VOLUME 1

Tampa International Airport

2012 AIRPORT MASTER PLAN UPDATE

BOARD APPROVAL DATE: APRIL 4, 2013

VOLUME 1 CONTENTS

TABLE OF CONTENTS

Page

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF TABLES

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF FIGURES

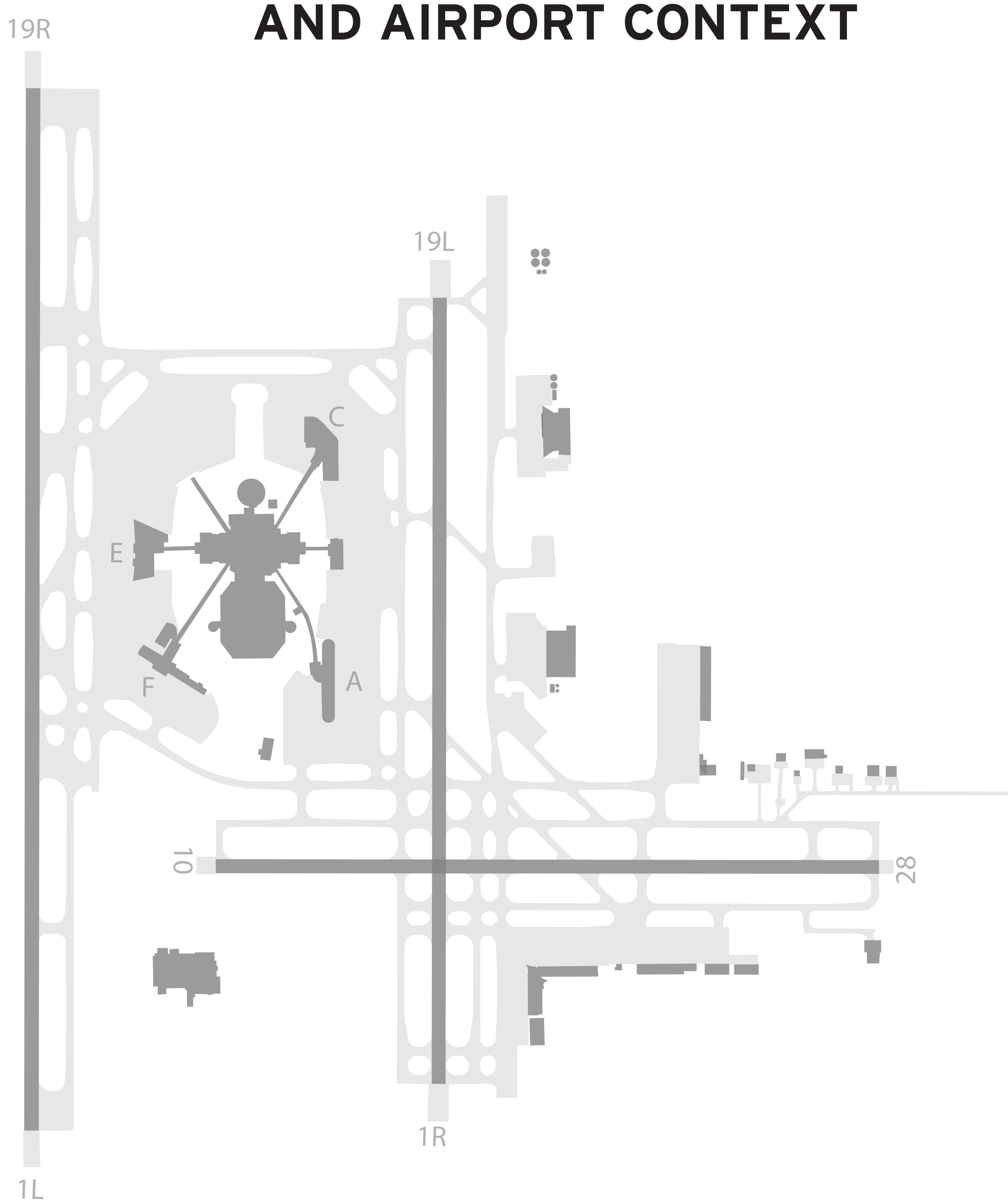
On or Following Page

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

SECTION 1 - INTRODUCTION AND AIRPORT CONTEXT



1 INTRODUCTION AND AIRPORT CONTEXT

1.1 Introduction

The Hillsborough County Aviation Authority (HCAA, or the Authority) initiated the Airport Master Plan Update process in November, 2011 for Tampa International Airport (TPA or the Airport). The purpose of updating the Master Plan is to provide the Authority with a refreshed blueprint for short- (five-year), intermediate- (10-year), and long-term (20-year) development of the Airport that takes into consideration changes that have occurred since the completion of the last Airport Master Plan Update (referred to as the 2005 Master Plan). The previous Plan was initiated in 2004 and completed in 2006 during a time of strong passenger growth nationally and in Tampa. The conduct of this Plan (2012 Master Plan Update) is in step with the Federal Aviation Administration (FAA) recommended practice of updating master plans every 5 years or so. Additionally, an update to the plan is due as a result of major changes in the economic climate that occurred shortly after the completion of the previous planning effort. These have significantly impacted the industry over the last six years. The change in the economic climate was a significant contributor to dynamic changes that have taken place in the aviation industry and particularly in the commercial airline segment of the industry.

Since the completion of the 2005 Master Plan the most significant global recession since the Great Depression occurred beginning in late 2007 and lasting through the second quarter of 2009. The recovery from the collapse of the housing market and financial services industry has been a drawn out and slow process that finally appears to be gaining consistent momentum as of the Spring of 2013. Naturally, this economic decline along with record high fuel prices affected the global health of the aviation industry and subsequent levels of passenger demand and airline services provided. Aviation activity at TPA was also affected with a sharp drop off in the level of passenger activity that contributed to the HCAA's desire to re-evaluate the development plan that was drafted during the last effort. The 2012 Master Plan Update effort was undertaken to take a refocused look at TPA with emphasis on maximizing the capacity and longevity of the existing main terminal facilities while ensuring that the high level of service which TPA is known for is not diminished. The Master Plan process and report are shaped around that general theme.

1.2 Airport Master Plan Process

While master plans typically look at a 20-year planning horizon the majority of airports typically update their plans every 5 to 10 years due largely to the dynamic nature of the aviation industry. Additionally the Federal Aviation Administration generally suggests a review and update of master plans on a 5 to 10 year timeframe. At the time of the initiation of this Master Plan approximately five to six years had lapsed since the completion of the previous Master Plan Update, which puts this effort right on schedule with the FAA's recommended frequency of plan updates. Further, given the significant economic events that have occurred over the 2006-2012 period and their impact on aviation the need to re-evaluate the previous plan is particularly important.

The Hillsborough County Aviation Authority initiated the TPA Airport Master Plan Update process in November, 2011. At the direction of the HCAA and the Airport Board, the emphasis of this study was on the following elements:

- Prepare new airport activity projections taking into consideration the impact of the economic recession, consolidations in the airline industry and actions to enhance international service at TPA.
- Evaluate facility capacity with a specific focus on terminal and passenger processing facilities.
    - Main Terminal
    - Airside Terminals
    - Rental Car Facilities
    - Parking and Curbside Functions
    - International Terminal Facilities
- Evaluate the potential benefits of Common Use Passenger Processing technologies and their ability to enhance the operational efficiency and capacity of existing Main Terminal functions and facilities.
- Conduct a detailed assessment of the Main Terminal Complex to identify reasonable and viable actions to extend the capacity of terminal facilities beyond the level identified in the 2005 Master Plan (28.7 Million Annual Passengers) and delay the need to initiate the development of the North Terminal while maintaining high levels and standards of service.
- Evaluate highest and best aviation and/or aviation and terminal support use of the inventory of airport real estate in the:
    - South Development Area
    - Eastside Development Area
    - North Terminal Expansion Area
    - Several Individual Perimeter Parcels to the north, south, east and west of the Airport
- Identify and evaluate an intra-airport transportation corridor and various modes of passenger conveyance within this corridor.
    - Identify options and a preferred manner for connecting to regional transit in the near term and to long-term regional transit systems.
- Identify facility requirements with a strong focus on the above noted facilities and areas.
- Analyze reasonable alternative development schemes by functional area with a focus on maximizing existing facilities.
- Ensure the continued provision of the high level of service for which Tampa International Airport has been consistently recognized.

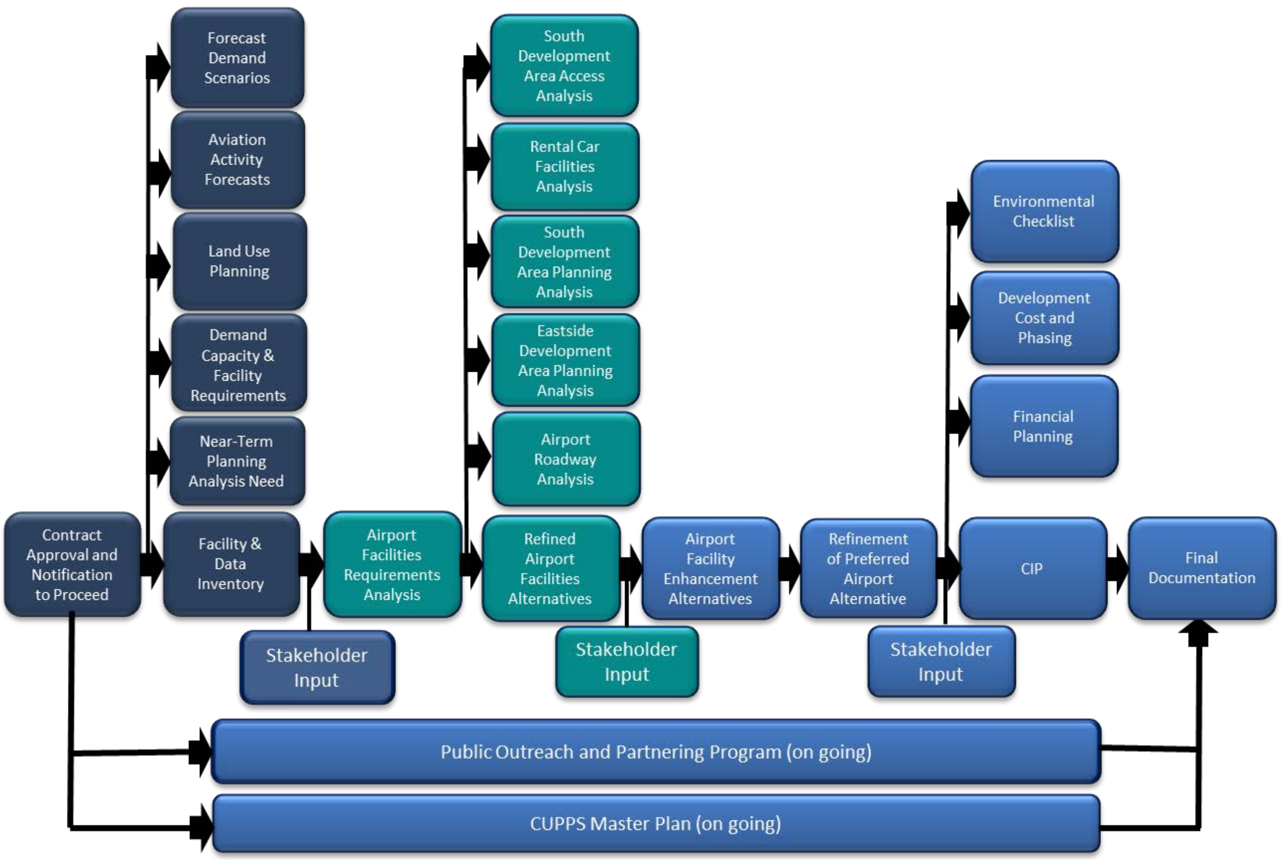
One element that is not a primary focus of the 2012 master planning effort is the re-evaluation of airfield alternatives that were prepared under the 2005 Master Plan. While it was recognized that the timing of several of the improvements recommended in the previous plan would be pushed back, it was determined that the configurations of airfield recommendations from the

2005 Master Plan remained valid and should be carried forward. The one exception to this was the proposed extension of Runway 10-28, which was identified for re-evaluation.

See **Figure 1.1** below for a general graphical depiction of the fundamental airport master plan components and workflow that was followed over the course of the 2012 Master Plan Update.

Figure 1.1

Airport Master Plan Process



1.3 Document Organization

This report is divided into three volumes, including six main sections and a set of supporting appendices, as outlined below. Each section is described after the section heading.

1.3.1 Volume I

Section 1 - Introduction and Airport Context – Provides an introduction to the project, an overview of the Airport and the context in which this Master Plan was conducted.

Section 2 - Aviation Activity Forecasts – Provides a forecast of future aviation activity levels. This section feeds the development of airport facility requirements.

Section 3 - Airfield Existing Conditions, Capacity and Requirements – Provides an updated overview of the existing airfield facilities at TPA, an analysis of airfield demand/capacity, and assesses the ability of the airfield to accommodate forecast growth in activity over the planning period. This section also describes the airfield recommendations from the previous plan that are being carried forward by the 2012 update and re-evaluates the need for the proposed 1,200 foot extension to Runway 10-28.

Section 4 - Inventory and Facility Requirements – Provides an updated inventory of Terminal Facilities, Landside Facilities, and Airport Support Facilities and provides a set of facility requirements for each in order to accommodate the forecasted aviation activity levels and serve as the basis on which the airport facility alternatives will be developed.

1.3.2 Volume II

Section 5 - Airport Facility Alternatives - Provides a geographically based assessment of airport development alternatives at TPA and ultimately identifies preferred improvements for each included functional element. This culminates to a final recommended set of airport improvements that provide the basis on which the Capital Improvement Program (CIP) is built. This section also includes a review of the recommended on-airport land use map and suggested modifications to the airport land use categories

Section 6 – CIP – Provides an overview of the recommended Capital Improvement Program for TPA and descriptions of the projects therein.

1.3.3 Volume III

Appendices - A significant amount of analysis and documentation was developed during the Master Planning process. Much of this analysis, while critical, is too detailed to include in the body of the master plan text. As such, supporting materials and background analysis that may be required for further investigation or use during preliminary design efforts, are included in a separate volume for future reference.

- Appendix A - Aviation Activity Forecast Tables
- Appendix B – Gated Flight Schedule Gantt Charts
- Appendix C - Airline Arrival Curve Distributions

- Appendix D - Flight Schedule Summary
- Appendix E - Ticket Processing Time Distributions
- Appendix F - SSCP Throughput Distributions by Terminals
- Appendix G – Concession Tables
- Appendix H - Traffic Count Data
- Appendix I – C&S Market Assessments
- Appendix J – Land Use Assessment
- Appendix K - Alternative Refinement Process
- Appendix L - Landside Automated People Mover System Plan – Technical Report
- Appendix M – Meeting Presentations
- Appendix N – FAA Correspondence on RPZs

1.4 Airport Overview

To provide a baseline understanding of the existing facility prior to assessing future needs this section provides an abbreviated history of TPA and an overview of the facilities, administration, characteristics of the operation, and market area.

1.4.1 Airport History

What is now known as Tampa International Airport, started as Drew Field, a general aviation facility constructed on what were previously sparse pine woods owned by the citrus planter and land developer, John H. Drew. The construction of Drew Field was completed and opened on February 23, 1928. The airport was initially developed as a 160-acre general aviation facility. The Airport started with a single 7,000-foot runway and an apron.

In the 1940s (until 1945) the U.S. Military leased the Field to support the United States' involvement in World War II. By the mid-1940s, the Airport had expanded to include three runways, a large apron, and a perimeter taxiway system. In 1945, with the draw-down following the War, control of the facility was given back to the City of Tampa, at which time the Hillsborough County Aviation Authority was created by the Florida Legislature, who charged the HCAA with the operation of all publicly-owned aviation facilities within Hillsborough County Florida. Scheduled airline service commenced on April 25, 1946.

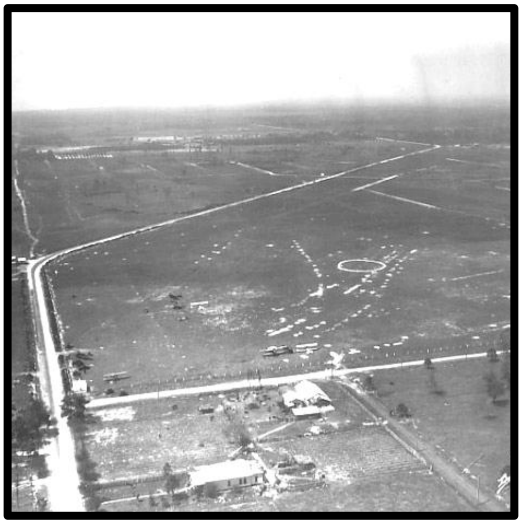


Photo: Drew Field 1926

Photo: Drew Field 1946

Photo: Tampa International Airport 1952

In 1952, the airport was officially named Tampa International Airport and served approximately 300,000 total passengers out of a single terminal facility located near the intersection of old Columbus Drive and Westshore Boulevard.

By 1959, the airport went from serving four airlines to serving 11 with a significant increase in air service provided. In 1962, the Airport served a reported 1 Million Annual Passengers (MAP). Ultimately the success of the airport required the construction of additional airfield and terminal facilities. On July 15th 1963, a parallel 6,800-foot north-south runway (Runway 18R-36L) was opened. In 1966, Westinghouse was awarded the contract for designing, building and maintaining an automated people mover system the first of its kind in the world. Most notably, a new terminal was constructed and opened on April 15, 1971. It is reported as having taken 31 months to construct the main structures at a cost of $85 Million dollars. At this time facilities including the main terminal building and Airsides B, C, D, and E were built. The most distinctive element of the new terminal was the separation of the satellite airside and landside facilities that were served by “people movers”. This was a ground breaking and radical design concept, necessitated by the larger facilities required to accommodate more passengers, more automobiles, larger roadway networks, larger aircraft, and larger parking facilities. These expanded facilities increased the convenience and efficiency of many functional elements at the airport but at the expense of the level of service in terms of walking distances, which would have been daunting if one had to walk from the main terminal to one of the airsides. The advent of people movers eliminated or significantly reduced the long walking distances necessitated by modern facility requirements. Recognizing that a focus on customer service would set Tampa International apart from many other airports, the HCAA implemented a design goal to keep all walking distances to no more than 700 feet, a standard that remains in place today.

Photo: Airside C and APM Track in 2012. Source: HNTB Corporation

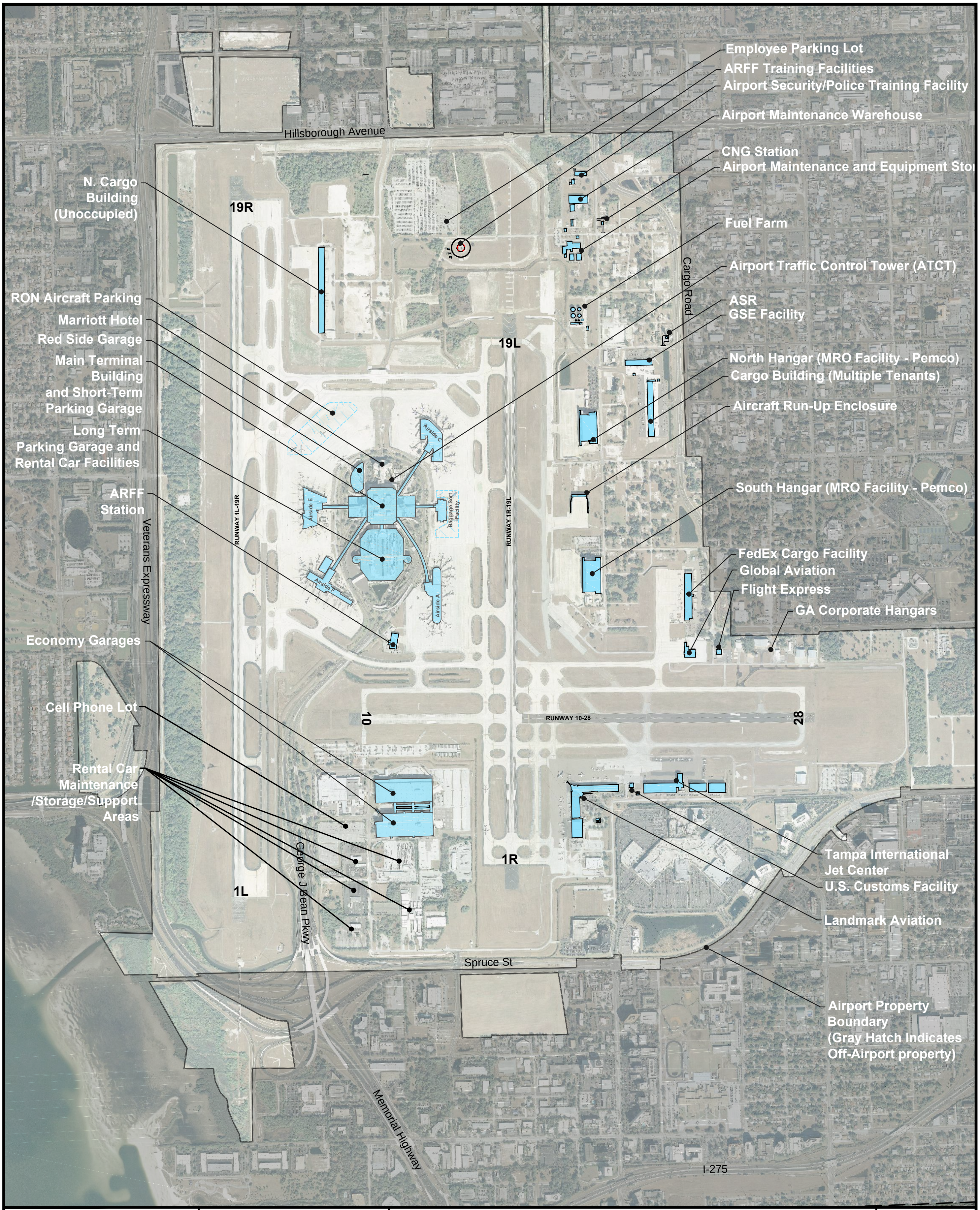
Following the construction of the new terminal and increased air service, passenger activity at the Airport increased significantly. In 1972, the 207-foot tall (MSL) FAA Airport Traffic Control Tower was constructed. At the time, the tower was the highest in the nation. By 1973, passenger demand had reached nearly 5 MAP and the HOST International Airport Hotel (what is now the Marriott hotel) was constructed just north of the Terminal. Airside F opened in 1987, while Airside A opened in 1995 and Airside C was reconstructed in 2005. Through the 70s, 80s, 90s, and 2000s a number of runway reconstruction/extensions and Terminal projects were completed to keep up with airline requirements and expanded destinations offered. It is this consortium of airport expansion projects and facility enhancements that make up the foundation of Tampa International Airport today.

1.4.2 Tampa Airport Today

The following sections provide a brief overview of the main characteristics of Tampa Airport today, in 2012.

1.4.2.1 Location

Tampa International Airport is a 3,300 acre facility located approximately six miles west northwest of Downtown Tampa. By car, the Airport is a 7.7 mile drive from downtown Tampa via SR-60, I-275 and the George J Bean Parkway. The airport is located just north of I-275, to the east of the Veterans Expressway (589), west of Dale Mabry Boulevard and South of West Hillsborough Avenue. The airport is surrounded primarily by commercial and industrial land uses with adjacent residential land use nearby. The airport is also proximate to the northern end of Old Tampa Bay which is only 2,000 feet southwest of landing threshold of the Runway 1L the westernmost runway at TPA. A graphical depiction of the Airport and major airport facilities is provided in **Figure 1.2**.



