvements will be necessary due to the express curbs identified in this 2016 Addendum.

To accommodate the new express curbs, mainline and ramp improvements will be constructed along the George J. Bean Parkway as part of the Phase 2 work. The ramp work will include constructing dedicated exit lanes from the George J. Bean Parkway to both the red and blue curbsides. Once motorists have exited the Parkway, they will then have the option to head towards the existing curbsides or the new express curbsides.

The roadway improvements will also include dedicated entrance lanes from the curbsides to the George J. Bean Parkway. These dedicated lanes will improve the merge conditions that currently exist along the Parkway which will greatly enhance the safety along the Parkway.

The George J. Bean Parkway will be realigned at some locations to accommodate the express curb ramp improvements included with this Phase 2 work. Additional lanes will also be constructed along the Parkway near the main terminal in some location to provide additional lane capacity.

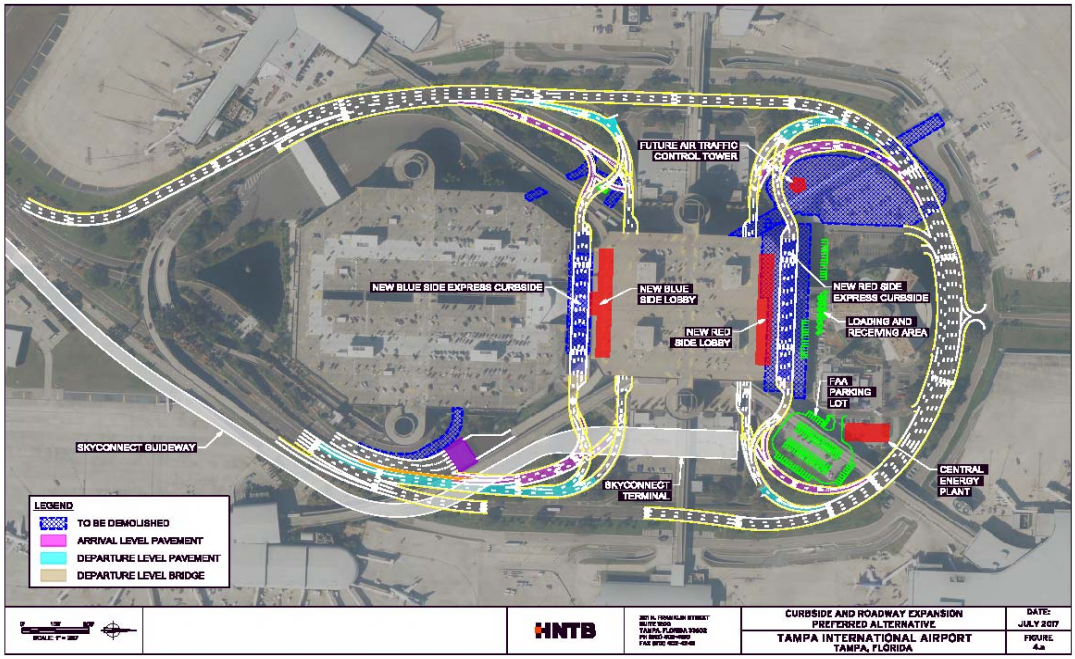
As previously mentioned, some of the George J. Bean Parkway widening improvements identified in the 2012 Master Plan will be incorporated into this phase of construction. These improvements include:

- Widening the northbound parkway between the South Terminal Area to the main terminal from 3 to 4 lanes

- Widening the southbound parkway from south of the taxiway bridge to the main terminal from 3 to 4 lanes

Additionally, these improvements will also include widening improvements to the northern exit from the South Terminal Area that will greatly improve access from the South Terminal Area to the ramp leading to westbound SR 60 and northbound Veterans Expressway.

Figure 1.15
Curbside and Roadway Expansion Preferred Alternative



1.7 Capital Improvement Program (CIP) Update & Conclusions

In summary, the 2016 Addendum provides validation and analysis that supports the following as recommendations for the Phase II and III projects.

- Phase II is still an enabling phase in anticipation of Phase III
- 2012 passenger forecast is on target
- Passenger growth is stimulated by larger aircraft
- Curbs remain stressed with additional lanes needed sooner to meet the demand
- Additional airside gates are still not needed until Phase III
- Adjusted phasing and scope achieves significant cost savings and less complexity.

The following represents the consolidated summary of recommendations for the 2012 Master Plan Update and 2016 Addendum by phase:

Phase I:

- Consolidated Rental Car Center
- Automated People Mover
- Taxiway J Reconstruction
- South Terminal Support Area Roadway Expansion
- Transfer Level Expansion and Concessions Redevelopment
- Concessions Warehouse
- Reclaim Levels 1 and 2 in the Long-Term Parking Garage
- Common Use Implementation

Phase II:

- Demolish Red Side Garage
- Gateway Development Area
- Parkway Expansion
- Gateway Development Area – Exit Lane South of Post Office
- Taxiway A
- Central Energy Plant and Related Work
- Demolish Airport Administration Building
- Blue and Red Curb Expansion
- Loading Dock Building
- FAA Parking Lot

Phase III:

- New 16 gate Airside D with new APM shuttle, passenger security screening checkpoint, CBP/FIS and checked baggage screening facilities

Other Potential Capacity Projects if Airside D is not constructed:

- Airside C Restroom Expansion
- Airside A SSCP Expansion
- Airside F RON Parking
- Airside F Expansion
- Airline/Airside Rebalancing

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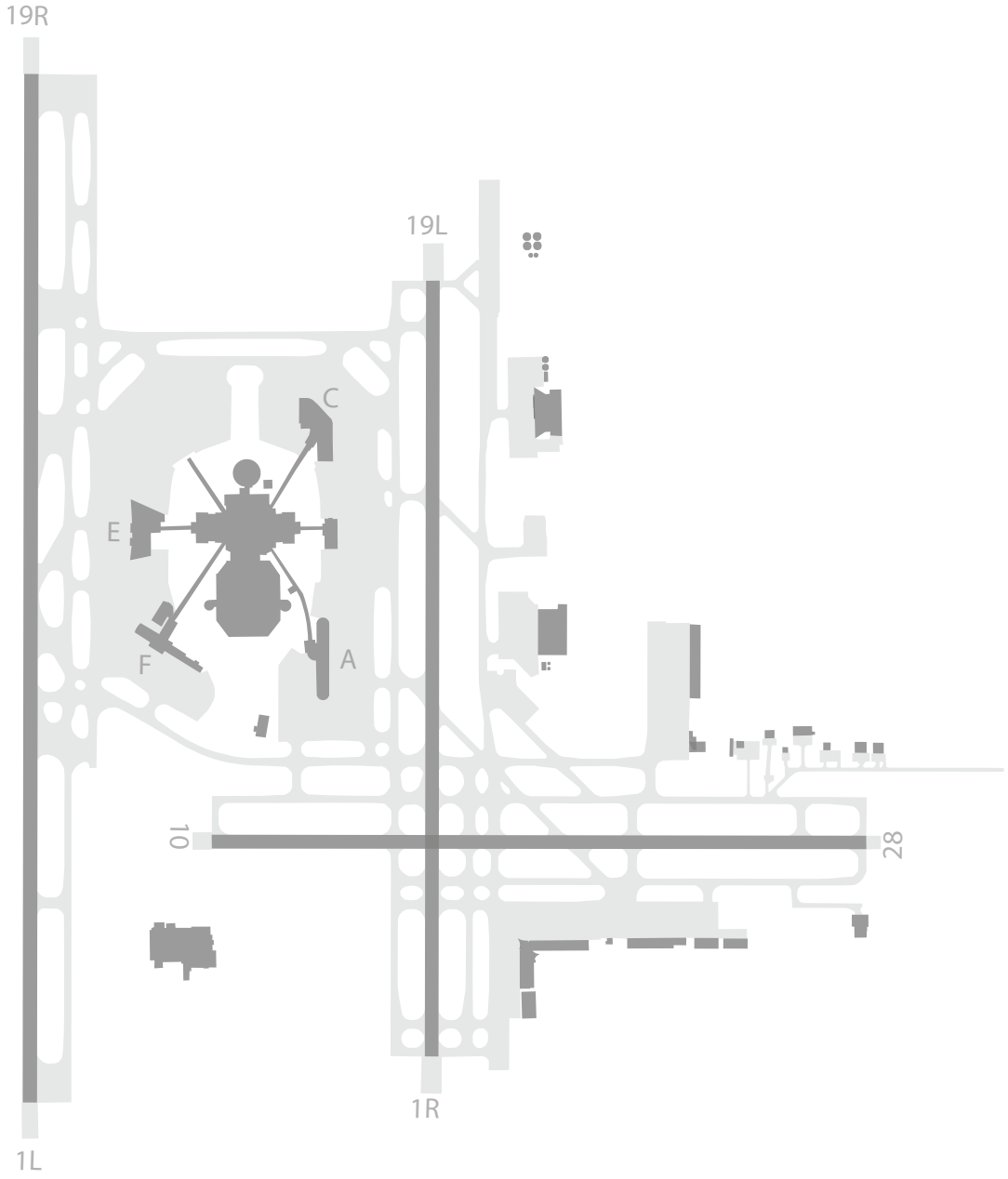
SECTION 2 - FORECAST



2.0. AVIATION ACTIVITY FORECASTS

An airport activity forecast was prepared as part of the TPA Master Plan Update (MPU) in early 2012 and approved by the FAA in April 2012. In late 2015, the HCAA management team determined that a review of the Master Plan Update would be valuable. As part of the review, a Workshop to evaluate the status of the forecasts was held on January 14, 2016. During the Workshop, it was determined that elements of the MPU forecast should be revisited, especially gate requirements and peak passenger flows, to confirm that the current plan is still adequate to accommodate anticipated demand.

The re-evaluation of the forecast determined that actual passenger activity levels were tracking with the forecast but actual passenger aircraft operations were lagging behind the forecast. Therefore, for the purposes of revalidating the need for terminal expansion in the 2016 Addendum, the 2012 MPU passenger forecast was retained but a lower passenger aircraft operations forecast was prepared to reflect the trends for higher load factors and larger average aircraft size that have occurred and are expected to continue.

The forecast focused on three planning periods:

- Near Term: 2015-2021
- Mid Term: 2015-2026
- Long Term: 2015-2031

The following sections review recent aviation activity at TPA and discuss the elements of the forecast that were updated. The 2012 MPU is referenced for forecast elements that did not change as part of the 2016 MPA.

2.1. Introduction

This chapter first provides a review of recent historical activity followed by a comparison of the MPU forecast with actual passenger and aircraft operations activity. This is followed by an update of the assumptions and key factors expected to affect future aviation activity at the Airport. Where applicable, a discussion of the updates to the passenger and other forecasts is then provided. The final sections describe the updated design day flight schedules (DDFS) and the future peak hour passenger flows and gate requirements that were derived from the DDFSs. The information contained in this chapter is supplemental to the original 2012 MPU. Sections that have not changed as part of this Master Plan Addendum are noted so that the reader can refer to the original 2012 document.

2.2. Historical Aviation Activity

Table 2.1 and **Figure 2.1** describe historical domestic and international passenger activity at the Airport from 1992 through 2016. After a major decline between 2007 and 2011 from the Great Recession, the collapse of the real estate bubble in Florida, and the impact of the Gulf of Mexico oil spill on tourism, domestic passenger traffic has begun a steady recovery since 2011. International passenger traffic began to recover after 2007, and has experienced accelerated growth since 2011 because of the Airport's aggressive marketing programs.

Table 2.1
Historical Passengers (Enplanements + Deplanements)

Year	Domestic	International	Total
1992	8,934,127	628,712	9,562,839
1993	9,405,814	612,419	10,018,233
1994	11,439,553	602,965	12,042,518
1995	10,772,392	623,738	11,396,130
1996	12,387,916	613,175	13,001,091
1997	12,784,292	586,338	13,370,630
1998	13,305,902	525,089	13,830,991
1999	14,594,630	527,696	15,122,326
2000	15,566,843	476,540	16,043,383
2001	15,426,464	461,972	15,888,436
2002	15,062,343	432,325	15,494,668
2003	15,094,481	429,087	15,523,568
2004	16,927,817	469,019	17,396,836
2005	18,551,337	494,053	19,045,390
2006	18,358,796	508,745	18,867,541
2007	18,782,177	372,780	19,154,957
2008	17,884,105	378,829	18,262,934
2009	16,565,804	399,741	16,965,545
2010	16,254,851	390,914	16,645,765
2011	16,243,824	426,491	16,670,315
2012	16,316,069	504,790	16,820,859
2013	16,389,923	531,022	16,920,945
2014	16,932,185	621,367	17,553,552
2015	18,096,164	719,261	18,815,425
2016	18,080,432	851,490	18,931,922
Average Annual Growth Rate			
1992-2007	5.1%	-3.4%	4.7%
2007-2011	-3.6%	3.4%	-3.4%
2011-2016	2.2%	14.8%	2.6%
1992-2016	3.0%	1.3%	2.9%

Source: Tampa International Airport, Monthly Activity Reports

Figure 2.1
Historical Passengers (Enplanements plus Deplanements)

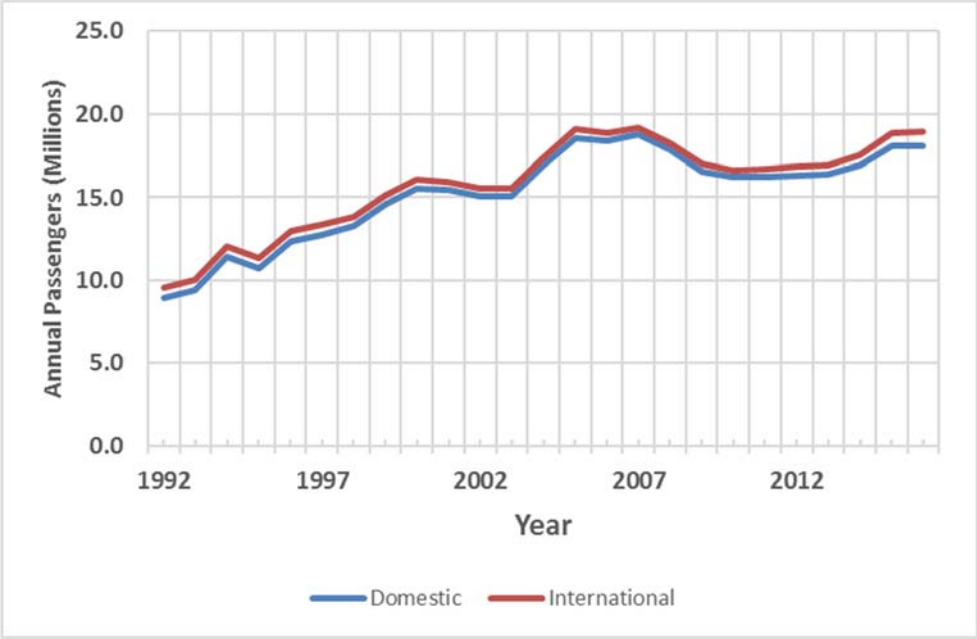


Table 2.2 and **Figure 2.2** describe aircraft operations at the Airport between 1992 and 2016. Domestic commercial operations, including domestic scheduled passenger, all-cargo, and air taxi flights, declined steeply from 2007 to 2009 because of the Great Recession, airline consolidation, and the elimination of many smaller regional aircraft from airline fleets. Since that time, domestic operations have held at approximately 160,000 operations annually. Throughout the historical period, the number of passengers per aircraft has increased, because of higher load factors and larger aircraft and, consequently, operations have increased more slowly than passengers. The historical and forecast relationships between passengers and passenger aircraft operations are discussed in more detail in Section 2.3.

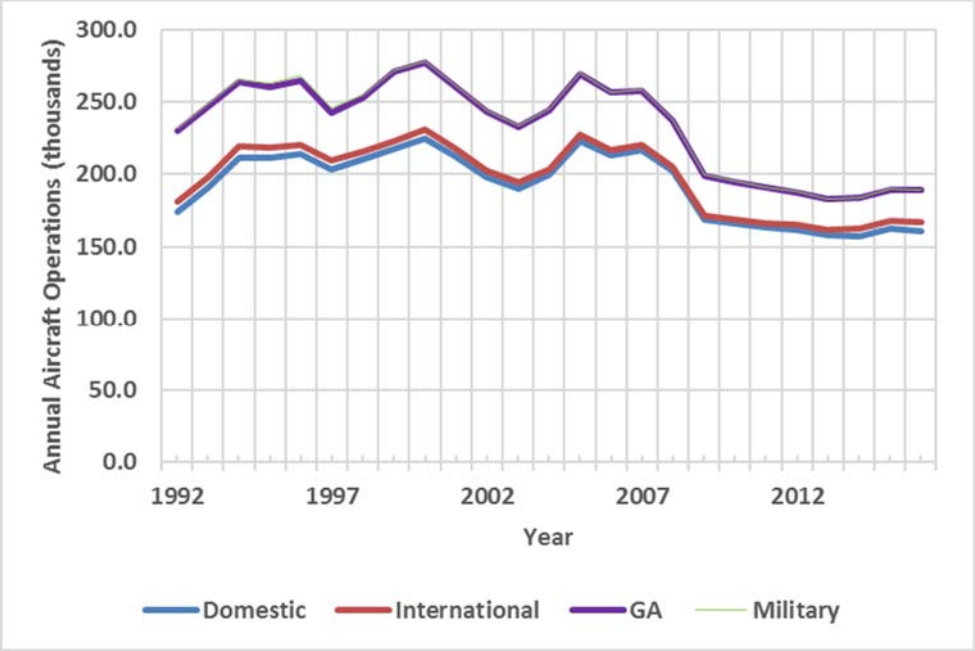
International aircraft operations have grown and declined in accordance with international enplaned and deplaned passengers. Because of gradual increases in aircraft size, international passengers have increased slightly and more rapidly than international aircraft operations.

Table 2.2
Historical Aircraft Operations

Domestic								
Year	Passenger	Cargo	Air Taxi	Subtotal	International	GA	Military	Total
1992				174,256	7,240	48,261	2,389	232,146
1993				191,222	6,966	48,349	1,806	248,343
1994				211,611	7,858	44,687	1,531	265,687
1995				211,616	6,592	42,263	2,109	262,580
1996				213,825	6,158	44,545	3,485	268,013
1997				203,731	5,962	32,892	3,229	245,814
1998				210,189	5,638	37,272	1,843	254,942
1999				217,361	5,154	48,696	750	271,961
2000				225,128	5,730	46,190	815	277,863
2001				212,621	5,150	42,438	652	260,861
2002				198,439	4,166	40,422	923	243,950
2003				190,200	3,950	38,976	475	233,601
2004				199,946	3,624	40,686	604	244,860
2005				223,121	4,270	42,228	505	270,124
2006				213,212	3,474	39,784	601	257,071
2007				217,134	3,001	37,539	675	258,349
2008				202,123	2,920	32,223	619	237,885
2009				168,539	3,142	27,632	647	199,960
2010				166,167	2,950	25,575	667	195,359
2011	150,562	6,340	6,529	163,431	2,976	24,337	571	191,315
2012	148,367	6,242	6,667	161,275	3,690	22,380	709	188,054
2013	148,680	4,552	4,667	157,899	3,818	21,278	347	183,342
2014	146,058	3,846	7,599	157,503	4,874	21,078	530	183,985
2015	150,850	2,168	9,138	162,156	5,522	21,641	430	189,749
2016	147,116	3,260	10,701	161,077	5,760	21,964	795	189,596
Average Annual Growth Rate								
1992-2007				1.5%	-5.7%	-1.7%	-8.1%	0.7%
2007-2011				-6.9%	-0.2%	-10.3%	-4.1%	-7.2%
2011-2016	-0.5%	-12.5%	10.4%	-0.3%	14.1%	-2.0%	6.8%	-0.2%
1992-2016				-0.3%	-0.9%	-3.2%	-4.5%	-0.8%

Source: Tampa International Airport, Monthly Activity Reports

Figure 2.2
Historical Aircraft Operations



General aviation at the Airport has declined through most of the historical period. Factors contributing to the decline include increase acquisition and operating costs, more regulations, and decreased interest in personal and recreational flying by younger generations. These trends are occurring throughout the United States. Additionally, part of the decline at the Airport is attributable to diversion of general aviation activity to TPA's reliever airports including Peter O. Knight Airport (TPF), Plant City Airport (PCM), and Tampa Executive Airport (VDF).

Military aircraft operations account for less than half of one percent of the Airport's total activity. During the last fifteen years they have fluctuated with no discernible long-term trend.

Total operations dropped significantly between 2008 and 2009, and have since averaged about 190,000 annually.

2.3. Forecast Review

The 2012 MPU forecasts were reviewed and compared against actual activity. In addition, current aviation industry trends were evaluated to determine if they were likely to influence the future forecasts. The analyses were used to help determine which elements of the MPU forecasts could be retained for the updated terminal and roadway demand analysis, and which elements would need to be adjusted or revised.

2.3.1. Review of Passenger Forecasts

Figure 2.3 and **Table A-1** in Appendix A show actual domestic passengers in comparison to the MPU forecast. Actual passenger levels lagged the forecast from 2012 to 2014, but slightly exceeded the forecast in 2015 before falling back slightly in 2016. The divergence between the two sets of numbers has never exceeded 3.5 percent.

Figure 2.3
Comparison of Forecast vs. Actual Domestic Passengers

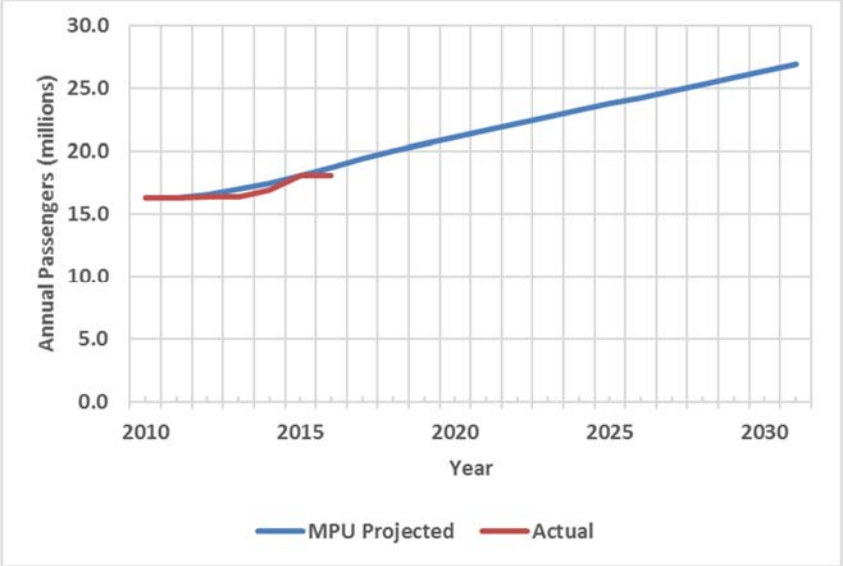


Figure 2.4 and **Table A.2** in Appendix A provide a comparison of the MPU forecast of international passengers along with actual international passenger levels. In the MPU forecast, international passengers were projected to more than double between 2011 and 2016 because of the Airport's active marketing efforts and incentive programs for new international air service. As a result of these efforts, the Airport has attracted new service to Panama City, Zurich, Cuba and Frankfurt as well as other destinations, and actual activity levels have doubled over the 2011-2016 period. With a full year of Frankfurt service and the addition of new Reykjavik service, it is anticipated that the gap between MPU forecast passengers and actual passengers will narrow in 2017.

Figure 2.5 and **Table A.3** in Appendix A compare the MPU forecast of total passengers with actual total passenger levels. Like domestic passengers, actual total passenger levels lagged the forecast from 2012 to 2014, but almost matched the forecast in 2015 before falling back slightly in 2016. The divergence between the two sets of numbers has never exceeded 3.8 percent.

Figure 2.4
Comparison of Forecast vs. Actual International Passengers

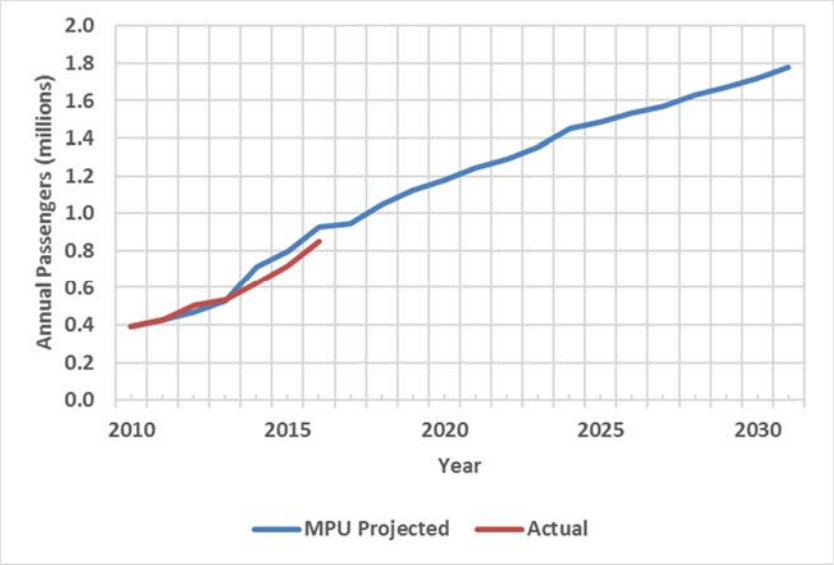
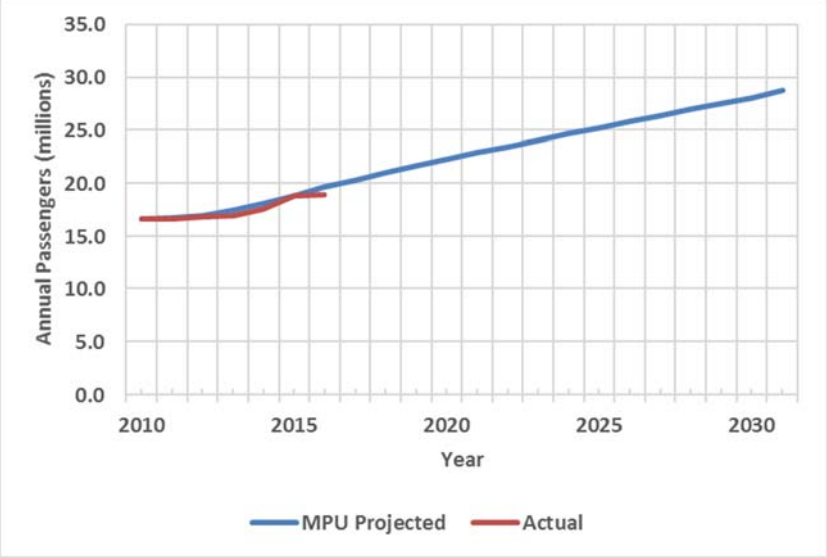


Figure 2.5
Comparison of Forecast vs. Actual Total Passengers



2.3.2. Review of Passenger Aircraft Operations Forecasts

Figures 2.6, 2.7, and 2.8, along with **Tables A-4 through A-6** in Appendix A, provide comparisons of the MPU forecasts of domestic, international, and total passenger aircraft operations with actual operations levels in each category. In contrast to the passenger forecasts, actual passenger aircraft operations levels are tracking below forecast levels in both the domestic and international categories. For example, in 2016 actual domestic passenger aircraft operations were 10.7 percent below forecast levels and actual international passenger aircraft operations were 30.0 percent below forecast levels. Total passenger aircraft operations were 11.4 percent below forecast levels in 2016.