0' 1,000' 2,000'
SCALE: 1" = 2,000'
N

HNTB

Airport Facility Overview

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
May 07, 2013

Figure:
1.2

P:_Projects\57785 – Tampa MP\00-CADD\HNTB_Team_Dwg_files\TPA_Airport Overview Figure.dwg 1 – Support Facilities May 07, 2013 – 1:14pm

1.4.2.2 Regional Access

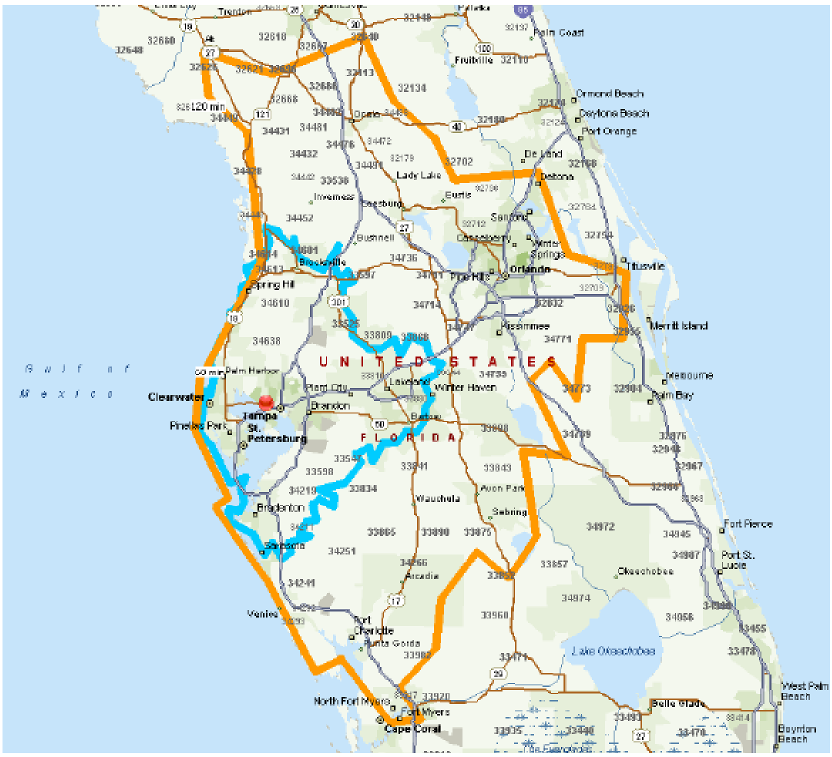
Regional access to TPA is provided by the interstate highway system, an interstate grade toll road, and major north-south and east-west arterial roadways. The most significant facilities serving the airport include I-275 providing connectivity to areas to the north, east and south/southwest, SR 60 (Memorial Highway and Courtney Campbell Causeway) from the west, Memorial Highway/Veterans Expressway (SR 589) from the northwest and north, Dale Mabry Highway from the north and south, Spruce Street/Boy Scout Blvd from the east, and Hillsborough Avenue from the east and west. With the exception of Dale Mabry Highway and Hillsborough Avenue, the above noted roadways all connect directly to the George J. Bean Parkway, the main entrance to the airport. Hillsborough Avenue provides access to the air cargo complex through a connection to Cargo Road and to employee parking on the north side of the airport via Hoover Blvd. Cargo Road, which is on the east side of the airport, also provides access to airport maintenance, the fuel farm, and airline maintenance bases.

1.4.2.3 General Market Area Served

The Airport is conveniently located to serve passengers throughout central Florida. **Figure 1.3** shows the primary and secondary service areas for the Airport based on analysis done by HCAA. The primary service area includes areas which can access the Airport within one hour by ground. The secondary service area includes areas which can access the Airport within two hours by ground.

Figure 1.3

Tampa International Airport Primary and Secondary Service Areas



Notes: Blue Line: 1-hour driving time; Orange Line: 2-hour driving time
Source: Tampa International Airport[4].

1.4.2.4 Administration

The airport is owned and operated by the Hillsborough County Aviation Authority, which is comprised of a five-member Board. Three of the Board members are appointed to four-year terms by the Governor of Florida, while the other two members are ex-officio, the Mayor of the City of Tampa and a member of the Hillsborough County Board of Commissioners. The Chief Executive Officer of the Aviation Authority at the time of the 2012 Master Plan Update is Joseph W. Lopano. The aforementioned administration is supported by approximately 547 airport employees that include finance, property, legal, IT and commercial management professionals, airport planning and engineering staff, operations professionals, and airport emergency and police, traffic enforcement, and maintenance personnel. All contribute to the daily operation and subsequent success of the Airport.

1.4.2.5 Airfield

The airfield at Tampa International Airport consists of a system of three existing runways. These are comprised of two primary runways and a crosswind runway. The primary runways, Runway 1L-19R (150 feet by 11,002 feet) and Runway 1R-19L (150 feet by 8,300 feet), are aligned parallel to one another with a north/south orientation and are situated on either side of the main terminal complex. The two parallel runways have a runway centerline to runway centerline lateral separation of 4,300 feet which allows for simultaneous landings during periods of low visibility. It should be noted that the 4,300 foot separation distance can be a challenge when developing or redeveloping terminal facilities between runways as this amount of space is not overly generous given airport design standards and criteria. The crosswind runway, Runway 10-28 (150 feet by 6,999 feet), is located to the south/southeast of the terminal and is oriented along a general east-west alignment. This three runway system is supported by an array of taxiways connecting the airfield to the developed aviation uses and facilities at TPA. At the heart of operations on the Airport is the existing Main Terminal Complex located between the parallel runways. The existing control tower (ATCT), is situated on the north/northeast end of the Main Terminal Complex and is approximately 207 feet tall AGL (233 feet tall MSL).

1.4.2.6 Terminal

The existing Airport terminal is a single passenger terminal complex with a total enclosed building area of approximately 1.94 million square feet located between Runways 1L-19R and 1R-19L. The existing terminal complex opened in 1971 and has undergone several changes and expansions over the years to meet the evolving needs and expectations of the passengers and tenants it serves. Tampa International Airport has routinely ranked high in industry surveys and is well known for the level of customer service that is provided in the terminal complex.

The main terminal building is functionally divided into a Red side and a Blue side and has three levels for various passenger processing functions and activities; Level 1 – Baggage Claim Level, Level Two – Ticketing/Check-in Level, and Level Three – Transfer Level. The Transfer Level of the Terminal has an arcade lined with shops, seating areas and a display area. The north end of the Transfer Level is connected to the Marriott Hotel, while the “airsides” radiate outwards. There are currently four passenger airsides (Airsides A, C, E, & F) serving all commercial departing and arriving flights at TPA. Each airside is connected to the main passenger terminal by a pair of automated people mover (APM) trains running in tandem.

The terminal area complex provides a total of 59 contact gates and 19 remain overnight (RON) aircraft parking positions. The RON positions are located on the northwest portion of the terminal area apron, formerly the site of Airside D.

While the separation into red and blue sides provides an effective means of identification of the location of facilities for passengers, this system is effectively translated into a physical separation in the building that affects where airlines are located and their ability to use some facilities, such as the in-line baggage system, in a manner that would be desired. These considerations are reviewed in the analysis of the Main Terminal Complex. One significant focus of analyses conducted on the Terminal Facility will be to maximize the ability of the existing facilities to accommodate long-term demand while ensuring that a high level of service is provided.

1.4.2.7 South Terminal Support Development Area

The South Terminal Support Development Area (STSDA) is a large area situated south of the main terminal complex and south of crosswind Runway 10/28. The area is defined by Spruce Street to the South, the George J. Bean Parkway on the west, and the alignment of Runway 10/28 to the north. Runway 1R/19L and its extended runway centerline south to Spruce Street establish the eastern boundary of the STSDA. The total site area equates to approximately 200 acres.

The current primary activities being accommodated in the South Terminal Support Development Area consist of:

- Economy parking garages
- Rental car support facilities
- Taxi and bus staging
- Cell phone parking Area
- Flight kitchen - LSG Skychef
- United States Postal Service

The focus of analyses to be conducted in this area is to identify alternative development scenarios to accommodate key terminal support activities including functions that may need to be relocated out of the main terminal complex to allow for the expansion of passenger processing capabilities. Ultimately this area is anticipated to play a key role aiding the operation of the main terminal and maintaining the high level of service for which TPA is known.

1.4.2.8 Eastside Development Area Facilities

The Eastside Development Area, consists of airport owned property situated to the north of the alignment of Runway 10/28, to the south of Hillsborough Avenue, to the east of Runway 1R/19L, and primarily to the west of Cargo Road/North Lauber Way with the exception of a tract of airport owned property immediately south of Hillsborough Ave. The total site size equates to approximately 415 acres of which approximately 145 are presently un-developed or under-developed.

The Eastside Development Area currently accommodates a number of airport related activity areas and uses. These uses are primarily airport support facilities that include the following:

- Air Cargo Facilities (Airline Belly Haul and Dedicated Air Freight)
- Aircraft Maintenance/Maintenance Repair and Overhaul (MRO) Facilities
- Ground Service Equipment (GSE) Storage and Maintenance Facilities
- Airport Maintenance, Equipment Storage and Maintenance Warehouse
- Airport Fuel Farm
- Airport Surveillance Radar (ASR)
- Compressed Natural Gas (CNG) Fuel Facility
- Airport Security and Police (K9 Training Facility and Range)
- Ground Run-Up Enclosure

The focus of the analyses conducted on this area is to determine of the highest and best aviation related development for the remaining undeveloped or under-developed lands in this area.

1.4.2.9 Activity

In 2012, the Airport facilitated the movement of 16.8 Million Annual Passengers and was ranked number 31st in terms of passenger traffic among North American Airports. There was an average of 212 daily aircraft departures. Among the operators at the Airport, the top three were Southwest, Delta, and US Airways. Southwest has approximately 30 percent of the market with Delta at 16.8 percent and US Airways at 10.5 percent. The top three markets at TPA are New York, Chicago, and Detroit.

The level of total passengers needs to be considered in light of past events and affiliated passenger activity during those times. For example the 1999 Master Plan was completed at the end of a cycle that saw total passenger levels at TPA increase by over 5.5 million in just seven years reaching a level of 15.12 MAP by the end of 1999. With a period of slight reduction between 2000 and 2003 passenger activity returned to strong growth reaching an all-time peak of 19.15 MAP by year end 2007. By the end of 2010 total passenger activity had dropped back to 16.64 MAP. Aside from airline and air passenger activity, the Airport also supports a range of other users, particularly Air Cargo, Aircraft Maintenance Repair and Overhaul (MRO) service, corporate general aviation, and fixed base operators. Section 2.0 Forecast of Aviation Activity provides considerable detail on historic, existing and forecast activity levels addressing all facets of aviation activity at TPA.

1.5 Past Master Plan Recommendations

The analyses and recommendations from previous planning documents are highly valuable assets to subsequent planning efforts. While events may trigger changes requiring the reconsideration of planning recommendations or the timing of these recommendations the work performed is typically highly informative and offers considerable value. This is the case with the 2012 Master Plan Update process which has been greatly assisted by the work done both on the 1999 Master Plan and the 2005 master planning efforts. The one key factor in the aviation industry is that it is highly dynamic and change is a constant element. Just as the 2005 Master Plan is being re-evaluated due to the housing market collapse that lead to the 2007 Economic Crisis; the 2005 Master Plan was a re-evaluation of the 1999 planning effort stemming from the tech bubble collapse and recession of 2001 coupled with the impacts of 9/11. A quick review of the two previous planning efforts provides a foundation of previous ideas, concepts and recommendations to keep in mind when reviewing the 2012 update.

1.5.1 Summary of 1999 Airport Master Plan Recommendations

The following briefly summarizes the major recommended improvements from the 1999 Airport Master Plan. It should be noted that the 1999 AMPU was conducted during a period of significant economic growth in the U.S. and abroad and was completed immediately prior to the start of a recession and the 9/11 attacks. This period of strong economic growth translated to significant growth in aviation activity and, as such the focus of the AMPU was in response to this and resulted in recommendations for significant improvements. The overall programmed cost to achieve elements recommended in the AMPU totaled some $1.0+ billion dollars. Major improvements included in the recommendations were as follows:

1.5.1.1 Airfield Improvements

- Construction of a new parallel runway on the west side of the airport
- Expansion of the taxiway network to improve airfield circulation
- Extension of the east parallel runway, 1R-19L and Runway 10-28 (post-2020)

1.5.1.2 Landside Terminal Improvements

- Relocation of the rental car functions to new facilities on the north and south sides of Landside Terminal.
- Extension of the main terminal building east by 180 feet and west by 60 feet to provide more room at the baggage claim and ticketing levels.
- Expansion of three AGTS stations on the Transfer Level to accommodate 2-car trains.
- Movement of inner walls on baggage claim level inward to create more circulation space.
- Construction of an automated conveyance system to deliver outbound baggage to each airside building.
- Development of a new North Terminal Complex (post-2020).
- Development of Economy Garages in the South Development Area

1.5.1.3 Recommended Airside Improvements

- Reconstruction of Airside E.
- Renovation and expansion of Airsides C and D.
- Addition of two cars to each AGTS for Airsides C, D, and E.
- Demolition of Airside B (post-2010) to provide room for remote aircraft parking.

Of note in the above listing are the number of recommendations that were either constructed, such as the new Airside C and the Economy Garages, or carried forward into the 2005 Master Plan such as the new parallel runway, extension of Runway 1R and the development of a new North Terminal.

1.5.2 Summary of 2005 Airport Master Plan Recommendations

The following briefly summarizes the recommended improvements from the 2005 Airport Master Plan. Similar to the 1999 AMPU, the 2005 Master Plan was conducted during a time of significant growth in aviation activity stemming from the recovery from the dual impacts of the 2000 recession and the 9/11 attacks in 2001. The most significant element to come out of this Plan was the recommendation to move forward with the development of the North Terminal Complex, a second entirely separate terminal complex that would be located north of the Main Terminal Complex. Phases I and II of this project would add 50 gates and allow the airport to meet forecast demand of an estimated 24 MAP Total (based on a stated capacity of 240,000 annual passengers per gate). Supplemental to the major terminal additions were a multitude of airfield recommendations including a number of recommendations that were carried forward from the 1999 planning effort, along with a significant proposed build out of the Eastside Development Area with additional support facilities.

The major projects in the 2005 Master Plan recommendations include the following:

1.5.2.1 Airfield Improvements

- Construct new 9,962 foot parallel runway on the west side of the airport
- Extend Runway 1R-19L and associated taxiways 2,200 feet to the north to support the north terminal complex.
- Extend Runway 10-28 1,202 feet to the east.
- Construct multiple additions to the taxiway network.

1.5.2.2 Landside Terminal Improvements

- Construct second Economy Garage
- Expand Remote economy garage
- Widen Bean Parkway
- Construct Long-Term garage improvements
- Construct new terminal re-circulation ramp
- Accommodate Light Rail Corridor through the airport from north to south

1.5.2.3 Recommended Airside Improvements

- Construct new Airside D
- Construct new ATCT

- Construct North Terminal Complex – Phase I. and all associated support functions (i.e. parking, rental car, etc.)
- Construct APM Connection from Main Terminal to the North Terminal Complex.
- Relocate Airside E Shuttle Station.
- Improve FIS facility.
- Expand and improve bag claim.

1.5.2.4 Support Facilities in the Eastside Development Area

- Relocate ASR-9
- Expand airport maintenance facilities
- Relocate USPS facility to the Eastside Development Area
- Expand Fuel Farm
- Construct new ARFF training facilities in Eastside Development Area
- Construct Cargo Road
- Construct future cargo facilities (as demand dictates)
- Construct new belly cargo and GSE facilities

1.6 External and Industry Events Since Completion of the 2005 Master Plan

Similar to the 1999 Master Plan, events that were unforeseen at the national level in 2005 arose in 2007 that were to have a massive impact not only in Tampa, not only in the U.S. but worldwide. At the core of these events was the burst of the housing bubble in 2007 triggering the collapse of financial markets and major financial institutions commonly referred to as the Global Financial Crisis. Associated with this crisis, the Dow Jones Industrial Average Index shed half of its value dropping from over 14,000 points to 7,000 points contributing to massive financial losses by large and small investors alike. A significant number of large financial services companies were devastated some, such as Lehman Brothers and Bear Stearns, disappearing entirely and others being acquired and exiting from the investment banking industry including Goldman Sachs and Merrill Lynch.

These events rippled through the U.S. economy triggering a sharp rise in unemployment. The events also rippled through the aviation industry which in the local Tampa setting, has led to the re-evaluation of the 2005 Master Plan recommendations. The desire of the HCAA was to make absolutely sure that all prudent actions and improvements that could be taken to allow for the extension of the capability and capacity of the Main Terminal Complex to meet demand up to the 28.7 MAP level, previously identified as the capacity of the terminal complex, should be identified and assessed before committing to the cost and operational challenges of developing and operating a second stand-alone terminal at TPA, If after this assessment the prudent action is to move forward with the North Terminal then it will not be because other avenues have not been considered. If, on the other hand, actions are identified that, while potentially costly, extend the capacity of the Main Terminal Complex beyond the 28.7 MAP threshold at a lesser cost than the north terminal, these actions should be given full consideration. As noted in HCAA board discussions, once the move to the north is taken the airport is committed to this and must be sure of its capability to support this action despite the fluctuations that are so endemic to the aviation industry. Or to put it more simply, building the first gate of the North Terminal is essentially a $1 billion commitment. Prior to that step the HCAA wants to make sure there are no other scalable options that can be considered within the current terminal area. This desire is very much related to the events over the past several years that have significantly changed the aviation and airline industry and are briefly described in the following.

Since the last Master Plan update, activity (passenger enplanements and operations) at the Airport has been greatly impacted by several national, aviation industry and local events. As noted, beginning in late 2007, the U.S. economy experienced one of the most severe recessions in history. As a result, the aviation industry suffered substantial revenue losses. In parallel, rising fuel cost and volatility have also been a significant constraint on the growth of air passenger travel and subsequent revenue streams. Many of the major carriers at the time were forced to enter bankruptcy and several of these carriers did so for the second time in just the last nine years. Carriers entering bankruptcy included Delta, Northwest and United.

After the official end of the recession in 2009, fuel costs rose again and continued to fluctuate dramatically. As a result this cost component for the airlines has overtaken personnel expenses as the top cost category for airlines. According to an *Airline for America* 2011 financial report, jet fuel costs jumped 36.1 percent compared with 2010. It has remained as the industry's largest expense at about 35 percent of total operating costs, up from 30 percent in 2010. This has had a dampening effect on airline business models with a number of carriers significant cutting U.S. domestic capacity and ramping up international service to their major hubs.

In response to the recession, spike in energy prices and a multitude of other associated factors, both legacy and low-cost carriers have exhibited an unprecedented level of capacity discipline. In several instances, this capacity discipline was supported by a series of airline mergers since the previous Plan was completed. Notably, the following major carriers have merged or are in the process of merging:

- Delta/Northwest (Northwest name ceasing to exist)
- United/ Continental (Continental name ceasing to exist)
- Southwest/ATA/Air Tran (ATA and Air Tran names ceasing to exist)
- US Airways/American (US Airways name ceasing to exist)

These subsequent airline re-alignments and re-evaluations markedly changed flight frequencies, fleet mixes, networks and facility requirements nationally and at Tampa and must be considered in the update of the 2005 planning effort. Specifically these changes could have a significant impact to demand for terminal space and the balancing of gate locations between the red and blue sides at TPA, and on the need or timing of the North Terminal.

Another factor that will likely influence planning for several years to come is associated with deficit reduction efforts at the Federal and State levels and continued restraints on revenue increases that support airport improvement funding. While the Airport Improvement Program has not been officially subject to recent sequestration requirements, other FAA staffing and programs have come under the auspices of sequestration. For example, furloughs of air traffic controllers and the closure of private ATCT facilities did result from sequestration. More recently the component of the Airport Improvement Program used to fund capital development was tapped to provide $275 million to address the controller furlough issue, reducing the allocation to cover airport improvements.

At the same time as the drop in passenger activity over the past six years nationally along with significant domestic capacity cuts by airlines, increasing fuel efficiency of the airline fleet and operational practices has reduced the revenue used to fund the AIP program. This has occurred at a time of aging airport infrastructure and delays in major airport improvements due to previous shocks to the industry (2000 recession & 9/11) which have increased the backlog of documented facility needs. In short, facility needs completely overshadow traditional available financial resources

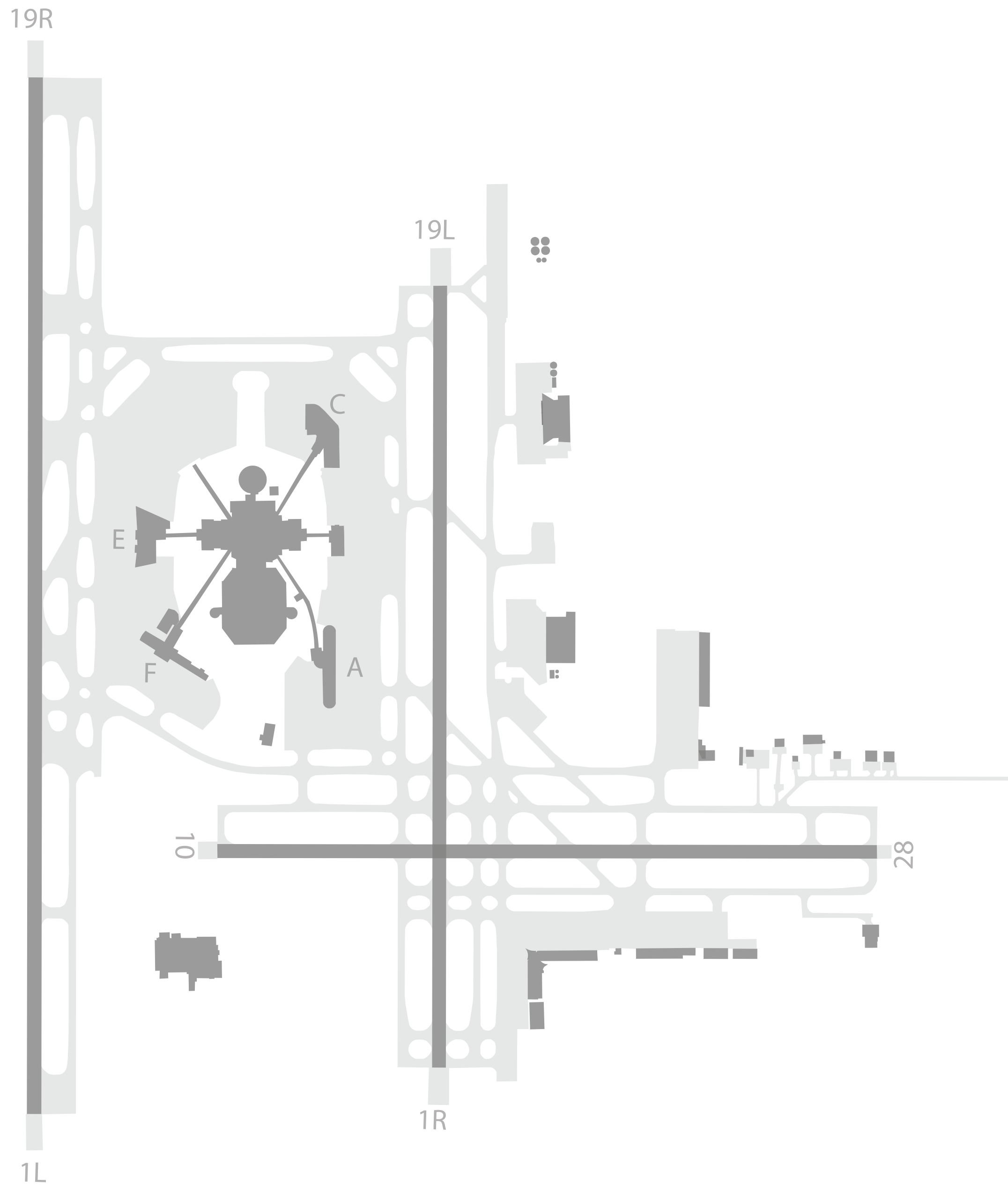
Additionally, for the first time Passenger Facility Charges (PFC) have been treated as a tax increase by Congress rather than being considered user charges as has been the case since their inception. As a result, efforts to increase the PFC to aid airports in meeting their facility needs have been stymied. The picture at the local and state levels is equally challenging and airports themselves see increasing challenges in developing the revenue streams through their rates and charges needed to support their ongoing operations and maintenance. As a result, planning future facilities has to focus on a delicate balance between providing high quality facilities, passenger experience and level of service and addressing a complex array of regulatory requirements, all within the revenue and fiscal realities of the industry at the local, state and federal level in the post Global Economic Crisis world.

1.7 Summary

The preceding sections were intended to provide the reader with a high level overview of the existing facilities at TPA and past planning recommendations for the future development of the airport. Additionally, this section has provided a general overview of the format for the 2012 Master Plan update along with the key elements of the airport that will be the focus of the planning effort. Key to this Master Plan will be an overriding focus on the maximization of the capacity and capability of the existing Main Terminal Complex in a cost effective manner while providing a high level of service. The HCAA fully recognizes the cost and operational challenges associated with initiating the development of a second stand-alone terminal, particularly with the extensive consolidation within the airline industry over the past few years. The HCAA is not opposed to facing these challenges, but only if all reasonable, viable and cost effective alternatives of meeting future needs have first been fully exhausted in the current terminal complex. The approach that the HCAA is taking is prudent, responsible and in the best interest of airport tenants, airport users and the community at large.

The three-volume Document and affiliated sections that follow present the findings of a diverse array of analyses and planning investigations that were undertaken between November of 2011 and April of 2013. These analyses were conducted with considerable stakeholder and public input and with the extensive involvement and assistance of the senior professional staff of the Hillsborough County Aviation Authority and oversight of the Hillsborough County Aviation Authority Board.

SECTION 2 - FORECAST



2 AVIATION ACTIVITY FORECASTS

The aviation industry is strongly influenced by local and global economic conditions. In the past few years, the U.S. and the global economy experienced one of the most severe recessions in history. As a result, the aviation industry landscape has changed dramatically. Tampa International Airport (the Airport) was also affected by a series of national, industrial and local events. Therefore the 2005 Master Plan projections must be updated to incorporate these impacts.

The purpose of this chapter is to forecast future aviation activity levels in order to establish current facility requirements, identify future capacity shortfalls, estimate timing and cost of future improvements, assess potential supply shortfalls, calculate future costs, estimate future revenue streams, and measure and enhance the overall benefit of aviation to the local economy. Three planning periods are identified:

- Near Term: 2011-2016
- Mid Term: 2011-2021
- Long Term: 2011-2031

The following sections discuss relevant data sources, assumptions and methodologies in projecting future activity levels.

2.1 Introduction

Since the last Master Plan update, operations at the Airport have been greatly impacted by several national, aviation industry and local events. Beginning in late 2007, the U.S. economy experienced one of the most severe recessions in history. As a result, the aviation industry suffered substantial revenue losses. In response to the recession, both legacy and low-cost carriers have exhibited an unprecedented level of capacity discipline and, in several instances, completed a series of mergers. These subsequent airline re-alignments and re-evaluations markedly changed flight frequency and networks.

Florida was one of the most hard-hit markets during the real estate bubble collapse. The unemployment rate stayed above 9% from 2008 to 2011. In addition, the Gulf of Mexico oil spill in the spring and summer of 2010 contributed to the headwinds experienced at the Airport. Leisure travelers, an important component of airport traffic, were temporally discouraged from visiting attractions in the Tampa Bay area. The combined impacts of these factors warrant an update of the previous Master Plan forecast.

This chapter first reviews existing forecasts published by the Hillsborough County Aviation Authority (HCAA) and the Federal Aviation Administration (FAA). Next, a set of assumptions are delineated and historical airport activity levels are established. This is followed by an activity forecasting section organized as follows:

- Domestic and International passenger activity
    - Annual passenger enplanements by originating and connecting activity and by individual non-stop market

        - Passenger flight departures by market and aircraft type
            - Load factors
            - Seat departures for each market
            - Frequencies by aircraft type
- Cargo activity
    - Annual air cargo (freight and mail) tonnage by passenger carrier (belly) and all-cargo carrier (freighter)
    - All-cargo operations by aircraft type
- Other aviation activity
    - General Aviation (GA) activity
        - Based aircraft
        - Number of operations
    - True Air Taxi activity
    - Military operations

A summary of the key forecast results is provided at the end of this chapter.

2.2 Forecasts Review

Several forecasts were made in the past with varying purposes and planning horizons. The previous Master Plan update was completed in 2006[1] and provided comprehensive forecasts for a variety of aviation activities. The subsequent section describes the methodologies applied in the study and compares the forecasts with current observations. On the national level, the FAA publishes an annual Terminal Area Forecast (TAF) for airports in the National Plan of Integrated Airport Systems (NPIAS).[2] The FAA TAF consists of passenger enplanement and operation forecasts. They are further broken down by types of operations, and domestic or international categories. The TAF is used as the FAA's official projection for staff planning and funds allocation. Another forecast was developed when Airport bonds were issued in 2002. The HCAA also presented a forecast on passenger activities in the 2010 Strategic Business Plan[3]. The forecast was derived from the previous strategic plan and updated under the current economic conditions. All of the forecasts mentioned above are described in greater detail in the following sub-sections.

2.2.1 Previous Airport Master Plan Update

The most recent Master Plan update was completed in 2006. The 2003 TAF from the FAA was employed in the forecast section as a general guide. Based on the passenger counts reported by airlines and conversations with the FAA forecast branch, a 6.0% increase over the 2001 enplanement level was assumed to project the 2004 enplanements, after declining in 2002 and 2003. The study attributed this growth to unusually low anticipated fares. It was assumed that when air fares stabilized, the passenger flow would return to a level more consistent with historical trends. The 2005 enplanements were obtained by applying the TAF 2004-2005 growth rate to the projected 2004 enplanements. Passenger enplanement forecasts from the previous Master Plan are summarized in Table A-1 in ***Appendix A***.

The number of passenger aircraft operations was estimated for domestic, international and regional carriers. Load factors and fleet mix were forecasted to calculate the anticipated number of operations. Load factors were estimated based on current operation status and the FAA TAF. The airline fleet mix was developed by considering orders for new aircraft by airlines, local trends, and projections by the FAA, Boeing and Airbus. Using the passenger forecast, load factors, and fleet mix, the number of passenger aircraft operations were projected.

Future air cargo volumes and operations were consistent with growth rates published by the FAA Aerospace Forecasts 2004-2015. The base year air cargo tonnage and operations from the TAF were adjusted to match the current HCAA airport cargo statistics. They were then multiplied by the growth rate from the FAA's 2004 Aerospace Forecast to derive future air cargo. Table A-2 **in Appendix A** shows the cargo volumes forecast.

An average growth rate of approximately 0.5% was assumed to estimate the GA operations. Military operations were assumed to stay constant at a rate of 753 itinerant operations per year. Table A-3 **in Appendix A** summarizes the operations forecast for all the operational categories.

Peaking characteristics of each operation category of aircraft operations were also projected in the report. A summary of the main forecasts are presented in **Table 2.1** below.

Table 2.1

2005 Master Plan Forecast Summary

Calendar Year	Passenger Enplanements	Cargo (lbs)	Based Aircraft	Total Operations
2005	8,814,477	72,113,852	57	242,946
2010	10,198,875	85,905,568	61	286,716
2015	11,583,273	102,509,970	66	312,752
2020	12,967,671	122,525,799	70	339,149
2025	14,352,070	146,683,328	75	370,680
Average Annual Growth Rate				
2005-2010	2.96%	3.56%	1.37%	3.37%
2005-2015	2.77%	3.58%	1.48%	2.56%
2005-2025	2.47%	3.61%	1.38%	2.13%

Source: 2005 Master Plan Update.

2.2.2 FAA Terminal Area Forecast (TAF)

The FAA TAF is the official forecast for FAA's budgeting and planning needs. The latest version, the 2011 2011, provides historical data from 1978 to 2010 and forecasts from 2011 to 2040.

Table 2.2 provides a summary of the FAA TAF forecast for the Airport. More detailed enplanements and operations forecasts can be found in Table A-4 and Table A-5 in Appendix A.

Table 2.2

FAA TAF Forecast Summary

Fiscal Year	Passenger Enplanements	Based Aircraft	Total Operations
2011	8,238,812	80	192,691
2016	9,060,416	80	200,649
2021	10,315,430	80	221,853
2031	13,373,515	80	272,743
Average Annual Growth Rate			
2011-2016	1.92%	0.00%	0.81%
2011-2021	2.27%	0.00%	1.42%
2011-2031	2.45%	0.00%	1.75%

Source: FAA TAF 2011.

2.2.3 Airport Bond Forecast

A 10-year activity outlook was prepared when airport bonds were issued in 2002. The study employed several forecasting techniques including market share analysis and socioeconomic regression. In general, forecasts developed for airport bonds issuance apply a conservative approach to avoid overestimating future airport performance. However, due to various adverse local and national developments, the forecast still overstated airport traffic. Passenger enplanements and total operations forecasts are summarized in **Table 2.3**. A more detailed forecast of passenger enplanements and total operations can be found in Table A-6 and Table A-7 in Appendix A.

Table 2.3

Airport Bond Forecast Summary

Calendar Year	Passenger Enplanements	Total Operations
2002	7,618,598	245,271
2007	9,134,200	273,100
2012	10,757,700	298,100
Average Annual Growth Rate		
2002-2007	3.70%	2.17%
2002-2012	3.51%	1.97%

Source: Airport bond forecast.

2.2.4 Strategic Business Plan

The HCAA developed a passenger enplanement and operations forecast in 2010. The forecast was built upon the previous strategic business plan and was updated based on the current economic conditions. Factors that may have an impact on future passenger demand were analyzed to help validate the new forecast, including socioeconomic factors, other comparative airport data, airline agreement types, airport financial metrics, and enplanement and revenue statistics. The updated forecast projected passenger enplanements to increase from 8.6 million in 2009 to 15.1 million in 2029, indicating an average annual growth rate of 2.9%.

Factors such as average aircraft size, load factor and potential markets were considered to estimate future passenger aircraft operations. Annual aircraft operations were expected to increase at an average annual rate of 2.2%.

2.2.5 Base Year Activity vs. Forecasts

The 2011 aviation activity statistics have been published in the HCAA monthly traffic report. The statistics were used to represent base year (2011) activity levels and to assess the forecasts reviewed above. Detailed base year activity level will be discussed in the historical aviation activity section. **Table 2.4** compares various forecasts with the latest HCAA monthly traffic counts.

Table 2.4

Forecasts vs. Traffic Counts in 2011

	HCAA Monthly Report	Airport Master Plan (2005)	Airport Bond Forecast (2002)	FAA TAF (2011)
Enplanements	8,409,647	10,461,840	10,398,000	8,238,812
Operations	191,315	291,744	292,600	192,691
Cargo Tonnage	42,579	44,498	N/A	N/A
Forecast Deviations				
Enplanements		24.4%	23.6%	-2.0%
Operations		52.5%	52.9%	0.7%
Cargo Tonnage		4.5%	N/A	N/A

Sources: Airport Master Plan Update (2005), Airport Bond Forecast (2002), FAA TAF, and HNTB Analysis.

Other than the cargo forecast, both the previous Master Plan and bond forecasts are optimistic. Passenger enplanements were overestimated by more than 20% and the number of operations by more than 45%. This is due to adverse economic conditions not anticipated in the earlier forecasts, including a severe economic downturn, high oil prices, the Gulf of Mexico oil spill and the housing bubble collapse, which together largely reduced air travel. More recently, high oil prices have put considerable pressure on airline operating costs. The Gulf of Mexico oil spill discouraged leisure travelers from visiting tourist destinations along the gulf coast, including Tampa and Clearwater. In addition, Florida was one of the hardest hit markets during the real estate bubble collapse with the second highest foreclosure rate in the nation in 2008. All of the factors above contributed to a slower-than-expected growth at the Airport.

Therefore, it is essential to update the Master Plan to incorporate national and local changes that have occurred since the last update. In order to project future activity levels, it is necessary to examine historic and recent trends. The next section reviews available historical statistics at the Airport.

2.3 Historical Aviation Activity

Historic aviation activity at the Airport has been recorded in several databases. The Airport is part of the NPIAS and its operation statistics are published in FAA databases, including:

- Terminal Area Forecast (TAF). As the FAA official forecast, the TAF records historical airport operation statistics including passenger enplanements, the number of operations, and based aircraft.
- Air Traffic Activity Data System (ATADS). The ATADS reports daily air traffic by IFR/VFR, Itinerant/Local and Air Carrier/Air Taxi/GA/Military.
- Operational Network (OPSNET). OPSNET keeps track of hourly arrivals/departures by Air Carrier/Air Taxi/General Aviation/Military.
- Enhanced Traffic Management System Counts (ETMSC). The ETMSC provides detailed equipment information such as aircraft, weight class, number of arrivals/departures and available seats.

Additionally, airlines are required to submit their equipment, enplanements, capacity information and other operational data using Form 41. The forms are compiled and published by the Bureau of Transportation Statistics (BTS) in the T100 database.

Locally, the HCAA publishes a monthly activity report that consists of domestic and international passenger enplanements and deplanements, enplaned and deplaned cargo, and operations by domestic, international, GA and military categories.

The databases mentioned above are used to describe the historical aviation activity at the Airport.

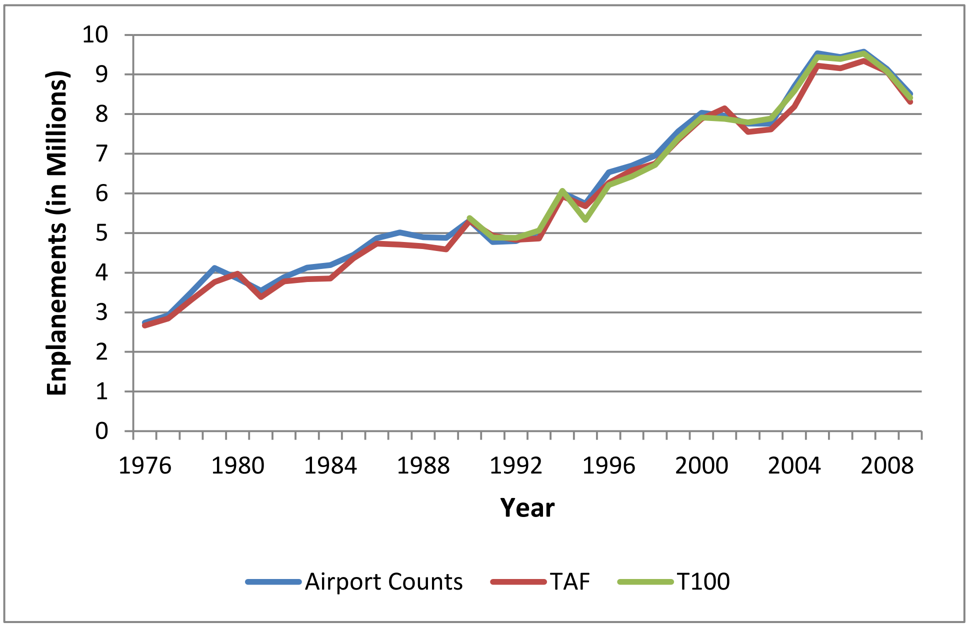
2.3.1 Passenger Activity

Passenger enplanements and deplanements are recorded locally by the HCAA and nationally by the FAA and BTS. The monthly report traces back to 1952 and provides domestic and international enplanements and deplanements. The FAA TAF provides passenger enplanements by domestic (air carrier, air taxi and commuter) and international operations from 1976. The BTS T100 database contains annual enplanements and deplanements with other information, such as equipment and airlines. Table A-8, Table A-9, and Table A-10 in Appendix A show the passenger statistics by the Airport report, FAA TAF and BTS T100.

It is worth noting that the TAF is reported by federal fiscal year ending September 30, while the monthly report and BTS T100 count activity by calendar year. **Figure 2.1** demonstrates the difference between these three data sources. In general, these databases report similar enplanement levels. Since the HCAA is more familiar with the Airport operation, the Airport report is used as the main data source in this study. Additionally, the report is based on calendar year, consistent with other data sources employed in this study. **Figure 2.2** shows all the recorded passenger flow at the Airport (enplanements plus deplanements).

Figure 2.1

Enplanements Comparison between Airport Counts and TAF

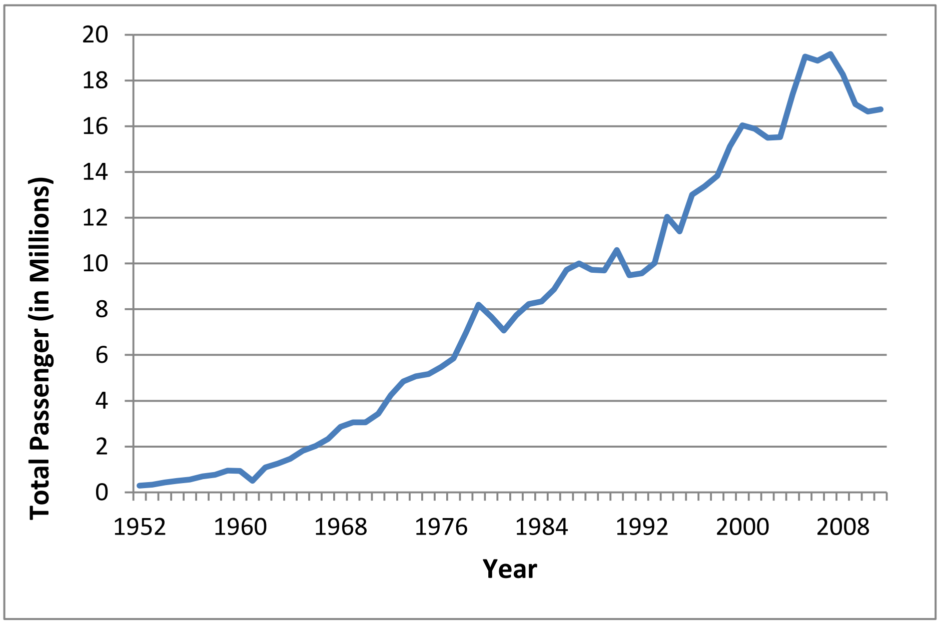


Sources: HCAA Airport Monthly Activity Reports, FAA TAF, and BTS T100.

Figure 2.2

Total Passenger Counts from the Airport Monthly Activity Report

(Enplanements plus Deplanements)

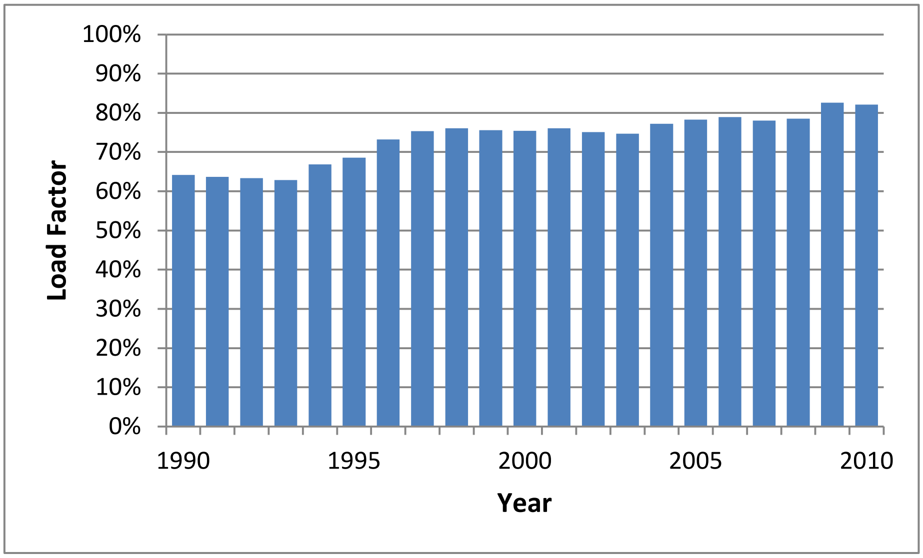


Source: The Airport Authority Monthly Activity Report.

Historical load factors were obtained from the BTS T100 database. **Figure 2.3** illustrates the reported load factors from 1990 to 2010. The load factors fluctuate annually but follow a general rising trend. In 2009 and 2010, load factors exceeded 80% for the first time in history, due to airline mergers and lower flight frequency. In 2011, the Airport recorded a load factor of 82.31%, slightly increased from 82.13% in 2010.

Figure 2.3

Historical Load Factors at the Airport



Source: BTS T100.

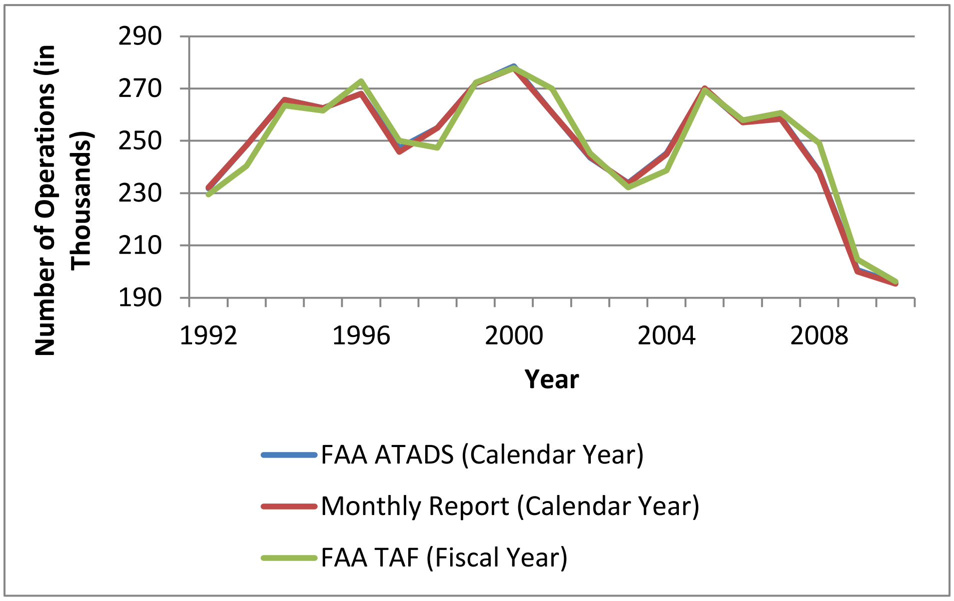
2.3.2 Operations

The number of aircraft operations is reported in the HCAA monthly activity report as well as the FAA TAF and ATADS. The ATADS data is available by both fiscal year and calendar year while the TAF is only available by fiscal year. Table A-11 in Appendix A shows the operation level recorded by the HCAA in calendar years. Table A-12 in Appendix A shows the FAA TAF records in fiscal years and Table A-13 in Appendix A shows the FAA ATADS records in calendar years.

Figure 2.4 compares the operation counts from the three sources. The monthly report and FAA ATADS data are almost identical. A comparison of the ATADS in fiscal years with the TAF reveals that both sources report identical statistics. As the airport is more familiar with the local operation pattern, the monthly report is used as the primary data source for operations.

Figure 2.4

Comparison between FAA ATADS, TAF, and Airport Counts



Sources: FAA ATADS, HCAA Monthly Activity Report, FAA TAF.

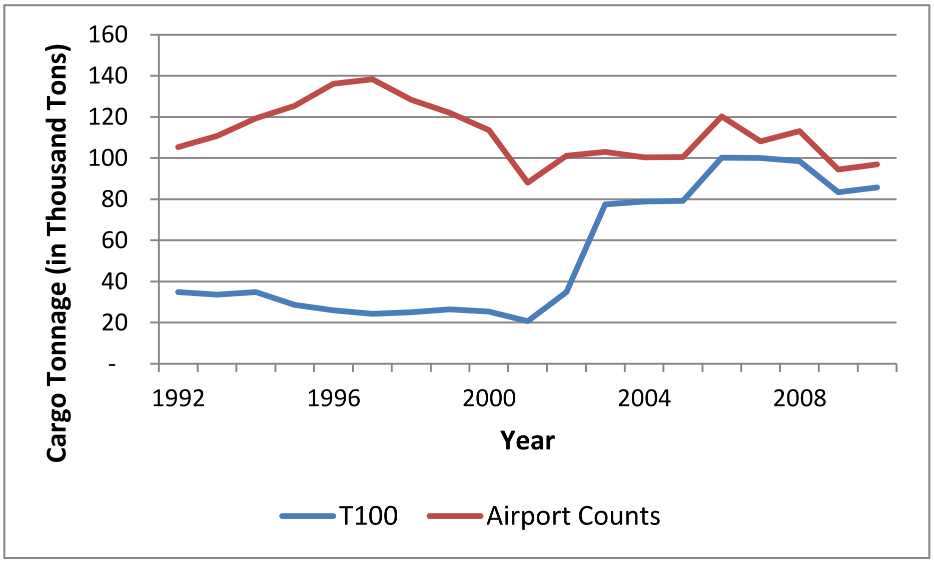
2.3.3 Cargo

There are two cargo activity data sources for the Airport. Besides the monthly activity report, cargo statistics are also recorded in the BTS T100 database and HCAA airline statistics report. The HCAA airline statistics report is the basis of the monthly activity report and provides more detailed information such as fleet, scheduled and non-scheduled operations, and maximum landing weight. Detailed cargo volumes are shown in Table A-14 and Table A-15 in Appendix A.