Figure 2.6
Comparison of Forecast vs. Actual Domestic Passenger Aircraft Operations

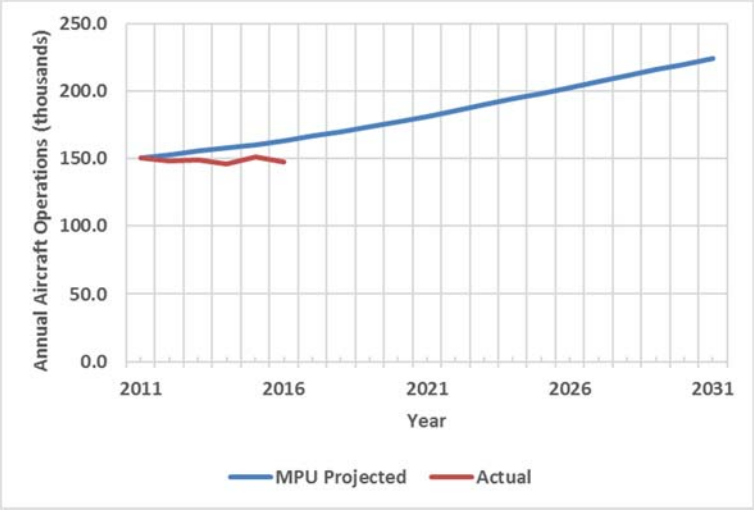
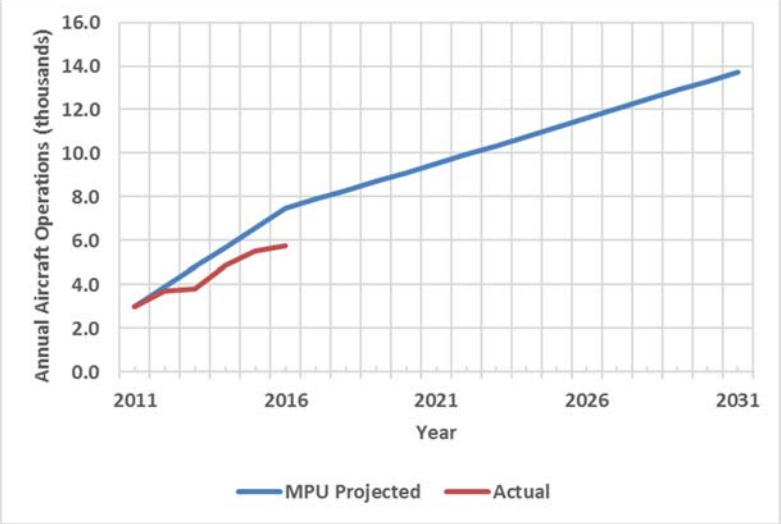
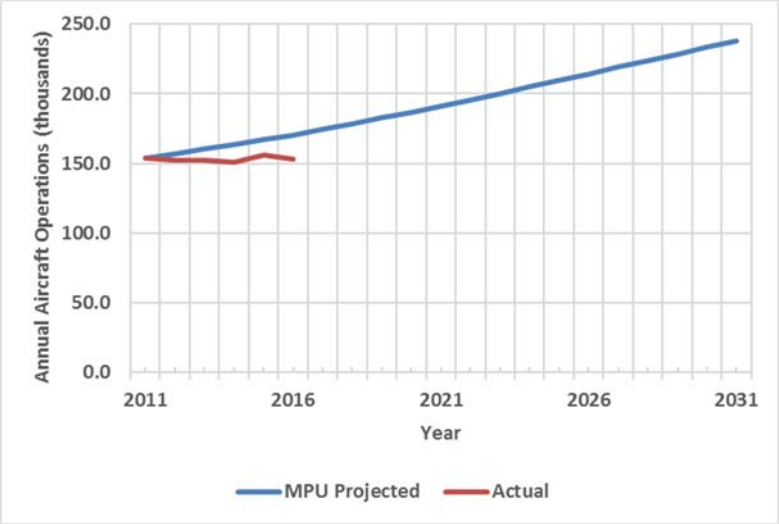


Figure 2.7
Comparison of Forecast vs. Actual International Passenger Aircraft Operations



Comparison of Forecast vs. Actual Total Passenger Aircraft Operations



The relationship between total passengers and passenger aircraft operations depends on the number of passenger per aircraft operation which in turn depends on average load factor and average seats per aircraft.

Table 2.3 and Figure 2.9 show the recent history of domestic and international load factors at the Airport. As shown, despite the Great Recession, domestic load factors increased between 2004 and 2009 and continued to increase between 2011 and 2016. These increases were possible because of airline consolidation among U.S. flag carriers and the capacity restraint that was made possible by the reduced competition.

In contrast to the domestic carriers, average international load factors decreased between 2011 and 2016. It is not unusual for load factors to begin at below average levels on new routes until customers become more fully aware of the new service. It is anticipated that once the new international service is more fully established, international load factors will increase again.

Recent trends in domestic and international average aircraft size at the Airport are provided in **Table 2.4 and Figure 2.10**. Domestic flights averaged 121.9 seats per aircraft in 2004, increased to 135.5 in 2011 and then increased again to 144.1 in 2016. International flights averaged 150.8 seats per aircraft in 2004, 168.8 seats per aircraft in 2011, and 183.8 seats per aircraft in 2016. As a result of the increases in load factor and average seats per aircraft, average passengers per operation increased between 2004 and 2011, and again between 2011 and 2016. Consequently, aircraft operations have increased much more slowly than total passengers during those periods. This trend is consistent with most airports in North America as Airlines reduce small regional aircraft from their fleets and up-gauge other aircraft to larger seat capacity.

Table 2.3
Historical Domestic and International Load Factors

Year	Domestic	International	Total
2004	75.5%	78.2%	75.6%
2005	76.6%	74.7%	76.5%
2006	77.4%	84.1%	77.6%
2007	77.2%	77.4%	77.2%
2008	77.1%	81.5%	77.2%
2009	81.0%	82.7%	81.0%
2010	80.5%	83.5%	80.6%
2011	79.6%	84.9%	79.7%
2012	81.1%	79.3%	81.1%
2013	81.7%	82.2%	81.8%
2014	84.1%	77.7%	84.0%
2015	85.3%	77.8%	85.0%
2016	85.3%	80.4%	85.1%
Average Annual Growth Rate			
2004-2011	0.8%	1.2%	0.8%
2011-2016	1.4%	-1.1%	1.3%
2004-2016	1.0%	0.2%	1.0%

Sources: USDOT T100 data as compiled by DataBase Products, Inc.

Figure 2.9
Historical Domestic and International Load Factors

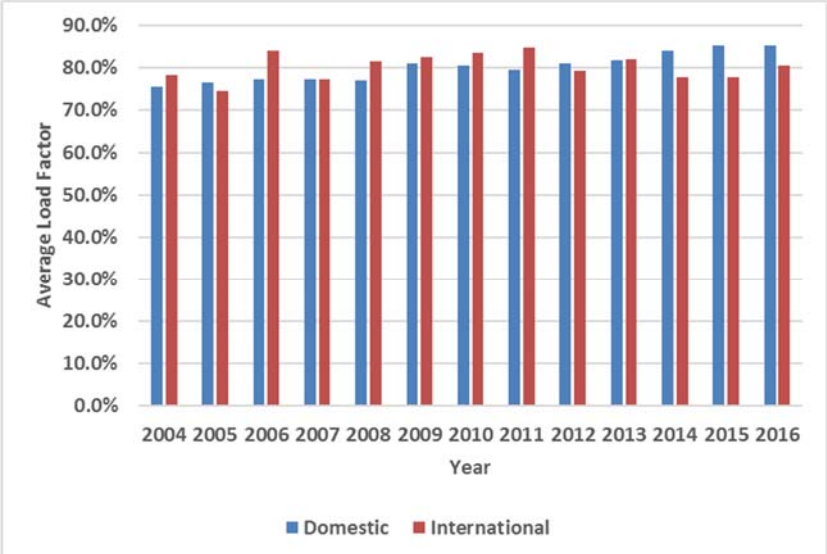
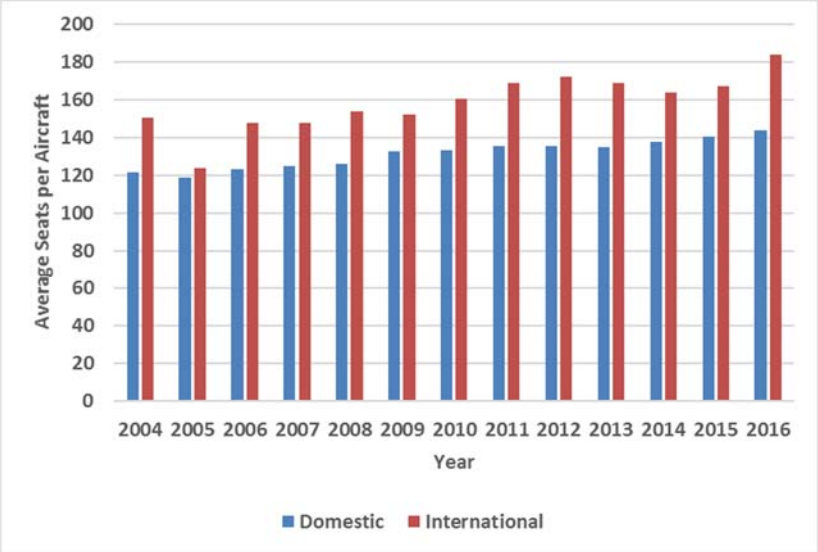


Table 2.4
Historical Domestic and International Average Seats per Aircraft

Year	Domestic	International	Total
2004	121.9	150.8	122.3
2005	118.8	123.8	118.9
2006	123.3	147.6	123.7
2007	124.9	147.9	125.3
2008	126.1	153.8	126.6
2009	132.6	152.5	133.0
2010	133.5	160.9	134.1
2011	135.5	168.8	136.2
2012	135.7	172.6	136.4
2013	134.9	169.3	135.7
2014	137.8	164.0	138.5
2015	140.7	167.4	141.5
2016	144.1	183.8	145.5
Average Annual Growth Rate			
2004-2011	1.5%	1.6%	1.6%
2011-2016	1.2%	1.7%	1.3%
2004-2016	1.4%	1.7%	1.5%

Sources: USDOT T100 data as compiled by DataBase Products, Inc.

Figure 2.10
Historical Domestic and International Average Seats per Aircraft



The MPU forecasts had assumed a more moderate increase in average aircraft size than occurred. Therefore, the MPU forecasts projected lower growth in the number of passengers per aircraft and higher growth in passenger aircraft operations. The MPU projections in average seats per aircraft were based on the MPU fleet mix forecasts.

Figure 2.11 provides a comparison of the MPU domestic fleet mix forecast for 2016 along with the actual domestic fleet mix for 2016. The actual fleet was similar to the forecast fleet mix; in both instances Boeing 737 aircraft account for about half the total and Airbus 320 family aircraft account for about one quarter of the total. The main difference was that the actual 2016 fleet had more 737-800 aircraft in the Boeing 737 mix than had been projected. Likewise, there were a greater number of large A321 aircraft in the Airbus 320 mix than had been projected.

Figure 2.11
Comparison of Forecast and Actual Domestic Fleet Mix: 2016

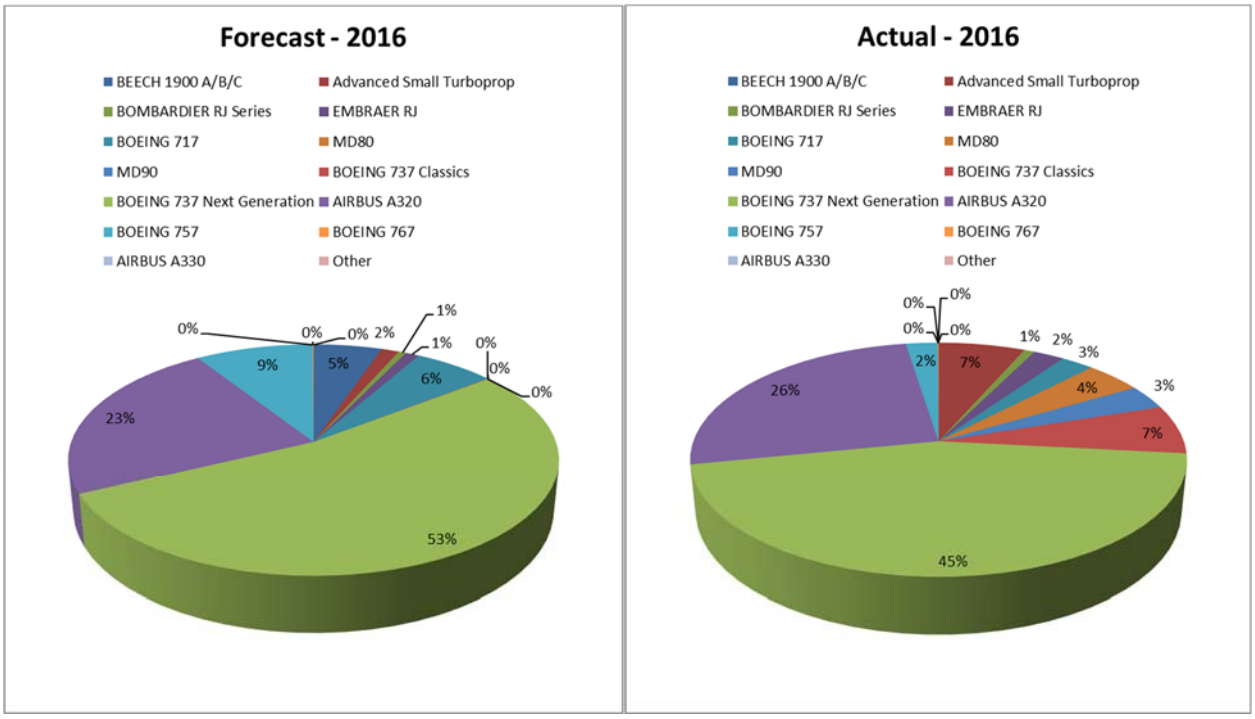
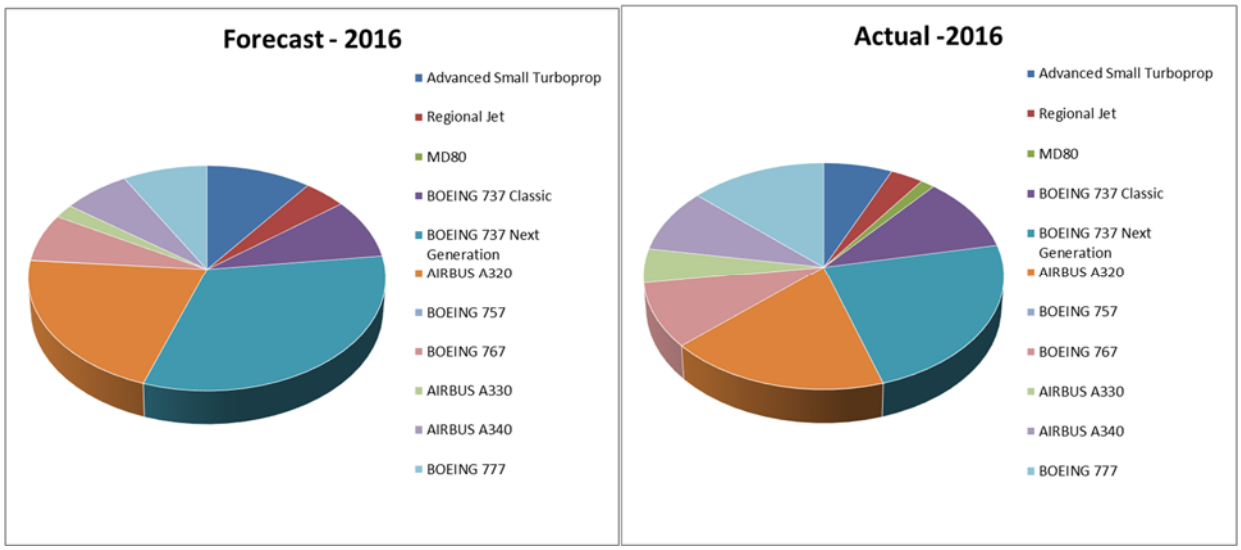


Figure 2.12 provides a comparison of the MPU international fleet mix for 2016 along with the actual international fleet mix for that year. The 2016 actual international fleet mix includes a greater percentage of wide-body aircraft and a smaller percentage of narrow-body aircraft than had been projected in the MPU. The MPU forecast had assumed that most of the initial new international service would be to Caribbean markets served by narrow-body aircraft. In actuality, most of the new international service was to European markets on wide-body aircraft. Consequently, the average international aircraft size was larger than projected in the MPU and the number of international aircraft operations was less than projected in the MPU.

Figure 2.12
Comparison of Forecast and Actual International Fleet Mix: 2016



2.3.3. Review of MPU Forecasts of Non-Passenger Categories

The passenger and passenger aircraft forecasts were the focus of the forecast review, since the terminal building and access roadways were the principle facilities being evaluated in this 2016 Addendum. Other categories, however, including cargo, air taxi, general aviation, and military operations, were also evaluated. Comparisons for these categories are provided in **Tables A-7 through A-10** in Appendix A.

Air cargo tonnage in 2016 (132,249 tons) is tracking above the MPU forecast for 2016 (109,459 tons). However, air cargo aircraft operations are tracking well below the MPU forecast through 2016 (**Table A-7**). This is primarily because of the loss of Flight Express operations in 2013. Operations by FedEx, ABX, Air Transport International using larger aircraft are ongoing.

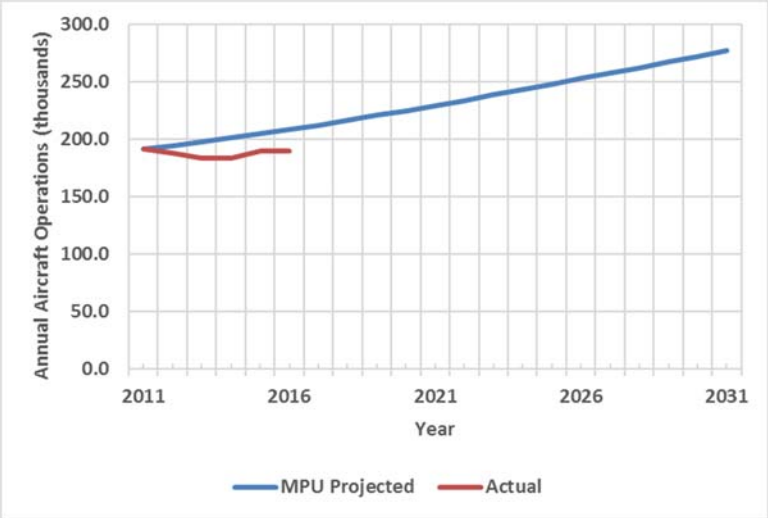
In the MPU, air taxi operations referred to on-demand passenger or cargo operations that do not operate on regular schedules and are not documented in the Airport's landing reports. They are typically calculated by subtracting operations from carriers that file landing reports from the ATCT counts of air carrier and air taxi operations. In 2016, they were tracking above the MPU forecast (see Table A.8) but historically they have not followed a consistent trend.

General aviation operations declined between 2011 and 2014 (see **Table A.9**) but have since begun to recover as fuel prices have declined. They are currently tracking about 10.6 percent below the MPU forecast.

Military aircraft operations were tracking above the MPU forecast in 2016 (see **Table A.10**). However, they were tracking below MPU levels between 2013 and 2015. Because of the low level of baseline military activity at the Airport, changes of one operation per day can result in significant percentage deviations from the forecast.

Table A.11 in Appendix A and **Figure 2.13** provide a comparison of the MPU forecast of total aircraft operations and actual operations between 2011 and 2016. As noted earlier, scheduled passenger, all-cargo, and general aviation operations are all tracking lower than the MPU forecast. Consequently, in 2016 total operations were tracking 10.0 percent below the MPU forecast of total operations.

Figure 2.13
Comparison of Forecast vs. Actual Total Aircraft Operations



2.4. Assumptions

The forecast review in the 2016 Addendum included a re-examination of the assumptions in the MPU forecast. These included economic assumptions, aviation industry assumptions, regulatory assumptions, and assumptions on competition from other modes.

The MPU forecast assumed no severe downturn such as the Great Depression or Great Recession. It also defined primary and secondary geographic draw areas based on accessibility to the Airport and competition from other airports such as Orlando International. Finally, the MPU forecast assumed that tourism would continue to recover from the recession and Gulf oil spill. A review of regional economic trends since 2012 indicated that no change in these assumptions is warranted.

The key MPU airline industry assumptions included no additional airline mergers and that the national airspace system would provide sufficient capacity to accommodate future traffic. Alaska Airlines and Virgin America have merged subsequently. However, their operations are concentrated on the West Coast and the merger is therefore unlikely to have a material effect on Airport activity. Although NextGen continues to be delayed, the growth in national aircraft operations has slowed, thereby reducing the pressure on the system.

One of the MPU regulatory assumptions anticipated that Open Skies agreements would continue to allow the Airport international passenger traffic levels to grow in response to demand. This assumption continues to be valid but may change depending on the success of efforts by Delta, American, and United to restrict foreign-flag competition.

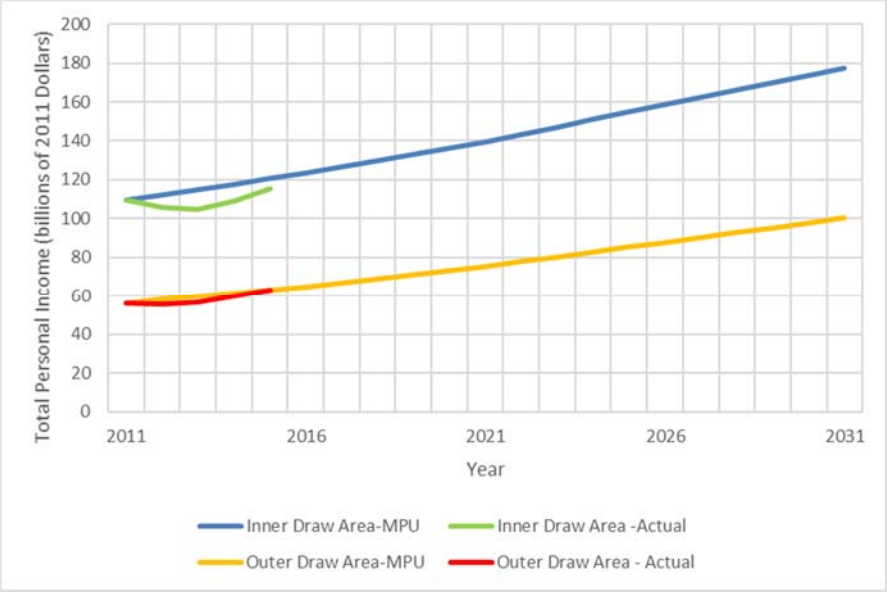
The MPU forecast assumed there would be no competition from high speed rail. The private Brightline higher-speed rail system has since begun construction on the Florida East Coast. However, because of its routing and relatively low speed, it is not believed that it will materially affect demand at the Airport.

2.5. Key Factors

The MPU forecast identified several key factors that would determine future passenger levels, including socioeconomic projections, fuel prices, air fares, Airport incentive programs, and unemployment rates.

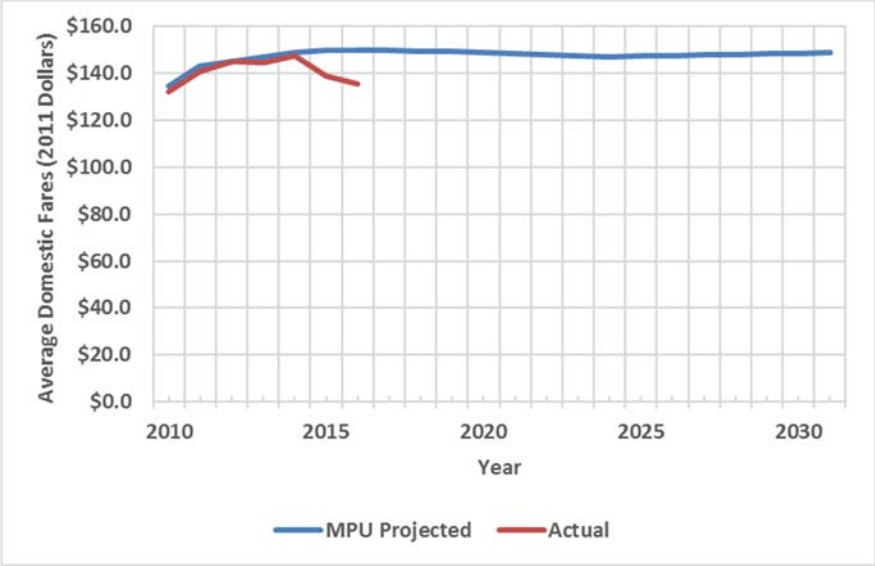
Figure 2.14 provides a comparison of actual regional personal income and the projections used in the MPU. The comparison is provided for the Inner Draw Area (Hillsborough, Pinellas, Hernando, Pasco, and Manatee Counties) and the Outer Draw Area (Citrus, Sumter, Polk, Hardee, DeSoto, and Sarasota Counties). Actual income levels in the Inner Draw Area trailed the forecast in 2012 through 2014, and then began to recover in 2015. Income in the Outer Draw Area has closely followed the original projections.

Figure 2.14
Comparison of Forecast and Actual Regional Income Projections



The jet fuel price projections used in the MPU anticipated that prices would remain between $3.00 and $4.00 per gallon during the forecast period. They remained at that level until late 2014, and then plunged to less than $1.50 per gallon by mid-2017. The jet fuel price estimates were used to adjust the average air fare projections in the MPU which, in turn, were used to estimate passenger demand. **Figure 2.15** compares the MPU projection of average air fares at the Airport with actual air fares. As shown, actual fares have tracked much more closely with projected fares than was the case with fuel prices. This indicates that most of the decline in fuel prices was used to increase airline profits instead of being passed on to consumers. It should also be noted that some of the decrease in fares was offset by increases in ancillary fees which are not shown on the chart.

Figure 2.15
Comparison of Forecast and Actual Average Air Fares



The unemployment rate projections used in the MPU forecast were based on forecasts developed by the White House Office of Economic and Budget Analysis, which projected U.S. unemployment to decline to 5.9 percent in the long term. According to the U.S. Bureau of Labor Statistics, the most recent unemployment rate (June 2017) is 4.4 percent.

One of the key assumptions for the MPU international passenger forecast was that the Airline Incentive Program (AIP) would continue to attract international air service. To date, the program has continued in place and has been successful in its efforts to attract new international service and passengers.

The lower than projected income levels tend to reduce demand, while the lower than projected air fares and unemployment rate tend to increase demand. These factors have mostly offset each other so that that domestic and international passenger levels are closely tracking the MPU forecast (see **Figures 2.3 and 2.4**).

2.6. Passenger Forecasts

This section discusses the passenger and passenger aircraft operation forecasts that were selected for use in this review.

2.6.1. Passenger Forecasts

The passenger forecasts were reviewed with Airport staff and it was decided that actual passenger levels at the Airport were tracking sufficiently closely to the MPU forecasts that the passenger portion of the MPU forecast should be retained. The selected forecasts are provided in **Table 2.5.** The details of the passenger forecast methodology are provided in the 2012 MPU.

Table 2.5
Selected Passenger Forecasts

Year	Domestic	International	Total
2010	16,254,851	390,914	16,645,765
2011	16,243,824	426,491	16,670,315
2012	16,316,069	504,790	16,820,859
2013	16,389,923	531,022	16,920,945
2014	16,932,185	621,367	17,553,552
2015	18,096,164	719,261	18,815,425
2016	18,080,432	851,490	18,931,922
2017	19,377,999	943,037	20,321,036
2018	20,012,617	1,048,211	21,060,829
2019	20,545,279	1,123,395	21,668,674
2020	21,095,391	1,177,540	22,272,931
2021	21,631,749	1,241,541	22,873,290
2022	22,172,406	1,292,543	23,464,949
2023	22,717,476	1,355,233	24,072,710
2024	23,267,080	1,448,186	24,715,266
2025	23,733,581	1,485,259	25,218,840
2026	24,254,661	1,533,578	25,788,239
2027	24,776,270	1,572,837	26,349,107
2028	25,298,499	1,632,235	26,930,734
2029	25,821,444	1,674,021	27,495,465
2030	26,345,203	1,716,876	28,062,079
2031	26,925,389	1,778,674	28,704,063
Average Annual Growth Rate			
2016-2031	2.7%	5.0%	2.8%

Source: MPU Forecast and HNTB analysis.

2.6.2. Passenger Aircraft Operations Forecasts

As noted in Section 2.3, passenger aircraft operations have deviated from the 2012 MPU forecasts much more significantly than the passenger enplanement and deplanement forecasts. Therefore, it was decided to update the passenger aircraft operations forecasts to incorporate the most recent historical data and available information on upcoming aviation trends, specifically regarding fleet mix and average aircraft size.

Figure 2.16 presents average seats per narrow-body aircraft for the airlines currently serving the Airport, broken out by existing fleet and aircraft on order. Except for Frontier Airlines, aircraft on order average more seats than aircraft currently operating, indicating that average seats per aircraft will continue to increase.

Figure 2.16
Comparison of Average Seats per Aircraft by Airline
Existing and On Order

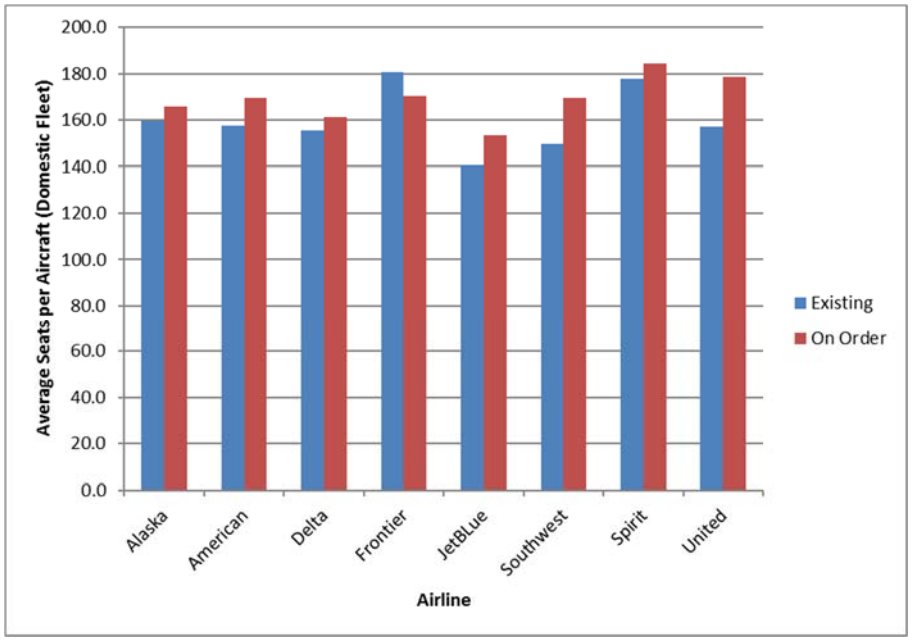


Table 2.6 provides the details of existing fleets and order lists by airline. Most of the aircraft on order are Airbus A320 and Airbus A321, and Boeing 737 MAX 8, MAX 9, and MAX 10 aircraft, all of which have more than 150 seats. Smaller aircraft, such as the Boeing 737-700 or Airbus A319, have very limited orders. The information on aircraft orders was used to help develop the fleet mix for the design day flight schedules (see Section 2.9) and estimates of future average seats per aircraft.