A comparison between the BTS T100 database and the airport monthly report is presented in **Figure 2.5**. The T100 database reports substantially lower cargo volume than the monthly report. This is due to missing carrier data, especially prior to 2003, and understated non-scheduled cargo volume. Consequently the monthly report was used as the primary cargo database. The HCAA airline statistics report contains equipment, landing counts, and freight and mail volume from 2007 to 2011. The report was used to analyze cargo volume share carried by passenger aircraft (usually referred to as belly cargo) and freighters (all-cargo), which was not included in the monthly report. The BTS T100 database was used to evaluate revenue ton-miles and load factors.

Figure 2.5

Comparison between Airport Cargo Volume Observation and the T100 Report



Sources: HCAA Monthly Activity Report and BTS T100.

2.3.4 General Aviation and Military

General aviation (GA) encompasses a wide spectrum of aviation activities other than commercial, cargo, military and air taxi. It represents a large share of active aircraft, pilots and traffic handled at most airports. Indicators of GA activities at a study airport usually comprise the number of based aircraft and operations. Types of GA aircraft range from more advanced jets to low-cost piston powered aircraft. GA operations are generally broken down to local and itinerant operations. The FAA defines local operations as "Aircraft operating in the traffic pattern or within sight of the tower, or aircraft known to be departing or arriving from flight in local practice areas, or aircraft executing practice instrument approaches at the airport." Itinerant operations are defined as "all aircraft operations other than local operations." Therefore, a local operation refers to a flight within sight of an airport and an itinerant operation represents arrivals and departures that are out of sight of the airport.

Historical GA statistics are available in the HCAA monthly report and the FAA TAF. The FAA TAF offers both based aircraft and operation counts. The HCAA monthly report only provides operation counts. However, it is supplemented by a quarterly GA tenant survey that summarizes based aircraft counts from 2007 to 2011.

Military activities refer to non-civilian operations performed by the airport military tenants. Military statistics are also available in the FAA TAF and the HCAA monthly report.

Table A-16, Table A-17 and Table A-18 in Appendix A show the number of based GA aircraft, and GA and military operations from the FAA and HCAA. An operations summary is provided in **Table 2.5.**

Table 2.5

GA and Military Operations

Calendar Year	FAA ATADS		FAA TAF		HCAA	
	GA	Military	GA	Military	GA	Military
1990	49,939	1,948	47,091	1,826	49,938	1,948
1991	49,397	2,437	50,154	2,355	N/A	N/A
1992	48,289	2,389	48,323	2,498	48,261	2,389
1993	48,363	1,806	48,591	1,923	48,349	1,806
1994	44,687	1,531	45,537	1,608	44,687	1,531
1995	42,263	2,109	42,227	1,616	42,263	2,109
1996	44,545	3,485	44,186	3,351	44,545	3,485
1997	34,488	3,225	38,372	3,381	32,892	3,229
1998	37,672	1,843	32,475	2,291	37,272	1,843
1999	48,939	744	50,229	824	48,696	750
2000	46,966	814	47,002	839	46,190	815
2001	42,536	654	43,975	667	42,438	652
2002	40,417	916	40,499	957	40,422	923
2003	39,402	476	39,309	479	38,976	475
2004	41,086	601	40,356	522	40,686	604
2005	42,426	493	42,739	569	42,228	505
2006	39,831	590	40,307	543	39,784	601
2007	37,923	674	38,587	701	37,539	675
2008	32,596	619	34,520	637	32,223	619
2009	28,285	647	28,398	639	27,632	647
2010	26,411	677	27,234	695	25,575	667
2011	24,337	571	N/A	N/A	24,201	571

Sources: FAA ATADS, TAF, and HCAA.

2.4 Assumptions

A range of assumptions were made to facilitate the forecast update, such as various local and national conditions and policies including economic, aviation industry, operational and other assumptions.

2.4.1 Economic Assumptions

General Economic Conditions

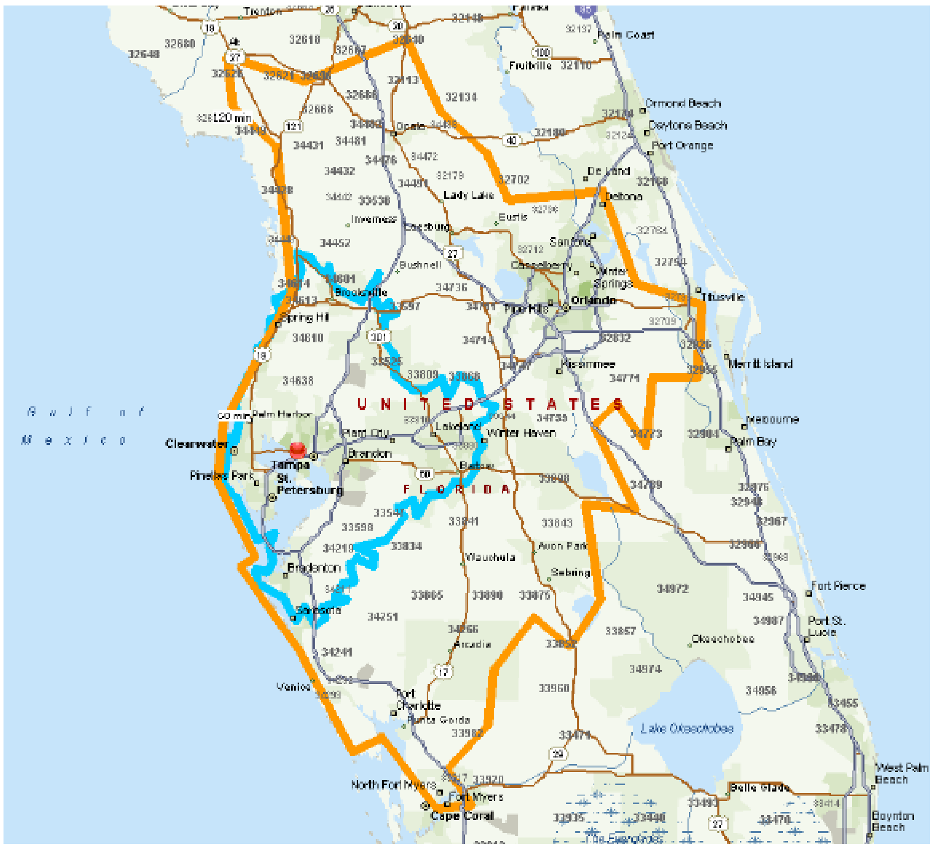
The forecast assumes that no major economic downturn, such as the Great Depression or Great Recession, will occur in the planning period. It is acknowledged that normal business cycles, as were typical between 1945 and 2007, will continue to occur.

Airport Service and Draw Areas

The Airport is conveniently located to serve passengers throughout central Florida. **Figure 2.6** shows the primary and secondary service areas for the Airport. The primary service area includes areas which can access the Airport within one hour by ground. The secondary service area includes areas which can access the Airport within two hours by ground. These service areas are the focus of the Airport's air service development efforts.

Figure 2.6

Tampa International Airport Primary and Secondary Service Areas



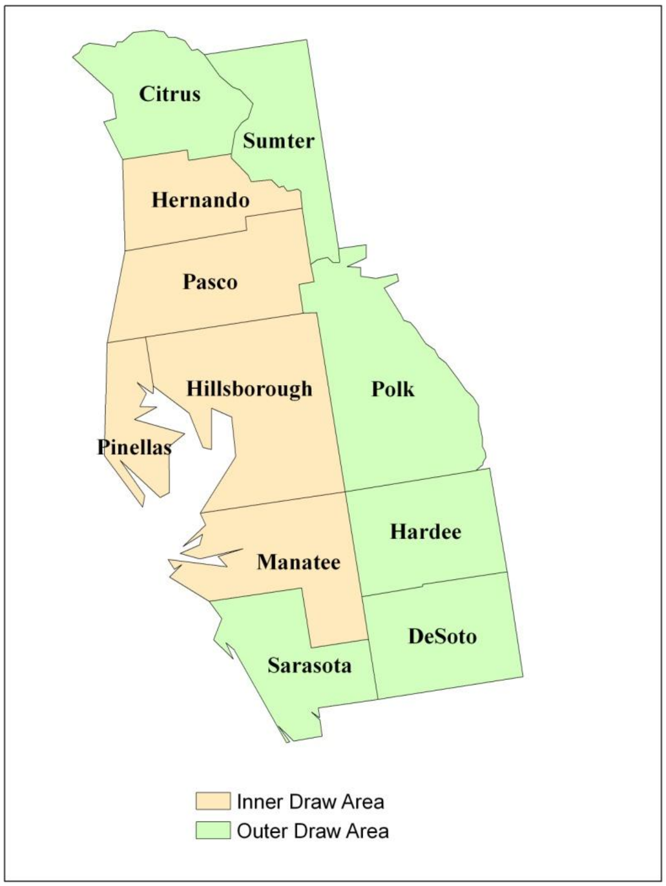
Notes:
Blue Line: 1-hour driving time
Orange Line: 2-hour driving time

Source: Tampa International Airport[4].

Figure 2.7 shows the primary and secondary draw areas for TPA. Draw areas are similar to service areas except that they also take the effects of nearby competing airports, such as Orlando International Airport, into account. The airport draw areas were obtained from the previous Master Plan update. They include two tiers of draw areas: the primary inner draw area and the primary outer draw area. The primary inner draw area consists of counties that have a significant ground access advantage to the Airport and for which there is limited competition from all other commercial service airports serving Central Florida. This category includes Hillsborough, Pinellas, Hernando, and Pasco counties. The definition of the primary draw area was redefined from the previous Master Plan to include Manatee County. Manatee County was added to the primary draw area because of losses of air service at Sarasota International Airport and new information provided in the Tampa International Airport 2010 Passenger Surveys that indicated that the majority of Manatee County passengers now use TPA. The primary outer draw area consists of counties for which the Airport is competitive with other large hub airports serving Central Florida, in terms of ground access. It includes Citrus, Sumter, Sarasota, De Soto, Hardee counties and part of Polk County. Polk County is located between Tampa International and Orlando International Airports and thus enjoys similar access to either airport. A GIS analysis was conducted to determine the share of the county residents who would be included in the Tampa Airport draw area. Based on driving times, the analysis showed 58% of the population lives closer to the Tampa International than Orlando International (see Figure A-1 in Appendix A). Therefore, 58% of the population in Polk County was included in the Tampa International Airport secondary draw area.

Figure 2.7

Tampa International Airport Draw Area



Source: Hillsborough County Aviation Authority.

Tourism Development

It is assumed that tourism employment within the Tampa area will recover from the recession and the Gulf of Mexico oil spill and return to normal growth levels.

2.4.2 Aviation Industry Assumptions

Airline Industry Assumptions

Although there may be additional airline mergers after the completion of the United/Continental and Southwest/AirTran mergers, it is not possible to accurately project which specific airlines will merge. Therefore, no specific future airline merger scenarios will be incorporated into the baseline forecast. No radical changes in the legacy airline hub-and-spoke strategy for serving and competing in markets are assumed.

National Airspace System Assumptions

It is assumed that the National Airspace System (NAS) will develop sufficient capacity to accommodate future traffic without major bottlenecks. The FAA will implement necessary technologies (i.e. components of NextGen) to ensure a safe and efficient environment in both en-route and terminal areas. No significant changes in the current network structure are assumed.

2.4.3 Regulatory Assumptions

No passenger or cargo cabotage is assumed. It is also assumed that sufficient progress on Open Skies agreements will continue to allow the Airport passenger traffic levels to grow depending on demand.

2.4.4 Competition from Other Modes

On February 16th, 2011, the Florida governor formally rejected federal funds to construct a high-speed rail in the state, effectively killing the Florida High Speed Rail project. [5,6] Those funds were then redirected to other states. At the time of this report, it was still unclear if or when the High Speed Rail project would be revived. Due to this uncertainty, this study assumes that the high speed rail, if it occurs, will not divert significant passenger demand from the Airport.

2.5 Key Factors

As previously mentioned, air traffic levels at a study airport are influenced by a range of local, national and international factors. Several common factors play key roles in understanding historical and current traffic patterns and forecasting future activities. This section discusses the following key factors:

- Socioeconomics: historical development and future projections
- Fuel prices: historical trends and forecasts
- Air fares: average fare movement and projections
- Airport incentive programs: envisioned incentive programs and their impacts
- Important national and local events: unemployment rates and impacts of Independence Air

2.5.1 Socioeconomics

Historical socioeconomics and future projections are available from public agencies and private companies. One of the most widely used private socioeconomic projections, the Complete Economic and Demographic Data Source (CEDDS) by Woods & Poole Inc,[7] provides a wide range of major socioeconomic statistics and projections down to county level. The 2011 CEDDS was used in this study. The last year of historical data in this version is 2008 (2009 for population). Public baseline data and projections include datasets from the Florida Office of Economic and Demographic Research (EDR)[8], the Bureau of Economic and Business Research (BEBR) of the University of Florida[9], and the Bureau of Economic Analysis (BEA)[10]. The BEA only provides the latest historical statistics without projections.

Population estimates for the base year and horizon years are shown in Appendix A – Table A-19**,** Table A-20**,** Table A-21 and Table A-22. Local projections, such as EDR and BEBR, are preferred over the CEDDS as they reflect in-depth knowledge of the State. The BEBR data was developed under a contract with the Florida legislature and used as the official population projections, whereas the EDR data was a product of the Florida Demographics Estimating Conference.[11] The BEBR projects high, medium and low population growth that can be incorporated in the scenario analysis. Therefore, population projections from the BEBR were used in this study.

The BEBR does not produce other key socioeconomic forecasts apart from population. To estimate other factors, such as income and employment, hybrid methods that combine BEBR population forecasts and CEDDS projections were employed.

To project employment, an employment to population ratio for each county in each horizon year was calculated using the CEDDS. This ratio was multiplied by the corresponding population in the county to project total employment. The results are shown in Table A-23 (medium growth scenario), Table A-24 (low growth scenario) and Table A-25 (high growth scenario)in Appendix A. Per capita income projections were obtained from CEDDS. The CEDDS per capita income levels were compared with the published BEA per capita income in 2009 and the income levels were adjusted by adjustment factors developed for each county (see Table A-26 in Appendix A). The projected total income of each county was a product of the adjusted per capita income and the BEBR population forecast. Table A-27, Table A-28 and Table A-29 in Appendix A list the medium, high, and low total income projections for the airport draw area.

Please note that 58% of Polk County's population is included in the primary outer draw area calculation.

The total income growth rates for destination markets from the CEDDS were used for distributing market-by-market passenger flows. Hub airport destinations were represented by the Metropolitan Statistical Area (MSA) where the airport is located. Non-hub airport destinations were represented by the county in which the airport is located.

From 1970 to 2010, the state of Florida outpaced the U.S. in terms of population, employment and total income growth. However, the average per capita income was slightly lower than the national average. This was partly due to the hard-hit Florida real estate market during the late 2000 housing bubble collapse, as well as localized events such as the Gulf of Mexico oil spill. Socioeconomics within the airport draw area are compared to two other MSAs, including the

Miami-Fort Lauderdale-Pompano Beach MSA (Miami MSA) and the Orlando-Kissimmee-Sanford MSA (Orlando MSA), the State, and the U.S.

Like other states in the Sun Belt, Florida experienced strong population growth during the 1980s and the first decade of the 21st century. The airport draw area's population increased at a rate similar to the state average. This rate was higher than the U.S. average and the Miami MSA average, but lower than the Orlando MSA average. However, population growth in the airport draw area is expected to slow down in the future. Although it is still higher than the U.S. average, the projected growth rate within the draw area trails the other two MSAs and the overall state rate (See Table A-30 in Appendix A for details).

Similarly, the historical employment growth rate in Florida and the two MSAs increased much faster than the US. It decelerated significantly during the last decade, but still exceeded the national average. The airport draw area, however, experienced lower than average employment growth during the last decade. It is expected to recover in the near term and continue to increase at a pace slightly slower than the state average. Table A-31 **in Appendix A** shows the historical and projected employment growth rate.

Table A-32 and Table A-33 **in Appendix A** show the historical and forecasted growth rate of per capita income and total income. From 1970 to 2010, the airport draw area residents' per capita income matched the national rate, which was higher than the other two MSAs and the state. However, a slow recovery is anticipated compared with the other two MSAs in the state. In the near and mid-term, the recovery rate is expected to be generally in line with the national rate. In the long term, the growth rate is projected to exceed the national average.

Locally, the outer draw area outperforms the inner draw area in terms of historical and projected population, employment and total income growth. The primary inner draw area experienced higher per capita income growth historically, but is projected to trail the outer draw area during the planning period. Table A-34, Table A-35, Table A-36 and Table A-37 in Appendix A show the historical and projected growth rates mentioned above.

2.5.2 Fuel Prices

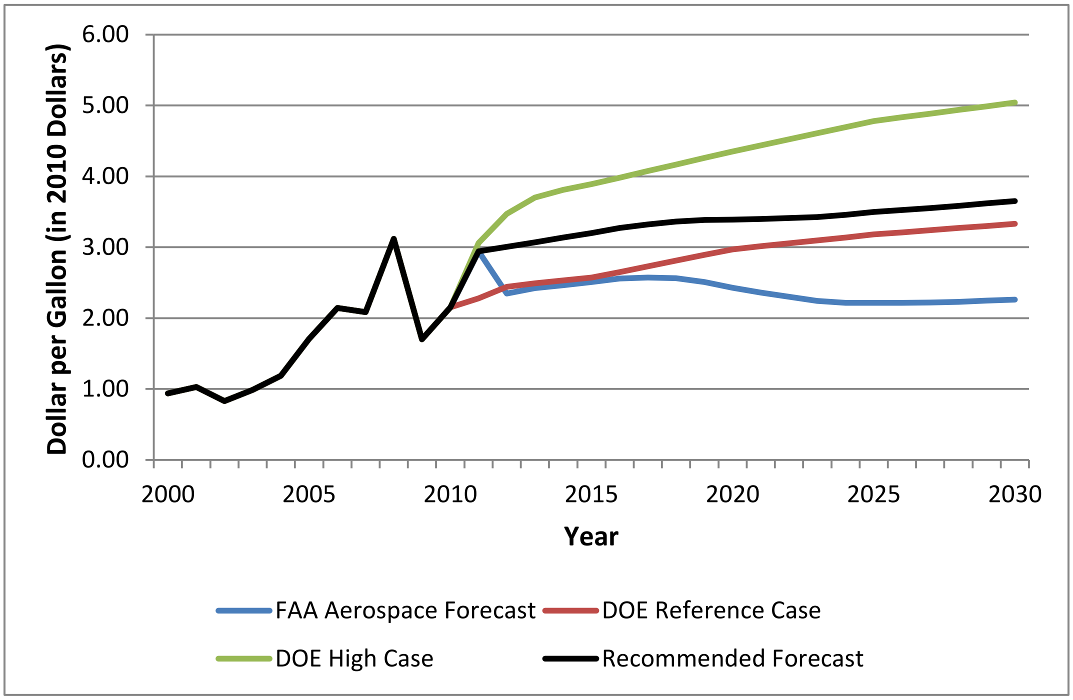
Fuel comprises a major cost component for airlines, especially during the recent fuel price spike. Fuel costs have overtaken personnel expenses as the top cost category for airlines. According to an *Airline for America* 2011 financial report, jet fuel costs jumped 36.1 percent compared with 2010. It remained as the industry's largest expense at about 35 percent of total operating costs, up from 30 percent in 2010.[12] There are two public agencies that publish forecasts on jet fuel prices. The FAA projects domestic, international and combined jet fuel prices for mainline carriers in the 2011 Aerospace Forecast.[13] It predicts jet fuel price to fluctuate between \$2.20/gallon to \$2.60/gallon. At the time this report was written, the market price was \$3.32s/gallon[14], well above the FAA forecast. The U.S. Department of Energy (DOE) provides jet fuel price forecasts for reference case and high oil price scenarios. Table A-38 **in Appendix A** presents the various available jet fuel price forecasts.

As the table shows, forecasts of future average jet fuel prices vary markedly. As a compromise between alternative projections, the average of the lowest case (FAA) and the highest case (DOE) High Case was used in this study.

Figure 2.8 compares the available and recommended forecasts.

Figure 2.8

Jet Fuel Prices Forecast



Sources: U.S. DOE, FAA Aerospace Forecast 2011, and HNTB analysis.

2.5.3 Air Fares

Air fares are one of the primary factors affecting travel decisions. As the other major commercial service airport in Central Florida, Orlando International Airport (MCO) offers an alternative to Tampa Bay area residents. Therefore, it is necessary to analyze historical and future air fares at both airports and their correlation with passenger enplanements.

Air fares were gathered from the BTS Airline Origin and Destination Survey (OD1A),[15] which collects a 10% sample of the airline tickets. Table A-39 **in Appendix A** shows historical domestic air fares at MCO and TPA. In general, average domestic air fares have been declining since 1990. Average air fares have recently rebounded due to airline consolidation, reduced frequencies and routes, and high jet fuel prices. Historically, fares at TPA were higher than MCO fares in the 1990s and close to MCO fares from 2000 to 2008. More recently, the TPA fares have been higher than MCO fares.

Future air fares were projected using the 2011 FAA Aerospace Forecast’s airline yield, trip length and enplanement projections. Airline yield and trip length by mainline and regional airlines comprise part of the annual FAA Aerospace Forecast. Weighted by the total mainline and regional airline enplanements, the average yield per passenger mile and average trip length was estimated. The yield projection was also adjusted by the recent fuel price trend. The average U.S. fare was calculated as a product of the adjusted yield and trip length.

Once the FAA yield projection was adjusted to account for anticipated fuel prices, it was used to project future average MCO domestic fares As a result of ongoing HCAA marketing efforts, new airline entrants are expected to increase competition and thus reduce average air fares at the Airport. Therefore, TPA average fare rates were assumed to approach parity with average MCO fares over the 2014-2024 period. The more competitive air fares would reduce leakage from the primary TPA draw area and increase the number of TPA passengers coming from outside the primary draw area. Although the efficiency of aircraft and airline operations is projected to increase, and airline competition is expected to be enhanced by HCAA marketing efforts, these efficiencies would be offset to some extent by higher fuel prices. The domestic fares projected above were used in regression equations as independent variables. Detailed projections are shown in **Table 2.6.**

Table 2.6

Projected TPA and MCO Domestic Fares (2010 Dollars)

Year	TPA Unadjusted (a)	MCO (a)	TPA Adjusted (b)
2010	$134.61	$125.62	$134.61
2016	$154.20	$143.90	$149.58
2021	$156.71	$146.25	$148.41
2031	$159.22	$148.58	$148.58

(a) Assumed to grow at FAA projected national rate (average yield multiplied by average trip length) adjusted by jet fuel prices.
(b) TPA average fare assumed to converge to MCO average fare as a result of HCAA marketing efforts leading to more airline service and more competitive air fares.

2.5.4 Airport Incentive Program

In the summer of 2011, the HCAA Board created the first Airline Incentive Program (AIP) in all of Airport history.[16, 17] Under this program, airlines launching a new daily widebody service to Europe could save millions of dollars in fee waivers and advertising money. Other flights would obtain lower levels of fee reductions and advertising assistance depending on flight frequency. It is expected that the AIP will attract additional international flights to the Airport throughout the planning period.

2.5.5 Impact of Independence Air

Independence Air, once an operating feeder service for Delta and United, became an independent low-cost airline in 2003. It began operations in June 2004 and announced non-stop service to the Airport from various locations in November 2004.[18] The low fare offered stimulated demand and lowered the overall fares at the Airport. However, due to financial stress, Independence Air ceased all operations in January 2006. The overall air fares at the Airport soon returned to the previous levels. In the subsequent passenger enplanement forecast, a dummy variable was used to model this temporary market disturbance. Dummy variables are those independent variables assuming values of 0 or 1 to represent the absence or presence of hard-to-quantify events that may have an impact on the outcome.

2.5.6 Unemployment Rate

As an important indicator of labor market health, the unemployment rate in the U.S. has an implicit impact on air travel demand. When the unemployment rate is high, it generally indicates a period of economic slowdown or recession, during which air travel levels usually decline as well. When unemployment is high, people tend to feel uncertain about the future, and are therefore less inclined to spend on discretionary items and services even when they do have income. Therefore, historical unemployment rates from the Bureau of Labor Statistics,[19] short term forecast[20] and long term projection[21] were used in the passenger forecast.

2.6 Passenger Forecasts

Domestic and international enplanements were forecasted separately in this section. Three methodologies were employed in forecasting domestic enplanements including trend line, market share, and regression analysis.

The incentives from the AIP and marketing efforts are expected to expand international destinations to South America, the Caribbean and Europe. A market-by-market analysis was conducted to project international flight frequency and enplanements.

2.6.1 Domestic Enplanements and Operations Forecast

Three methodologies were employed to forecast domestic enplanements:

- Market share analysis which projects the passenger enplanements as a share of the total U.S. passenger enplanements.
- Trend line analysis which extrapolates passenger counts based on historical trends.
- Regression analysis which correlates passenger activity levels with a variety of local and national factors that historically influenced aviation activity.

Domestic operations were forecasted market-by-market by aircraft type.

Market Share Analysis

The passenger enplanements market share among all the U.S. airports was segregated by domestic market and international market. From 1992 to 2010, the Airport share of domestic traffic enjoyed consistent growth whereas the international share declined. The domestic market share was assumed to sustain its growth at historical rates during the forecast period. As a market-by-market analysis was used for the international enplanements forecast, a market share analysis for international destinations was not conducted. The historical and forecast market share results are presented in Figure A-2 in Appendix A.

Trend Line Analysis

Trend line analysis presents a straightforward extrapolation of the passenger enplanements from historical counts. Figure A-3 in Appendix A illustrates the historical data and fitted trend line.

Regression Analysis

Various regression analysis equations were tested to estimate originating domestic passengers. A technical discussion of regression theory and definitions of dependent, independent and dummy variables are included in Appendix A. Three types of independent variables were assessed. Firstly, various socioeconomic data within the Airport's draw area were tested including population, total income, per capita income, employment and the national unemployment rate. These variables represent demand side characteristics. Secondly, supply side parameters such as average fares from the BTS OD1A database and jet fuel prices from FAA were incorporated. Important events such as the September 11th terrorist attack in 2001, entrance and exit of low-cost airline Independence Air, and the Gulf of Mexico oil spill in 2010 were also tested as dummy variables.

A step-wise regression analysis was conducted to assess the correlation of the above-mentioned independent variables with originating passenger enplanements. A regression function with U.S. national income, average air fares at TPA and MCO, the September 11th terrorist attacks, entrance of Independence Air, and the U.S. unemployment rate as independent variables, was selected based on parameter sign, goodness-of-fit and statistical significance (see Equation A-1 in Appendix A for details).

The regression function above only includes originating passengers, and therefore other passenger categories were projected separately. These categories include passengers traveling on a domestic segment of an international journey (referred as Domestic Portion of International Journey (DPIJ) in OD1A) and connecting passengers. The DPIJ passengers were projected using regression analysis. The U.S. total international enplanements and the September 11th terrorist attacks were included as the independent variables. The ratio of domestic connecting passengers to total domestic passengers from 2008 to 2010 was used to project future connecting passengers.

Preferred Forecast

To serve future planning needs, the selected forecast should be capable of assessing different scenarios should the underlying operation environment change. Both trend line and market share analysis provide growth insights from a historical perspective. However, neither method incorporates important parameters essential to evaluate demand fluctuations when they deviate from the historical trend. Regression analysis, on the other hand, employs these parameters explicitly. Therefore, the regression function was chosen as the preferred forecast.

Table 2.7 compares domestic enplanements forecasts from the market share, trend line and regression analyses with the FAA TAF forecast. The average growth projected by the regression analysis is higher than the FAA TAF forecast but lower than the other two approaches.

Table 2.7

Domestic Enplanements Forecasts Comparison

Year	Market Share	Trend Line	Regression	FAA TAF
2011	8,197,942	8,197,942	8,197,942	8,016,073
2016	10,389,503	10,033,575	9,360,547	8,777,976
2021	11,457,971	11,504,075	10,815,875	9,979,979
2031	14,816,812	13,733,220	13,462,695	12,900,328
Average Annual Growth Rate				
2011-2016	4.85%	4.12%	2.69%	1.83%
2011-2021	3.40%	3.45%	2.81%	2.22%
2011-2031	3.00%	2.61%	2.51%	2.41%

Sources: HCAA, FAA TAF, and HNTB Analysis.

Load Factor

Historically, domestic load factors at TPA have been in line with the national average. Recent airline consolidation and subsequent network reorganization has boosted average load factors at the Airport to above 80% for the first time in history. This trend is assumed to continue at the same rate as forecasted in the FAA 2011 Aerospace Forecast (see **Table 2.8**).

Table 2.8

TPA Domestic Load Factor Forecast

Year	Load Factor	
	FAA (a)	TPA (b)
2011	81.7%	82.4%
2016	83.1%	83.8%
2021	83.6%	84.3%
2031	84.0%	84.7%

(a) FAA Aerospace Forecast: Fiscal Years 2011-2031.

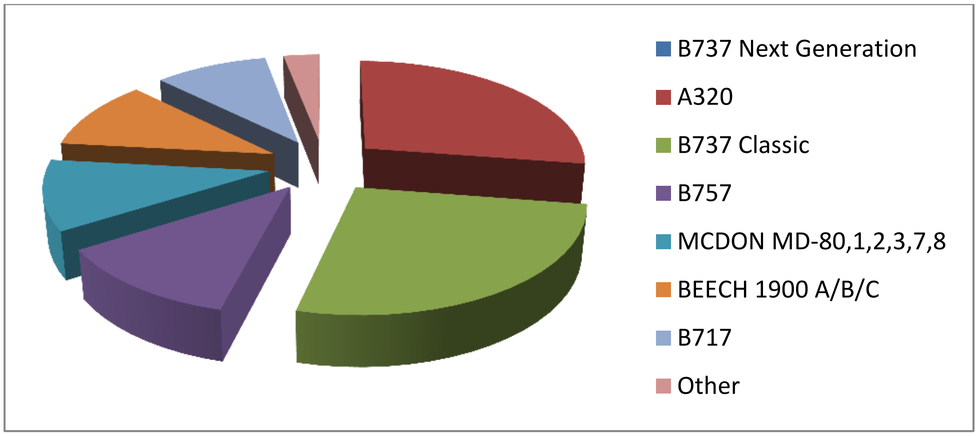
(b) Same growth rate as the FAA forecast.

Future Fleet

Commercial fleet compositions at the Airport were analyzed using the 2010 T100 data. **Figure 2.9** shows the mainline and commuter passenger aircraft fleet composition by the number of operations. The top two commercial passenger aircraft, B737 and A320, are the two best-selling commercial aircraft of the Boeing and Airbus.

Figure 2.9

Current Domestic Fleet Composition by the Number of Operations (As of 2010)



Sources: BTS T100 and HNTB Analysis.

The fleet mix forecast assumes the following aircraft replacements:

- The B737 Classic including the B737-300, 400 and 500 series will be replaced by the B737 New Generation including the B737-700, 800 and 900 series and the A320 New Engine Option (neo) family based on airline orders.
- The B757 will be replaced by the B737-900ER, the B737-MAX 9, the Airbus A321 and the Airbus A321neo based on airline orders.
- The MD80 and variants, as well as the B717, are anticipated to be replaced by the B737 and A320 next generation models.

The following assumptions are made for commuter market:

- The Beech 1900 will be replaced by the Saab 340.
- 50-seat Regional Jets will be replaced by newer 70-seat Regional Jets.

Operations Forecast

The number of commercial operations was determined by the projected passenger enplanements, load factor and future fleet mix. It was estimated market-by-market by aircraft type. The projected enplanements were allocated by market based on current shares and projected relative income growth at the destination market. The total seat departures for each market were estimated by dividing passengers by the load factors (see Table A-40 in Appendix A for details). The current manner in which airlines accommodated the passenger enplanements in terms of aircraft type and frequency of service was obtained from the BTS T100 database. Future operations were projected based on the current carriers and aircraft serving each route, individual aircraft seat capacity and aircraft on order by the carriers. Annual aircraft frequencies on each route was estimated so that the cumulative seat departures of the aircraft estimated for the market were equal to the required seat departures for that market.

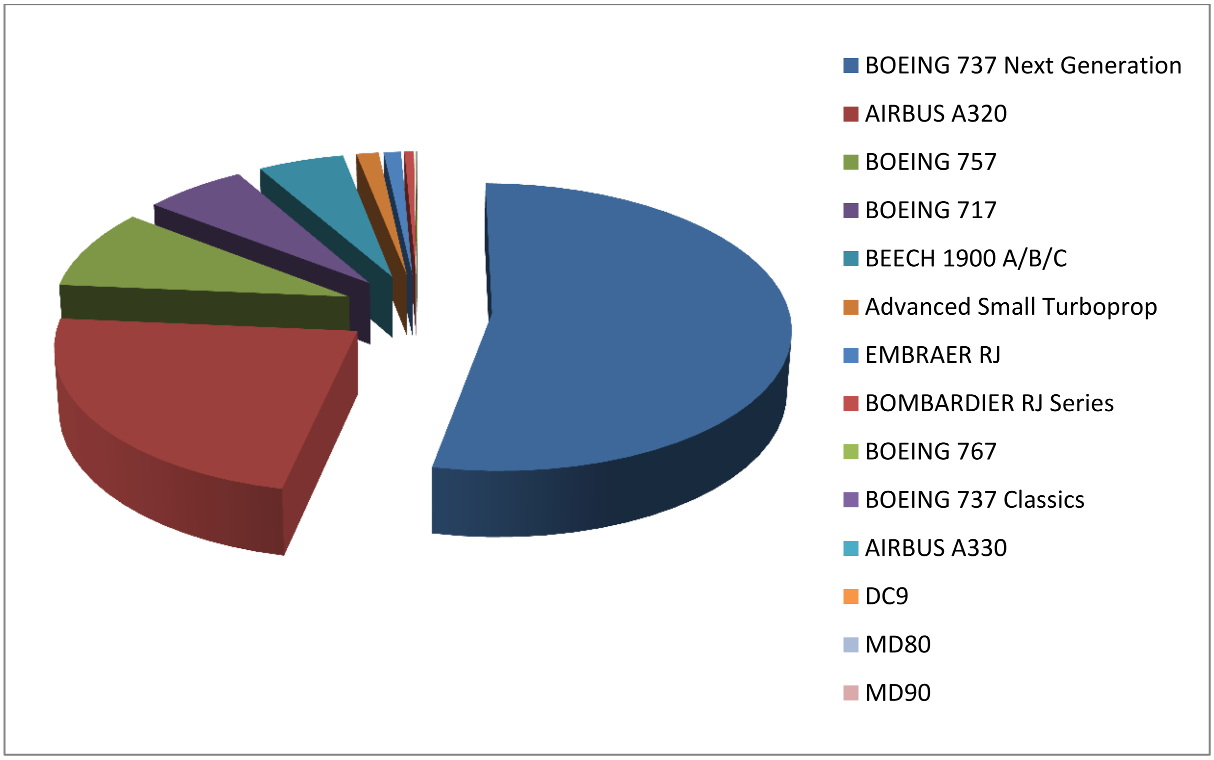
Potential new markets were analyzed by distance brackets and associated airline revenue thresholds. The destinations with the lowest revenue with non-stop service to the Airport and the destinations with the highest revenue without non-stop service to the Airport within each distance bracket were derived from the OD1A database. The average revenue of the two destinations in each distance bracket was assumed to be the revenue threshold for new non-stop service. Assuming revenue from each prospective non-stop market increases at the same rate as TPA, revenue from each potential non-stop market was estimated. When a destination's projected revenue exceeds the revenue threshold, it is assumed that a new non-stop service will be established. The revenue threshold for each distance bracket is presented in Table A-41 in Appendix A.

Figure 2.10 shows the projected passenger fleet in 2016 by the number of operations. The Boeing 737 next generation aircraft including -700/-800/-900 is expected to increase its market share. It is followed by the Airbus A320 family including A319, A320 and A321 and new engine option (neo) variants. The projected future fleet mix during the mid and long term is illustrated in Figure A-4 and Figure A-5 in Appendix A.

Passenger enplanements were allocated to each non-stop market including new markets based on the current market share and projected relative income growth at destination markets. Detailed enplanements to each domestic non-stop market are delineated in Table A-42 in Appendix A.

Figure 2.10

Domestic Passenger Aircraft Fleet by the Number of Operations in 2016



Sources: BTS T100 and HNTB Analysis.

2.6.2 International Enplanements and Operations Forecast

International enplanements are projected based on planned target markets and frequencies. The number of operations was estimated market-by-market by aircraft.

International Enplanements Forecast

The international market share is expected to rebound as the Airport actively pursues international markets. A twice-per-week non-stop service to Zurich, Switzerland commenced in May 2012 by Edelweiss Air using the Airbus A330 with 301 seats.[22] In March 2011, FAA officially granted the Airport rights to operate charter flights to Cuba.[23] Currently, four weekly chartered flights to Cuba are offered including three flights to Havana and one to Holguin.[24] The Airport is marketing new destinations to Europe and Latin America with the new incentive program.

After consulting with airport staff, the following observations and assumptions were made regarding recent and future new international destinations and frequencies:

- Zurich service began 1.5x weekly (301 seat capacity) in 2012
- Daily turbo-prop (34 seat) service to the Caribbean launches in mid-2013
- 2x Weekly Narrow-Body (100 seat capacity) Caribbean service launches in 2014

- Additional Year-Round Canadian service (120 seat capacity) is added in 2014
- Cuban flights are daily by 2015
- 5x Weekly Narrow-Body (124 seat capacity) service to Latin America launches in 2015
- Additional Frequencies (248 seat capacity) to London are added in 2015
- 2x Weekly Wide-Body (223 seat capacity) Latin American service launches in 2015
- 5x Weekly Wide-Body (221 seat capacity) service to Europe launches in 2016
- 3x Weekly Narrow-Body (120 seat capacity) Latin American service launches in 2018
- Additional 3x Weekly Wide-Body (208 seat capacity) service to Europe launches in 2018

Load Factor

International enplanement load factors were provided by the BTS T100 database. It was assumed that international load factors would increase at the same rate as the FAA 2011 Aerospace Forecast international load factors forecast (see **Table 2.9**). The load factors are slightly below the national average and are expected to increase modestly as indicated in the FAA 2011 Aerospace Forecast.

Table 2.9

TPA International Load Factor Forecast

Year	Load Factor	
	FAA (a)	TPA (b)
2011	82.1%	81.6%
2016	82.7%	82.2%
2021	82.9%	82.4%
2031	83.2%	82.7%

(a) FAA Aerospace Forecast: Fiscal Years 2011-2031.

(b) Same growth rate as the FAA forecast.

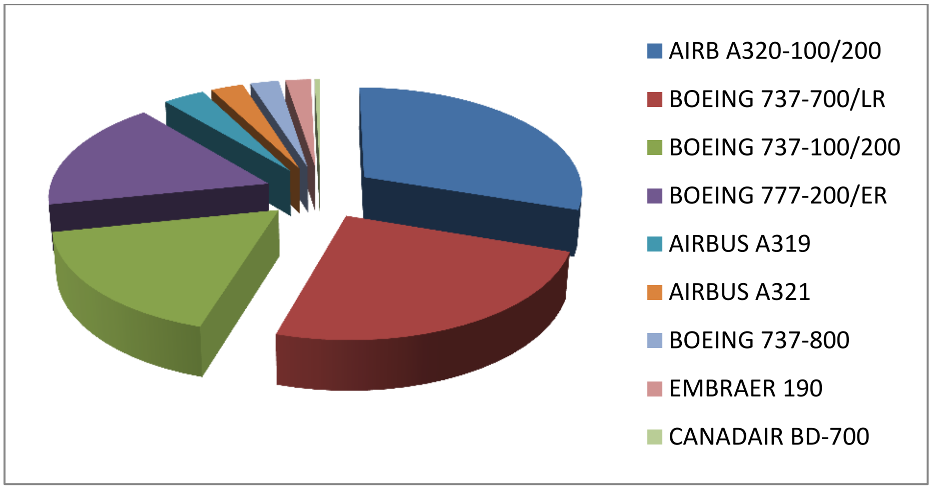
The load factor forecast was used in the market-by-market analysis to estimate future number of international passenger operations.

Future Fleet

The Airbus A320 family and the Boeing 737 family accounted for more than 75% of the total number of international operations in 2010 according to the BTS T100 (**Figure 2.11**). Other important aircraft include the Boeing 777-200/ER that was used by British Airways and the Embraer E-190 used by Air Canada.

Figure 2.11

Current International Fleet Composition by the Number of Operations (As of 2010)



Sources: BTS T100 and HNTB Analysis.

It is assumed that the following aircraft replacements will take place:

- Airbus A320-100/200 will be replaced by the Boeing 737-800 by 2021
- Boeing 737-100/200 will be replaced by the Boeing 737-700/LR by 2016

Operations Forecast

The number of commercial operations was determined by the projected passenger enplanements, load factor and future fleet mix. The procedure was similar to the domestic operations forecast described in Section 2.6.1. Table A-43 **in Appendix A** shows the projected international seat departures.

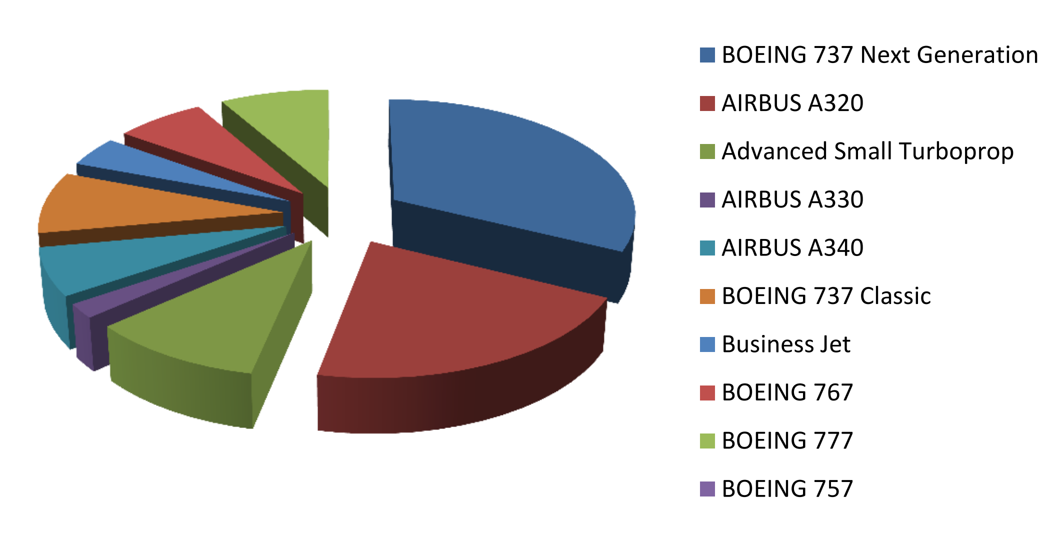
Figure 2.12 shows the projected international passenger fleet by the number of operations in 2016. Similar to the domestic fleet, the Boeing 737 next generation and the Airbus A320 family comprise the majority of the fleet. Advanced turboprops are expected to serve short haul markets to the Caribbean until they are replaced by regional jets as these markets mature. The international passenger fleet mix forecasts during the mid and long term are shown in Figure A-6 and Figure A-7 in Appendix A.

Passenger enplanements were allocated to each non-stop market including new markets based on the current market share and projected passengers to each region by the FAA 2011 Aerospace Forecast.

Table A-44 in Appendix A shows FAA's forecast of passengers from/to the U.S. by world region. Detailed enplanements to each international non-stop market are delineated in Table A-45 in Appendix A.

Figure 2.12

International Passenger Aircraft Fleet by the Number of Operations in 2016



Sources: BTS T100 and HNTB Analysis.

2.6.3 Passenger Forecast Summary

A summary of the passenger enplanements forecast is presented in **Table 2.10.**

Table 2.10

TPA Passenger Enplanements Forecast

Year	Domestic			Domestic Total	International (d)	Grand Total
	Originating (a)	DPIJ (b)	Connecting (c)			
2011	6,783,660	479,985	934,298	8,197,943	211,705	8,409,648
2016	7,954,992	546,253	859,302	9,360,547	462,273	9,822,820
2021	9,197,834	625,140	992,901	10,815,875	620,770	11,436,645
2031	11,389,400	837,415	1,235,880	13,462,695	889,337	14,352,032
Average Annual Growth Rate						
2011-2016	3.24%	2.62%	-1.66%	2.69%	16.91%	3.16%
2011-2021	3.09%	2.68%	0.61%	2.81%	11.36%	3.12%
2011-2031	2.62%	2.82%	1.41%	2.51%	7.44%	2.71%

(a) Regression with U.S. Income, TPA Fare, MCO Fare, Sep-11, Independence Air, and U.S. Employment Rate as variables.

(b) Regression with total international enplanements and Sep-11 as variables.

(c) Assuming connecting passengers comprise 10% of total domestic enplanements.

(d) Follows HCAA forecast.

In the near term, domestic enplanements are expected to recover and achieve an average annual growth rate of 2.69%. Growth will increase to 2.81% during the mid-term and decrease to 2.51% in the long term. To put it in perspective, the domestic enplanement growth rates are slightly higher than the overall growth rate forecasted by the latest FAA TAF, which is 2.44% in the short term, 2.36% in the mid-term and 2.32% in the long term.

International passenger enplanements are projected to sustain strong growth throughout the planning periods. Various marketing efforts including the AIP are anticipated to attract international service that will in turn attract travelers that currently use other airports in the region. In the near term, international enplanements are projected to increase 16.91% annually. In the first month of 2012, the international enplanements increased 13.25% compared with January 2011. With new service to Zurich by Edelweiss Air having commenced in May 2012, this growth rate is expected to increase further. In the mid-term, the average annual growth rate slows down to 11.36%. In the long term, a single-digit growth rate of 7.44% is projected.

Domestic passenger flight departures are forecasted to increase at a slower pace than passenger enplanements as a result of larger aircraft and improved load factors. International passenger flight departures are expected to outpace enplanements because of the proposed smaller aircraft catering to the Latin American and Caribbean markets. Growth rates shown in **Table 2.11** are slightly higher than the national growth rates projected by the FAA TAF, which are 2.07% in the near term, 1.99% in the mid-term, and 1.96% in the long term.

Table 2.11

Passenger Flight Departures Forecast

Year	Domestic	International	Total
2011	75,281	1,488	76,769
2016	81,402	3,745	85,147
2021	90,604	4,754	95,358
2031	112,181	6,865	119,046
Average Annual Growth Rate			
2011-2016	1.58%	20.27%	2.09%
2011-2021	1.87%	12.32%	2.19%
2011-2031	2.01%	7.94%	2.22%

Sources: BTS T100, OD1A, and HNTB Analysis.

2.7 Cargo Forecasts

2.7.1 Relevant Factors

In addition to socioeconomic factors mentioned in the passenger forecast, several additional factors have impacted cargo demand in history. The entrance and exit of major all-cargo carriers created disruptions in the local cargo market that lasted for several years. Post-September 11th security policy changes, such as the 'Known Shippers Program', tightened air cargo transport policy and increased cargo screening time.