The projections of future seats per aircraft, together with load factor projections, were used to estimate future average passengers per operation. As shown in **Table 2.7**, forecast domestic passengers were divided by forecast passengers per aircraft operation to derive total domestic passenger aircraft operations (see **Figure 2.17**). The updated international passenger aircraft operations forecast is presented in **Table 2.8** and **Figure 2.18**.

Table 2.6
Fleet for Airlines Serving Airport: Existing and On-Order

	United		American		Delta		Southwest		Alaska/Virgin		JetBlue		Spirit		Frontier		Total	
	Exis-ting	On Order	Exis-ting	On Order	Exis-ting	On Order	Exis-ting	On Order	Exis-ting	On Order	Exis-ting	On Order	Exis-ting	On Order	Exis-ting	On Order	Exis-ting	On Order
A319	62	2	125		57				10				31		18		303	2
A320	97		48		65				53		130		48	7	25		466	7
A321			214	5	22	100					43	23	21	9	17	2	317	139
A319neo																18	0	18
A320neo										30		25	5	50	9	53	14	158
A321neo				100					2	8		60					2	168
717-200					91												91	0
737-300							75										75	0
737-400									9								9	0
737-700	40				10		497	15	10								557	15
737 MAX 7								30									0	30
737-800	137	4	294	10	77		151	56	61								720	70
737 MAX 8				100				170		20							0	290
737-900	12								12								24	0
737-900ER	136				81	49			59	12							276	61
737 MAX 9		61							0	17							0	78
737 MAX 10		100															0	100
737-7/8/9																	0	0
757-200	56		51		99												206	0
757-300	21				16												37	0
MD-80			53		116												169	0
MD-90					64												64	0
Embraer 190			20								60	24					80	24
CS100						75											0	75
Total	561	167	805	215	698	224	723	271	216	87	233	132	105	66	69	73	3410	1235

Sources: Airline financial forms, airline websites, and HNTB analysis. As of June 2017.

Table 2.7
Updated Forecast of Domestic Passenger Aircraft Operations

Year	Passengers[1]	Average Seats per Aircraft[2]	Average Load Factor[3]	Passengers per Aircraft[4]	Passenger Aircraft Operations[5]
2015	18,096,164	140.7	85.3%	120.0	150,850
2016	18,080,432	144.1	85.2%	122.8	147,186
2021	21,631,749	151.5	86.2%	130.6	165,686
2026	24,254,661	154.8	86.5%	133.9	181,141
2031	26,925,389	158.5	86.7%	137.4	195,979

[1]Table 2.5
[2]Based on Design Day Flight Schedule analysis (Section 2.9)
[3]Assumed to increase at FAA national projected rate for domestic operations
[4]Average seats multiplied by load factor.
[5]Passengers divided by passengers per aircraft.

Figure 2.17
Comparison of MPU and Updated Domestic Passenger Aircraft Operation Forecasts

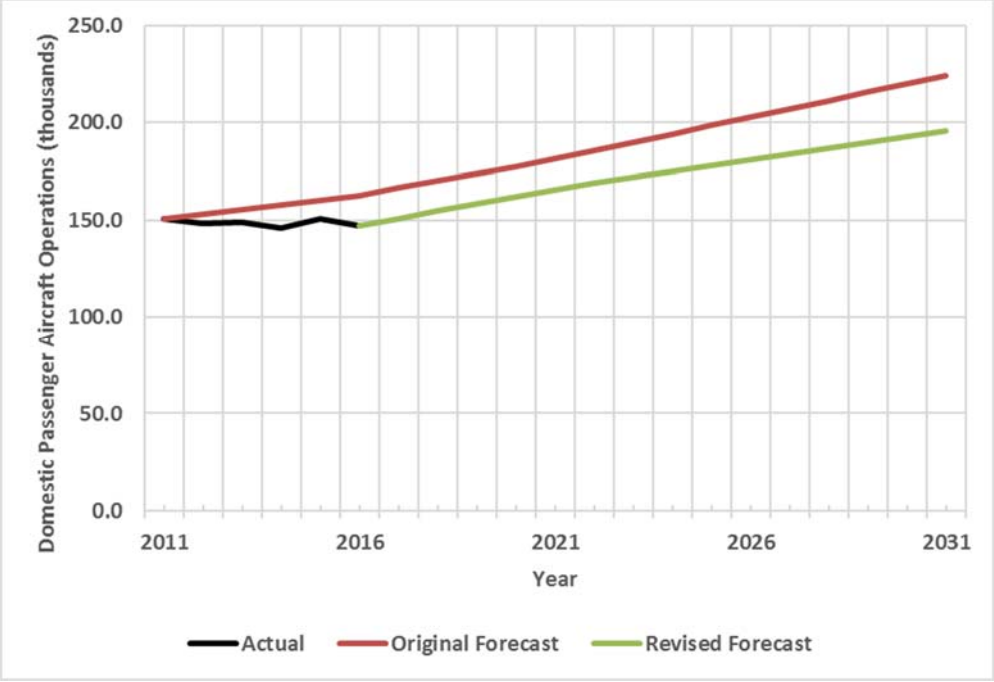


Table 2.8
Updated Forecast of International Passenger Aircraft Operations

Year	Passengers[1]	Average Seats per Aircraft[2]	Average Load Factor[3]	Passengers per Aircraft[4]	Passenger Aircraft Operations[5]
2015	719,261	167.4	77.8%	130.3	5,522
2016	851,490	183.8	80.4%	147.8	5,760
2021	1,241,541	196.5	78.7%	154.6	8,032
2026	1,533,578	203.7	78.9%	160.8	9,538
2031	1,778,674	203.6	79.1%	161.1	11,044

[1]Table 2.5
[2]Based on Design Day Flight Schedule analysis (Section 2.9)
[3]Assumed to increase at FAA national projected rate for international operations
[4]Average seats multiplied by load factor.
[5]Passengers divided by passengers per aircraft.

Figure 2.18
Comparison of MPU and Updated International Passenger Aircraft Operation Forecasts

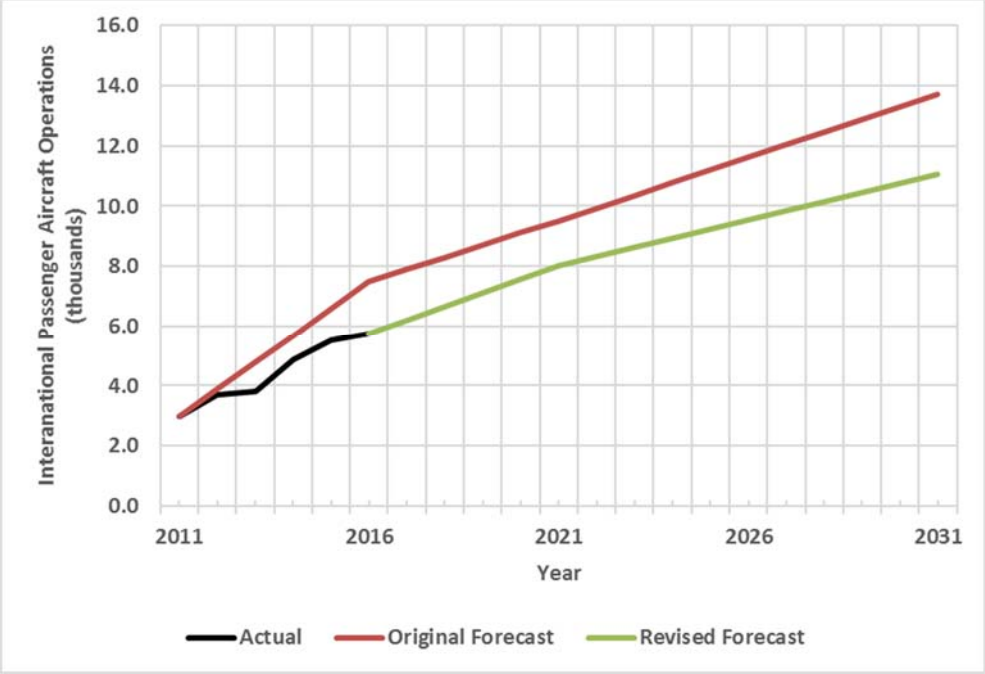


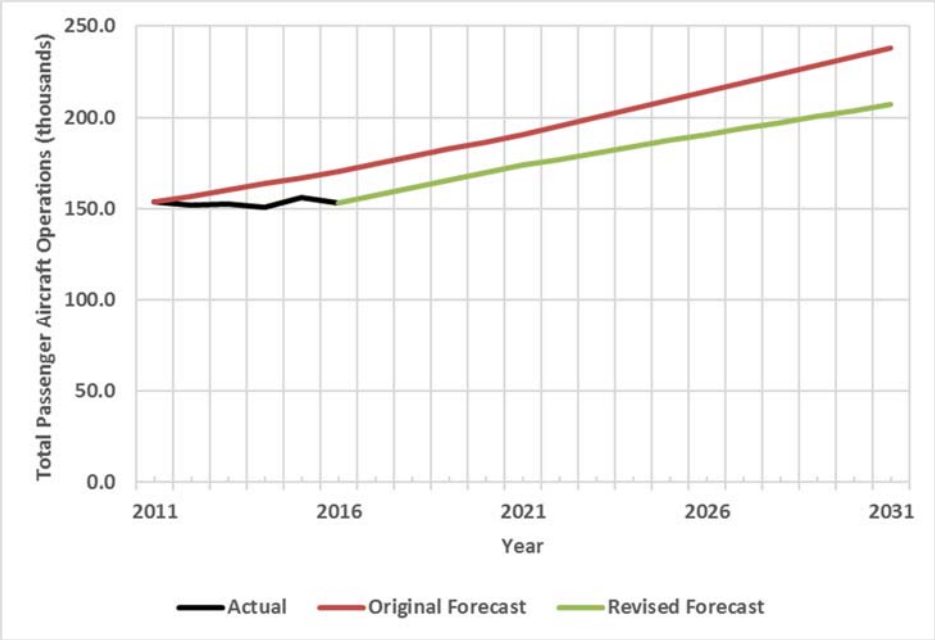
Table 2.9 and **Figure 2.19** summarize the updated forecasts of total (domestic plus international) passenger aircraft operations. Total operations are projected to increase by an average of 1.8 percent per year, compared to 2.8 percent per year for passengers. Under the updated forecast, total passenger aircraft operations are not expected to exceed 200,000 until 2029, as compared to 2023 under the 2012 MPU forecast.

Table 2.9
Updated Passenger Aircraft Operation Forecasts

Year	Domestic	International	Total
2011	150,562	2,976	153,538
2012	148,367	3,690	152,057
2013	148,680	3,818	152,498
2014	146,058	4,874	150,932
2015	150,850	5,522	156,372
2016	147,186	5,760	152,946
2017	150,886	6,214	157,100
2018	154,586	6,669	161,255
2019	158,286	7,123	165,409
2020	161,986	7,578	169,563
2021	165,686	8,032	173,718
2022	168,777	8,333	177,110
2023	171,868	8,634	180,502
2024	174,959	8,936	183,895
2025	178,050	9,237	187,287
2026	181,141	9,538	190,679
2027	184,109	9,839	193,948
2028	187,076	10,140	197,217
2029	190,044	10,442	200,485
2030	193,011	10,743	203,754
2031	195,979	11,044	207,023
Average Annual Growth Rate			
2016-2031	1.9%	4.4%	2.0%

Source: MPU Forecast and HNTB analysis.

Figure 2.19
Comparison of MPU and Updated Total Passenger Aircraft Operation Forecasts



2.7. Cargo Forecasts

The focus of the 2016 Addendum was the airsides, terminal building, and terminal building roadways, and therefore the forecast revisions focused on passenger and passenger aircraft activity. The cargo tonnage forecasts in the 2012 MPU were therefore retained. Please refer to the 2012 MPU for the details of the forecast approach. The forecasts of all-cargo aircraft operations were updated by applying the 2012 MPU forecast growth rates to data from 2016, the most recent base year.

2.8. Other Aviation Activity Forecasts

Forecasts for aircraft operations in the other aviation activity categories, including air taxi, general aviation and military operations, were updated by applying the 2012 MPU forecast growth rates to the most recent base year data.

2.9. Forecast Scenarios

The 2012 MPU forecast scenarios were not updated for the 2016 Addendum.

2.10. Summary of Updated Annual Forecasts

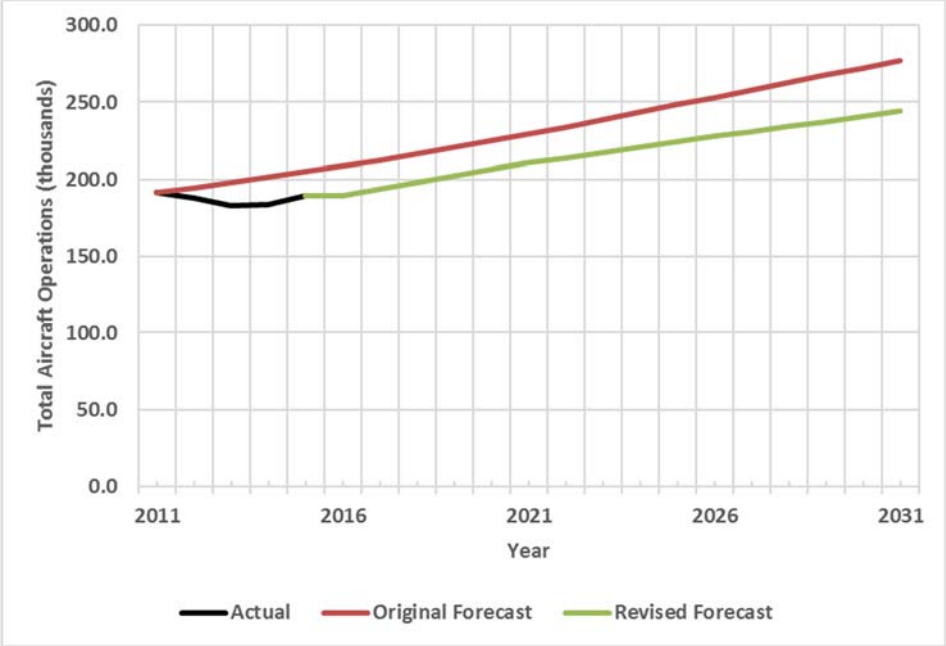
Table 2.10 and Figure 2.20 summarize the updated annual operations forecasts, including passenger and non-passenger categories. Total aircraft operations are projected to increase from 189,596 in 2016 to 244,088 by 2031, an average annual increase of 1.7 percent. International passenger operations are projected to be the most rapidly growing category, followed by domestic passenger operations and air cargo. Following recent trends, general aviation is projected to continue to gradually decline in the long-term.

Table 2.10
Updated Total Aircraft Operation Forecasts

Passenger Carrier								
Year	Domestic	International	Subtotal	Air Cargo	Air Taxi	General Aviation	Mili-tary	Total
2011	150,562	2,976	153,538	6,340	6,529	24,337	571	191,315
2012	148,367	3,690	152,057	6,242	6,667	22,380	709	188,054
2013	148,680	3,818	152,498	4,552	4,667	21,278	347	183,342
2014	146,058	4,874	150,932	3,846	7,599	21,078	530	183,985
2015	150,850	5,522	156,372	2,168	9,138	21,641	430	189,749
2016	147,186	5,760	152,946	3,260	10,631	21,964	795	189,596
2017	150,886	6,214	157,100	3,305	10,631	21,957	795	193,788
2018	154,586	6,669	161,255	3,350	10,631	21,950	795	197,981
2019	158,286	7,123	165,409	3,395	10,631	21,943	795	202,173
2020	161,986	7,578	169,563	3,440	10,631	21,936	795	206,365
2021	165,686	8,032	173,718	3,486	10,631	21,929	795	210,558
2022	168,777	8,333	177,110	3,536	10,631	21,901	795	213,973
2023	171,868	8,634	180,502	3,586	10,631	21,873	795	217,388
2024	174,959	8,936	183,895	3,636	10,631	21,845	795	220,802
2025	178,050	9,237	187,287	3,687	10,631	21,818	795	224,217
2026	181,141	9,538	190,679	3,737	10,631	21,790	795	227,632
2027	184,109	9,839	193,948	3,787	10,631	21,762	795	230,923
2028	187,076	10,140	197,217	3,838	10,631	21,734	795	234,215
2029	190,044	10,442	200,485	3,888	10,631	21,707	795	237,506
2030	193,011	10,743	203,754	3,938	10,631	21,679	795	240,797
2031	195,979	11,044	207,023	3,988	10,631	21,651	795	244,088
Average Annual Growth Rate								
2016-2031	1.9%	4.4%	2.0%	1.4%	0.0%	-0.1%	0.0%	1.7%

Sources: MPU forecast, Tables 2.2, 2.9, and HNTB analysis.

Figure 2.20
Comparison of MPU and Updated Total Aircraft Operation Forecasts



2.11. Design Day Flight Schedules

Design Day Flight Schedules (DDFS) were prepared for the 2016 Addendum to provide the detail by each airside building and time of day necessary to determine requirements for gates and other terminal facilities. The DDFSs were prepared for an average weekday in March for 2015 (the base year), 2021, and 2031. The DDFSs are essentially a forecast of a future airport flight schedule and contain the following information on a flight-by-flight basis:

- Time of arrival at and departure from TPA
- Airline
- Aircraft type
- Origin and destination market
- Domestic/International/Pre-cleared designation
- Passenger enplanements/deplanements including local and connecting

The following assumptions and procedures were used to prepare the design day flight schedules:

- The annual passenger forecasts (see Table 2.5) were converted to design day passenger forecasts using current seasonal factors.

- The design day passenger forecasts were converted to design day seat departure forecasts using peak month load factor projections. Since load factors were forecast to increase slightly, the seat departures were projected to grow slightly less rapidly than passengers.
- New domestic and international nonstop markets were estimated based on the existing airline revenue generated by those markets and their distance from TPA. Scheduled seat departures to those new nonstop markets were assumed to be the same as at the most similar existing nonstop market.
- The seat departure projections were allocated among markets based on the existing distribution of scheduled seats by market, after adjustment for the nonstop markets.
- The March 2015 Official Airline Guide (OAG) schedule was used as the initial source of flight times for the future schedules.
- Changes in airline market share were based on recent trends and the ratio of aircraft orders to existing aircraft for each carrier. In general, low-cost carriers were projected to grow more quickly than legacy carriers.
- Aircraft equipment estimates for 2021 and 2031 were based on current service patterns and aircraft on order by the airlines serving TPA.

The market-by-market departure projections are detailed in **Table A-12** of Appendix A.

- New flights were scheduled to avoid two flights in the same connecting bank by the same airline in each individual market.
- Flights were scheduled to avoid take-offs and landings during nighttime (2300-0600) at both the origin and destination market.
- Aircraft turnarounds (determination of which arriving flight becomes which departing flight) were estimated based on existing turnaround times by airline and aircraft size category.

Enplaned and deplaned passengers were assigned to each flight based on existing load factors by airline for each market, with an adjustment for the projected increase in average load factor over the forecast period. The split between O&D and connecting passengers for each market was based on existing O&D/connecting split for each airline serving the Airport.

Two DDFS airside/gate use scenarios were developed to assist the facility requirements analysis, one which assumed the current configuration of airsides and another which assumed the addition of a new 16-gate Airside D. Scenario 1 assumed that airlines would continue to occupy their current airsides while Scenario 2 assumed that the new Airside D would become the international terminal and accommodate several of the domestic carriers. **Table 2.11** provides the assumed gate assignments by airside.

Table 2.11
Assumed Gate Assignments for DDFS Scenarios

	Airside A	Airside C	Airside D	Airside E	Airside F
Scenario 1	United, JetBlue, Spirit, Alaska, Sun Country, Silver	Southwest, Frontier	N/A	Delta, Air Canada, WestJet	American, Foreign Flag, International Arrivals
Scenario 2	JetBlue, Spirit, Alaska, Frontier, Silver	Southwest	United, Foreign Flag, International Arrivals, Sun Country, Air Canada, WestJet	Delta	American

The DDFS analysis provided the basis for the peak activity forecasts and gate requirements analysis in Sections 2.12 and 2.13.

2.12. Peak Activity Forecasts

Many internal terminal building and airside facility requirements, including security checkpoints, baggage processing, and restrooms, are determined by peak period passenger flows. The data from the DDFSs was used to generate updated forecasts of peak hour passenger enplanements and deplanements by airside for each gate use scenario. The peak hour enplanement forecasts were adjusted to include a lead factor or show-up curve, to reflect the fact that passengers arrive at a distribution of times before their scheduled flight departure. The show-up curves were based on the passenger surveys performed as part of the MPU.

Figure 2.21 shows the peak hour enplanement forecasts by airside and scenario. Under Scenario 2 it was assumed that the proposed Airside D would be operational by 2026. The potential new Airside D would significantly reduce peak hour enplanements at Airsides A and E. The reduction would be much less at Airside C since the bulk of activity is accounted for by passengers flying on Southwest Airlines, which is assumed to remain at Airside C under Scenario 2. A minimal reduction is also projected at Airside F, since the enplaning peak hour there occurs in the morning during the American Airlines departure push instead of during the international peak later in the day.

Figure 2.22 shows the peak hour passenger deplanement forecasts by airside and scenario. As was the case with peak hour enplanements, the addition of a new Airside D would significantly reduce peak hour deplanements at Airsides A and E. Airside C would again be relatively unaffected since the bulk of activity is accounted for by Southwest Airlines, which is not anticipated to move under either scenario. Since the deplaning peak at Airside F occurs late in the day when there is substantial international activity, the addition of a new Airside would reduce peak hour deplanements at Airside F.

Figure 2.21
Peak Hour Enplanement Forecasts by Scenario and Airside

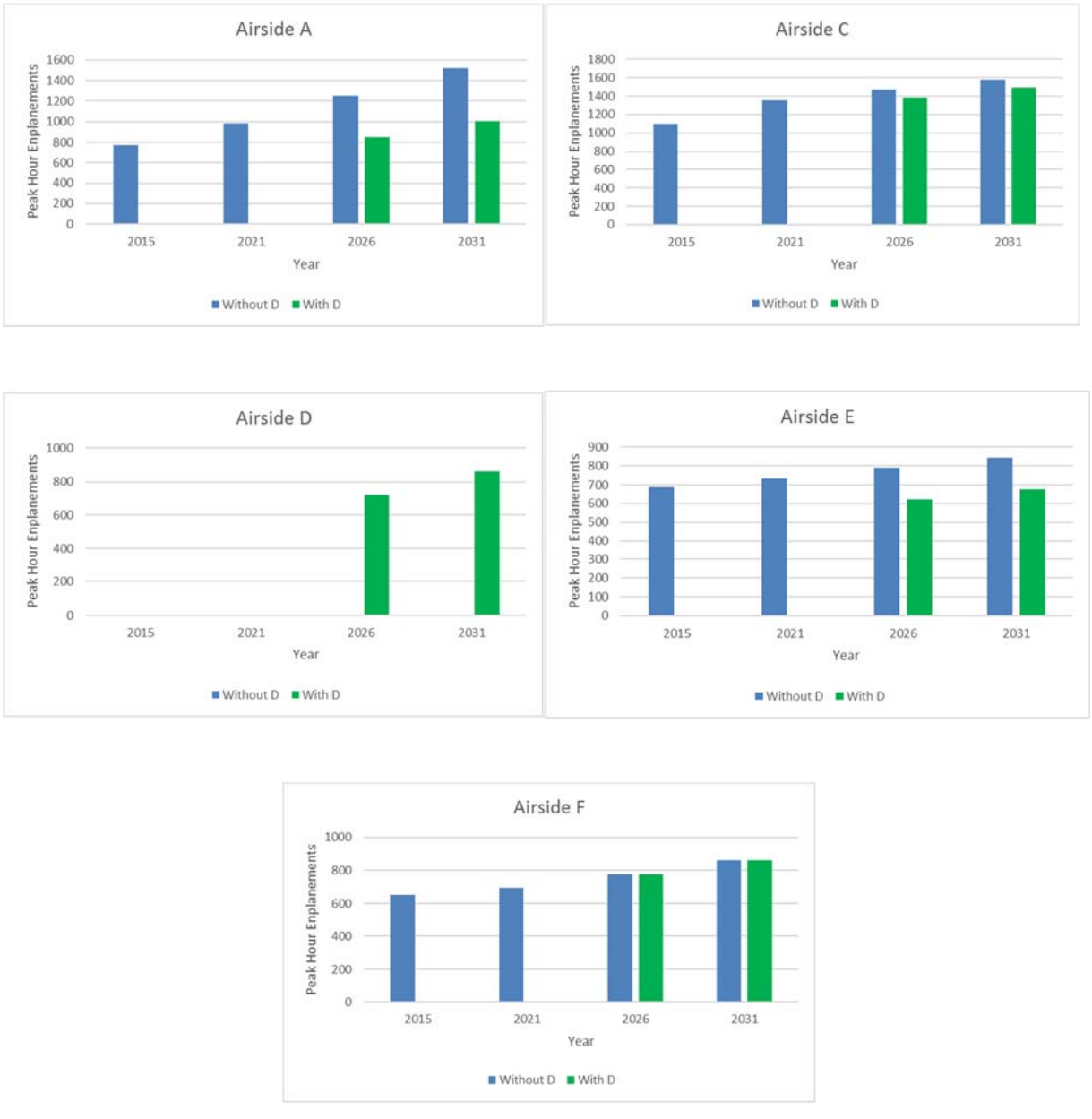
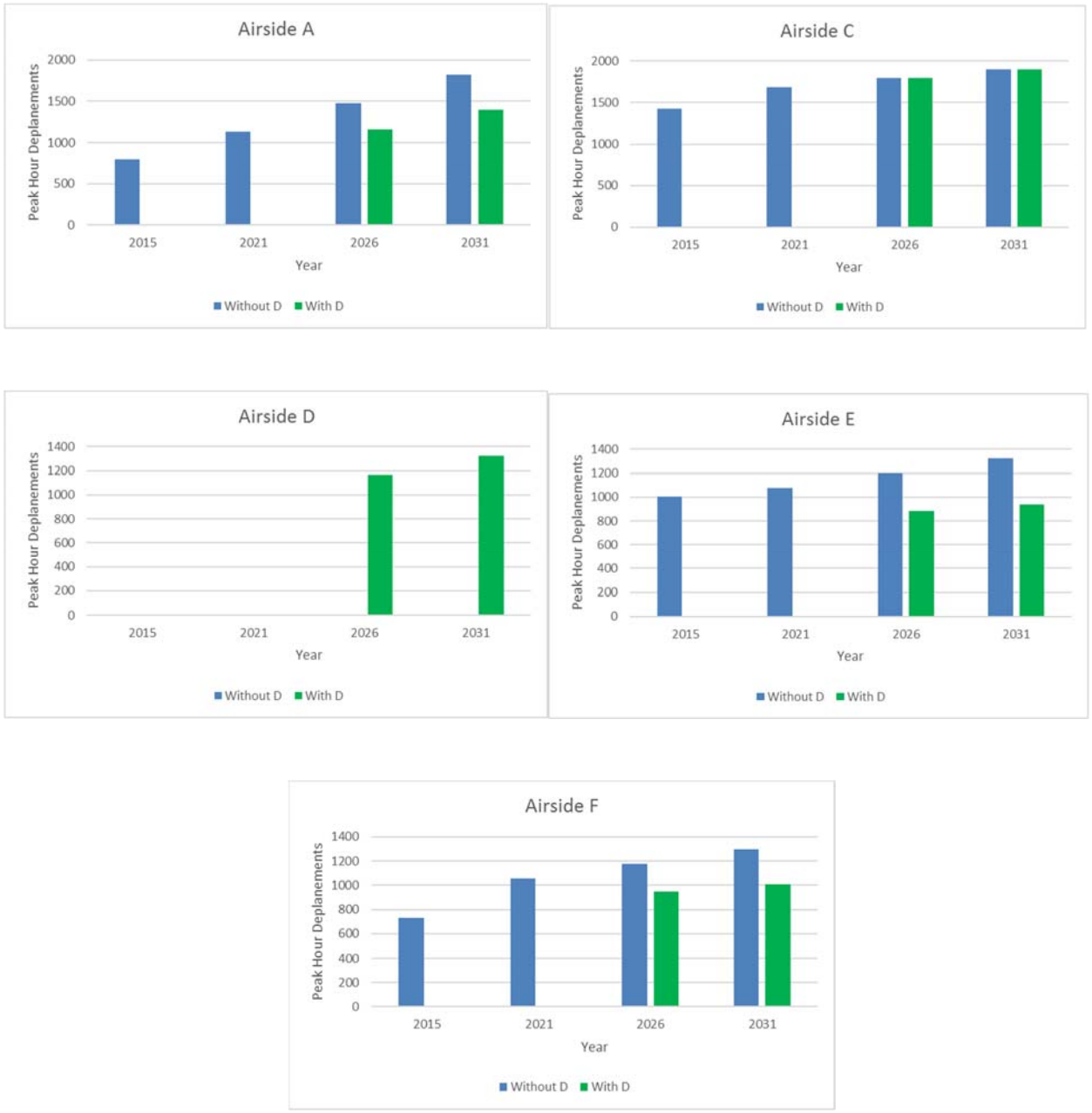


Figure 2.22
Peak Hour Deplanement Forecasts by Scenario and Airside



Tables A.13 and A.14 in Appendix A provide additional information on the peak hour forecasts, and **Figures A-1, A-2 and A-3** in the Appendix show projected peak hour passenger originations, passenger terminations, and total passengers (enplanements plus deplanements) by scenario and airside.