Since the 1990s, there have been two major all-cargo carriers entering and exiting the Airport. Emery Worldwide, once the largest freight forwarder/integrated air carrier in the U.S., ceased operations at the end of 2001. At the end of 2008, another major all-cargo shipper, DHL Express, ended domestic cargo service in the U.S. Each time a major shipper ceased operation, the air cargo volume immediately declined and took years to recover. Currently, two main all-cargo carriers operate at the Airport, namely FedEx and Flight Express.

All the factors described above, together with socioeconomic factors, were considered in the cargo demand forecast.

2.7.2 Cargo Tonnage Forecast

The HCAA monthly traffic report records air cargo in terms of freight and mail. Air cargo is carried in cargo compartments under the main deck of a passenger aircraft (belly cargo) or a dedicated cargo aircraft (all-cargo). Various passenger airlines carried belly cargo in 2011 with British Airways as the leading belly cargo carrier, followed by Southwest Airlines and United Airlines. Belly cargo accounts for around 15% of air freight and all the reported air mail tonnage in 2011.

FedEx dominated the TPA all-cargo market, in terms of total tonnage, transporting more than 75% of the total tonnage in 2011. The other all-cargo carrier, Flight Express, mainly utilized smaller single-engine piston aircraft such as the Cessna C210 and the Beech Baron. Therefore, although it carried less than 25% of the total tonnage, Flight Express reported around three times the number of landings as FedEx. All-cargo accounted for around 80% of air cargo transported at the Airport in 2011.

FedEx does not report freight and mail separately. Therefore, the freight and mail volume reported in the HCAA monthly activity report does not reflect the real freight and mail breakout. Consequently, freight and mail were forecasted together in this study.

Air cargo was estimated using both a top-down and a bottom-up approach. The top-down methodology examines historical market share trend of the air cargo ton-miles at the Airport relative to the entire U.S. A trend line was then developed to model the market share of future cargo ton-miles. Since the U.S. air cargo total ton-miles is forecasted in the 2011 FAA Aerospace Forecast, future cargo ton-miles were estimated using the projected market share and the U.S. total air cargo ton-miles. The market share trend and fitted trend line are included in Figure A-8 in Appendix A.

The bottom-up methodology is essentially a regression function that correlates air cargo tonnage with factors including airport draw area income, post-September11th security measures and DHL service at the Airport. A detailed discussion of regression analysis and dummy variables is included in Appendix A. The regression equation and results are included in Equation A-2 in Appendix A.

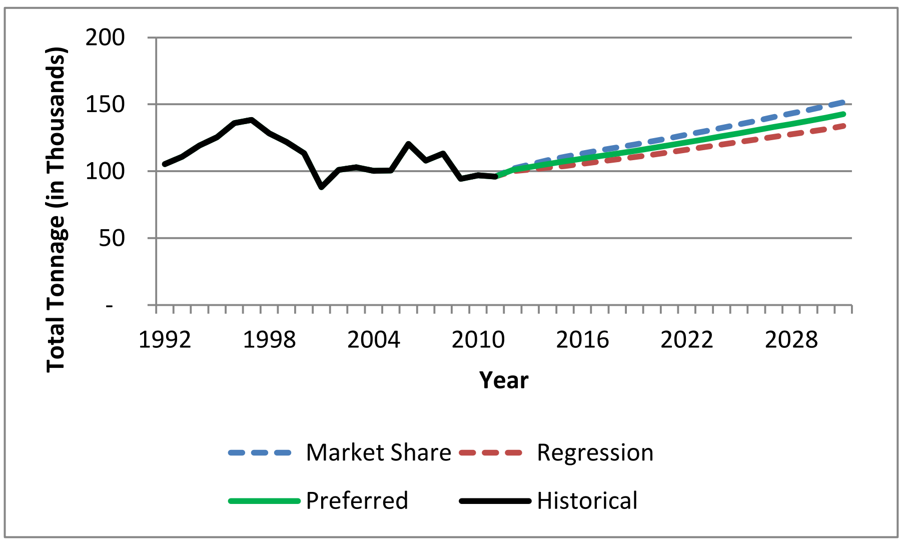
The average air cargo transport distance was estimated to extract cargo tonnage from ton-miles. The air cargo mileage recorded at the Airport in the BTS T100 database increased from 2003 to 2010. As competition from ground transportation such as rail and truck increases for short haul markets, the average air cargo transport distance is expected to continue to rise.

The average of the two methodologies is chosen as the preferred forecast.

Figure 2.13 illustrates the historical cargo volume, market share approach, regression analysis and preferred forecast.

Figure 2.13

Air Cargo Volume Forecast



Sources: HCAA Airline Statistics and HNTB Analysis.

The forecast in Figure 2.13 is conservative, and reflects the challenges involved in attracting new all-cargo air service. The largest cargo airports in the southeast, such as Miami International Airport, benefit from a large network of freight forwarders and cultural connections which are difficult to transfer to other airports such as TPA. That said, the development of manufacturing, export, or logistic industries in the Tampa region, coupled with the increased lift capacity provided by anticipated new international passenger service, could serve to attract new freight forwarders and new all-cargo carriers. If these events were to occur, the cargo tonnage forecasts could be much higher. Therefore, it is prudent to reserve space for additional cargo facilities should this demand emerge.

After the total cargo tonnage was forecasted, it was segregated to belly cargo and all-cargo categories. Two parameters in the FAA 2011 Aerospace Forecast, available seat-miles and passenger revenue ton-miles, were applied to project belly cargo. The available seat-miles projection was divided by the passenger revenue ton-miles projection to calculate the ratio of revenue tons per seat. It was assumed that the belly cargo tonnage, as a percentage of total seat departures, would increase at the same rate as this ratio. The FAA forecasts and growth factor calculation are detailed in Table A-46 in Appendix A. All-cargo tonnage is calculated as the difference between total cargo volume and belly cargo volume.

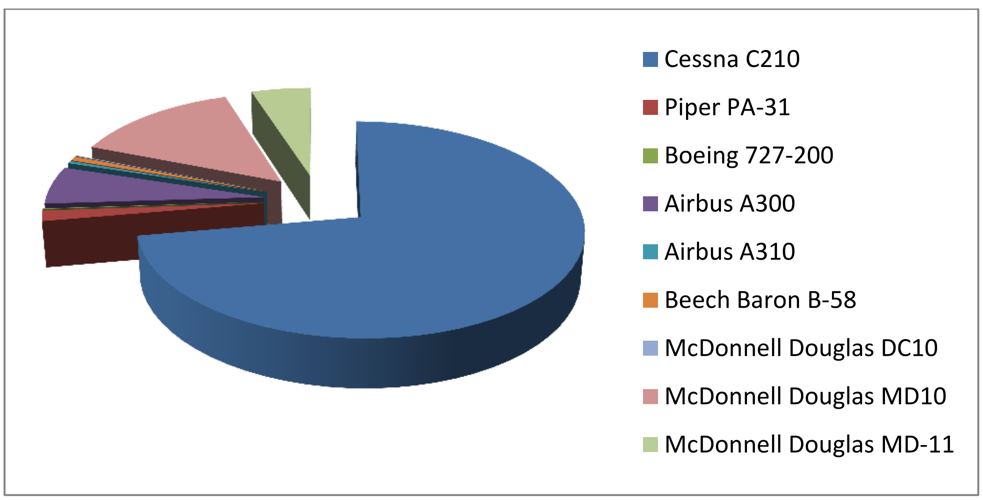
International belly cargo is projected to grow more quickly than domestic belly cargo for two reasons. First, as shown in Section 2.6, international passenger aircraft operations are projected to grow more quickly than domestic passenger aircraft operations. Secondly, international passenger operations include a higher percentage of wide-body aircraft, which provide much greater cargo capacity than narrow-body aircraft.

2.7.3 All-Cargo Operations Forecast

The current fleet composition was estimated from the projected tonnage, load factor and future freighter fleet. Two main all-cargo carriers, Flight Express and FedEx, were analyzed. The current fleet composition was obtained from the BTS T100 and HCAA airline statistics (see **Figure 2.14**). The HCAA airline statistics provided detailed aircraft landing statistics including airline, aircraft, number of landings and onboard cargo and mail. The BTS T100 database included similar information but was missing operations from Flight Express. Therefore, the HCAA airline statistics were used as the main data source. Each all-cargo aircraft's capacity was obtained from various data sources including Boeing, FedEx and web search.

Figure 2.14

Current All-Cargo Fleet Composition by the Number of Landings (As of 2010)



Source: BTS T100.

The future all-cargo freighter fleet projection employs the following assumptions:

- DC10 and MD11 aircraft are assumed to stay in the fleet in the near term and will be replaced by the Airbus A330-200F in the mid and long term
- B727 aircraft are expected to be replaced by the converted B757-200F in the mid term
- Airbus A300 freighters are assumed to be replaced by the A330-200F and B767-300F in the mid-term
- Beech Baron, Piper PA-31-350 Chieftain, and Cessna C210 aircraft are expected to be replaced by future advanced piston/turboprop aircraft with similar capacity

The total required freight capacity for each carrier was estimated by dividing cargo tonnage by load factors. The current manner which all-cargo carriers operate in terms of aircraft type and frequency of service was obtained from the HCAA airline statistics. Future operations were projected using the current carrier fleet mix, individual aircraft cargo capacity and future fleet replacement plans. Annual freighter frequencies were estimated so that the cumulative freight capacity would be equal to the required cargo capacity. Future fleet and expected operations of Flight Express and FedEx are listed in Table A-47 and Table A-48 in Appendix A.

2.7.4 Cargo Tonnage and Operations Summary

A summary of freight and mail forecasts is shown in **Table 2.12**. The all cargo operations forecast is presented in **Table 2.13.**

Table 2.12

Air Cargo Forecast

Year	All-Cargo		Belly		Total		Grand Total
	Enplaned	Deplaned	Enplaned	Deplaned	Enplaned	Deplaned	
2011	33,651	42,870	8,928	10,443	42,579	53,313	95,892
2016	37,932	48,173	10,288	13,066	48,220	61,239	109,459
2021	41,324	52,482	11,285	14,332	52,609	66,814	119,423
2031	49,358	62,684	13,480	17,120	62,838	79,804	142,642
Average Annual Growth Factor							
2011-2016	2.42%	2.36%	2.88%	4.58%	2.52%	2.81%	2.68%
2011-2021	2.08%	2.04%	2.37%	3.22%	2.14%	2.28%	2.22%
2011-2031	1.93%	1.92%	2.08%	2.50%	1.97%	2.04%	2.01%

Sources: HCAA Monthly Report and HNTB Analysis

Table 2.13

All-Cargo Operations Forecast

Year	All-Cargo Operations			Average Annual Growth Factor	
	Departures	Landings	Total		
2011	3,172	3,168	6,340	N/A	N/A
2016	3,401	3,397	6,798	2011-2016	1.41%
2021	3,637	3,632	7,269	2011-2021	1.38%
2031	4,161	4,156	8,317	2011-2031	1.37%

Sources: HCAA Monthly Report and HNTB Analysis.

The projected annual growth in terms of all-cargo operations lags projected cargo volume growth as a result of increased average freighter size and load factors. It was assumed that the load factor at FedEx will remain at the current level and the load factor at Flight Express will increase 1% every five years. The near term operations growth rate is projected at 1.41%. It then slows down to 1.38% and 1.37% in the mid and long term, respectively, when the all-cargo transport market is expected to stabilize.

2.8 Other Aviation Activity Forecasts

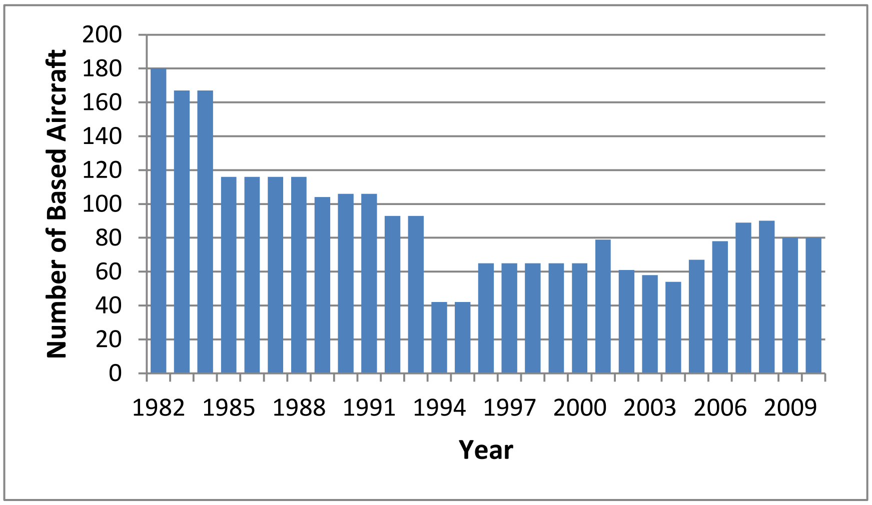
Other aviation activities consist of general aviation (GA), air taxi and military operations. The number of GA aircraft by category was projected using regional and national market share analysis. GA operations were calculated from the FAA's General Aviation and Air Taxi Activity (GAATA) survey and adjusted to match the HCAA monthly activity report. Two methodologies, trend line and market share, were applied to estimate air taxi operations. Military operations at the Airport were assumed to remain at the 2011 level. The following sections describe methodologies and data sources for each forecast.

2.8.1 General Aviation

During the early 1980s, the number of based aircraft at the Airport peaked, which was attributed to a new GA complex and several additional facilities. It declined afterwards from 180 aircraft in 1982 to around 80 aircraft in 2010 according to the FAA TAF (See **Figure 2.15**Figure 2.). A quarterly GA tenant count provided by the HCAA shows the total number of based aircraft declined further to no more than 70 based aircraft in 2011 (See Table A-17 in Appendix A). The decline was partly due to the availability of other HCAA owned and operated facilities including Peter O. Knight Airport, Plant City Airport and Tampa Executive (formerly Vandenberg Airport). In addition, other airports in the Tampa Bay area such as Albert Whitted Airport in St. Petersburg and St. Petersburg – Clearwater International Airport in Clearwater provide alternative bases for GA users.

Figure 2.15

Number of Based Aircraft at the Airport



Sources: FAA Terminal Area Forecast (TAF) and HNTB Analysis.

The number of single engine piston aircraft fluctuated from 2007 to 2011. Both multi-engine piston and turboprop aircraft counts decreased substantially in the last five years. By comparison, the decline of based jets and helicopters was moderate.

The number of based jets was forecasted separately for several reasons. Firstly, the decline in the jet population at TPA has been much slower than any other category. Additionally, jets prefer to base at large airports with sufficient supporting facilities. And lastly, jets represent a fast growing category in the Aerospace Forecast 2011, a trend different from other traditional GA aircraft category. Therefore, based jet aircraft at the Airport are expected to increase as the economic environment recovers.

In 2009 and 2010, based jets at the Airport accounted for around 0.35% of the national jet population. It is assumed that this market share would stay the same in the forecasting horizon. By multiplying this market share by the total based jet forecast published by the FAA TAF, the total number of based jets at the Airport was projected.

However, with increased commercial traffic and development of reliever GA airports in the region, other based GA aircraft at TPA are expected to decrease. The Airport's based aircraft (without jets) share of the national total declined from 0.06% in 1990 to 0.02% in 2010. This trend is expected to continue as more GA activities migrate to less congested reliever airports catering to GA traffic.

The number of based GA aircraft (without jets) was also compared with the GA based aircraft population in the primary and secondary draw area. A list of commercial and GA airports in the region and GA based aircraft is included in Table A-48 in Appendix A. Similarly, the Airport's share of regional GA aircraft (without jets) gradually declines. This trend would continue for the same reason mentioned above.

Trend lines were developed to forecast the future based aircraft share of both the national market (Figure A-9 in Appendix A) and regional market (Figure A-10 in Appendix A). By multiplying market share by the total number of based aircraft forecasted by the FAA TAF, the expected GA based aircraft population at the Airport other than jets was projected. Table A-50 and Table A-51 in Appendix A show the GA based aircraft forecast from the national and regional market share analyses.

Both methodologies produced similar projections. The average of the two methodologies was used as the preferred based GA aircraft forecast. After the total number of GA aircraft was forecasted, the current share of based aircraft in each category relative to the total aircraft counts and the expected growth pattern from the FAA 2011 Aerospace Forecast were used to forecast future GA based aircraft in each category.

The GA based aircraft forecast is summarized in **Table 2.14.**

Table 2.14

GA Based Aircraft Forecast by Aircraft Category

Year	Single Engine Piston	Multi-Engine Piston	Multi-Engine Turboprop	Jet	Helicopter	Total
2011	17	2	5	37	8	69
2016	14	2	4	40	8	68
2021	12	1	4	42	8	67
2031	9	1	3	47	7	67

Sources: HCAA quarterly GA tenant survey, FAA TAF, FAA GAATA, and HNTB analysis.

The number of GA operations was projected based on the forecast of based GA aircraft and operations per based aircraft. Although all GA operations are not necessarily performed by based aircraft, their counts usually correlate with the total number of GA operations. The FAA 2011 Aerospace Forecast publishes historical counts and forecasts of active GA and air taxi aircraft by aircraft category. It also provides the number of landings performed by these aircraft by geographic region. The rate of growth by aircraft category in the Southern region was applied in this study. By multiplying the landing rate by the number of based aircraft, the estimated operations were compared with the HCAA monthly activity report. An adjustment factor was calculated and assumed to remain constant in the future. This factor was used to account for regional differences, operations performed by non-based GA aircraft, and difference between landings and operations. **Table 2.15** presents the expected GA operations.

Table 2.15

General Aviation Operations Forecast

Year	Single Engine Piston	Multi-Engine Piston	Multi-Engine Turboprop	Jet	Helicopter	Total
2011	3,739	556	958	11,584	7,363	24,201
2016	3,192	462	888	12,439	7,316	24,297
2021	2,764	380	818	13,061	7,235	24,258
2031	2,063	242	653	14,616	6,377	24,258
Average Annual Growth Rate						
2011-2016	-3.12%	-3.64%	-1.51%	1.43%	-0.13%	0.08%
2011-2021	-2.98%	-3.74%	-1.57%	1.21%	-0.18%	0.02%
2011-2031	-2.93%	-4.08%	-1.90%	1.17%	-0.72%	0.01%

Sources: FAA GAATA, FAA Aerospace Forecast, FAA GAATA, and HNTB analysis.

GA activity at the Airport is projected to increase slightly in the future. Less sophisticated aircraft including piston and turboprop aircraft will continue to migrate to other GA airports in the region. Moderate growth is expected from more advanced jet aircraft. The decline in piston and turboprop aircraft is expected to be offset by the increase of jet operations. Future GA operations at the Airport are envisioned to be dominated by jet and helicopter operations.

2.8.2 True Air Taxi

For the purpose of this study, air taxi refers to on-demand cargo or passenger operations that do not operate on a regular schedule. In this study, true air taxi operations were calculated by subtracting T100 passenger operations and HCAA all-cargo operations from the FAA ATADS count of commercial operations. In 2011, there were 6,529 air taxi operations. It is assumed that future air taxi operations will stay at 6,529 operations annually.

2.8.3 Military

Military activity peaked during the mid-1990s. During the late 1990s, the number of operations dropped to below 1,000 operations. In 2011, the Airport recorded 571 military operations. Figure A-11 in Appendix A illustrates historical annual military operations.

With the MacDill Air Force Base less than 10 miles to the south and the anticipated increase in civilian traffic, military operations are not anticipated to change substantially at the Airport. It is assumed that military operations will stay at the current level of 571 annual operations during the planning period.

2.9 Forecast Scenarios

The assumptions used in developing the forecasts are likely to vary over the forecast period, and the variations could be material. One way to explore the impact of these variations is to develop alternative scenarios in which the impact on the forecast of a variation in a critical assumption is evaluated. The baseline forecast provides the basis for determining what additional facilities will be required at the Airport through 2031. The HCAA must be able to respond to a range of contingencies that could occur, taking into account political and economic changes, technological changes, and changes in the policies of individual airlines. The recommended development program must be flexible enough to accommodate these contingencies.

To address these potential changes, three alternative forecast scenarios were selected with the assistance of HCAA staff. Much of the background information used to develop the scenarios is provided in previous sections.

The three scenarios represent:

1. High Economic Growth
2. Enhanced International Service
3. High Fuel Costs Combined with Low Economic Growth

The scenarios include annual domestic and international passengers, annual cargo tonnage and annual operations by category in each forecast year. For purposes of comparison, the baseline forecast is summarized in **Tables 2.16 and 2.17** below.

Table 2.16

Summary of Baseline Forecast

Year	Passenger Enplanements			Cargo Tonnage	GA Based Aircraft
	Domestic	International	Total		
2011	8,197,943	211,705	8,409,648	95,892	69
2016	9,360,547	462,273	9,822,820	109,459	68
2021	10,815,875	620,770	11,436,645	119,423	67
2031	13,462,695	889,337	14,352,032	142,642	67
Average Annual Growth Rate					
2011-2016	2.69%	16.91%	3.16%	2.68%	-0.15%
2011-2021	2.81%	11.36%	3.12%	2.22%	-0.19%
2011-2031	2.51%	7.44%	2.71%	2.01%	-0.14%

Source: HNTB Analysis

Table 2.17

Summary of Baseline Aircraft Operations Forecast

Year	Commercial		Air Taxi	All Cargo	GA		Military	Grand Total
	Domestic	International			Itinerant	Local		
2011	150,562	2,976	6,529	6,340	24,201	136	571	191,315
2016	162,804	7,490	6,529	6,798	24,147	136	571	208,475
2021	181,209	9,508	6,529	7,269	23,946	136	571	229,167
2031	224,362	13,730	6,529	8,317	23,395	136	571	277,040
Average Annual Growth Rate								
2011-2016	1.58%	20.27%	0.00%	1.41%	-0.04%	0.00%	0.00%	1.73%
2011-2021	1.87%	12.32%	0.00%	1.38%	-0.11%	0.00%	0.00%	1.82%
2011-2031	2.01%	7.94%	0.00%	1.37%	-0.17%	0.00%	0.00%	1.87%

Source: HNTB Analysis

2.9.1 High Economic Growth

This scenario assumes regional and national personal income grow at a 25 percent higher rate than projected under the baseline forecast through 2016, and 50 percent higher than projected under the baseline forecast from 2017 through 2031. This assumption would apply to both regional and national growth. Therefore, in the Tampa metropolitan area average annual income growth would be 3.4 percent from through 2016, and 3.9 percent from 2017 through 2031, as compared to 2.6 percent in the baseline case. In the United States average annual income growth would be 2.8 percent through 2016, and 3.3 percent from 2017 through 2031, as compared to 2.2 percent in the baseline case.

Nationally, factors that have led to these growth rates in the past include demographic changes that have led to large numbers of people entering the workforce as occurred in the 1960s and productivity improvements as occurred with the dot.com boom in the 1990s. Regionally, strong in-migration and the associated development and investment have also led to periods of strong economic growth.

Table 2.18 summarizes the results of the High Economic Growth scenario. Combined domestic and international passengers are projected to grow 3.5 percent per year compared to 2.7 percent per year under the baseline scenario. Cargo tonnage and the number of based aircraft would also grow more rapidly than under the baseline forecast. **Table 2.19** summarizes the High Economic Growth operations scenario. Total operations are projected to grow 2.72 percent annually compared to 1.87 percent under the baseline case.