2.13. Gate and Remain Overnight (RON) Parking Requirements Forecast

This section discusses the process used to forecast 2016 Addendum gate and RON parking requirements at the Airport using the DDFS results. Alternative gating scenarios are presented, and the adjustment factors used to ensure sufficient gates or hardstands for the absolute busiest part of the season and irregular operations are then described.

Scenario 1 (see Section 2.11) was developed to assess the ability of the existing airsides to accommodate projected activity. Therefore, it assumes no new airsides or gates and also assumes that airlines continue to use the airsides to which they are currently assigned. Aircraft were assigned to gates so that individual airlines could operate from adjacent gates and a single airside. In addition, a minimum buffer time of 15 minutes was assumed between the time an aircraft departed a gate and the next aircraft arrived at that gate.

The design day flight schedules were gated using two different gate utilization cases:

- No Towing Case - This case assumes there will be no towing of aircraft to free up gates, except for international arrivals by U.S. flag carriers which are assumed to arrive at Airside F and then be towed to their respective individual airsides for departure.
- Aggressive Towing Case - This case assumes aggressive towing to free up gates when not needed to load or unload passengers. The case assumes that an arriving mainline aircraft would need a minimum of 45 minutes to unload passengers before being towed off the gate and a departing mainline aircraft would need a minimum of 45 minutes after being towed to a gate to load passengers before departing for takeoff. This assumption was reduced to 30 minutes for regional aircraft.

The same flight schedule was used as a starting point for each of the two gating cases, but the process for assigning gates differed as noted above.

Flights were initially assigned to gates to maximize gate utilization given the above constraints. Once gate requirements were determined the flights were redistributed among the gates to provide for more balanced airline operations.

Two additional adjustments were made to the design day gate requirement forecasts to ensure the Airport would be able to plan for adequate gate capacity under all conditions. The first adjustment was made to reflect Airport gate requirements in the busiest day of the year, which was Saturday, March 28 in 2015. The second adjustment was made to account for irregular operations, wherein weather conditions or other factors at the Airport or origin/destination airports create delays. These delays often result in overlapping gate demands that increase the overall gate requirement.

During March 2015, the peak day accounted for 8 percent more passenger aircraft operations than the design day. Most of these additional operations occurred at times other than the early morning departure peak or late evening arrival peak, and therefore had minimal impact on RON parking requirements and did not affect the gate requirements under the No Towing Case. The additional operations did affect peak turn periods, however. Therefore, under the Aggressive Towing Case, existing peak day gate requirements increased by 2 gates at Airside C and by 1 gate at Airside E compared to design day gate requirements.

Experience at other large U.S. airports indicate that airlines typically plan for spare gates ranging from 6 to 8 percent of scheduled requirements to account for delays and irregular operations. A conservative 6 percent spare gate adjustment factor was used to account for these factors.

2.13.1. Scenario 1 (Without Airside D)

Table 2.12 presents the Scenario 1 gate requirements forecast under the No Towing Case. Currently, gate demand at Airsides A and F is over capacity and aircraft towing is required during peak periods and irregular operations. Airside E is at capacity and is projected to be over capacity by 2024. Airside C is currently slightly below capacity but is projected to be over capacity before 2031. Overall, Airport gate demand currently exceeds capacity by 2 gates and is expected to significantly exceed capacity by 12 gates in 2031.

Table 2.12
Scenario 1 Forecast of Gate Requirements – No Towing Case

Airside	Available Gates	2015	2021	2024	2031
Design Day Requirements – No Spare Gates[1]					
A	16	16	16	18	21
C	16	13	14	15	16
E	13	12	12	13	13
F	13	15	15	15	15
Total	58	56	57	61	65
Peak Day Requirements – No Spare Gates[2]					
A	16	16	16	18	21
C	16	13	14	15	16
E	13	12	12	13	13
F	13	15	15	15	15
Total	58	56	57	61	65
Peak Day Requirements – Including Spare Gates[3]					
A	16	17	17	20	23
C	16	14	15	16	17
E	13	13	13	14	14
F	13	16	16	16	16
Total	58	60	61	66	70

[1] Based on design day flight schedules.
[2] Design day gate requirements adjusted by 2015 difference in peak day vs. design day requirements.
[3] Peak day requirements increased by 6 percent to allow for spare gates to accommodate delays and irregular operations.
Green indicates gate demand is below capacity, yellow indicates demand is equal to capacity, red indicates demand is above capacity.

Table 2.13 presents the gate requirements forecast under the Aggressive Towing Case. This case indicates that, even if all airlines at the Airport agreed to tow aircraft to hardstands when they were not needed to load or unload passengers, Airside A would be at capacity by 2024, and all the airsides except Airside E would be over capacity by 2031.

Table 2.13
Scenario 1 Forecast of Gate Requirements – Aggressive Towing Case

Airside	Available Gates	2015	2021	2024	2031
Design Day Requirements – No Spare Gates[1]					
A	16	12	14	15	17
C	16	11	11	12	14
E	13	9	9	9	10
F	13	8	10	11	13
Total	58	40	44	47	54
Peak Day Requirements – No Spare Gates[2]					
A	16	12	14	15	17
C	16	13	13	14	16
E	13	10	10	10	11
F	13	8	10	11	13
Total	58	43	47	47	57
Peak Day Requirements – Including Spare Gates[3]					
A	16	13	15	16	19
C	16	14	14	15	17
E	13	11	11	11	12
F	13	9	11	12	14
Total	58	47	51	54	62

[1] Based on design day flight schedules.
[2] Design day gate requirements adjusted by 2015 difference in peak day vs. design day requirements.
[3] Peak day requirements increased by 6 percent to allow for spare gates to accommodate delays and irregular operations.
Green indicates gate demand is below capacity, yellow indicates demand is equal to capacity, red indicates demand is above capacity.

Figure 2.23 provides a comparison of the two gating cases and existing gate availability. As indicated, the Airport is already above capacity, and towing of aircraft is required during peak periods and irregular operations. Even if all domestic airlines were to agree to tow aircraft from gates when not needed for passenger loading and unloading - something that does not occur at any other large Florida airport, Airside A would run out of capacity by 2024 and the airport campus would run out of gate capacity by the late 2020's.

Figure 2.23
Scenario 1 Comparison of Gate Demand Scenarios

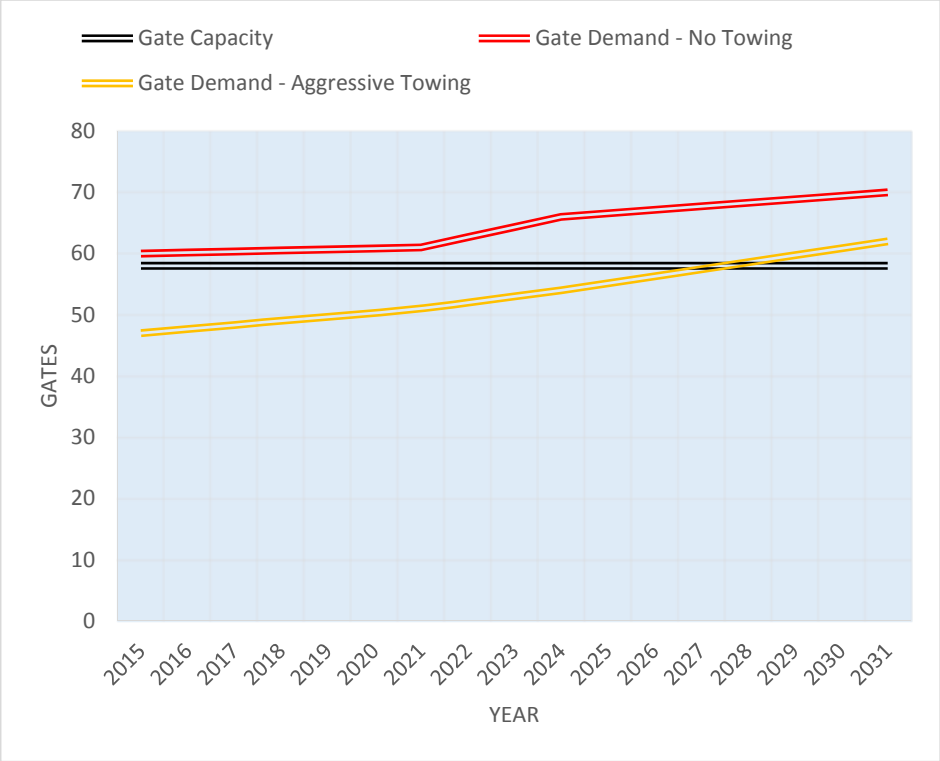


Table 2.14 summarizes the gate requirements of the No Towing Case with and without a spare gate requirement. The Airport is currently at a gate deficit assuming a 6% requirement for spare gates. Without a spare gate requirement, the Airport would incur a gate deficit shortly after 2021.

Table 2.14
Scenario 1 Summary Forecast of Peak Day Gate Requirements

Year	Existing Gates	Peak Day Requirements (No Spare Gates)		Peak Day Requirements (Including Spare Gates)	
		Required Gates	Surplus (Deficit)	Required Gates	Surplus (Deficit)
2015	58	56	2	60	(2)
2021	58	57	1	61	(3)
2024	58	61	(3)	66	(8)
2031	58	65	(7)	70	(12)

Note: Green indicates gate demand is below capacity, yellow indicates demand is equal to capacity, red indicates demand is above capacity.
Source: Table 2.12.

Several factors should be noted in the gate requirement forecasts:

- The gates are distributed among four airsides, almost all occupied to capacity. Thus, there may be instances in which a gate may be available at the Airport, but not at the airside at which it is needed.
- The most significant deficit occurs at Airside F, which is currently occupied by American Airlines and international carriers. Although Airside C currently has two gates available, it can provide no effective relief, as it would require American to split operations between opposite ends of the terminal and there are no Customs and Border Protection facilities at Airside C.
- There is very little available gate capacity to accommodate a domestic new entrant airline or substantial service increases by an existing carrier, limiting the Airport's ability to foster competition.

Three of the 58 existing gates at TPA, all located on Airside F, can accommodate international wide-body aircraft arrivals. When used simultaneously, they block the use of two additional adjacent domestic gates, effectively limiting the Airport to 56 gates. All of the three international wide-body gates are used during the peak, eliminating the Airport's ability to accommodate international growth or competition during the peak period. **Table 2.15** shows existing and projected international gate requirements, based on the forecast and also including an additional scenario in which a new entry international carrier attempts to add service during the most desirable time.

Table 2.15
Scenario 1 Forecast of Peak Day International Wide-Body Arrival Gate Requirements

	International Arrival Gates				
Year	Existing	Required	Surplus (Deficit)	Required + 1 New Entry	Surplus (Deficit)
2015	3	3	0	4	(1)
2021	3	3	0	4	(1)
2024	3	4	(1)	5	(2)
2031	3	4	(1)	5	(2)

Note: Green indicates gate demand is below capacity, yellow indicates demand is equal to capacity, red indicates demand is above capacity.

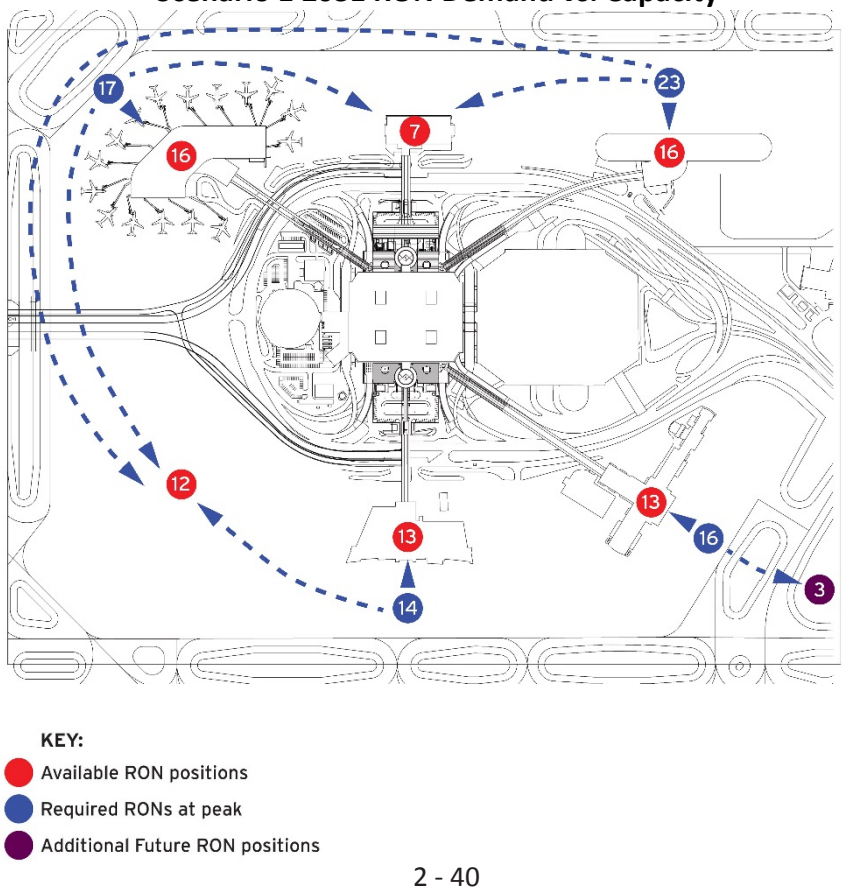
Note the following from **Table 2.15**.

- All international gates are used to capacity during the peak and will be unable to accommodate forecast demand within the next ten years.
- There is currently no available international gate capacity to accommodate an international new entrant airline during peak times, significantly limiting the Airport's ability to foster competition for international air service.
- Any modifications to Airside F to accommodate additional international gate demand will constrain the ability of American Airlines) to maintain or expand service.

Figure 2.24 shows the forecast Remain Overnight (RON) parking demand compared to available capacity under Scenario 1. The total RON parking demand is determined by the total number of passenger aircraft parked at the Airport during the peak, and is therefore the same regardless of whether aircraft are towed. The blue circles indicate the peak RON parking demand, including an additional 6 percent spare capacity to account for irregular operations, from the airlines assigned to each airside. The circles in red show the available parking capacity at each Airside, plus the seven existing hardstands at the Airside B Sort Facility and the twelve existing Airside D hardstands. At airsides where RON demand is projected to exceeded capacity, the dashed lines show the nearest available aircraft parking locations. Note the following from **Figure 2.24**:

- Towing to existing hardstands is an inadequate solution for Airside F carriers. The nearest available hardstands are at the proposed location for the new Airside D, a towing distance of approximately 1700 feet (one-third of a mile). The proposed three future hardstands to the southeast of Airside F will allow Airside F carriers to avoid the much longer tow to the Airside D hardstands.
- Access to hardstands will be even more problematic by 2031. In some instances, Airside A carriers may need to tow all the way to the Airside D hardstands, more than one mile.

Figure 2.24
Scenario 1 2031 RON Demand vs. Capacity



2.13.2. Scenario 2 (With Airside D)

Under Scenario 2, a new Airside D with sixteen swing gates that could be used to accommodate domestic or international operations would be added to supplement the existing airsides. **Table 2.16** is like **Table 2.12**, except that it includes the proposed Airside D. Under this scenario, all airsides except Airside F could accommodate gate demand through 2031, even with an allowance for spare gates. The peak at F would be generated by late evening arrivals and early morning departures by American Airlines and could be accommodated with minimal towing with three new additional hardstands to the southwest of Airside F.

Table 2.16
Scenario 2 Forecast of Gate Requirements with Airside D – No Towing Case

Airside	Available Gates	2015	2021	2024	2031
Design Day Requirements – No Spare Gates[1]					
A	16	16	16	11	14
C	16	13	14	14	15
D	0/16[4]			12	14
E	13	12	12	12	12
F	13	15	15	15	15
Total[5]	58/74[6]	56	57	64	70
Peak Day Requirements – No Spare Gates[2]					
A	16	16	16	11	14
C	16	13	14	14	15
D	0/16[4]			12	14
E	13	12	12	12	12
F	13	15	15	15	15
Total[5]	58/74[6]	56	57	64	70
Peak Day Requirements – Including Spare Gates[3]					
A	16	17	17	12	15
C	16	14	15	15	16
D	0/16[4]			13	15
E	13	13	13	13	13
F	13	16	16	16	16
Total[5]	58/74[6]	60	61	69	75

[1] Based on design day flight schedules. Assumes that United Airlines and international carriers move to Airside D.
[2] Design day gate requirements adjusted by 2015 difference in peak day vs. design day requirements.
[3] Design day requirements increased by 6 percent to allow for spare gates to accommodate delays and irregular operations. Green indicates gate demand is below capacity, yellow indicates demand is equal to capacity, red indicates demand is above capacity.
[4] Airside D with 16 swing gates assumed to be completed by 2024.
[5] Total gate requirements exceed those in Table 2.12 because of reduced opportunities for airlines to share gates.
[6] Total available gates increase from 58 to 74 after 2021 with addition of 16 Airside D gates.

The projections in **Table 2.16** assume the airlines would not be required to tow aircraft. Under an aggressive towing case, fewer contact gates would be required and scenario 2 would provide ample capacity. **Table 2.17** summarizes the Scenario 2 gate requirements with and without a spare gate requirement.

Table 2.17
Scenario 2 Summary Forecast of Peak Day Gate Requirements

Year	Existing Gates	Peak Day Requirements (No Spare Gates)		Peak Day Requirements (Including Spare Gates)	
		Required Gates	Surplus (Deficit)	Required Gates	Surplus (Deficit)
2015	58	56	2	60	(2)
2021	58	57	1	61	(3)
2024	74	64	10	69	5
2031	74	70	4	75	(1)

Note: Green indicates gate demand is below capacity, yellow indicates demand is equal to capacity, red indicates demand is above capacity.
Source: Table 2.16.

Table 2.18 compares international gate requirements and capacity under Scenario 2. The 16 gates proposed for the new Airside D could provide the equivalent of 12 wide-body international-capable gates and ample gate capacity for projected international demand.

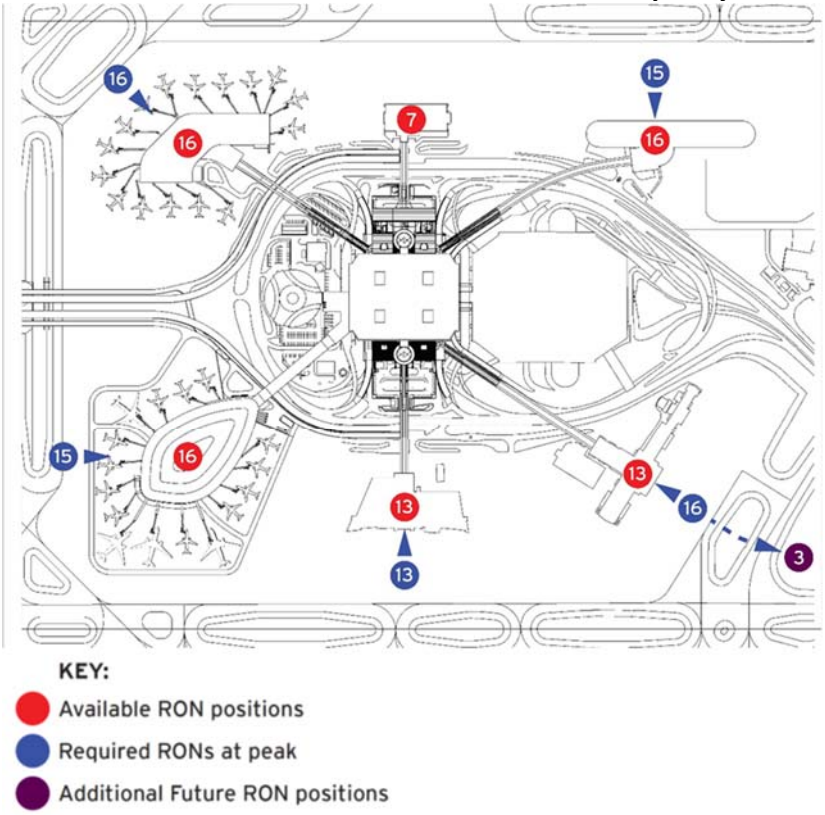
Table 2.18
Scenario 2 Forecast of Peak Day International Wide-Body Arrival Gate Requirements

Year	International Arrival Gates				
	Existing	Required	Surplus (Deficit)	Required + 1 New Entry	Surplus (Deficit)
2015	3	3	0	4	(1)
2021	3	3	0	4	(1)
2024	12[1]	4	8	5	7
2031	12[1]	4	8	5	7

[1]Because of adjacency restrictions the 16 gates in the proposed Airside D would translate to an equivalent of 12 widebody gates.
Note: Green indicates gate demand is below capacity, yellow indicates demand is equal to capacity, red indicates demand is above capacity.

As shown in **Figure 2.25**, the proposed Airside D project, through a combination of airline redistribution and additional overnight parking capacity, would significantly reduce towing distances and eliminate the need to enter active taxiways. For example, some of the air carriers currently assigned to Airside A would be relocated to the new Airside D. Therefore, instead of being towed from Airside A to the Airside D hardstands as under Scenario 1 (see **Figure 2.24**) they would be able to park at their gate under Scenario 2. The carriers remaining at Airside A would have sufficient RON parking at Airside A and would no longer need to tow. Also under Scenario 2 the Airside F carriers could tow to the proposed future hardstands to the southeast of Airside F and avoid the much longer tow to the Airside D hardstands.

Figure 2.25
Scenario 2 2031 RON Demand vs. Capacity



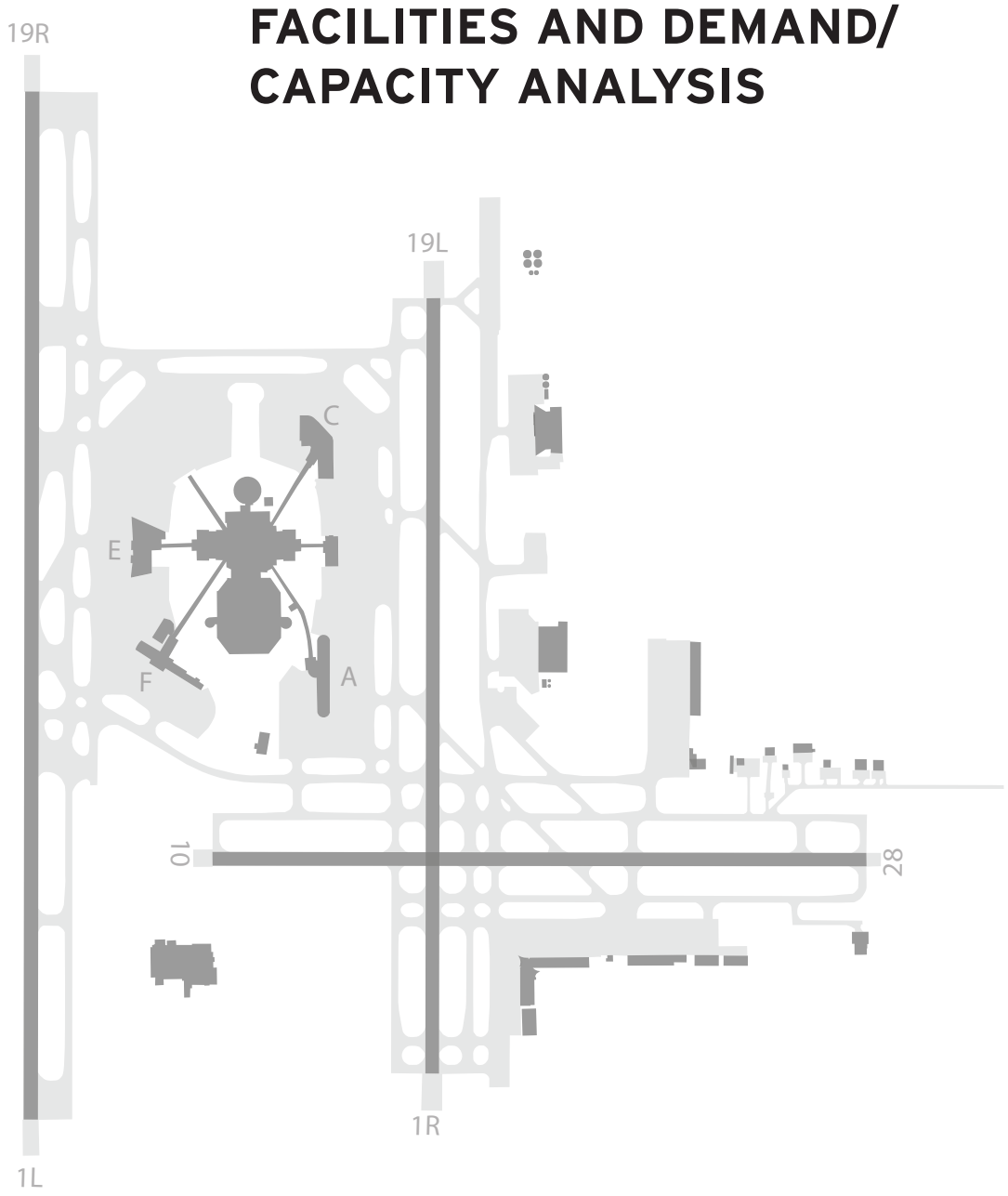
2.14. Forecast Summary

Table 2.19 provides some key metrics relevant to the forecast and gate requirements analysis. Although passengers are projected to increase more than 50 percent over the forecast period, passenger aircraft departures are projected to increase only 35 percent, with significant amounts of passenger growth accommodate with larger aircraft and higher load factors. Gate requirements are projected to increase less quickly than aircraft departures, reflecting a forecast increase in gate utilization.

Table 2.19
Key Forecast Metrics

	2015	2031	Cumulative Increase
Annual Passengers	18,815,425	28,704,063	53%
Design Day Passenger Enplanements	30,966	47,769	54%
Design Day Load Factor	86.4%	87.9%	2%
Design Day Average Seats/Aircraft	142.3	160.3	13%
Design Day Aircraft Departures	252	339	35%
Gate Requirements – No Towing	60	70	17%
Gate Requirements – Aggressive Towing	47	62	32%

SECTION 3 - AIRFIELD FACILITIES AND DEMAND/ CAPACITY ANALYSIS



[Refer to 2012 Airport Master Plan Update]

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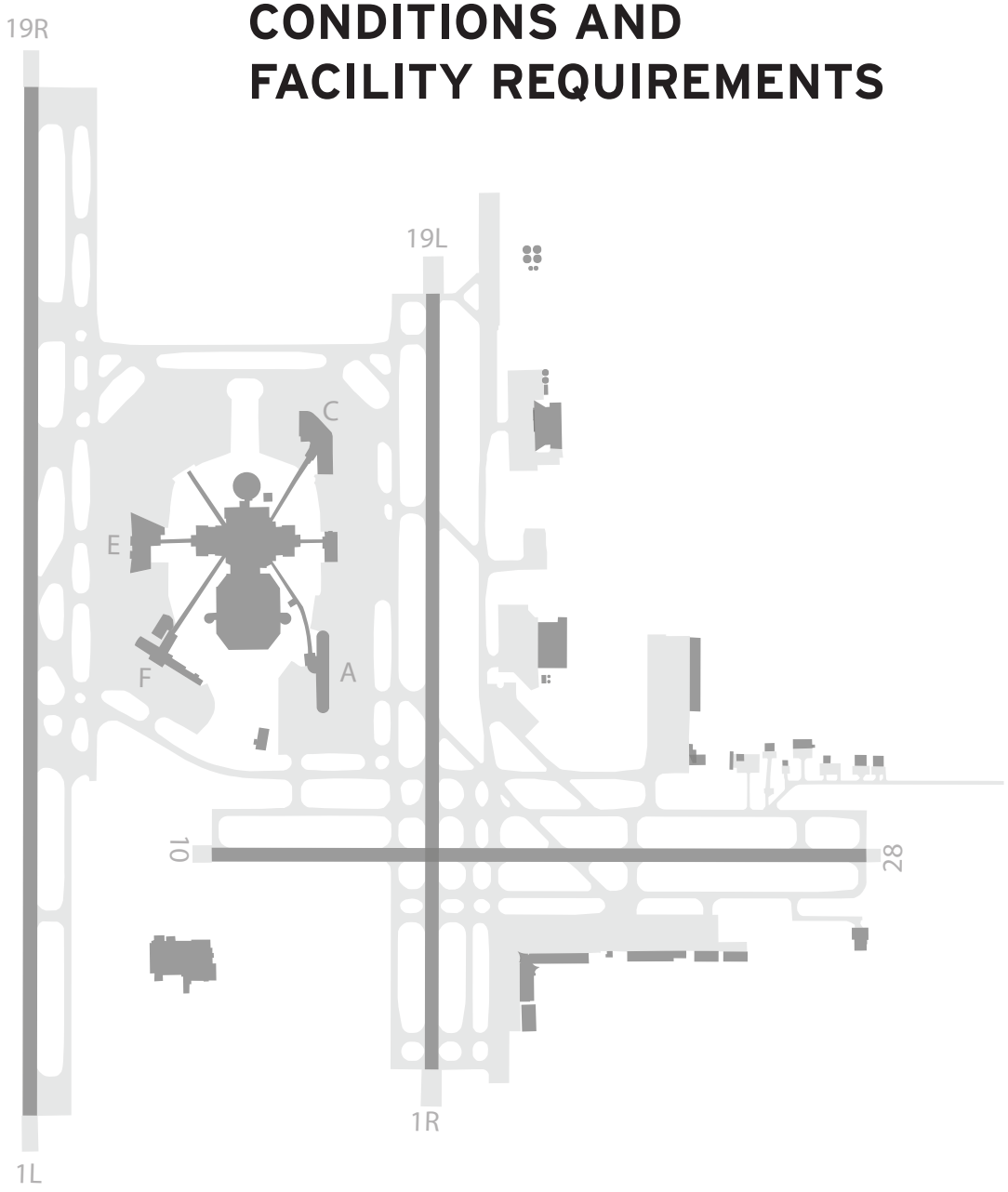
SECTION 4 - EXISTING CONDITIONS AND FACILITY REQUIREMENTS



4 EXISTING CONDITIONS AND FACILITY REQUIREMENTS

This section includes the existing conditions for key functional elements at TPA and associated facility requirements for each to accommodate the forecast demand at the airport over the course of the planning period (2017 through 2031). The Existing Conditions and Facility Requirements of the key functional elements have been combined in this section for the sake of efficiency and convenience. First an inventory of the respective facilities is provided, which is then followed by a discussion of the facility requirements for the facility. The following functional areas are included in this section:

- Terminal Facilities
  - Landside Terminal
  - Airside A
  - Airside A Bag Sortation Building
  - Airside C
  - Airside E
  - Airside F
  - Airside F Bag Sortation Building
- Landside Terminal Facilities
  - Terminal Curbs
  - Terminal Roadways
  - Terminal Parking

4.1 Overview of Inventory and Facility Requirement Development Process

The focus of the documenting the existing conditions in the 2016 Addendum has been on identification of changes that have occurred since the completion of the 2012 Master Plan Update. Where changes have not occurred, the intent is to refer to the previous master plan conditions data. Specific inventory is based on the existing building envelope and the overall building systems as previously documented in the 2012 Airport Master Plan Update. This inventory, along with the documented changes in terminal layouts and area take-offs and gate capacity provides a baseline for determining future facility requirements. While the facility requirements are discussed in this section, specific alternative methods of meeting these requirements are evaluated in Section 5, Alternatives Development.

4.2 Terminal Facilities Inventory and Requirements

This section provides an inventory of existing terminal facilities at Tampa International Airport and identifies facility requirements based on updated forecasted passenger activity. Specific terminal elements and building systems as documented since completion of the 2012 Airport Master Plan Update have been included in the terminal facilities inventory and requirements.

The planning standards and criteria referenced in Chapter 4 of the 2012 MPU remain the same for each functional element in the terminal complex, which include:

- Inventory of existing conditions
- Recommended passenger level of service (LOS) criteria, if applicable
- Performance criteria for functional systems in the terminal, such as processing times at ticket counters and passenger security screening check points
- Space planning standards and facility requirements for functional elements of the terminal, such as departure lounges, circulation spaces, and airline support areas

Refer to Table 4.1 in Chapter 4 of the 2012 MPU for a summary of the planning assumptions, which also applies to the analysis of the terminal elements that are included in this addendum.

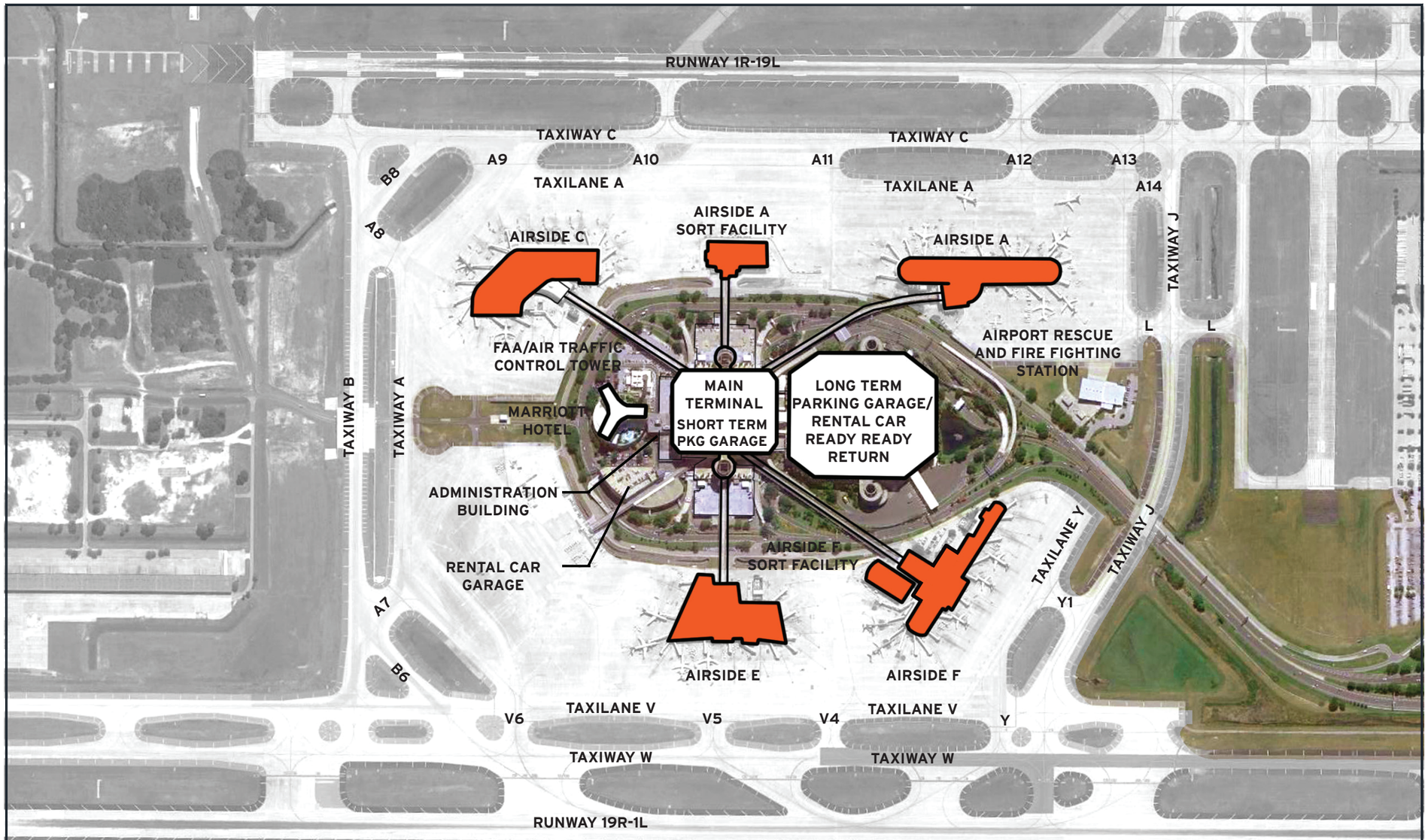
4.2.1 Terminal Facilities Overview

The existing terminal complex (Landside and Airsides) total approximately 1.98 million square feet of enclosed building area and has undergone several expansions and modifications since the existing facility opened in 1971. During the previous Master Plan Update, improvements to the terminal and airsides' interiors were identified and implemented, while some are currently underway. In addition to the Airsides' ongoing and planned interior modifications, Airside F has undergone an expansion program, which has included additional square feet of Customs and Border Protection (CBP), security screening checkpoint, and concessions areas. The updated footprint of Airside F is shown in **Figure 4.1**, Terminal Area Site Plan.

4.2.1.1 Landside Terminal

The Landside Terminal, which is also referred to as the Main Terminal, is functionally divided into a Red side and a Blue side and has three levels for various passenger processing functions and activities. Level one, which is referred to as the Baggage Claim Level includes baggage claim, baggage service offices, checked baggage inspection system (CBIS), and ground transportation facilities. Level two, the Ticketing Level includes ticketing/check-in functions, network operations center, and United Services Organization (USO). Level three is the Transfer Level, which includes concessions, shuttle stations, waiting areas for meeter/greeters and well-wishers, observation deck, Aviation Authority offices, board room and information booths, traveler's aid, and arcade (corridor to Marriott Hotel) and the future Phase I access to the APM to the south development area. Recent modifications to the terminal have been made to address improvements identified during the previous Master Plan Update, which includes an addition of approximately 50,000 SF.

Figure 4.1
(Terminal Area Site Plan)



		HNTB	2900 SOUTH QUINCY STREET, SUITE 200 ARLINGTON, VIRGINIA 22206 PH (703) 824-5100 FAX (703) 671-6210	TERMINAL AREA SITE PLAN TAMPA INTERNATIONAL AIRPORT TAMPA, FLORIDA	DATE: August 2017 FIGURE 4.1

4.2.1.2 Airsides

The four existing passenger airside facilities (Airsides A, C, E & F) serve all commercial departing and arriving TPA flights. In addition to these passenger facilities are two baggage sortation buildings; one serving Airside A, located on the former site of Airside B, and one that is adjacent to and serving Airside F. The baggage sortation systems for Airsides C and E are located at the ramp level of each facility. The airport's Customs and Border Protection (CBP) facility, which is located at the ramp level of Airside F was undergoing improvements during the 2012 MPU. The facility has been expanded by approximately 18,000 SF. This additional square foot total was included in the Terminal Area Space Summary in **Table 4.1** of the 2012 MPU.

As documented in the existing conditions section of the 2012 MPU, in addition to the baggage sortation area locations, each airside facility has a ramp level area that houses airline operations, mechanical, electrical and plumbing rooms, loading dock, trash compactor area, service area for their respective APM system and other support spaces. Airsides A and C also have apron-level holdrooms to serve airline commuter operations.
The boarding level at each airside consists of an APM station, security screening checkpoint, holdrooms, public restrooms, airline support areas, and concessions. Airside F has a common-use airline club that is also located at its boarding level and is used primarily by British Airways.
In addition, Airsides A, E and F each has a mezzanine or third level. Airside A's mezzanine level is unoccupied and is used for storage, and the mezzanine level at Airsides E and F is currently being used as concessionaire or airline offices and airline club space.

The airside facilities provide a total of 58 contact gates and 19 remain overnight (RON) aircraft parking positions. The RON positions are around the area of the Airside A baggage sort facility, which accommodates 7 RON positions, and in the apron area of the former Airside D facility, which accommodates 12 RON positions.

TPA is currently implementing a major concessions redevelopment program that is scheduled to be complete in early 2018. The plan includes concessions improvements and expansions at each airside facility as well as the Main Terminal facility. The programmed areas are being developed within the existing footprint of the facilities and have been designed with a focus on providing passengers more choices and options beyond the security checkpoint. The concessions improvements program at the Landside Terminal facility includes expansion of existing interior areas and addition of new concessions along the east area of the terminal between the APM shuttle stations.

Additionally, under the current TSA Checked Baggage System Upgrades and Optimization Program, Airsides A and C baggage sort facilities are planned for future modifications to house the baggage screening functions. These future modifications, which are planned for 2018 are included in the program to relocate the screening functions that are currently housed within the Main Terminal of the airport to each of the airsides for 100% screening and delivery of cleared bags to the existing outbound sortation systems and to be in full compliance with TSA guidelines and standards.

4.2.1.3 Facility Requirements

The major components of the terminal complex were analyzed to update and identify the facilities capability of operating at TPA's desired level of service based on updated forecast demand throughout the Master Plan period. The following are the results of those major facility components:

AIRLNE AREAS

Ticketing/Check-in – Based on IATA recommended Level of Service (LOS) C or better, the existing capacity remains above LOS C for most of the planning up through year 2026, and begins to decline steadily to below LOS C near 2029 through the end of the planning period of 2031.

Curbside Check-in – There is a significant surplus of curbside check-in positions with nearly twice as many as currently occupied. It is anticipated that the curbside requirement will remain at this level.

Airline Ticket Offices (ATO) – The ATO capacity is projected to be adequate throughout the Master Plan period. However, it is projected that the ATO space will be occupied by the end of the planning period and thereby resulting in LOS C or slightly below.
Baggage Claim – The existing baggage claim capacity is adequate with a LOS B or better and is not projected to decline below LOS C before 2031.

Baggage Service Offices (BSO) – The existing baggage service office capacity is projected to be adequate throughout the 2031 Master Plan period. It is projected that all vacant BSO space will be utilized by new entrant airlines.

Baggage Make-up Areas – It is projected that Airside A sortation building will reach capacity by 2031, but can be expanded when required. Airside C is currently at or near capacity and will require expansion to meet future needs. Airside E is projected to have surplus capacity throughout the planning period, while Airside F is projected to decline with insufficient capacity to accommodate make-up requirements for forecasted domestic and international airlines.

Airline Operations (Airside) – Airsides A, C & E currently have unassigned or unfinished space that is available for growth of operations. However, there is insufficient area at Airside F to accommodate the forecasted domestic and international entrant airlines.

Airline/VIP Clubs – It is assumed that existing airline clubs will remain at Airside E meeting existing and future area requirements. However, additional space will be required at Airside F by the end of the 2031 planning period to support the growth of international traffic.

Table 4.1

Terminal Area Space Summary (SF)

Facility	Level Area	Building Area
Landside Terminal		
Baggage Claim Level	275,321	
Ticketing/Check-in Level	154,038	
Transfer Level	237,856	
Total		**667,215**
Administration Office Building		
Level 1	59,392	
Level 2	56,508	
Total		**115,900**
Airside A		
Ramp Level	117,100	
Boarding Level	116,216	
Mezzanine Level	10,788	
Total		**244,104**
Airside A Sortation Building		
Level 1	46,471	
Level 2	3,597	
Total		**50,068**
Airside C		
Ramp Level	153,679	
Boarding Level	154,695	
Total		**308,374**
Airside E		
Ramp Level	142,098	
Boarding Level	129,262	
Mezzanine Level	22,853	
Total		**294,213**
Airside F		
Ramp Level	132,906	
Boarding Level	126,426	
Boarding Level	9,206	
Total		**268,538**
Airside F Sortation Building		
Ramp Level	37,793	
Total		**37,793**
Grand Total		**1,986,205**

Notes:

1) Space Allocation as reported by HCAA CAD Services reflect as closely as possible to area assignments defined in the *TIA Airline-Airport Use and Lease Agreement* .

2) Airside F Space Requirements reflect CBP and Boarding Level expansion plans in process during the facility inventory.

Source: Hillsborough County Aviation Authority Drawings, October 2011
Prepared by HNTB Corporation, May 2012

Holdrooms – Holdroom capacity at Airsides C and E is adequate in accommodating projected requirements throughout the Master Plan period of 2031. However, Airsides A and F do not meet the recommended LOS C or better over the course of the planning period. It is near the year 2023 when these facilities decline to below LOS C for the remainder of the period.

SUPPORT AREAS

TSA Checked Baggage Inspection System (CBIS) – The CBIS serving Airsides A, E and F have adequate capacity throughout the Master Plan period. While the existing system serving Airside C is estimated to exceed screening capacity by 2021, it should be noted that a TSA Upgrade and Optimization Program is currently underway to relocate baggage screening operation to the Airsides' baggage sort facilities. Airsides A and C modifications to house these baggage screening functions are planned for 2018.

TSA Security Screening Checkpoints (SSCP) – The SSCP's at Airsides A is currently functioning below the recommended LOS C. At Airside A, there is limited space in the checkpoint lanes and queuing area which restricts capacity. Airside C, the checkpoint is functioning at the desired LOS C and is projected to require additional lanes near year 2024 and beyond. At Airside E, the number of screening lanes is adequate for LOS C or better. However, the functionality of the checkpoint impacts its capacity due to sloped floor and lack of appropriate queuing area. It is not until near the end of the planning period when the LOS is affected due to not having the adequate number lanes. The checkpoint screening area at Airside F is functioning at the desired LOS C and above and is projected to remain throughout the Master Plan period.

Customs and Border Protection (CBP) – The CBP expansion at Airside F is projected to satisfy program and processing requirements up through near year 2026 when the LOS is projected to decline to an unacceptable level.

Concessions – The concessions program is currently undergoing expansions and improvements to fulfill program requirements to the extent possible within the facilities. There are varying levels of expansion of food and beverage, retail, and support areas at all airsides and the terminal. The concessions improvements at Airside A will fulfill the space requirements throughout the Master Plan period. However, Airside C concessions improvements will fall short of meeting current requirements for both food and beverage and retail, even with the improvements. The planned food and beverage improvements at Airsides E and F will fulfill requirements up to near year 2026. Retail, while the retail expansion continues to fall short of fulfilling the requirements, which is also the case at Airsides A and C.

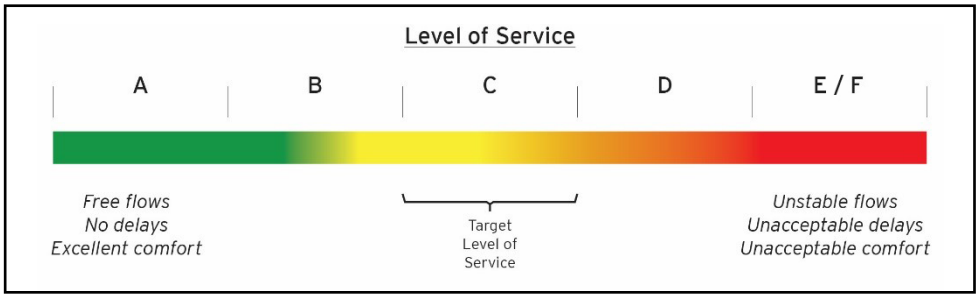
Restrooms – Airside A restrooms are currently adequate in size to provide above LOS C and are projected to begin decline to below LOS C near 2027 and the remain there towards the end of the Master Plan period. Airside C restrooms are currently functioning at LOS C with projected decline near year and 2024 up through the end of the planning period. During peak operating periods the existing Airside C restrooms are often at capacity with a queue into the concourse circulation. Similarly, Airside E is also functioning at LOS C with a projected LOS decline to slightly below LOS C near year 2026 and remaining through the end of the planning period. The restrooms at Airside F are currently functioning at LOS C and higher near LOS B and is projected to decline slightly to LOS C near year 2021 and remain throughout the planning period.

4.2.2 Stoplight Charts – Facility Requirement Triggers

As facilities age and get busier, the passenger experience and level of service will decrease. Stoplight charts are color coded by level of service gradation. Green represents LOS A and red represents LOS F. The coding is described in **Figure 4.2**. Typically, terminal elements are planned to LOS C. **Figures 4.3 – 4.12** present stoplight charts for the terminal and each airside that depict the level of service of each of the major functional elements presented in this section graphed over time through the 29 million annual passenger level, or approximately 2031. The stoplight charts do not factor in any facility improvements throughout the planning horizon. These charts serve as a useful tool to determine when to begin planning for replacement facilities. It is also a useful tool for summarizing the facility requirements.

Figures 4.3 – 4.12 also include stoplight charts for the terminal and each airside under the scenario of the future construction of a new Airside D facility, which would be in operation approximately between years 2024 and 2026. A new Airside D would provide sixteen domestic/international swing gates and would maximize the number of gates that can be developed in the current Terminal Development Area.

Figure 4.2
Stoplight Chart Level of Service Key



Source: HNTB Corporation, August 2017

4.2.2.1 Stoplight Charts - Main Terminal

Based on analysis of the Main Terminal, major components such as Ticketing, Curbside Check-in, Baggage Claim and terminal related support areas will also function at the recommended Level of Service C or better throughout the Master Plan period under the scenario of a new Airside D facility. However, in both scenarios (i.e., "without Airside D" and "with Airside D"), the Main Terminal stoplight chart currently shows inadequate capacity in the Airport Administration and Curbside Frontage components. A new Airport Administration Building and Curbside Frontage Improvements are two of several projects that are to be implemented under Phase 2 of the MPU Terminal Development Plan and will eliminate the capacity issue as noted on the stoplight charts, Figures 4.3 and 4.4.

Figure 4.3
Stoplight Chart - Main Terminal (Without Airside D)

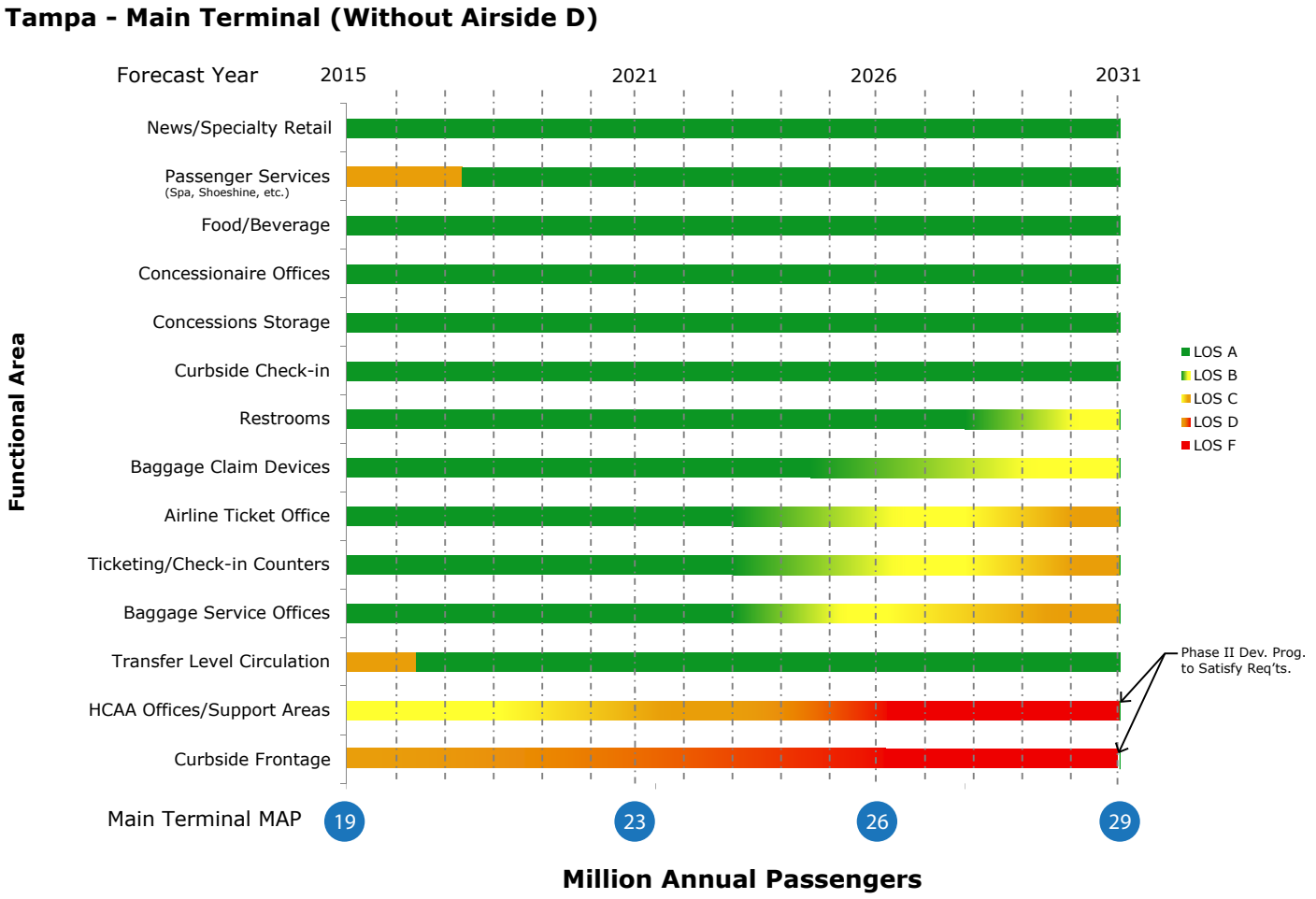
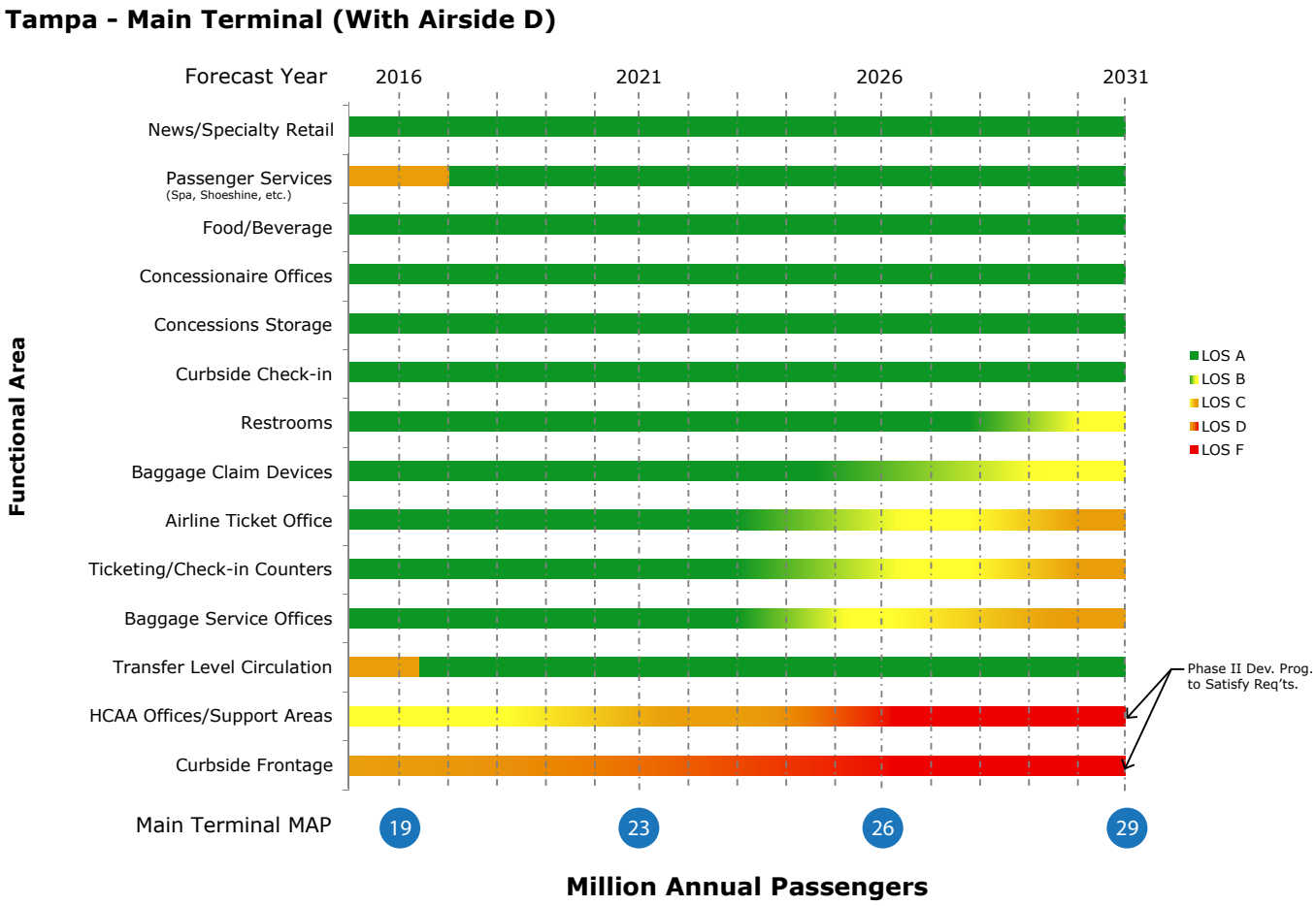


Figure 4.4
Stoplight Chart - Main Terminal (With Airside D)



4.2.2.2 Stoplight Charts - Airside A

Several components of Airside A, such as Holdroom/Gate and Security Screening Checkpoint (SSCP) area capacity are projected to improve with the addition of a new Airside D facility. However, without a future new facility, gate and SSCP capacity are projected to continually decrease in Level of Service due to the lack of required square foot area. The stoplight charts for Airside A, Figures 4.5 and 4.6 also show that the News/Specialty Retail component will continue to fall short in fulfilling requirements and providing the desired Level of Service C or above due to the lack of square foot area.