Table 2.18

Summary of Scenario 1 – High Economic Growth

Year	Passenger Enplanements			Cargo Tonnage	GA Based Aircraft
	Domestic	International	Total		
2011	8,197,943	211,705	8,409,648	95,892	69
2016	9,538,770	471,075	10,009,845	110,187	69
2021	11,566,977	663,879	12,230,857	122,601	73
2031	15,854,698	1,047,351	16,902,049	153,130	83
Average Annual Growth Rate					
2011-2016	3.08%	17.35%	3.55%	2.82%	0.15%
2011-2021	3.50%	12.11%	3.82%	2.49%	0.64%
2011-2031	3.35%	8.32%	3.55%	2.37%	0.96%

Source: HNTB Analysis

Table 2.19

Summary of Scenario 1 Operations Forecasts

Year	Commercial		Air Taxi	All Cargo	GA		Military	Grand Total
	Domestic	International			Itinerant	Local		
2011	150,562	2,976	6,529	6,340	24,201	136	571	191,315
2016	165,904	7,633	6,650	6,842	24,898	136	571	212,634
2021	193,793	10,168	6,972	7,459	26,350	136	571	245,449
2031	264,226	16,169	7,666	8,930	29,502	136	571	327,200
Average Annual Growth Rate								
2011-2016	1.96%	20.73%	0.37%	1.54%	0.57%	0.00%	0.00%	2.14%
2011-2021	2.56%	13.07%	0.66%	1.64%	0.85%	0.00%	0.00%	2.52%
2011-2031	2.85%	8.83%	0.81%	1.73%	1.00%	0.00%	0.00%	2.72%

Source: HNTB Analysis

2.9.2 Enhanced International Service

This scenario assumes continued aggressive international marketing efforts so that by the end of the forecast period (2031) TPA's share of Central Florida (TPA+MCO) international enplanements come closer to parity with TPA's share of Central Florida domestic enplanements. The scenario assumes recapture of international traffic in nearby counties that is currently leaking to other airports, proportional to its share of domestic traffic from those counties, and significant inroads into markets defined by the one-hour and two-drive time contours from TPA.

The recapture would occur over a period of ten years and would be complete by 2021. The scenario also assumes that as a result of the international service improvements, visiting international passengers would increase in proportion to resident international passengers.

Based on data provided by the HCAA, TPA currently captures about 78 percent of the domestic originations that come from the principle counties served by TPA, including Pinellas, Pasco, Hernando, Hillsborough, Sarasota, Manatee, and Polk Counties. TPA captures a lower percentage of international originations from these counties, especially for traffic going to Central America or South America. Under this scenario, it is assumed that the international capture rate would rise to 78 percent – the same as the domestic capture rate. It was assumed that the capture rate would increase by the same amount each year and reach the 78 percent level by 2021.

Because of its geographic location and lack of domestic feed traffic, TPA is unlikely to obtain non-stop service to markets in Africa, Asia, the Middle East, or Oceania. Therefore, even under the enhanced international service scenario, it was assumed that TPA originating passengers destined for these points would board a domestic flight at TPA to another international gateway.

Table 2.20 summarizes the results of the enhanced international service scenario. Under this scenario, international enplanements are projected to increase at an average of 9.01 percent per year, compared to 7.44 percent per year under the baseline case. The forecast of cargo tonnage would increase slightly as a result of the belly capacity on the additional international passenger flights. The domestic enplanement forecast and based aircraft forecast would be unchanged from the baseline case.

Table 2.21 summarizes the aircraft operations forecast associated with the enhanced international service scenario. Under this scenario, international passenger aircraft operations are higher than under the baseline case, but all other categories remain the same.

Table 2.20

Summary of Scenario 2 – Enhanced International Service

Year	Passenger Enplanements			Cargo Tonnage	GA Based Aircraft
	Domestic	International	Total		
2011	8,197,943	211,705	8,409,648	95,892	69
2016	9,360,547	573,246	9,933,793	109,722	68
2021	10,815,875	844,378	11,660,253	119,924	67
2031	13,462,695	1,189,533	14,652,228	143,283	67
Average Annual Growth Rate					
2011-2016	2.69%	22.05%	3.39%	2.73%	-0.15%
2011-2021	2.81%	14.84%	3.32%	2.26%	-0.19%
2011-2031	2.51%	9.01%	2.81%	2.03%	-0.14%

Source: HNTB Analysis

Table 2.21

Summary of Scenario 2 Operations Forecasts

Year	Commercial		Air Taxi	All Cargo	GA		Military	Grand Total
	Domestic	International			Itinerant	Local		
2011	150,562	2,976	6,529	6,340	24,201	136	571	191,315
2016	162,804	11,536	6,529	6,798	24,147	136	571	212,521
2021	181,209	12,933	6,529	7,269	23,946	136	571	232,592
2031	224,362	18,365	6,529	8,317	23,395	136	571	281,675
Average Annual Growth Rate								
2011-2016	1.58%	31.12%	0.00%	1.41%	-0.04%	0.00%	0.00%	2.12%
2011-2021	1.87%	15.83%	0.00%	1.38%	-0.11%	0.00%	0.00%	1.97%
2011-2031	2.01%	9.53%	0.00%	1.37%	-0.17%	0.00%	0.00%	1.95%

Source: HNTB Analysis

2.9.3 High Fuel Costs combined with Low Economic Growth

This scenario is intended to provide a stress test for the financial analysis to determine whether the Airport would be able to meet its estimated financial obligations under very adverse growth conditions. It assumes jet fuel prices rise to the levels projected under the U.S. Department of Energy's High Cost Scenario, from $2.94 per gallon in 2011 to $5.04 per gallon by 2030. It also assumes that regional and national personal income grows at a 50 percent lower rate than projected under the baseline forecast. The two assumptions are consistent since high energy costs tend to impede economic growth.

Based on the low economic growth assumptions, income in the Tampa metropolitan area would increase at an average of 1.3 percent per year vs. 2.6 percent per year under the baseline case. For the United States, income would grow at an average annual rate of 1.1 percent per year compared to 2.2 percent per year under the baseline case.

Table 2.22 summarizes the results of Scenario 3. Under these assumptions, total passenger enplanements would be expected to increase at an average annual rate of 1.38 percent, compared to 2.71 percent annually under the baseline case. Cargo tonnage growth would be 1.38 percent per year compared to 2.01 percent under the baseline case. Based aircraft would decline significantly.

Table 2.23 provides the Scenario 3 forecasts of aircraft operations. Total operations are projected to grow very slowly under this scenario, an average of 0.62 percent per year compared to 1.87 percent under the base. Part of the reason is that with higher fuel costs, it is expected that airlines will phase out the fuel-inefficient regional jets at a faster rate, and fly more mainline aircraft at lower frequencies. Consequently, the average size of passenger aircraft would increase more than under the base case, and passenger growth will result in fewer operations.

Table 2.22

Summary of Scenario 3 – High Fuel Costs Combined with Low Economic Growth

Year	Passenger Enplanements			Cargo Tonnage	GA Based Aircraft
	Domestic	International	Total		
2011	8,197,943	211,705	8,409,648	95,892	69
2016	8,645,790	426,302	9,072,092	108,040	65
2021	9,387,218	537,424	9,924,642	115,736	60
2031	10,370,624	682,386	11,053,010	133,241	51
Average Annual Growth Rate					
2011-2016	1.07%	15.03%	1.53%	2.41%	-1.04%
2011-2021	1.36%	9.76%	1.67%	1.90%	-1.32%
2011-2031	1.18%	6.03%	1.38%	1.66%	-1.46%

Source: HNTB Analysis

Table 2.23

Summary of Scenario 3 Operations Forecasts

Year	Commercial		Air Taxi	All Cargo	GA		Military	Grand Total
	Domestic	International			Itinerant	Local		
2011	150,562	2,976	6,529	6,340	24,201	136	571	191,315
2016	149,830	7,004	6,024	6,562	23,125	136	571	193,252
2021	157,978	8,474	5,712	6,752	21,617	136	571	201,240
2031	173,576	10,868	5,085	7,473	18,789	136	571	216,498
Average Annual Growth Rate								
2011-2016	-0.10%	18.67%	-1.60%	0.69%	-0.91%	0.00%	0.00%	0.20%
2011-2021	0.48%	11.03%	-1.33%	0.63%	-1.12%	0.00%	0.00%	0.51%
2011-2031	0.71%	6.69%	-1.24%	0.83%	-1.26%	0.00%	0.00%	0.62%

Source: HNTB Analysis

2.9.4 Forecast Scenario Summary

Table 2.24 summarizes the passenger enplanement forecasts for the baseline projections and the three scenarios. As shown, by 2031 the alternative assumptions generate a wide range in passenger activity levels. Passenger enplanement levels would range from slightly over 11 million under the High Fuel Cost and Low Economic Growth scenario to almost 17 million under the High Economic Growth scenario. There is a similar variation in the aircraft operations forecasts (see **Table 2.25**). By 2031, total aircraft operations range from 216,498 under the High Fuel Cost and Low Economic Growth scenario to 327,200 under the High Economic Growth scenario.

Table 2.24

Summary of Passenger Enplanement Forecasts By Scenario

Year	Baseline	Scenario 1	Scenario 2	Scenario 3
		High Economic Growth	Enhanced International Service	High Fuel Costs and Low Economic Growth
2011	8,409,648	8,409,648	8,409,648	8,409,648
2016	9,822,820	10,009,845	9,933,793	9,072,092
2021	11,436,645	12,230,857	11,660,253	9,924,642
2031	14,352,032	16,902,049	14,652,228	11,053,010
Average Annual Growth Rate				
2011-2016	3.16%	3.55%	3.39%	1.53%
2011-2021	3.12%	3.82%	3.32%	1.67%
2011-2031	2.71%	3.55%	2.81%	1.38%

Source: HNTB analysis.

Table 2.25

Summary of Aircraft Operations Forecasts by Scenario

Year	Baseline	Scenario 1	Scenario 2	Scenario 3
		High Economic Growth	Enhanced International Service	High Fuel Costs and Low Economic Growth
2011	191,315	191,315	191,315	191,315
2016	208,475	212,634	212,521	193,252
2021	229,167	245,449	232,592	201,240
2031	277,040	327,200	281,675	216,498
Average Annual Growth Rate				
2011-2016	1.73%	2.14%	2.12%	0.20%
2011-2021	1.82%	2.52%	1.97%	0.51%
2011-2031	1.87%	2.72%	1.95%	0.62%

Source: HNTB analysis.

2.10 Aviation Activity Forecast Summary

The annual baseline passenger, cargo, general aviation and military activity forecasts are summarized in **Table 2.26 and Table 2.27.**

Among all categories forecasted, the international passenger segment is expected to demonstrate the strongest growth as the Airport pursues European, Caribbean, South American and Latin American markets. As the less advanced GA population migrates to other GA airports in the region, piston and turboprop activity is forecasted to decline accordingly. However, based jet aircraft is expected to increase as jet users prefer larger airports with sufficient facilities. The domestic enplanements growth is expected to be higher than the national average. Air cargo market growth, however, is expected to be slower than the national average.

Table 2.26

Passenger, Cargo and GA Forecast Summary

Year	Passenger Enplanements			Cargo Tonnage	GA Based Aircraft
	Domestic	International	Total		
2011	8,197,943	211,705	8,409,648	95,892	69
2016	9,360,547	462,273	9,822,820	109,459	68
2021	10,815,875	620,770	11,436,645	119,423	67
2031	13,462,695	889,337	14,352,032	142,642	67
Average Annual Growth Rate					
2011-2016	2.69%	16.91%	3.16%	2.68%	-0.15%
2011-2021	2.81%	11.36%	3.12%	2.22%	-0.19%
2011-2031	2.51%	7.44%	2.71%	2.01%	-0.14%

Source: HNTB Analysis.

Table 2.27

Operations Forecast Summary

Year	Commercial		Air Taxi	All Cargo	GA		Military	Grand Total
	Domestic	International			Itinerant	Local		
2011	150,562	2,976	6,529	6,340	24,201	136	571	191,315
2016	162,804	7,490	6,529	6,798	24,147	136	571	208,475
2021	181,209	9,508	6,529	7,269	23,946	136	571	229,167
2031	224,362	13,730	6,529	8,317	23,395	136	571	277,040
Average Annual Growth Rate								
2011-2016	1.58%	20.27%	0.00%	1.41%	-0.04%	0.00%	0.00%	1.73%
2011-2021	1.87%	12.32%	0.00%	1.38%	-0.11%	0.00%	0.00%	1.82%
2011-2031	2.01%	7.94%	0.00%	1.37%	-0.17%	0.00%	0.00%	1.87%

Source: HNTB Analysis.

In terms of operations, the fastest growth will be concentrated in the international passenger segment. Moderate growth is expected for the all-cargo and domestic passenger markets. GA operations are projected to decline slightly. Military, true air taxi and local GA operations are projected to remain constant in the future.

The assumptions used in developing the forecasts are likely to vary over the forecast period. In order to address these potential changes, three alternative forecast scenarios were developed: high economic growth, enhanced international service, and high fuel costs combined with low economic growth. Forecasts of passenger enplanements and aircraft operations generated a wide range of activity levels between the three scenarios. By 2031, passenger enplanement levels would range from slightly over 11 million under the High Fuel Cost and Low Economic Growth scenario to almost 17 million under the High Economic Growth scenario. Similarly, in the aircraft operations forecasts, by 2031, total operations range from 216,498 under the High Fuel Cost and Low Economic Growth scenario to 327,200 under the High Economic Growth scenario.

The baseline forecasts from this study are compared with the FAA TAF 2011 forecast (**Table 2.28**). In terms of operations, the projected growth rates in this study are within 5% of the FAA TAF growth rates. The passenger enplanements are expected to grow at a faster pace than forecasted by the FAA TAF, in part because the base year numbers are higher. According to the FAA, forecasts are considered to be consistent with the TAF if they differ by less than 10 percent within the five-year forecast period, and by less than 15 percent within the ten-year forecast period. The TPA forecasts meet these criteria.

More detailed, year-by-year comparisons of the passenger and operations forecasts are provided in Tables A.52 and A.53 in Appendix A. Table A.52 also includes a comparison with the HCAA's internally-developed passenger forecast..

Table 2.28

Forecasts Comparison with FAA TAF

Year	Master Plan Forecast	TAF	Percent Difference
Passenger Enplanements			
2011	8,409,648	8,238,812	2.07%
2016	9,822,820	9,060,416	8.41%
2021	11,436,645	10,315,430	10.87%
2031	14,352,032	13,373,515	7.32%
Average Annual Growth Rate			
2011-2031	2.71%	2.45%	
Commercial Operations			
2011	159,878	167,370	-4.48%
2016	177,092	176,633	0.26%
2021	197,985	197,867	0.06%
2031	246,409	248,817	-0.97%
Average Annual Growth Rate			
2011-2031	2.19%	2.00%	
Total Operations			
2011	191,315	192,691	-0.71%
2016	208,475	200,649	3.90%
2021	229,167	221,853	3.30%
2031	277,040	272,743	1.58%
Average Annual Growth Rate			
2011-2031	1.87%	1.75%	

Sources: FAA TAF and HNTB Analysis.

References

1. 2005 Master Plan Update, Skyward 2025: Tampa International Airport, Jan 2006.

2. Terminal Area Forecast (TAF), http://aspm.faa.gov/main/taf.asp, Federal Aviation Administration (FAA).

3. Strategic Business Plan – Aviation Authority, Tampa International Airport, Peter O. Knight Airport, Plant City Airport, Tampa Executive Airport, May 2010.

4. Tampa International Airport, St. Pete/Clearwater Tourist Development Council, http://www.pinellascvb.com/files/st._pete-clearwater_tourist_development_council_-_6-8-11_-_tia_presentation.pdf, Jun 2011.

5. Governor halts Orlando-Tampa high speed rail project, http://www.railwaygazette.com/nc/news/single-view/view/orlando-tampa-hsr-project-halted.html, Feb 2011

6. Florida Governor Rejects US High-Speed Rail Funds, http://www.reuters.com/article/2011/02/16/florida-rail-idUSN1629082420110216, Feb 2012

7. The Complete Economic and Demographic Data Source (CEDDS) 2011, Woods & Poole Economics, http://www.woodsandpoole.com, 2011.

8. Florida Population Estimates for Counties, http://edr.state.fl.us/Content/population-demographics/data/FLcopops_2011.xls, Florida Office of Economic and Demographic Research, Population and Demographic Data.

9. Population Studies, Bureau of Economic and Business Research, University of Florida, http://www.bebr.ufl.edu/about/population.

10. GDP and Personal Income, Regional Data. http://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=2. U.S. Department of Commerce, Bureau of Economic Analysis. Accessed July 2011.

11. Florida Total County Population: April 1970-2030, Florida Office of Economic and Demographic Research, http://edr.state.fl.us/Content/population-demographics/data/Pop_0401_c.pdf, Florida Demographic Estimating Conference, Jan 2010 and Florida Demographic Database, Aug 2010.

12. U.S. Airlines Post Lower Earnings in 2011 Due to Rising Costs, Airlines for America, http://www.airlines.org/Pages/news_2-28-2012.aspx, accessed Apr 2012

13. FAA Aerospace Forecast Fiscal Year : 2011-2031, FAA, http://www.faa.gov/about/office_org/headquarters_offices/apl/aviation_forecasts/, accessed Dec 2011

14. Jet Fuel Price Monitor, The International Air Transport Association, http://www.iata.org/whatwedo/economics/fuel_monitor/Pages/index.aspx, accessed Mar, 2012.

15. Airline Origin and Destination Survey (OD1A), Research and Innovative Technology Administration, Bureau of Transportation Statistics, http://www.transtats.bts.gov/Tables.asp?DB_ID=125.

16. Tampa International Airport Plans for its Future, Board of Directors to Consider Airline Incentive Program, Tampa International Airport News Release, Jun 2011.

17. Steve Huettel, Tampa International Airport votes to give airlines incentive for adding flights, http://www.tampabay.com/news/business/airlines/tampa-international-airport-votes-to-give-airlines-incentives-for-adding/1176335, Jun, 2011.

18. Independence Air to shut down – Low-cost carrier succumbs to bankruptcy, will stop flying Thursday; refunds should be available, CNN, http://money.cnn.com/2006/01/02/news/midcaps/independence/, accessed Jan 2012

19. Local Area Unemployment Statistics, Annual Average, http://www.bls.gov/lau/home.htm, accessed Dec 2011

20. Fourth Quarter 2011 Survey of Professional Forecasters, http://www.phil.frb.org/research-and-data/real-time-center/survey-of-professional-forecasters/2011/survq411.cfm, The Federal Reserve Bank of Philadelphia, accessed Jan 2012

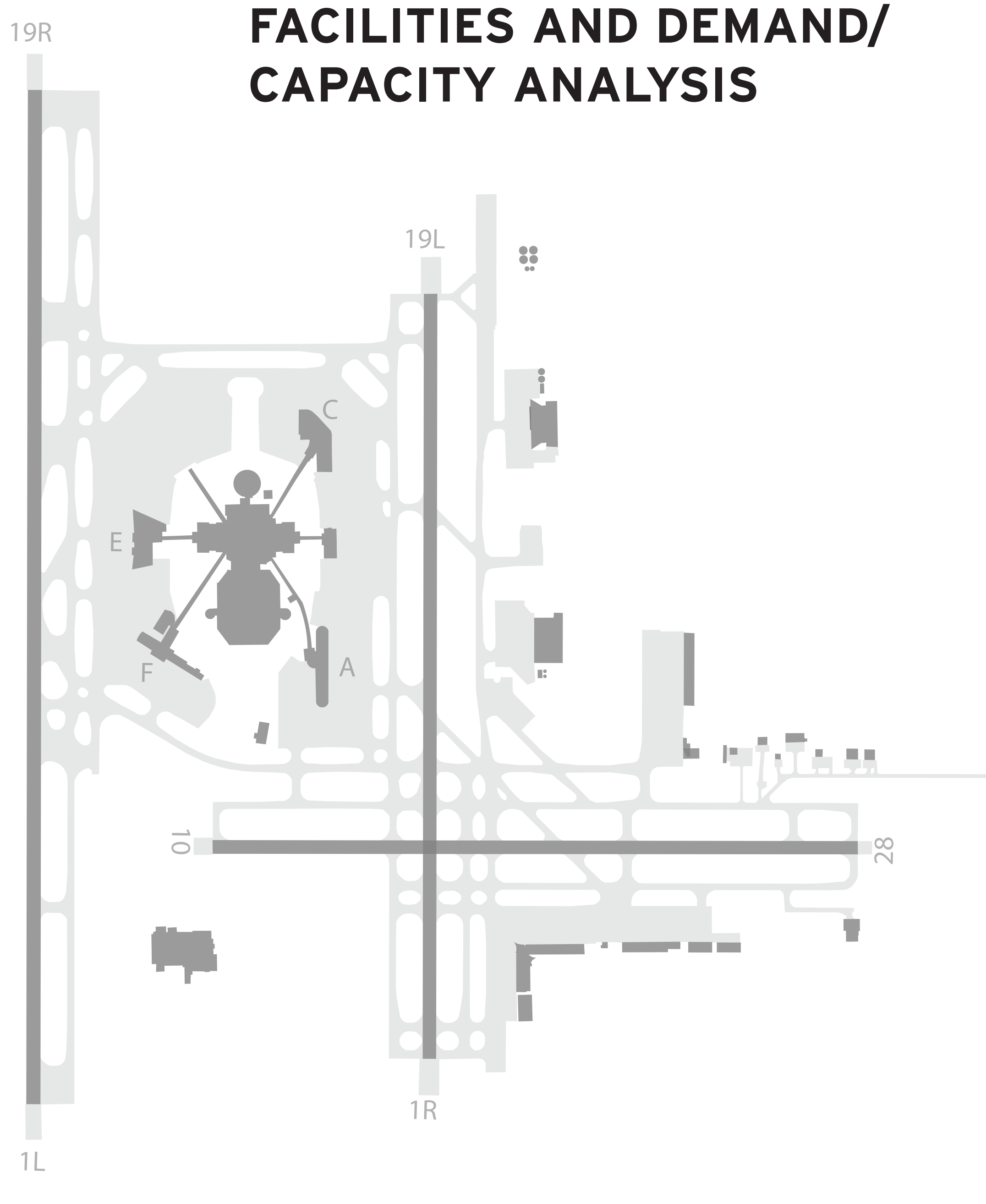
21. Economic and Budget Analyses, http://m.whitehouse.gov/sites/default/files/omb/budget/fy2012/assets/econ_analyses.pdf, The White House, accessed Jan 2012

22. Airport and Strategic Economic Partners Bring Home Nonstop Service to Zurich, Switzerland, via Edelweiss Air, Tampa International Airport News Release, Sep 2011.

23. Tampa International Airport wins approval to begin Cuba flights, http://www.tampabay.com/news/business/tourism/tampa-international-airport-wins-approval-to-begin-cuba-flights/1155810, Mar 2011.

24. Tampa Airport launches fourth weekly flight to Cuba – new service to Holguin starts Tuesday, Tampa International Airport News Release, Nov 2011.

SECTION 3 - AIRFIELD FACILITIES AND DEMAND/ CAPACITY ANALYSIS



3 AIRFIELD FACILITIES AND DEMAND/CAPACITY ANALYSIS

3.1 Airfield Existing Conditions

The following sections provide an abbreviated overview of the existing airfield facilities at TPA. This information is used in conjunction with the forecast of future activity to determine whether the airfield has sufficient capacity to accommodate the forecast growth in activity over the planning horizon. At the direction of the HCAA, the 2012 master plan update was specifically directed to not focus on a re-evaluation of existing airfield facilities with the exception of evaluating the need for and capacity related value of a proposed 1,200 foot long extension to Runway 10-28, the crosswind runway. The proposed extension to the crosswind runway was identified in the previous master plan. Further, the HCAA indicated that facilities not upgraded or changed since the 2005 master plan were to be noted and that a reference back to the 2005 master plan as a source of relevant facility information was to be incorporated into any documents developed as a part of the 2012 Master Plan effort.

As a result, the focus of this section is to provide an abbreviated update of existing airfield components with specific notation relative to changes in these facilities that have occurred since the 2005 Airport Master Plan. Basic information relative to airfield systems has been incorporated as necessary to provide the basis for subsequent capacity evaluation and facility requirements purposes. Consistent with the direction from the HCAA, should greater detail or discussion regarding airfield facilities be desired, it will be necessary to refer to Volume Two – Airfield Planning of the 2005 Airport Master Plan document. Included in this update assessment are a brief overview of existing airfield facilities, the demand capacity assessment, the analysis of the need for the extension of Runway 10-28 and the listing of projects that are recommended to be carried forward from the 2005 plan in this master plan update.