Figure 4.5
Stoplight Chart - Airside A (Without Airside D)

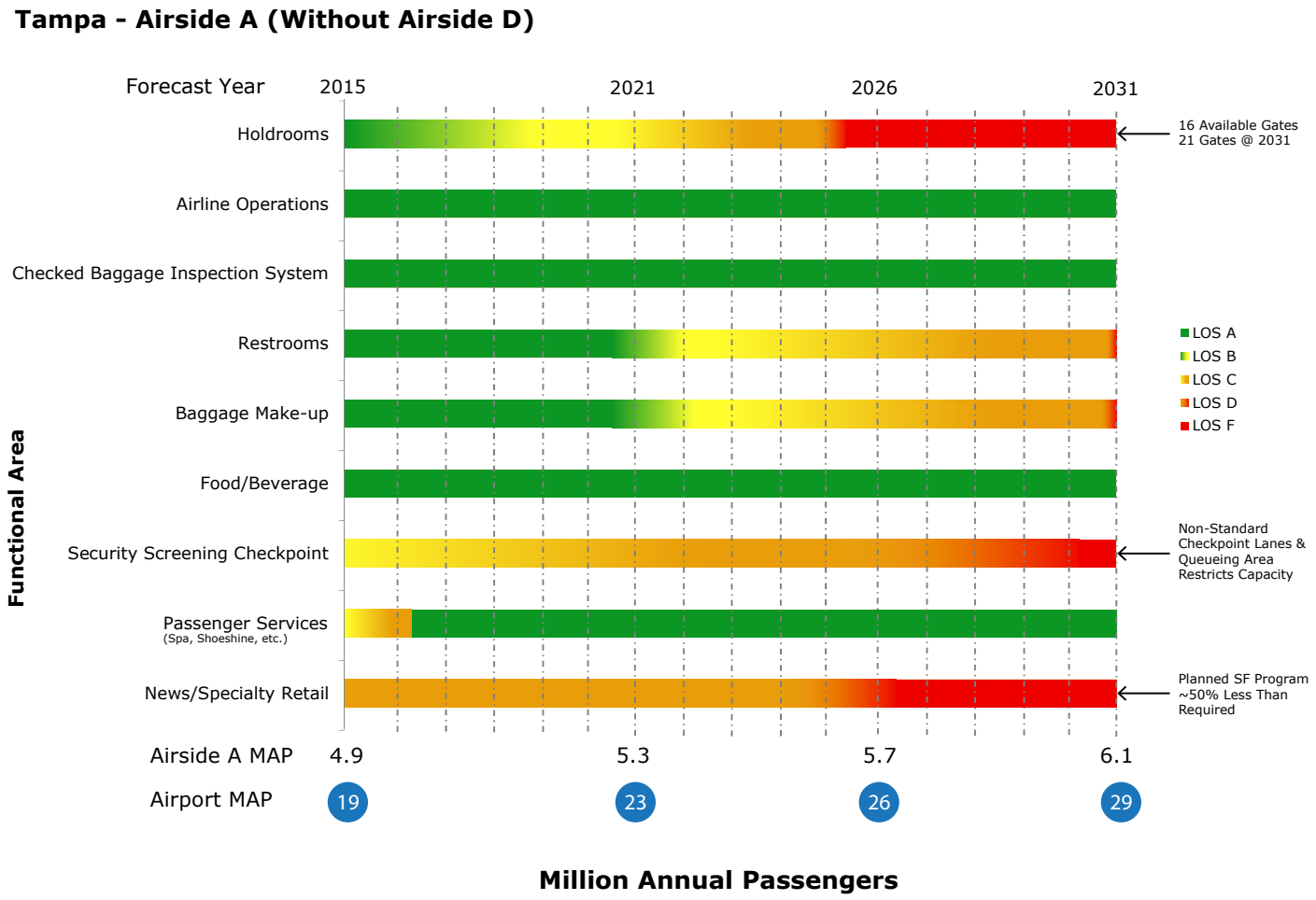
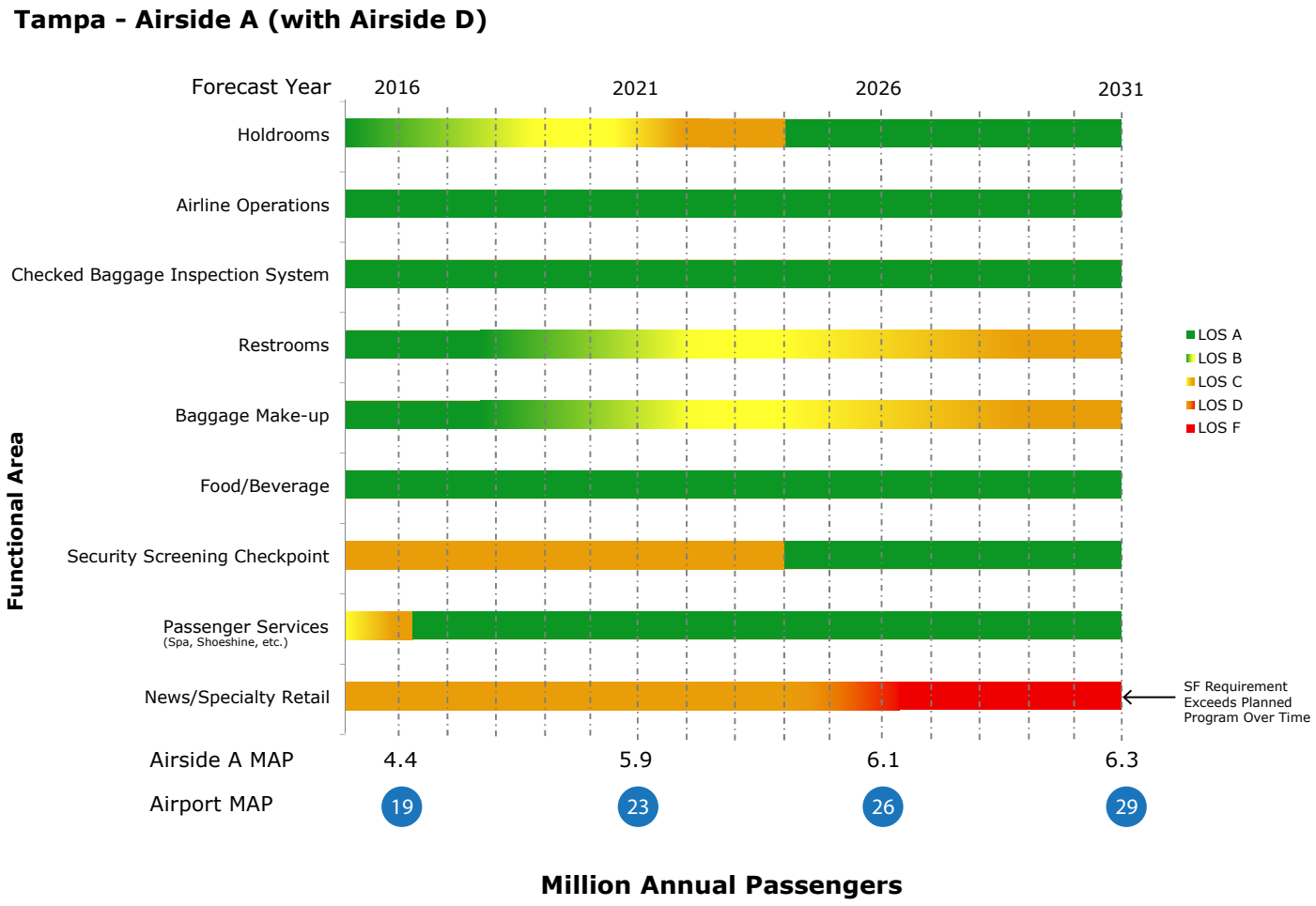


Figure 4.6
Stoplight Chart - Airside A (With Airside D)



4.2.2.3 Stoplight Charts - Airside C

As shown in Figure 4.7, there is no significant effect on Airside C that results from a new Airside D facility as depicted in Figure 4.8. The areas that are projected to decrease in LOS will continue to do so under either scenario (i.e., "with Airside D" or "without Airside D"). However, many of the facility components are planned for improvements during the planning period, while some of the components will continue to decrease in Level of Service, such as Food/Beverage and News/Specialty Retail.

Figure 4.7
Stoplight Chart - Airside C (Without Airside D)

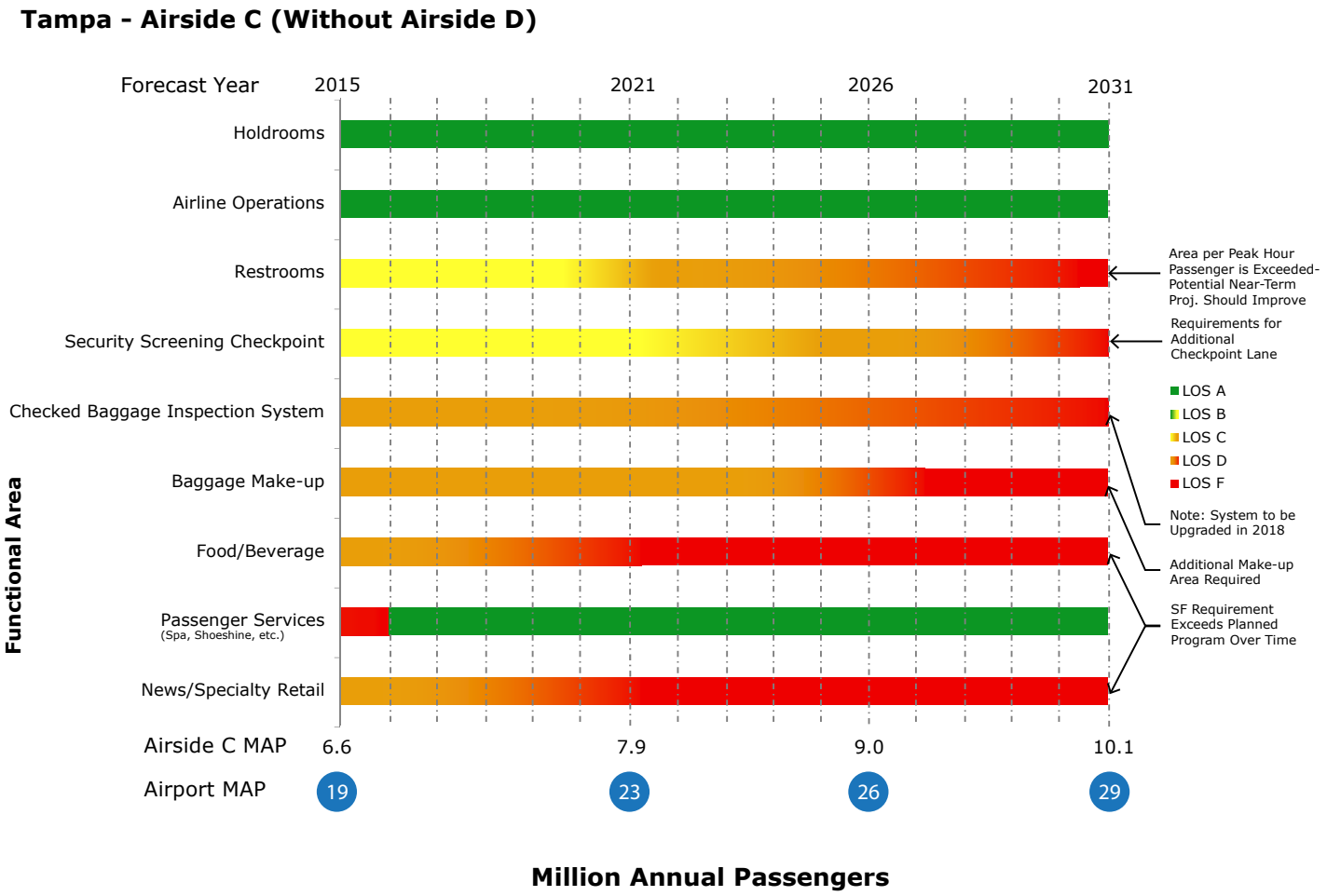
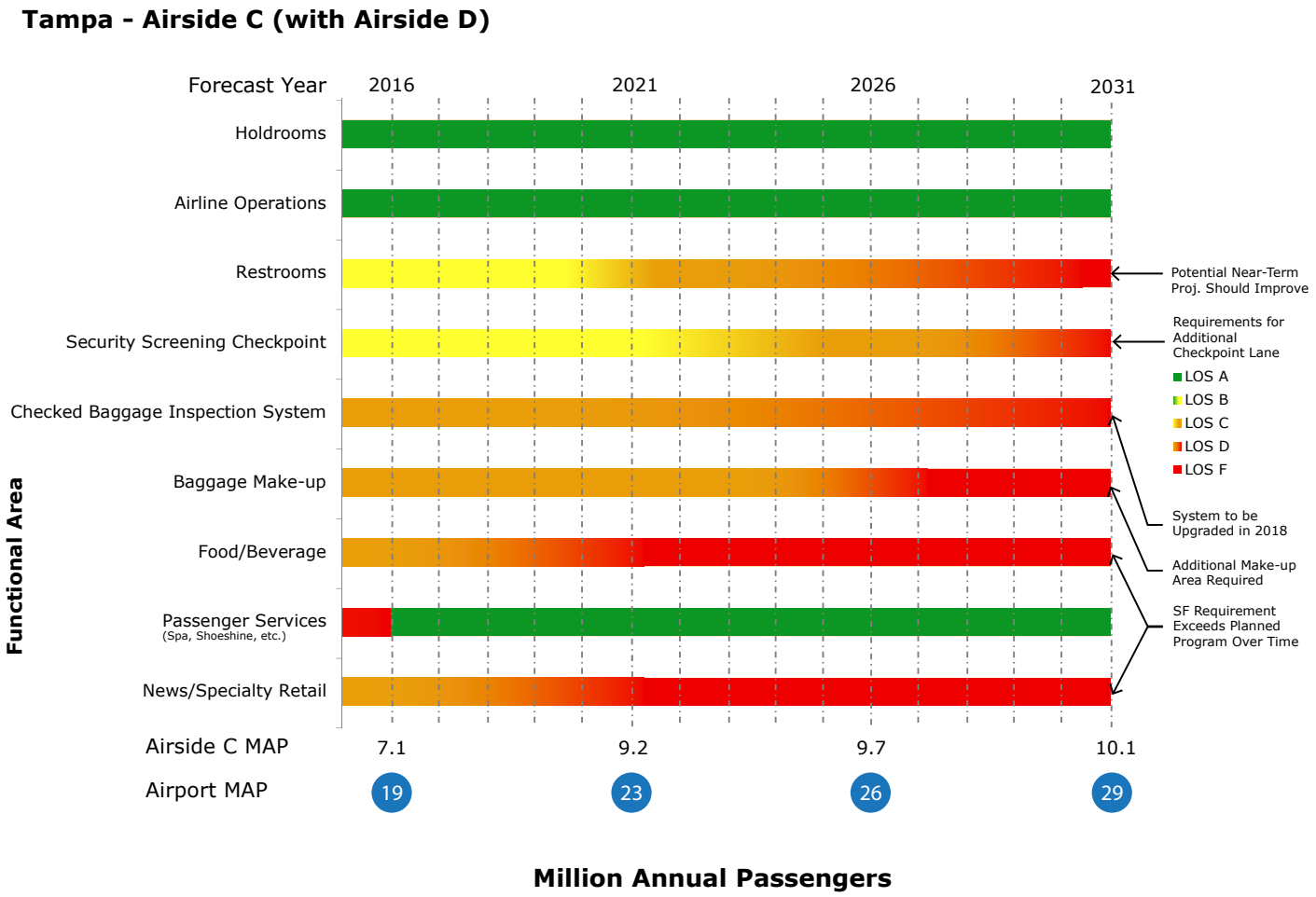


Figure 4.8
Stoplight Chart - Airside C (With Airside D)



4.2.2.4 Stoplight Charts - Airside E

In Figure 4.10, the stoplight chart of the Airside E facility components represents the Level of Service of the facility with a new Airside D coming on line during the planning period. Based on the analysis of peak hour operations and other analyzing elements resulting from a new airside, the restrooms and the Security Screening Checkpoint improve to a recommended or higher Level of Service throughout the planning period. However, the Food/Beverage and News/Specialty Retail continue to decline throughout the planning period. As shown in Figure 4.9, which depicts the Airside E without a new Airside D coming on line, these components (restrooms, SSCP, Food/Beverage and News/Specialty retail) decrease in LOS or up through the end of the planning period.

Figure 4.9
Stoplight Chart - Airside E (Without Airside D)

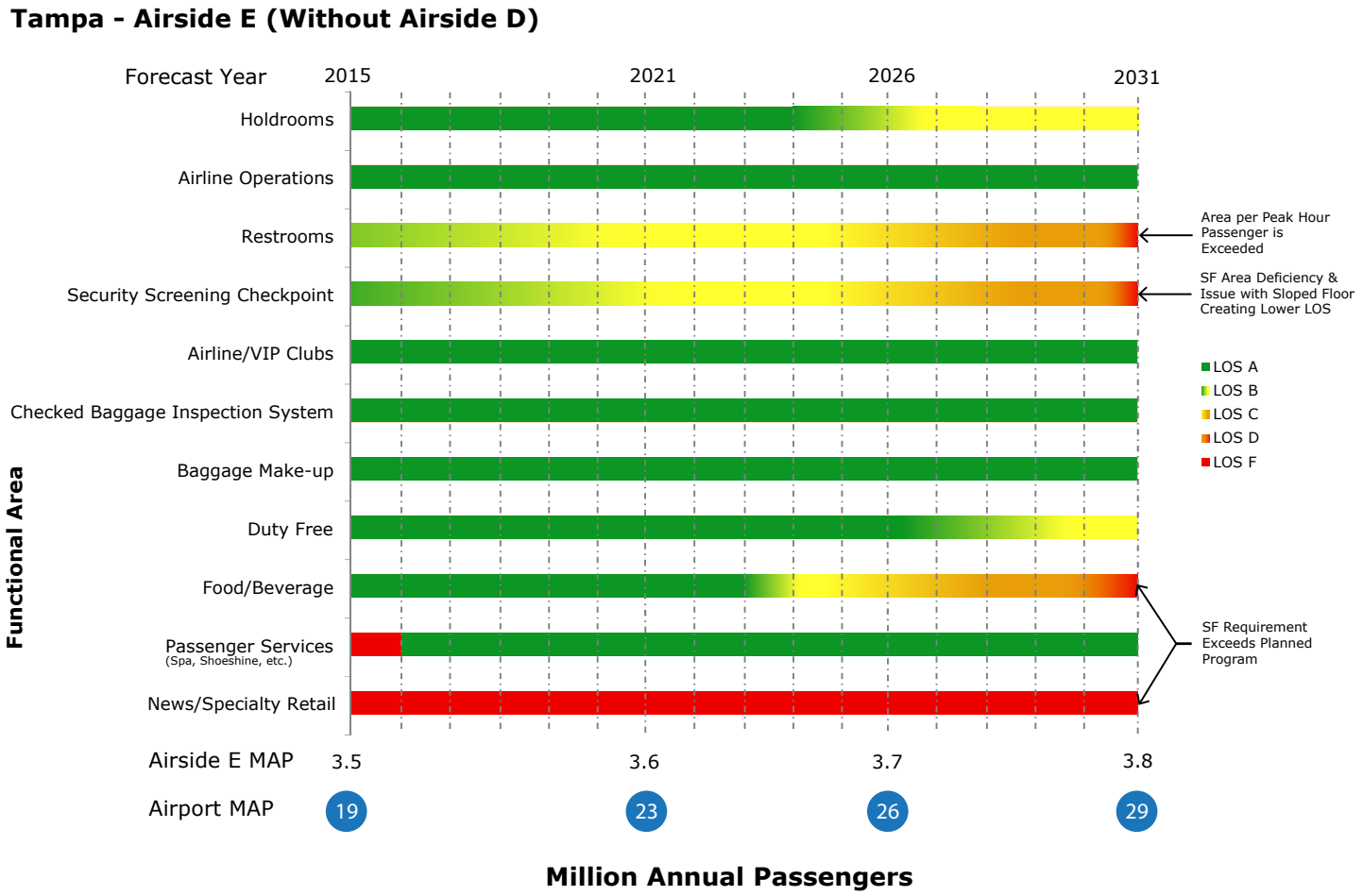


Figure 4.10
Stoplight Chart - Airside E (With Airside D)

4.2.2.5 Stoplight Charts - Airside F

Without a new Airside D facility, the stoplight chart for Airside F, as shown in Figure 4.11, shows that nearly all functional components of Airside F fall below the recommended Level of Service from approximately the midway point up through the end of the planning period, except for the SSCP component, Checked Baggage Inspection System, Airline/VIP Clubs, and the Airline Operations areas. As shown in Figure 4.12, the stoplight chart reflects that the improved LOS of the facility would primarily be contributed to a new International/Domestic facility. As a new Airside D facility comes on line between the years 2024 and 2026, the Airside F facility returns to functioning at a recommended or higher LOS, except for the Food/Beverage, News/Specialty Retail, and Concessions Storage/Office Components, which are inadequate in the amount of area needed for these components.

Figure 4.11
Stoplight Chart - Airside F (Without Airside D)

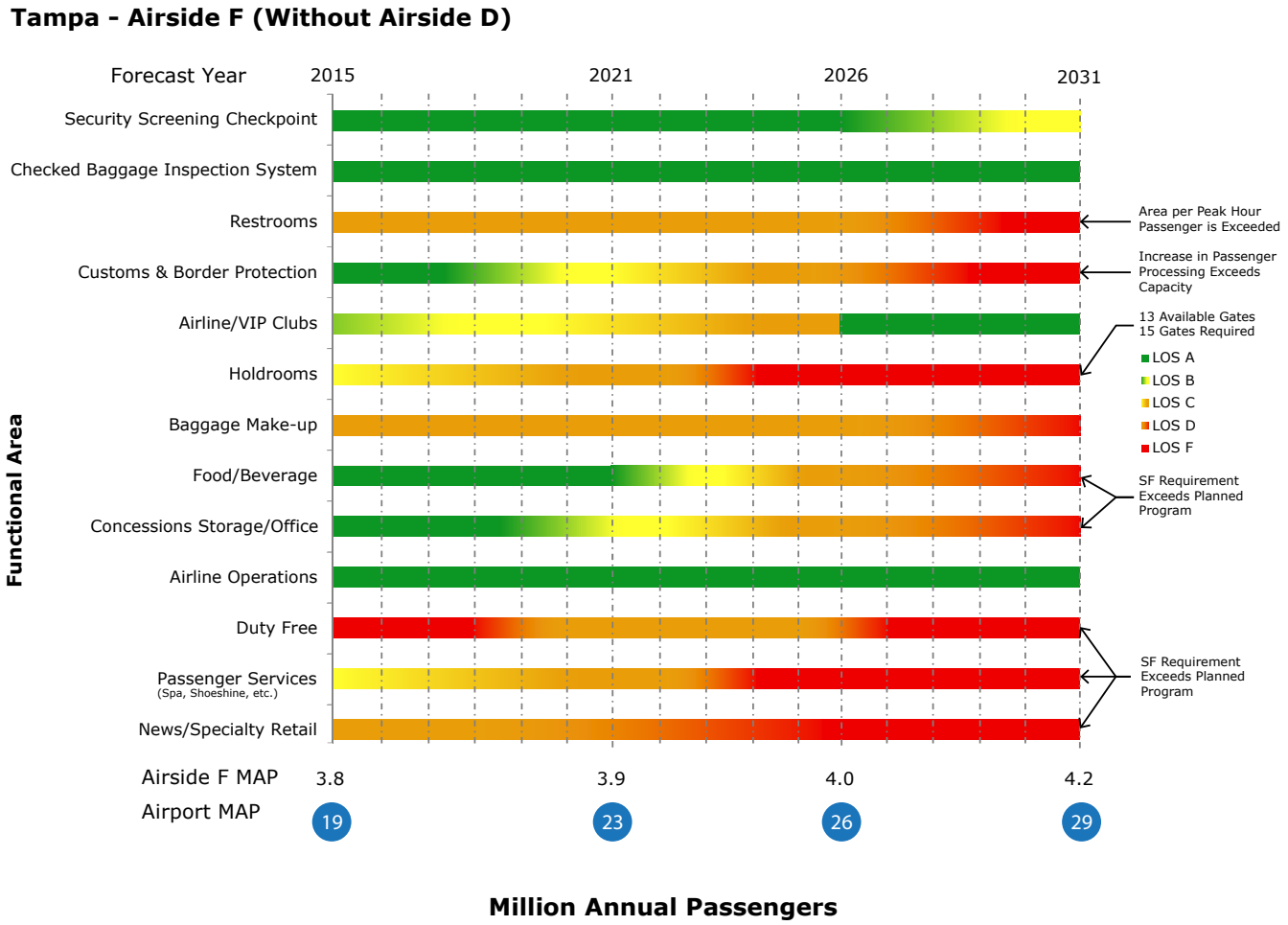
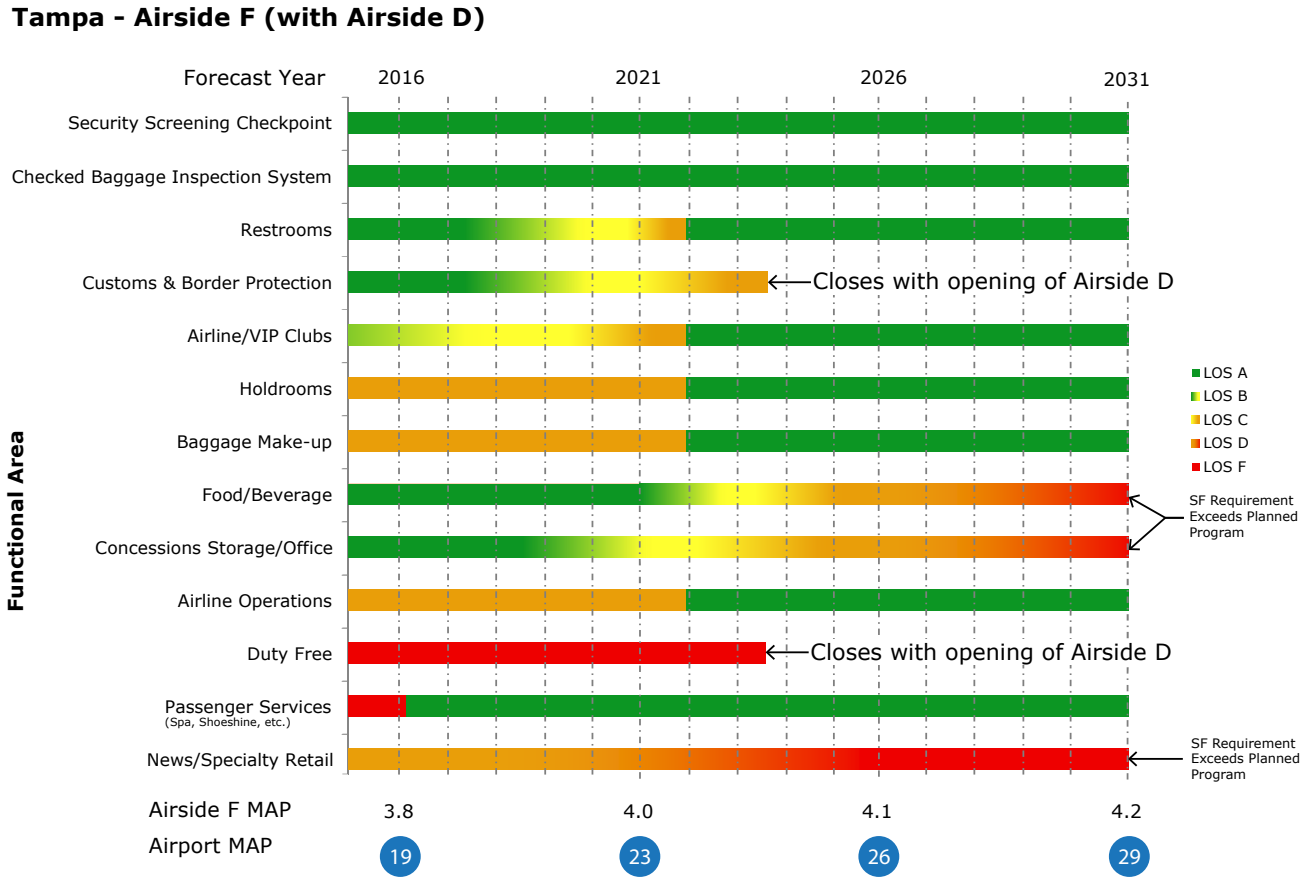


Figure 4.12
Stoplight Chart - Airside F (With Airside D)



4.3 Landside Terminal Support Inventory and Requirements

4.3.1 Inventory of Existing Facilities

The TPA terminal support facilities include the following elements:

- Regional and Local Access
- On-Airport Circulation
- Terminal Curbs
- Public Parking
- Employee Parking
- On-Airport Rental Car Facilities

Since the landside terminal roadway and curb are elements of focus in this 2016 Addendum, Section 4.3 of the 2012 MPU remains applicable for reference to the other TPA terminal support facilities listed above

4.3.2 Roadway and Curbside Operations Analysis

The 2016 Addendum was motivated in part by evolving conditions affecting the ease of landside access to the terminal complex. A major consideration was the trend of growing traffic congestion on the terminal curb roadways over the past several years. The congestion was increasing despite proactive operational changes that mandated adherence to the "active loading and unloading only signs" on all four curbs that had, with its implementation in late 2012, significantly reduced queues at the arrivals curbs by reducing the previously observed very long dwell times. With queues once again forming, impacts were being felt on the circulation roadways around the terminal complex. Thus, it was necessary to determine the cause of the congestion, so the Master Plan Update could propose and analyze how to resolve the congestion.

4.3.2.1 Traffic Data Collection

4.3.2.2 Curb Roadway Data

Data on curb roadway volumes were gathered by AECOM (refer to **Appendix R – TIA Ground Transportation Traffic Study**) in August 2016 (Blue Side) and February 2017 (Red Side). No additional data were gathered on dwell times, the other major factor that helps determine curb roadway level of service. Over time, the HCAA has focused its interest in achieving a quality level of service during the Spring Break peaks, which essentially are a long period of the "peak of the peaks" of overall passenger activity over the course of the year. However, significant backup and congestion is currently observed during non-peak periods as well. To reflect this, the planning team recognized two caveats that are important in considering which peak to analyze:

- Curb traffic does not necessarily peak when passenger activity peaks. The peak hour for total (enplaning and deplaning) passengers happens midday under current TPA air service schedules, while traffic on the departures curb peaks in the AM hours, and on the arrivals peaks, in the late PM hours.
- Holiday peaks, which create a different mix of mode of access/egress for passengers, may create somewhat higher peaks on the curbs than Spring Break does.

Nonetheless, the HCAA's interest in creating curb capacity to eliminate congestion during Spring Break peak hours is the sound choice for acceptable curb operations under any conditions, due to the heavy volume of passengers in the month long period. Consequently, the curb volume data were reviewed, adjusted, and factored to represent the HCAA's focus on the true curb peaks.[1]

Adjustments and factoring were made as follows:

- The count station locations included some traffic that was not destined for the curbs, e.g., the valet parking traffic on Blue Departures. Between 10 – 50 vehicles were subtracted from the AECOM data to account for this, which is similar to what was done under the Master Plan in 2012.
- A count of the number of vehicles entering a curb is not a count of the number of vehicles stopping at the curb, especially at the arrivals curb. Some vehicles are just recirculating as they wait for their party. Others cannot find a place to stop. In the 2012 Master Plan, there were specific counts to enable adjustments for this phenomenon. In this Update, such counts were not taken. Judgment was used to account for an assumed 25 percent of Blue Arrivals traffic as non-stopping, and 35 percent of Red Arrivals traffic as non-stopping.
- Seasonality factors used by AECOM reflected FDOT guidelines for non-airport roadways. The FDOT factors were adjusted out so that seasonality adjustments could be based on passenger activity levels.
- The adjusted data was then factored from the July or February counts to the March peak month based on passenger activity levels. Typically, at a large hub airport, the ratio of the activity in the peak hour of the peak month to the peak hour of the counted month is not as great as the ratio of the monthly totals. This is because aircraft and gates tend to already be more nearly at capacity in the peak hours than over the course of the entire month. For this Update, 60 percent of the March-to-July and March-to-February ratios were used to reflect seasonality of the peak hours of the peak days of those months.

The resulting volumes are shown in **Table 4.2**. Also shown are the 2011 volumes developed in the 2012 Master Plan. Note that the 2017 values are for the peak hour of the peak day of the peak month, while 2011 data are for the peak hour of the average day of the peak month. It is of particular importance to note that with the two arrivals curbs showing roughly a doubling in peak hour demand from the 2012 Master Plan, that the need for more curb capacity in this Master Plan Addendum becomes very evident.

Table 4.2
Curb Volumes, 2017 Peak Conditions

Side	Curb	2017	2011	Increase	% Increase
Blue					
	Departures	718	693	25	4
	Arrivals	1012	525	487	93
Red					
	Departures	650	587	63	11
	Arrivals	758	350	408	116

Source: Curtis Transportation Consulting analysis

The very large increases in the demand on the Arrivals curbs between the 2012 Master Plan and this Addendum is what is reflected by the increased congestion being experienced. After significant review, the Master Plan Update determined that the difference reflects the impacts of the following:

- Passenger activity at TPA is growing faster than forecast in 2012, a result of air service and economic factors
- Peaking of passenger activity is more intense than forecast in 2012, chiefly a result of air service factors, including up-gauging of aircraft in the peaks
- Some operational changes may have increased curb traffic recirculation. The adherence to the active-loading-only policy cleared out the long dwell times on the curb, and induced some changes in driver behavior. The cell phone lot and a grace period in the terminal-top parking helped to draw some of those who arrive early to wait elsewhere. But apparently, it induced others, perhaps in correlation with decreased fuel prices, to simply recirculate (especially on the Red Side where it is easiest to do). The emergence of ride-share, or Transportation Network Carriers, such as Uber and Lyft, have greatly attributed to this recirculation traffic as well and are a contributor to congestion.

The analysis in this 2016 Amendment was focused on the planning horizon (2031). The reason for the focus was that, with the arrivals curbs already operating near failure in 2017, the HCAA would need to find a solution is the reasonably near future that would suffice out to and perhaps beyond the planning horizon. To analyze 2031 conditions, 2017 data were then factored to the planning horizon, the peak hour of the peak day of the peak month of 2031. The new forecasts (see Section 2) of passenger activity were used as the basis for the factoring. **Table 4.3** shows the 2031 estimated curb volumes, and the factors used. It is relevant to note that the 2031 peak hour curb volumes greatly exceeded those forecast in the 2012 Master Plan.

Table 4.3
Curb Volumes, 2031 Peak Conditions

Side	Curb	2017	Growth Factor	2031
Blue				
	Departures	718	1.353	971
	Arrivals	1012	1.453	1471
Red				
	Departures	650	1.551	1008
	Arrivals	758	1.443	1093

The next step was to quantify the current (March 2017) curb capacity and level of service. The same analytic procedure was used as was used in the 2012 Master Plan. The technique looks at both the capacity to move traffic to and from the curb, as well as the capacity for stopping at the curb to serve passenger loading or unloading. The results are shown in **Table 4.4**. They indicate that while both Blue and Red Departures curbs are operating at satisfactory Level of Service B conditions, the two Arrivals curbs are operating at a seriously deficient Level of Service. This quantification reflects the long queues and congested arrivals curbs being experienced at Tampa. With a volume/capacity ratio of between 1.13 and 1.24, in 2017 the arrivals curbs are experiencing peak hour volumes 60 – 80 percent higher than they can process at a satisfactory level of service.

Table 4.4

Curb Capacity and Level of Service, Spring Break, 2017

CURB	Volume (vph)	Capacity (vph)	Volume/Capacity
Blue Dep	718	1061	0.67
Red Dep	650	1118	0.58
Blue Arr	1012	817	1.24
Red Arr	758	668	1.13

Source: Curtis Transportation Planning analysis

In order to drive the development of an appropriate solution to the current issue on the Arrivals curbs, it was necessary to project out to the planning horizon to see how much worse the congestion would get without resolution. For the peak hour of the peak day of Spring Break 2031, the capacity and level of service were analyzed under several different scenarios:

- Under the assumption that current conditions (physical and operational) would continue.
- Under the assumption that the physical infrastructure for each curb would be kept the same length but would be widened within the existing available space to five lanes from the current four. This assumption was necessary due to the fact that it is not feasible to extend the length of any of the curbs at Tampa, given the layout of the terminal complex.

For the Departures curbs, the same operating conditions (which drive dwell times, a major determining factor of capacity) were assumed for 2031. On the Arrivals curbs, it was assumed that additional operational means would achieve a decrease in dwell times for POVs and TNCs from an average of four minutes to an average of three minutes. The primary means to achieve reduced dwell times are increased staffing to manage the curbs at peak hour, and more information and education of users, so that they do not come to the curb for a pick-up until their party is ready at the curb with their bags. The results of these sets of analyses for 2031 are shown in **Table 4.5**.

Table 4.5
Curb Capacity and Level of Service, Spring Break, 2031

	PH PD Spring Break 2031, Existing Curbs			PH PD Spring Break 2031, with 5th Lane		
CURB	Volume (vph)	Capacity (vph)	Volume/Capacity	Volume (vph)	Capacity (vph)	Volume/Capacity
Blue Dep	971	1061	0.91	971	1353	0.72
Red Dep	1008	1118	0.90	1008	1458	0.69
Blue Arr	1470	817	1.80	1470	1038	1.42
Red Arr	1093	668	1.63	1093	949	1.15

Source: Curtis Transportation Planning analysis

Table 4.6
Curbside Levels of Service with Existing Lane Geometry

Terminal Levels	Existing		Year 2018		Year 2023	
	Utilization Factor	LOS	Utilization Factor	LOS	Utilization Factor	LOS
Blue Arrivals	1.9	E	1.6	D	1.7	E
Blue Departures	1.6	D	1.3	D	1.3	D
Red Arrivals	1.8	E	1.4	D	1.7	E
Red Departures	1.5	D	1.3	D	1.5	D

Source: Tampa International Airport Ground Transportation Traffic Study, AECOM, May 2017 (Appendix R)

Table 4.6 shows that all four existing curbs will experience some level of failure by 2023, indicating the need for additional capacity on all four curbs. Indeed, the arrivals curbs today are essentially at failure, but the level of service should improve in 2018 due to the opening of the Rental Car Center which will eliminate existing rental car traffic from the Parkway. After 2018 conditions will degrade as air service and passenger activity increases. The 2012 Master Plan had recommended a fifth lane as a means to improve the capacity, but **Table 4.5** shows that the tight-fitting five-lane scheme might work for the Departures curbs, but still come well short of the additional capacity required for the Arrivals curbs. Indeed, the Blue Arrivals curbs requires a doubling of capacity, and the Red Arrivals curb requires a 65 percent increase in capacity to provide the desired level of service in 2031. Section 4.3.2.2.1 presents the different ways curb capacity can be increased.

4.3.2.2.1 Curbs- Alternate Development

Within certain limits, curb capacity typically can be increased through a combination of longer curbs or additional lanes. At Tampa, however, there is no feasible way to increase the length of the curbs, given the overall terminal configuration and location. Thus, options were developed to add lanes. These options, though, respected the idea that the number of lanes and the length of the curbs have a relationship such that beyond certain limits, increasing one without increasing the other has no effective gain in capacity. Given that the requirements analysis had demonstrated that a five-lane arrivals curb could not meet 2023 demand, and there was no way to widen the existing curb to more than five lanes, the options considered all were based on the creation of second parallel curb, outboard from the existing curb.

The key issue was how wide to make the outer curbs. A single lane curb is simply a queue, with no room for a vehicle to pass others, and was never considered. Even a dual lane outer curb was rejected because it can be effectively shut down when any one vehicle comes to a stop in the second lane (the moving lane). A three-lane outer curb was considered, but a brief qualitative review showed that a wider curb would be feasible, and it would be very hard to widen a new three-lane curb roadway later to the maximum physically feasible width of four lanes. Stated otherwise, it was the logical idea to maximize the curb capacity now, both to meet the current need for more arrival curb capacity, to anticipate the need prior to 2031 for more departure curb capacity, and to provide the most capacity at this terminal complex that would take it to its overall maximum balanced capacity as a passenger processor.

The four-lane concept is shown in **Figures 4.13** and **4.14**. The space between the existing blue side curb and the garage would be developed as the four-lane outer “express” curb, plus a vertical circulation building that eliminates the need for passengers to cross the existing (inner) curbs. Similarly, on the red side, the express curb would be developed south of the hotel, and the current structure with rental car facilities and administrative offices would be replaced by the new vertical circulation building.

Figure 4.13 Blue Side "Express" Curbs

Figure 4.14 Red Side "Express" Curbs

The intended operation of the new outer "departure express curbs" is to have vehicles carrying passengers who have "checked- in" remotely (prior to arriving at the airport) and who have "carry-on" only bags to be dropped off at the outer curb. This is currently 45% of all passengers. These passengers will access vertical circulation directly to the Transfer Level and therefore proceed directly to gates, without passing through the ticketing lobby.

Similarly, upon arrival, passengers with no need to claim checked bags, will be signed on the Transfer Level to the descending vertical circulation to the outside "express" arrival curbs, by-passing the baggage claim facilities.

No pedestrian crossings across the roadways will be allowed from the outer to the inner curbs at the departure or arrival levels.

4.3.2.3 Circulation Roadway Operations Analysis

The existing George J. Bean Parkway is a two or three lane roadway that provides access to Tampa International Airport, and which traverses the perimeter of the terminal complex. There are multiple ingress and egress points that enter and exit the George J. Bean Parkway, including:

- Short Term Parking / Long Term Parking / Rental Car Return Egress
- Airport Recirculation Drive Ingress
- Blue Side Arrivals/Departures Egress
- Blue Side Access Road Egress
- Red Side Departures Ingress
- Red Side Arrivals Ingress
- TPA Service Road Ingress
- Marriott Ingress
- Bessie Coleman Boulevard Egress
- Marriott Egress
- TPA Service Road Egress
- Red Side Arrivals Egress
- Red Side Departures Egress
- Red Side Rental Car Ingress
- Red Side Access Road Egress
- Bessie Coleman Boulevard Ingress
- Blue Side Departures Ingress
- Blue Side Arrivals Ingress
- Airport Recirculation Drive Egress
- Short Term Parking / Long Term Parking Ingress

Traffic Data for the George J. Bean Parkway was gathered by AECOM (refer to **Appendix R**) in August 2016 (Blue Side) and February 2017 (Red Side) and this data was compared to the traffic data gathered in 2011 for the 2012 Airport Master Plan Update. The traffic data is shown in **Table 4.7**.

Table 4.7
George J. Bean Parkway Volumes, 2017 Peak Hour Condition

George J. Bean Parkway Location	2017 Volume	2011 Volume	Increase	% Increase
Inbound (NB)	2860	2410	450	19%
Outbound (SB	2700	2182	518	24%

The increases in demand on the George J. Bean Parkway is the main cause for the increased congestion along the parkway. The reasoning behind the additional demand is similar to what was discussed in Section 3.1.1.1 “Curbs”, including:

- Passenger activity at TPA is growing faster than forecasted in 2012, a result of air service and economic factors.
- Peaking of passenger activity is more intense than forecasted in 2012, chiefly a result of air service factors, including up-gauging of aircraft in the peaks.

The 2017 data was then factored to the planning horizon, the peak hour of the peak day of the peak month of 2031. The new forecasts of passenger activity were used as the basis for the factoring. Part of the factoring included removing the rental car vehicles that currently use the George J. Bean Parkway that will be shifted to the Consolidated Rental Car Facility once it is complete. **Table 4.8** shows the 2031 estimated George J. Bean Parkway volumes, and the factors used.

Table 4.8
George J. Bean Parkway Volumes, 2031 Peak Hour Projections

George J. Bean Parkway Location	2017 Volume	Growth Factor	2031 Projected Volume
Inbound (NB)	2860	1.157	3310
Outbound (SB)	2700	1.200	3240

The main planning component for improvement of the George J. Bean Parkway involved providing additional lanes related to the proposed additional terminal curb roadways at all four curb locations (Red/Blue sides, both arrivals and departures). These additional lanes are needed not only to improve capacity along the parkway but also to eliminate un-safe merge conditions that currently exist throughout the airport. The design aspects of the ramps for the preferred alternative for the George J. Bean Parkway are discussed further in Section 4.3.2.3.1.

4.3.2.4 Circulation Roadway – Alternate Development

To accommodate the additional 4-lane curbs discussed in Section 4.3.2.2.1 multiple improvements will need to be made to the existing circulation roadway. This includes widening portions of the current George J. Bean Parkway, widening existing ramps leading to the existing curbs, and constructing new ramps to the new 4-lane curbs. These improvements are needed to accomplish certain goals:

- Eliminate un-safe merge conditions where the ramps join the George J. Bean Parkway
- Improve capacity along the parkway
- Provide logical decision points for the motorists to determine which curbside they would like to travel towards

See **Figures 4.19 through 4.21** for the conceptual layout of the circulation roadway around the main terminal.

The improvements along the George J. Bean Parkway include improvements between the South Terminal Support Area (STSA) and the main terminal. The concept for these improvements were developed as part of the "Alternatives Feasibility Study for New Roadway Exit Configurations", see **Appendix S**. The main component of these improvements is to widen the Parkway in order to add an additional lane along the northern exit ramp from the STSA. This additional exit lane will provide motorists the maximum distance possible to get from the STSA to the southbound ramp heading towards westbound SR 60 and northbound Veterans Expressway. **Figure 4.24** portrays the improvements along the George J. Bean Parkway between the STSA and the main terminal. These improvements leading towards the STSA were previously anticipated as part of the 2012 Master Plan Update.

In addition, the improvements to the circulation roadway need to consider the future North Terminal improvements. The future North Terminal will require additional roadways outside of the existing George J. Bean Parkway, including improvements to Bessie Coleman Boulevard. Logical connection ramps will also be needed between the George J. Bean Parkway and the future North Terminal roadways. See **Figure 4.25** for the concept with how the George J. Bean Parkway improvements will interact with future Norther Terminal roadways.

Figure 4.15
Existing Roads - Level 01

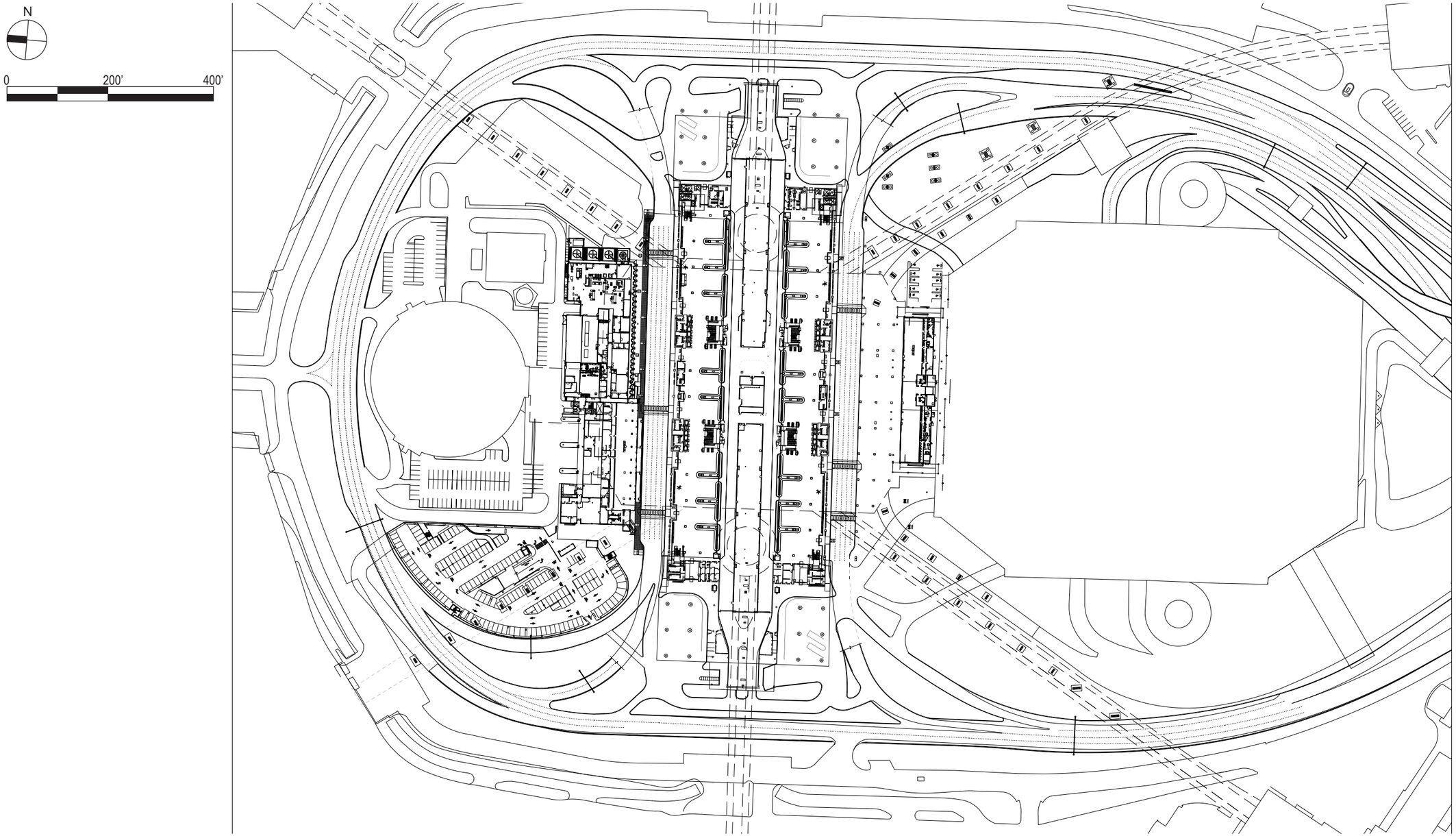


Figure 4.16
Existing Roads - Level 02

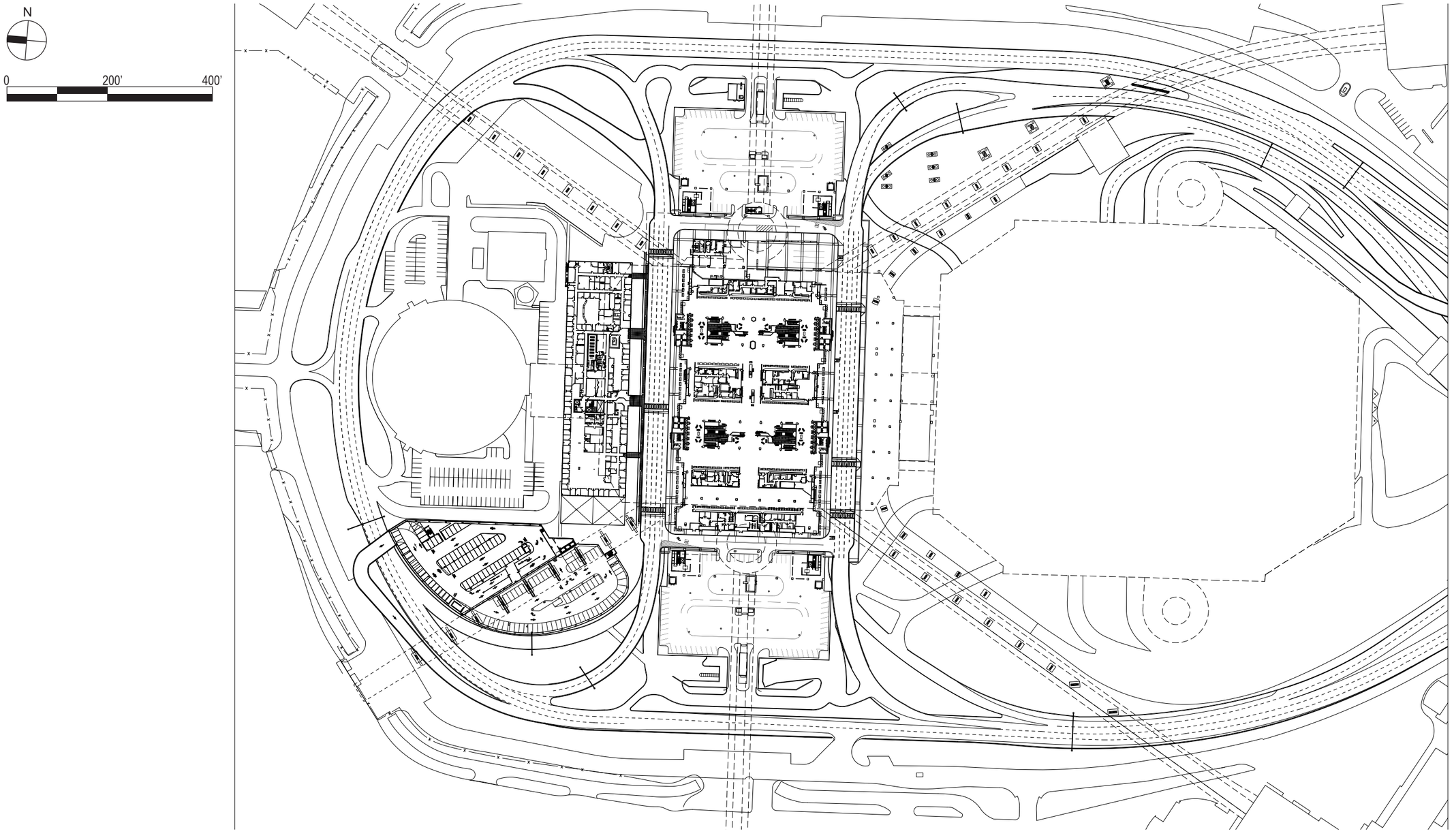


Figure 4.17
Existing Roads - Level 03

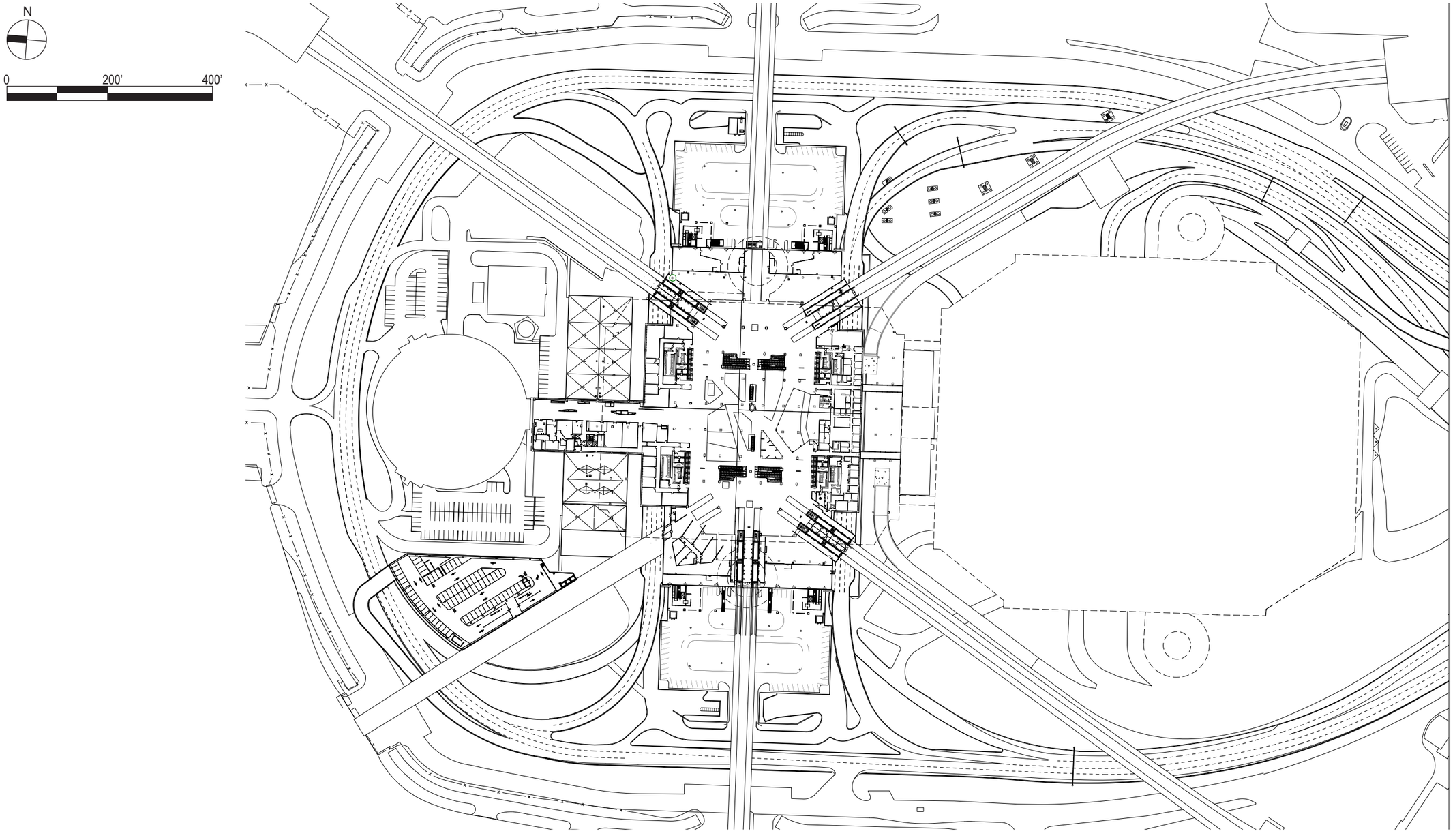
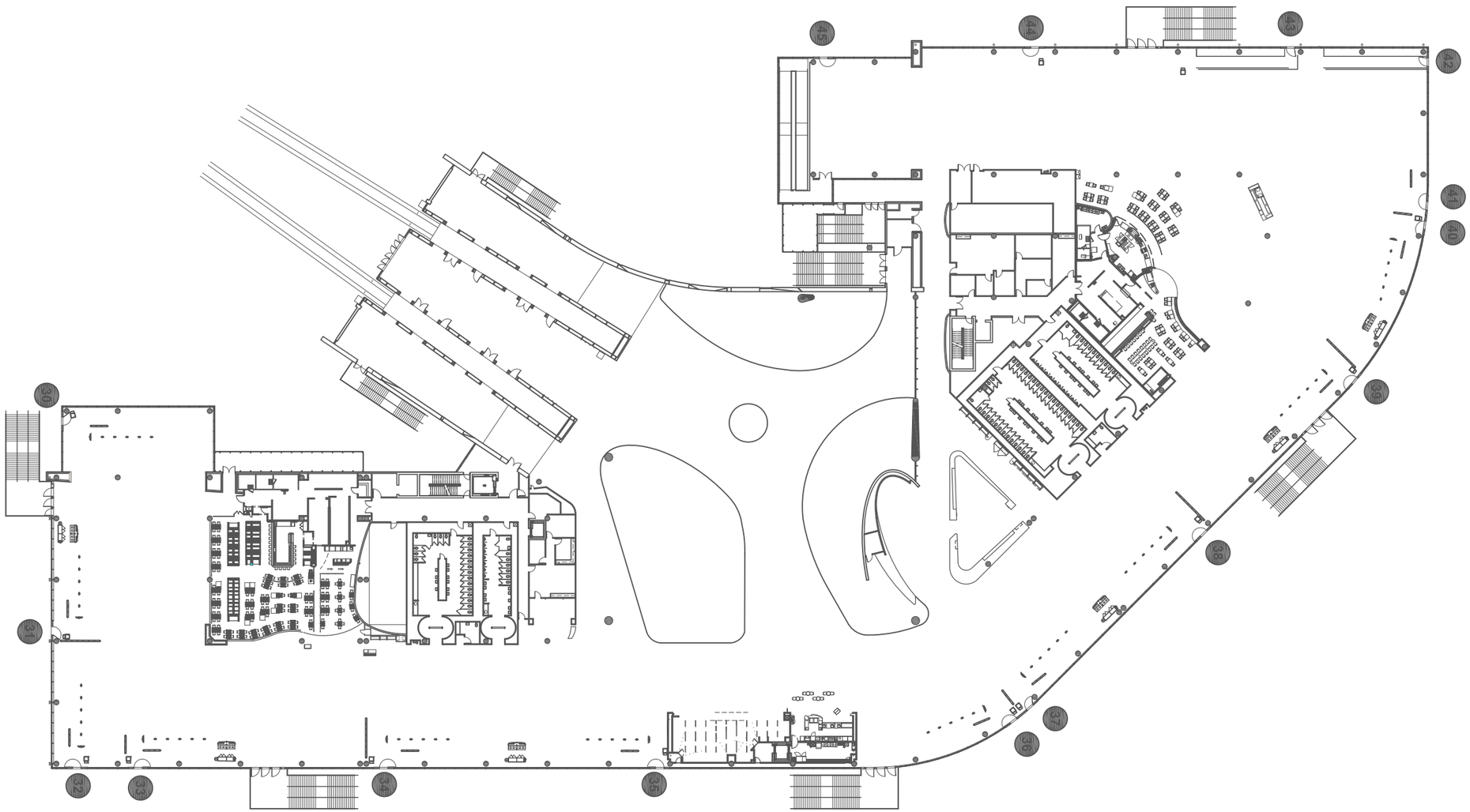
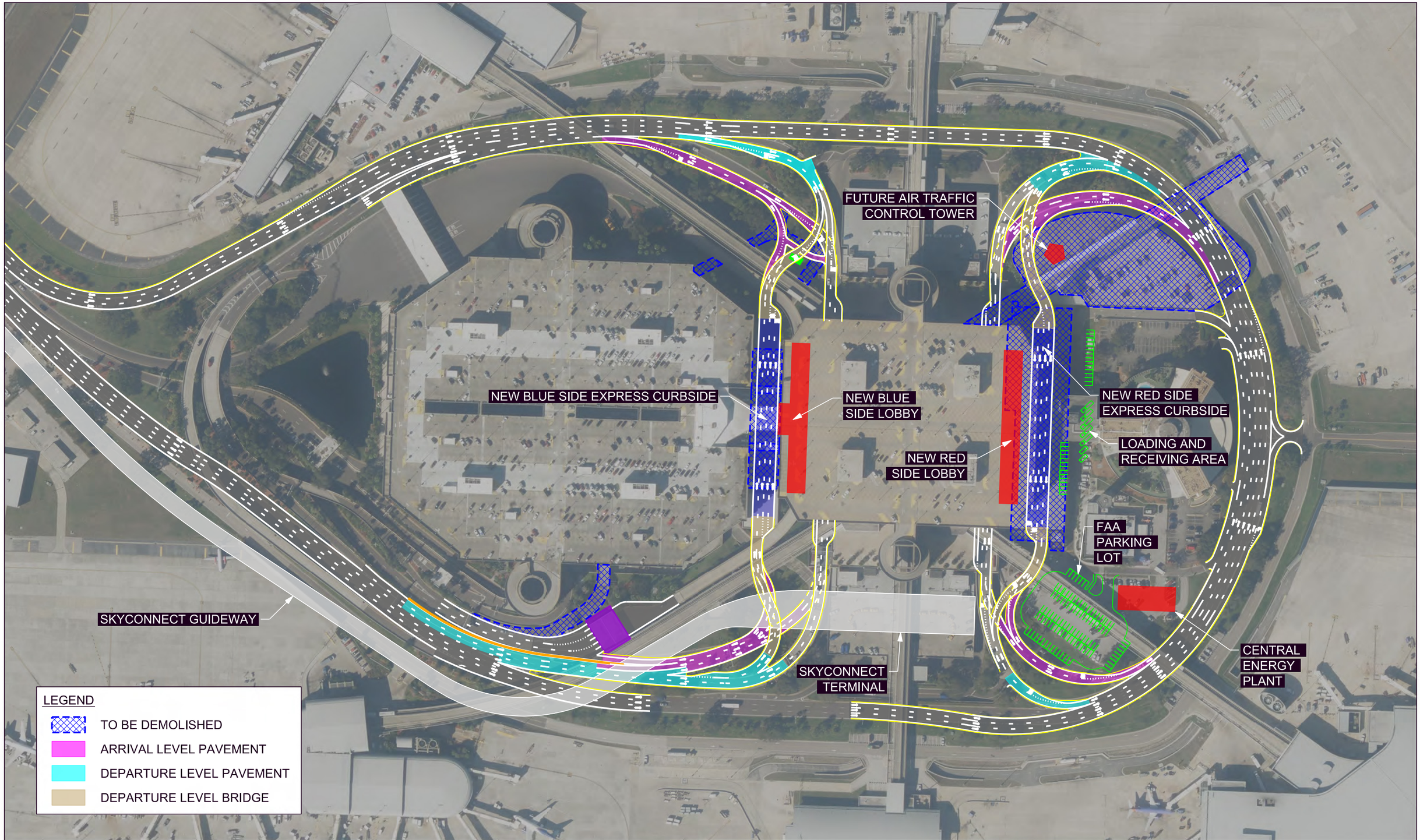


Figure 4.18
Airside C - Departure Level





0' 100' 200'
SCALE: 1" = 200'

HNTB

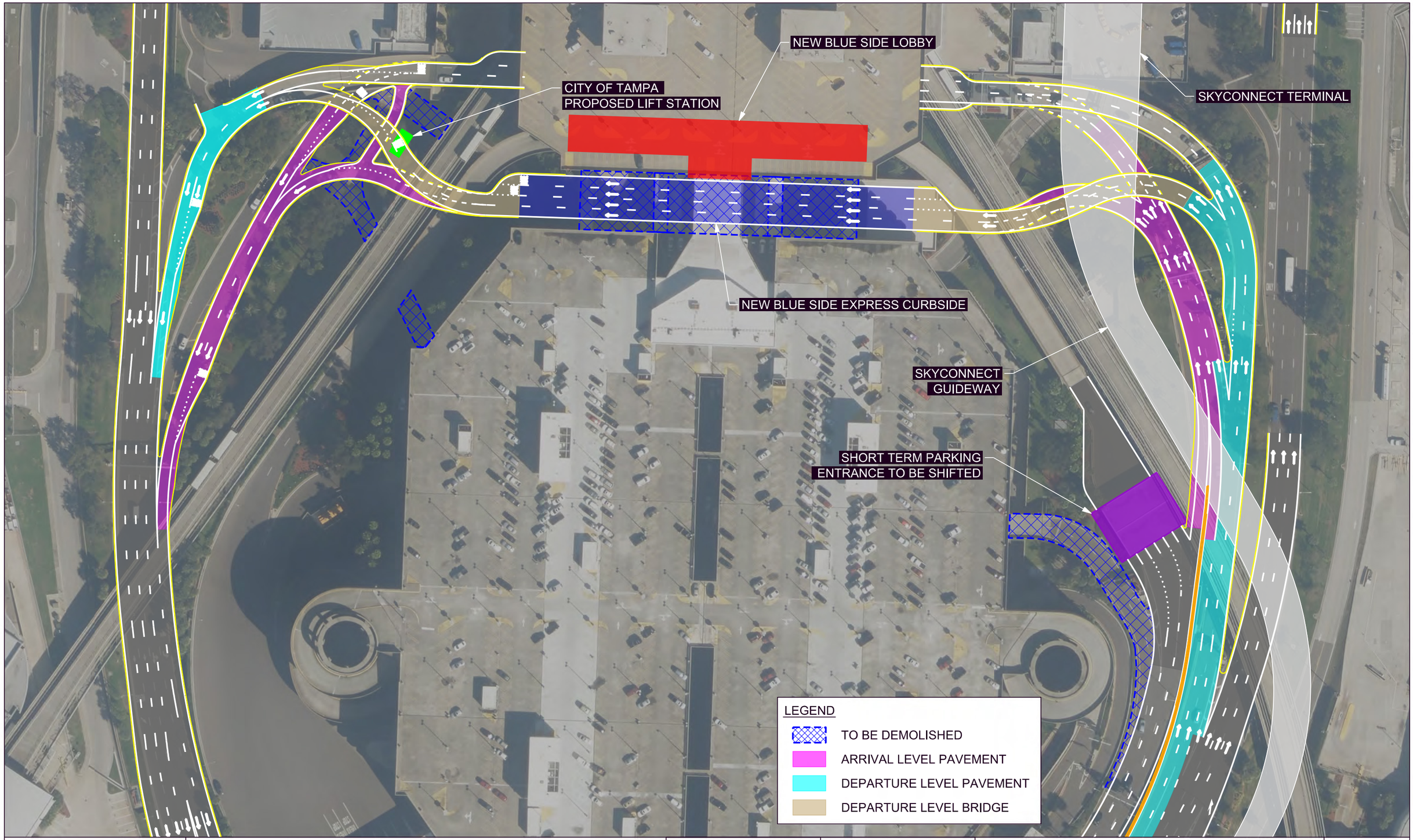
201 N. FRANKLIN STREET
SUITE 1200
TAMPA, FLORIDA 33602
PH (813) 402-4150
FAX (813) 402-4245

CURBSIDE AND ROADWAY EXPANSION
PREFERRED ALTERNATIVE

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
SEPT. 2017

FIGURE
4.19



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SCALE: 1" = 100'

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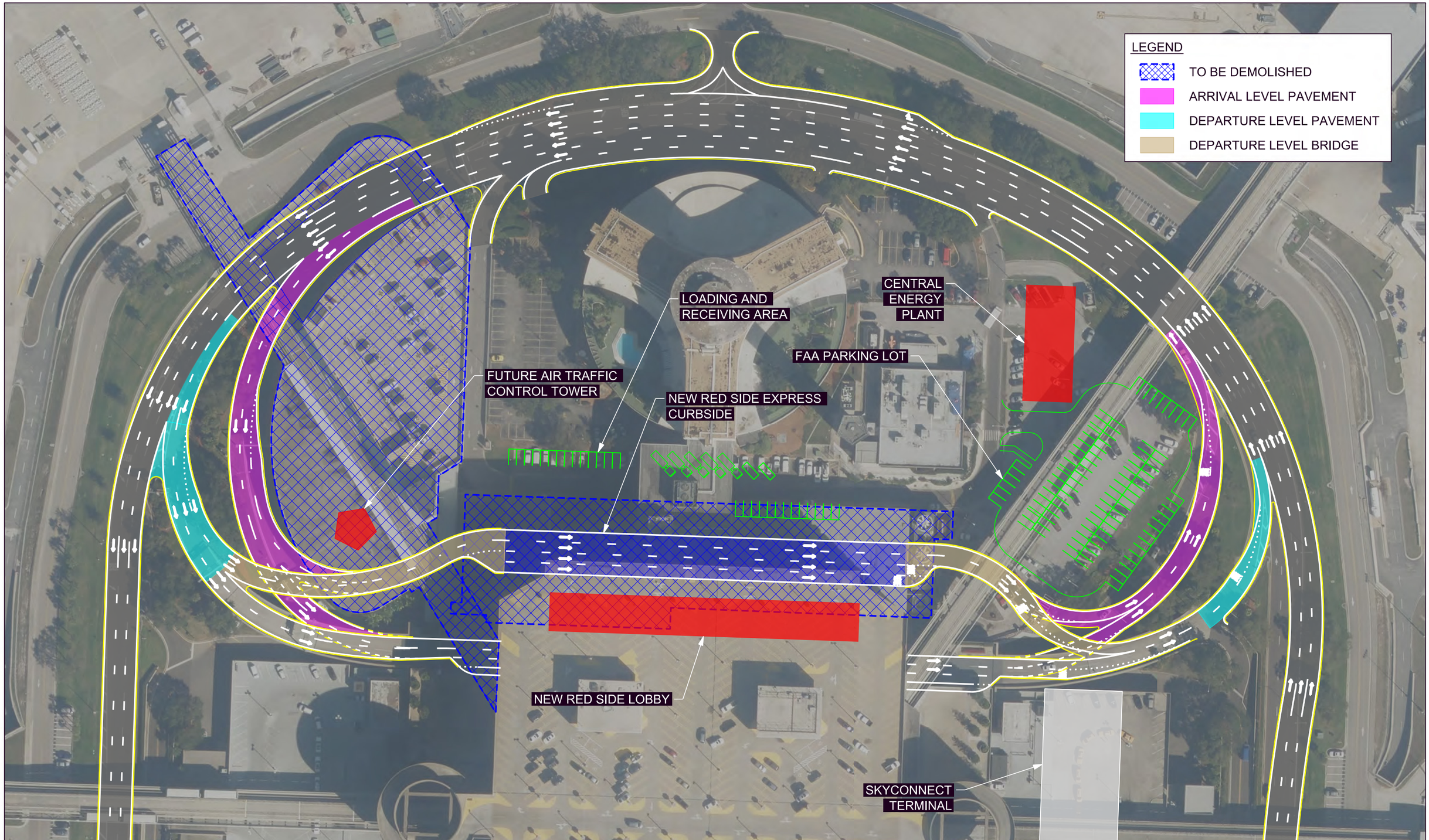
201 N. FRANKLIN STREET
SUITE 1200
TAMPA, FLORIDA 33602
PH (813) 402-4150
FAX (813) 402-4245

CURBSIDE AND ROADWAY EXPANSION
BLUE SIDE

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
SEPT. 2017

FIGURE
4.20



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SCALE: 1" = 100'

HNTB

1200 N. FRANKLIN STREET
SUITE 1200
TAMPA, FLORIDA 33602
PH (813) 402-4150
FAX (813) 402-4245

CURBSIDE AND ROADWAY EXPANSION
RED SIDE

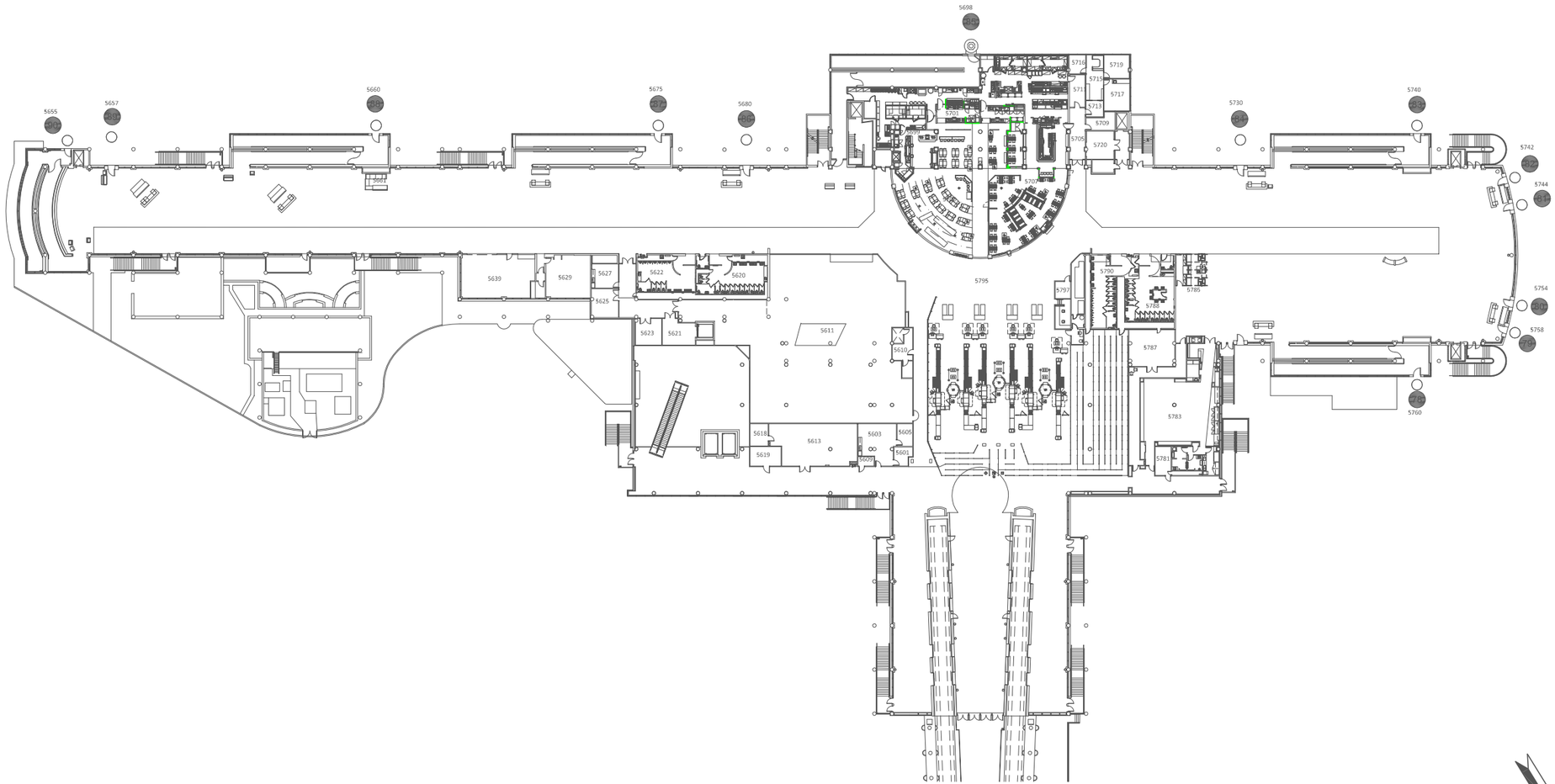
TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
SEPT. 2017

FIGURE
4.21

Figure 4.22

Airside F - Departure Level

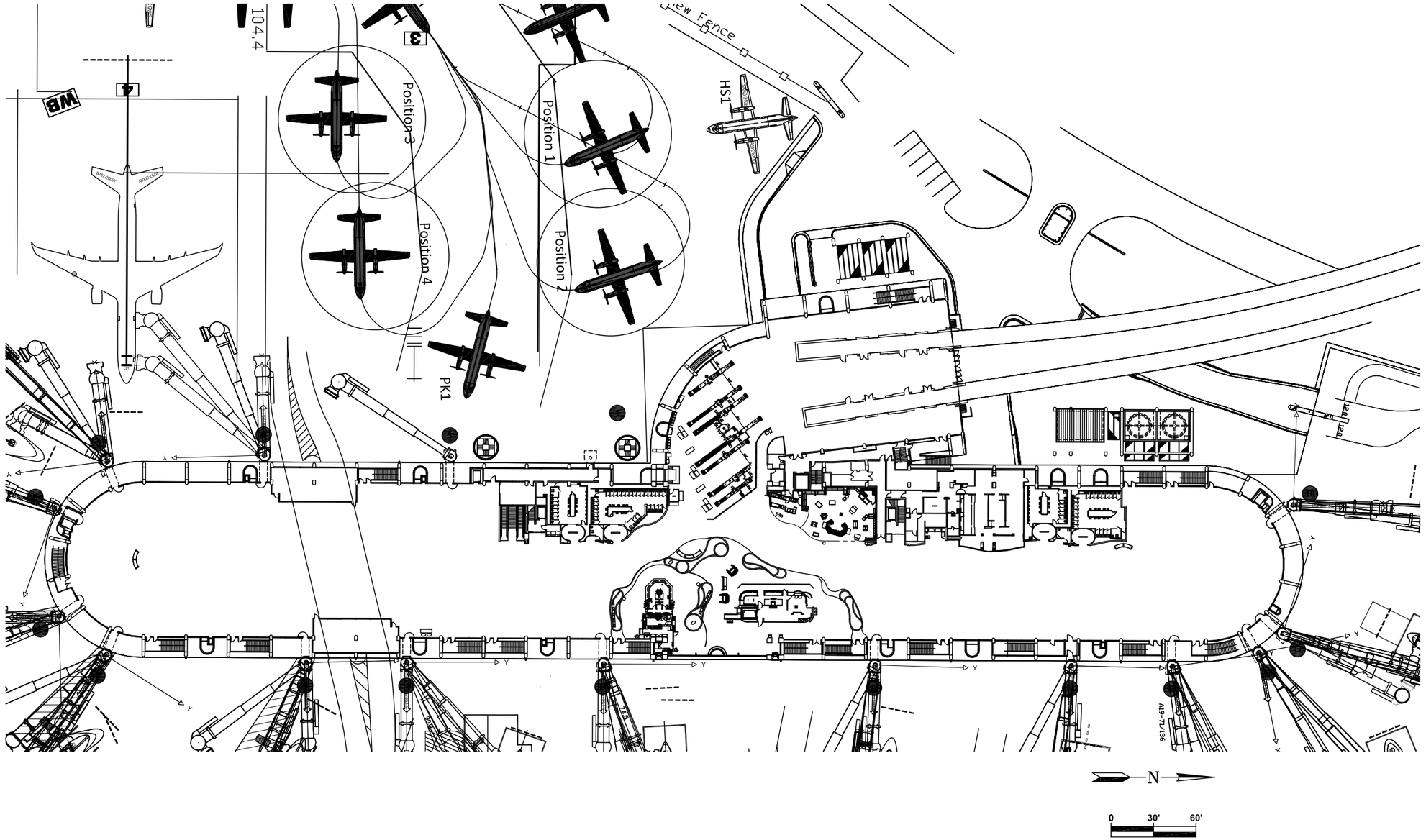


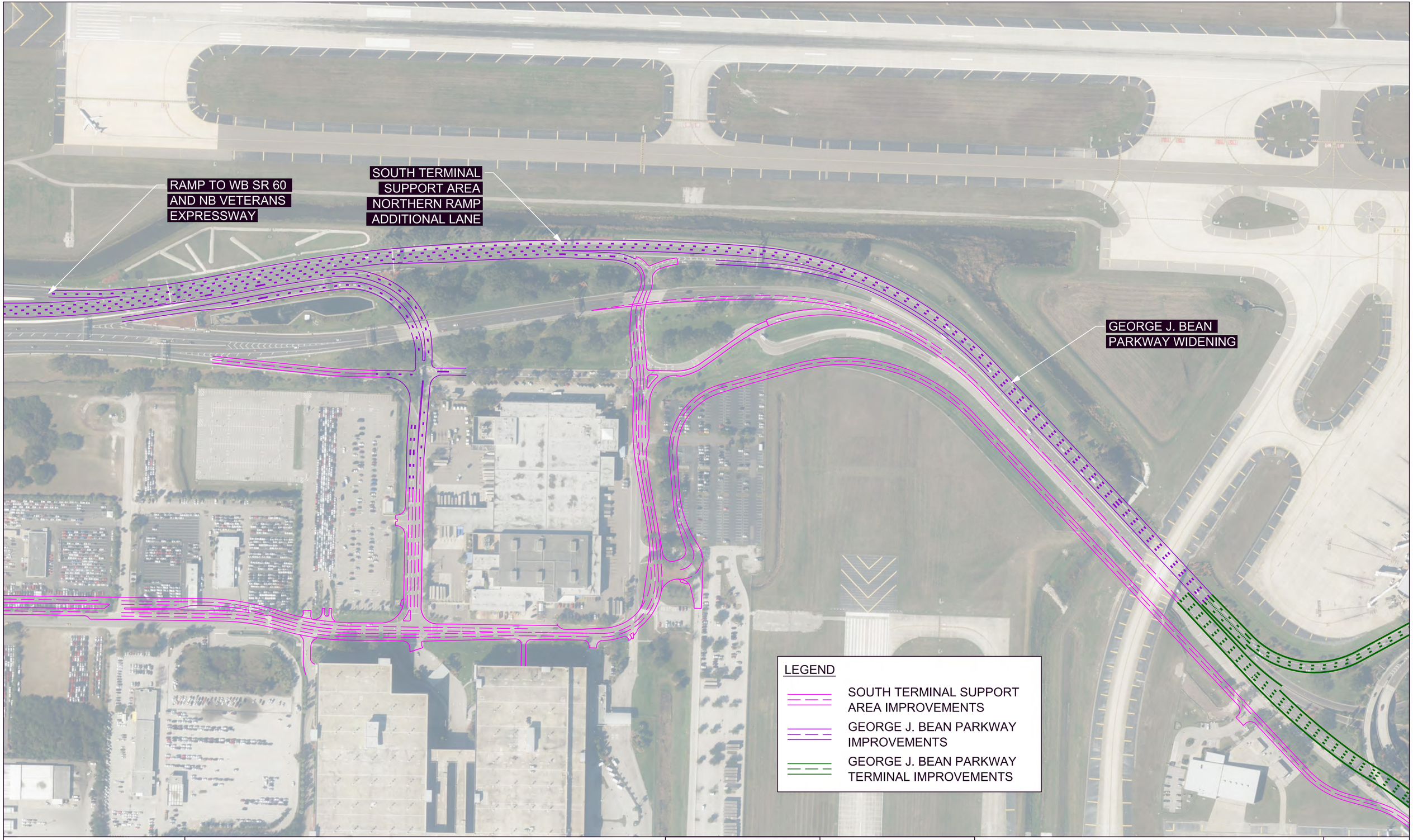
N

0 30' 60'

AIRSIDE 'F' - BOARDING LEVEL

Figure 4.23
Airside A - Departure Level





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SCALE: 1" = 300'

HNTB

201 N. FRANKLIN STREET
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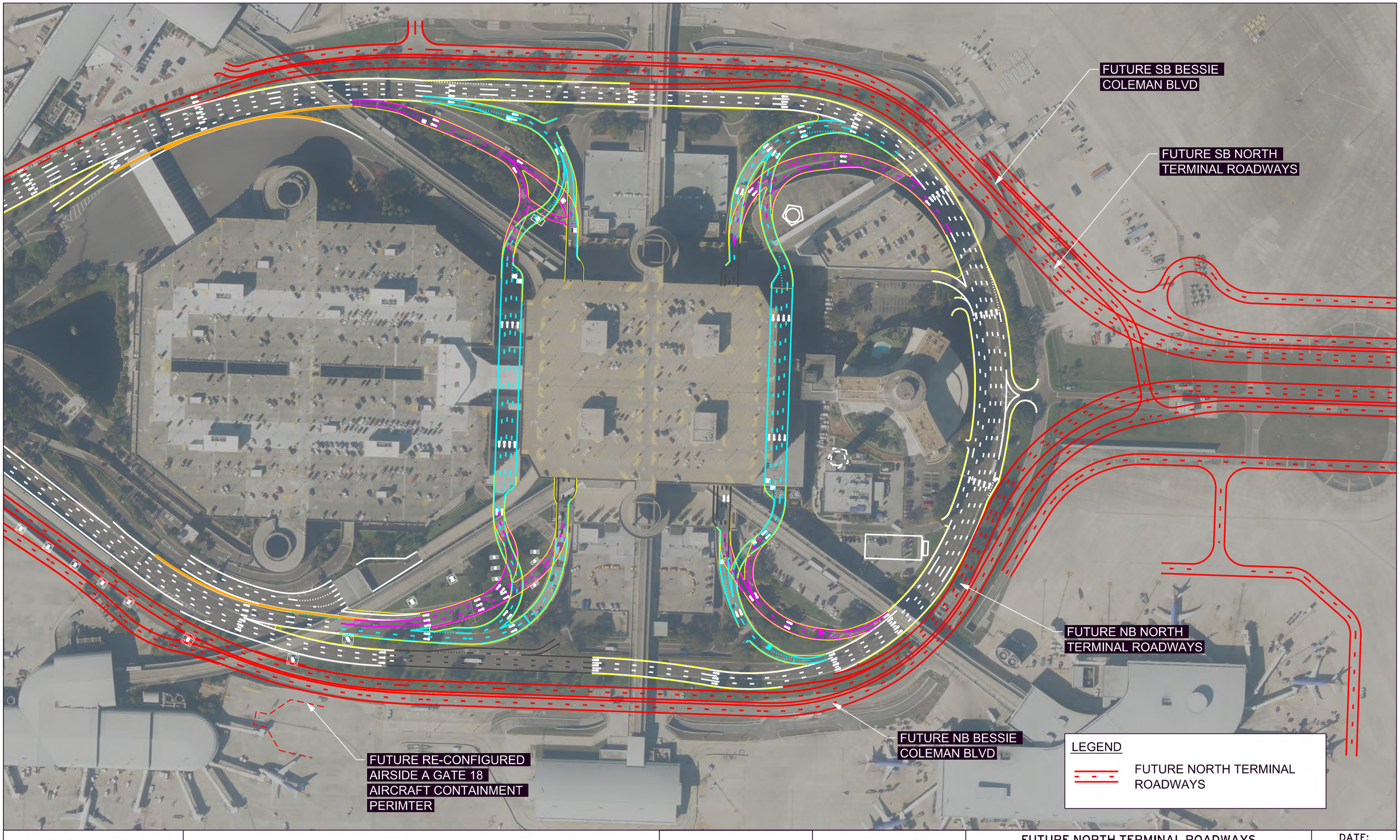
GEORGE J. BEAN PARKWAY SOUTH TERMINAL SUPPORT AREA IMPROVEMENTS

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
SEPT. 2017

FIGURE
4.24



0' 100' 200'
SCALE: 1" = 200'

HNTB

201 N. FRANKLIN STREET
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FUTURE NORTH TERMINAL ROADWAYS

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
SEPT. 2017

FIGURE
4.25