As noted the first step is to develop an abbreviated overview of the primary airfield facilities at TPA. The following elements are included in the review of existing airfield facilities.

- Existing Runways
- Approach Procedures and Minimums
- Existing Taxiways and Aprons

3.1.1 Existing Runways

The airfield at Tampa International Airport is comprised of a system of three existing runways. These consist of two primary runways and a crosswind runway. The primary runways, Runway 1L-19R and Runway 1R-19L, are aligned parallel to one another with a north/south orientation and are situated on either side of the Main Terminal. The crosswind runway, Runway 10-28, is located to the south/southeast of the terminal and is oriented along a general east-west alignment. This three runway system is supported by an array of taxiways connecting the airfield to the developed aviation uses and facilities at TPA. No change in any of the three runways at TPA has occurred since the completion of the 2005 Airport Master Plan. For added detail please refer to the 2005 Tampa Airport Master Plan Update, Volume Two. A brief overview of each runway is given in the following sections:

3.1.1.1 Runway 1L-19R

Runway 1L-19R is 11,002 feet long, 150 feet wide with 35 foot shoulders and serves as one of two primary air carrier runways at TPA. The runway is constructed of concrete with a grooved surface and is listed in good condition. The runway is located on the west side of the terminal complex and maintains a 4,301 foot lateral separation from the centerline of the parallel runway located to the east of the Main Terminal. **Table 3.1** provides a summary of key runway design characteristics data, geometry, lighting and navigational aids affiliated with the specific runway alignment.

Table 3.1
Runway 1L-19R Data

Category	Existing	Design Standard
Reference Code	D-V	N/A
Design Aircraft	B747-400	N/A
Runway End Elevations	10.6 ft (1L) 20.9 ft. (19R)	N/A
Runway Length	11,002	N/A
Runway Width	150’	150’
Shoulder Width	35'	35'
Blast Pad Length – 1L-19R	400' / 400'	400'
Blast Pad Width – 1L-19R	220' / 220'	220'
Runway Safety Area Length - 1L-19R (1)	1,000’ / 800'	1,000’
Runway Safety Area Length prior to Landing Threshold - 1L-19R	1,000' / 800'	1,000'
Runway Safety Area Width	500’	500’
Runway Object Free Area Length - 1L-19R	1,000’ / 800'	1,000’
Runway Object Free Area Width	800’	800’
Runway Pavement Weight Bearing Capacity		N/A
Single Wheel Loading (lbs)	60,000	N/A
Dual Wheel Loading (lbs)	210,000	N/A
Dual Tandem Wheel Loading (lbs)	358,000	N/A
Double Dual Tandem Wheel Loading (lbs)	850,000	N/A
Runway Lighting	High Intensity, touchdown point (1L), centerline lights	
Visual Slope Indicators	4-Light PAPI (1L & 19R)	
Approach Light Syste,	ALSF2 (1L) MALSR (19R	
Runway Visual Range	Touchdown, midfield, roll out (1L), touchdown (19R)	
Runway Markings	Precision (1L) (19R)	

Notes: (1) Beyond end of useable pavement or beyond end of defined stopway.

3.1.1.2 Runway 1R-19L

Runway 1R-19L is 8,300 feet long and 150 feet wide with 35 foot shoulders. The runway is constructed of concrete with a grooved surface and is listed in good condition. The runway is situated on the east side of the terminal complex. **Table 3.2** provides a summary of key runway design characteristics data, geometry, lighting and navigational aids affiliated with the specific runway alignment.

A 2,200 foot long extension on the north end of Runway 1R-19L and the relocation of the existing Category II instrument landing capability to the future runway end was identified in the previous master plan. This recommended extension was driven largely by the configuration of facilities associated with the proposed North Terminal Development and the impact that existing imaginary surfaces (primarily associated with U.S. Terminal Instrument Procedures requirements) would have on portions of the north terminal area. These impacts could best be mitigated by the identified extension along with enhancing aircraft movements to and from the proposed terminal complex.

Table 3.2
Runway 1R-19L Data

Category	Existing	Design Standard
Reference Code	D-V	N/A
Design Aircraft	B747-400	N/A
Runway End Elevations	17.5 ft. (1R) 26.01 ft. (19L)	N/A
Runway Length	8,300'	N/A
Runway Width	150’	150’
Shoulder Width	35'	35'
Blast Pad Length – 1R-19L	400' / 400'	400'
Blast Pad Width – 1R-19L	220' / 220'	220'
Runway Safety Area Length (1)	1,000’	1,000’
Runway Safety Area Length prior to Landing Threshold	1000	1000
Runway Safety Area Width	500’	500’
Runway Object Free Area Length	1,000’	1,000’
Runway Object Free Area Width	800’	800’
Runway Pavement Weight Bearing Capacity		N/A
Single Wheel Loading (lbs)	60,000	N/A
Dual Wheel Loading (lbs)	210,000	N/A
Dual Tandem Wheel Loading (lbs)	358,000	N/A
Double Dual Tandem Wheel Loading (lbs)	850,000	N/A
Runway Lighting	High Intensity Edge Lights Centerline Lights (1R & 19L) Touchdown point lights (19L)	High Intensity
Visual Slope Indicators	4-Light PAPI (1R &19L)	
Approach Light System	ALSF2 (19L)	
Runway End Identifier Lights	REIL (1L)	
Runway Visual Range	Touchdown (19L)	
Runway Markings	Non-Precision (1R) Precision (19L)	

Notes: (1) Beyond end of useable pavement or beyond end of defined stopway.

3.1.1.3 Runway 10-28

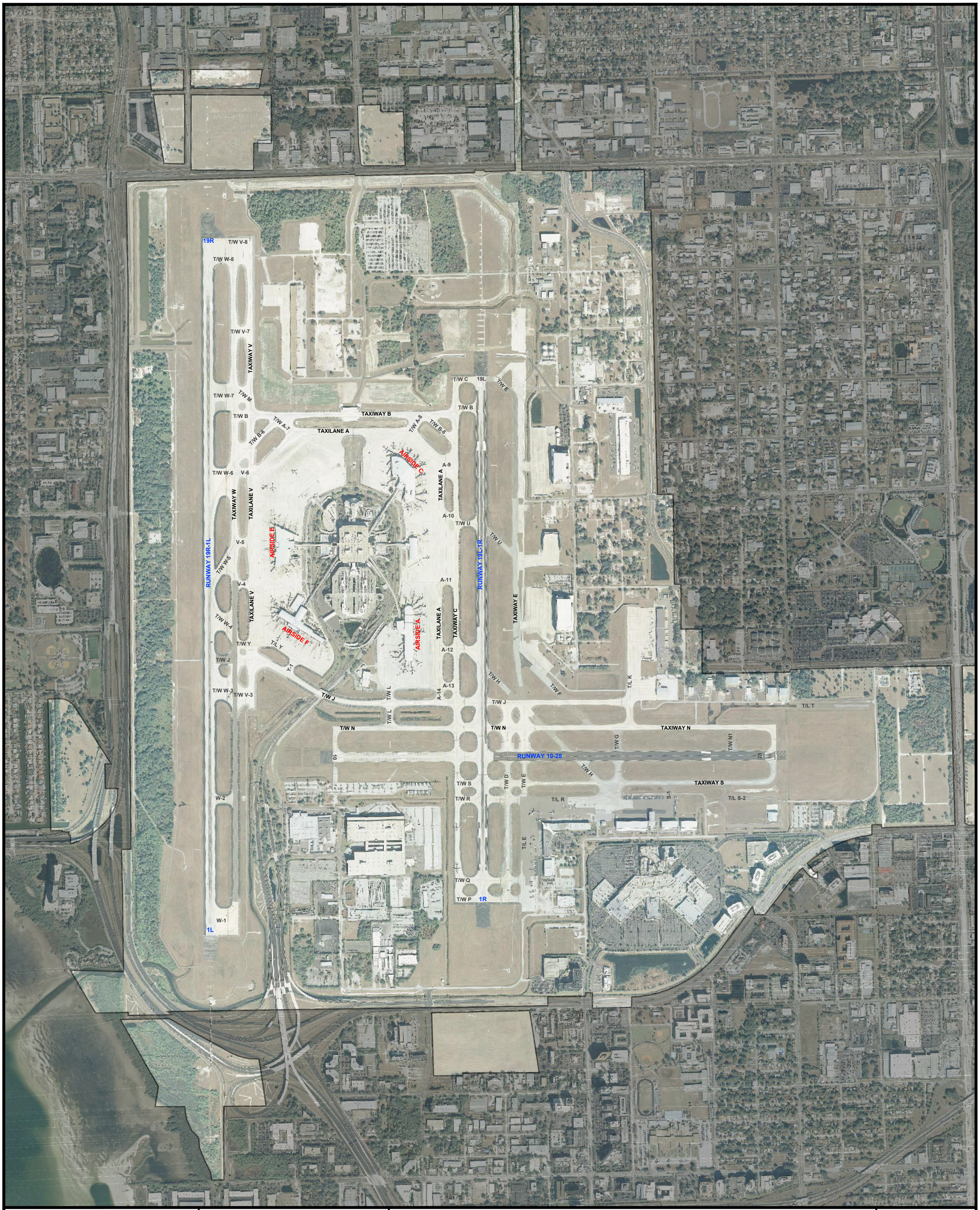
Runway 10-28 is a crosswind runway at TPA which is oriented essentially perpendicular to the two parallel runways. Runway 10-28 is 6,999 feet long and 150 feet wide. It is constructed of grooved asphaltic concrete and listed in fair condition, but the pavement is scheduled for rehabilitation. The runway does not have paved shoulders, which given the typical utilization of the runway would typically be required to be 25 feet wide along both sides of the runway alignment. The runway is situated south/southeast of the terminal complex extending eastward from the airport entrance roadway (George J Bean Parkway). Runway 10-28 experiences a relatively small percentage of airport business and commercial jet operations in contrast to the two main parallel runways. An operational restriction is noted in AirNav indicating that the runway is “Not normally available to operations by aircraft over 75,000 pounds gross weight”. This runway is, however, utilized during unique weather events when the prevailing weather patterns limit operational use of the parallel runways. A summary of the runway details, geometry, and lighting can be found in **Table 3.3**.

The 2005 Master Plan identified a proposed extension of Runway 10-28 that would increase the length from 6,999 feet to 8,200 feet. The previous master plan also incorporated improvements including the development of a full instrument landing approach capability to Runway end 28. This improvement would trigger the need for an expansion in the primary surface to a 1,000 foot width and the expansion of the Runway Protection Zone to a 1,000 foot inner width, 2,500 foot length off the end of the runway and an outer width of 1,750 feet, encompassing a total of 78.914 acres. The configuration of the current runway system at TPA is delineated in **Figure 3.1**.

Table 3.3
Runway 10-28 Data

Category	Existing	Design Standard
Reference Code	D-IV	N/A
Design Aircraft	B757-200	N/A
Runway End Elevations	14.4 FT. (10), 26.3 ft. (28)	N/A
Runway Length	6,999’	N/A
Runway Width	150’	150’
Blast Pad Length – Runway 10 end	200’	200’
Blast Pad Length – Runway 28 end	150’	200’
Blast Pad Width – Runway 10 end	200’	200’
Blast Pad Width – Runway 28 end	150’	200’
Runway Safety Area Length (1)	1,000’(2)	1,000’
Runway Safety Area Length prior to Landing Threshold	600’	600’
Runway Safety Area Width	500’	500’
Runway Object Free Area Length	1,000’(3)	1,000’
Runway Object Free Area Width	800’	800’
Runway Pavement Weight Bearing Capacity		N/A
Single Wheel Loading	75,000 lbs.	N/A
Dual Wheel Loading	200,000 lbs.	N/A
Dual Tandem Wheel Loading	280,000 lbs.	N/A
Double Dual Tandem Wheel Loading	380,000 lbs.	N/A
Runway Lighting	High Intensity Runway Edge Lights	High Intensity
Visual Approach Slope Indicators	4-Light PAPI (10 & 28)	
Approach Light System	None	
Runway End Identifier Lights	None	
Runway Visual Range	None	
Runway Markings	Non-Precision (10 & 28)	

Notes: (1) Beyond end of useable pavement or beyond end of defined stopway.
(2) RSA length beyond west end of runway achieved through application of Declared Distance Methodology.
(3) ROFA length beyond west end of runway achieved through application of Declared Distance Methodology.



0' 1,000' 2,000'

SCALE: 1" = 2,000'

HNTB

EXISTING AIRFIELD SYSTEM

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
Jun 04, 2012

Figure:
3.1

C:\Temp\AcPublish_4888\TPA_Airfield Figure.dwg 1 – Airfield Jun 04, 2012 – 12:22pm

3.1.2 Runway Approach Capabilities

With three individual runways, TPA provides a combined total of six runway ends that possess a wide array of non-precision and precision approach capabilities. There are currently 15 published instrument approach procedures on file with the FAA digital-Terminal Procedures Publication (d-TPP). These range from traditional Instrument Landing Systems (ILS) approaches to satellite based navigation systems such as RNAV. This section provides a summary of the instrument approaches that provide the lowest or best minimums available at the time of this study (with procedures effective 5/3/12, ending 5/31/12) for each runway end at TPA. The summary provided below is not a complete list of all approach capabilities, rather **Table 3.4** summarizes the lowest approach capability by each runway end, approach type, decision height (DH) and horizontal visibility. This information is employed in the assessment of capacity to define the extent of time the airport is below its operational minimums. As can be seen, TPA has excellent capabilities for accommodating operations in periods of instrument flying weather with the ability to land aircraft in periods with horizontal visibility down to 600' or slightly more than one-tenth of a mile. As a result, the percentage of time on an annual basis that the airport might be closed due to low visibility conditions is very limited.

Table 3.4
Instrument Approach Procedure Summary

Runway End	Approach Type	Decision Height (DH)	Horizontal Visibility/RVR
Runway 1L	ILS CAT III Approach	DH (NONE)	IIIA RVR 700, IIIB RVR 600, IIIC RVR NA
Runway 19R	ILS Approach	200 FT DH	RVR 1800
Runway 1R	LOC Approach	522 FT DH	1 Mile Visibility
Runway 19L	ILS CAT II Approach	100 FT DH	RVR 1200
Runway 10	RNAV (GPS)	250 FT DH	1 Mile Visibility
Runway 28	RNAV (GPS)	363 FT DH	1 1/8th Mile Visibility
Notes: Lowest published approach minimums are shown for each runway end. Runway Visual Range (RVR) values represent horizontal visibility expressed in feet.			

Source: FAA Digital Terminal Procedures Publication (d-TPP), Effective 03 May 2012

3.1.3 Taxiways and Aprons

This section overviews the existing taxiway system and aprons at TPA which are also delineated in Figure 3.1. Taxiways provide a network of connections and access points between the airport's system of runways and the developed aviation uses located adjacent to the airfield. The developed aviation uses at TPA include the terminal area airside complexes, RON parking areas, MRO facilities, air cargo facilities, Fixed Base Operators and individual corporate, business and government tenants. Consistent with the direction from the HCAA, this section will focus on addressing changes in the taxiway system that have occurred since the completion of the last master plan. These changes are summarized in the following section.

3.1.3.1 Taxiway Changes Subsequent to 2005 Master Plan Completion

- Taxiway V Extension – Taxiway V consists of a northerly and southerly extension of Taxilane V which is located along the west side outer edge of the terminal apron. The alignment of this designated ramp taxilane was extended northward to the threshold of

Runway 1L-19R along with a shorter southern extension of the alignment to the south of Taxiway J. Taxiway V is more fully described in the discussion of taxiways serving Runway 1R-19L later in this section.

- Taxiway B Bridge – Taxiway B, a cross-field connector taxiway has had a bridge installed along its alignment to allow an airfield access road to run north/south from the terminal complex. This is an initial step in facilitating a publically accessible transportation corridor that would connect the Main Terminal complex with the potential north terminal area. Taxiway B is 75 feet wide with typical 35 foot asphalt shoulders. The bridge is approximately 214 foot wide full-strength concrete, which is the width of ADG-V taxiway safety areas. This is consistent with FAA Taxiway bridge requirements as specified in 5300-13, Chapter 7 Runway and Taxiway Bridges, Paragraph 702.

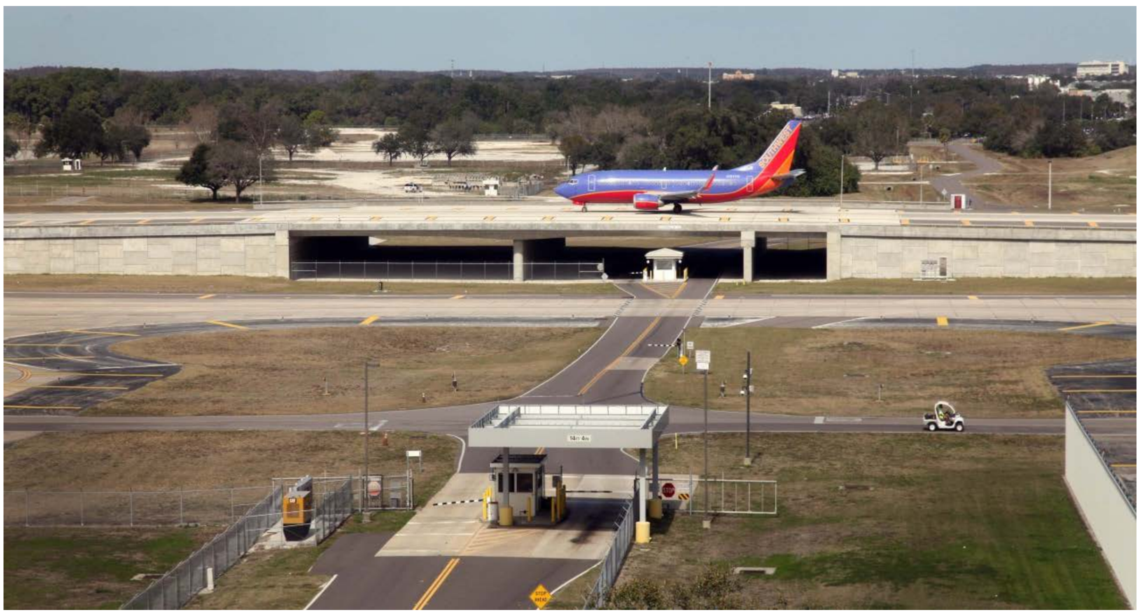


Photo: Taxiway B bridge looking north from Marriott hotel across Taxilane A. Source: HNTB Corporation

- Connector Taxiways – Two connector taxiways have been added just northeast of the intersection of Runway 1R-19L and 10-28. These consist of two 340 foot long sections added between Runway 10-28 and Taxiway N and between Taxiway N and Taxiway J.

- Taxilane S2 – Taxilane S2 is located to the south of Runway 10-28 and intersects the southern side of Taxiway S approximately 750 feet to the east of the eastern end of Runway 10-28. The taxiway is 50 feet in width and does not have paved shoulders. Taxilane S2 maintains a taxiway centerline to taxilane centerline separation from Taxiway S of approximately 245 feet. This new Taxilane S2 was constructed to provide airfield access to a recently built aircraft hangar that is located to the immediate west of the Moffat Cancer Center parking area. The hangar is occupied by JHS Capital Advisors and currently houses two corporate jets consisting of a Gulfstream G450 and a Gulfstream G II. Additionally, property situated between the JHS Capital Advisors hangar and the eastern end of the Signature FBO complex remains available for development and can be directly accessed via Taxilane S2.

3.1.3.2 Recent Pavement Removed

Pavement connecting Taxiway W and Taxiway V to the former north cargo ramp and cargo building has been demolished since the 2005 Master Plan. The pavement was removed after the belly haul cargo facility was constructed in the East Development Area and all cargo uses were transferred to facilities on the east side of the airport.

3.1.4 Main Movement Taxiways

The following briefly summarizes several of the most significant major airfield circulation taxiways at TPA. These consist of full length parallel taxiways to runways and the existing cross-field taxiways that facilitate movement to and from the east side of the airfield to the west side of the airfield. For purposes of reference, the taxiways are listed (where appropriate) by the runway alignments to which they are generally affiliated.

3.1.4.1 Taxiways Serving Runway 1R-19L

Major taxiways that serve the alignment of the eastern parallel runway (Runway 1R-19L) consist of two full length parallel taxiways and one partial parallel taxiway along with a portion of a terminal ramp taxilane. From east to west these taxiway/taxilane alignments consist of the following:

Taxiways E and D

Taxiway E is located along the east side of Runway 1R-19L and is a full length parallel taxiway for this runway. The centerline separation between the runway and taxiway is 526 feet north of Taxiway F. However the alignment of Taxiway E jogs outward slightly near the northern Pemco hangar providing a slight increase in separation from the runway centerline to the north end of Taxiway E. This easterly jog in the taxiway alignment provides a slight enhancement to the separation of the taxiway to the Runway 19L glide slope critical area.

The alignment of Taxiway E from Taxiway F to the south end of Runway 1R-19L also jogs to the east to provide added centerline to centerline separation. Commencing at the Taxiway E and Taxiway F intersection, the alignment of Taxiway F angles away from the runway to a point where the separation between the runway and taxiway centerlines is 651 feet. Taxiway E maintains 651 feet of lateral separation between Taxiway J and Taxiway R for this distance, approximately to the end of the runway. The 651 feet of separation between the runway and Taxiway E allows for the alignment of partial parallel Taxiway D, which is between Taxiway E and Runway 1R-19L and maintains a lateral separation of 401 feet from the runway centerline and 267 feet of centerline separation from Taxiway E. Taxiway D extends from Taxiway J on the north side of Runway 10-28 to the threshold of Runway 1R-19L, providing a dual taxiway configuration from Taxiway J southward. Both taxiways are 75 feet wide, but only Taxiway D has asphalt shoulders. Taxiway E provides access to the existing maintenance hangar areas.

Taxiway C

The west side of Runway 1R-19L and the eastern half of the terminal complex is served by a full-length parallel taxiway, Taxiway C. Taxiway C is 75 feet wide and has asphalt shoulders along each side and maintains 400 feet of taxiway to runway centerline lateral separation along its entire length. Taxiway C is the primary means for aircraft in the terminal area to access the south end of Runway 1R-19L for departures to the north.

Taxilane A

Taxilane A is the apron edge taxilane extending from Taxiway J, southeast of Airside A along the entire east side of the terminal ramp. It then runs along the north side of the apron area, north of Airside C and extending around to the west past the northwest RON area to the point at which it intersects Taxilane V northwest of Airside E. The taxilane is 75 feet in width and has paved shoulders along the side away from the parking apron. Taxilane A has numerous points of interconnection with Taxiway J, Taxiway C and Taxiway B. Currently, a secure roadway crosses Taxilane A at roughly the mid-point between Airside C and the former site of Airside D. This roadway provides for the movement of airport equipment between the terminal apron and the Ground Service Equipment building and Belly Cargo building in the Eastside Aviation Development Area. This road also provides a route for shuttle buses that shuttle employees from the employee lot in the North Terminal Development Area to the Main Terminal.

3.1.4.2 Taxiways Serving Runway 10-28

Runway 10-28 is presently served by a single full length parallel taxiway that extends along the north side of the entire length of the runway and a second partial parallel taxiway that extends from Taxiway C east to the eastern end of Runway 10-28. Taxiway J, which is located to the north of and lies parallel to Taxiway N, will be discussed under the section on Cross-field taxiways.

Taxiways N and S

Taxiway N is a 75-foot wide full-length parallel taxiway situated along the north side of the alignment of Runway 10-28. Taxiway N maintains a 450 foot taxiway centerline to runway centerline lateral separation along its entire length. Taxiway N provides access to both ends of Runway 10-28 as well as affording access to a number of aviation related uses on the airport including: the FedEx Air Cargo Facility, Global Aviation, Flight Express, the Hillsborough County Sheriffs hangar and the Mosquito Control facility, and four other private corporate hangars located on the north side of Runway 10-28. Taxiway J runs parallel to and 400 feet north of Taxiway N along the western 4,670 feet of Runway 10-28, resulting in a dual parallel taxiway capability along this portion of the crosswind runway. The easternmost 705 feet of parallel Taxiway N along with the section of Taxiway N connecting to the threshold of Runway 28 is located in an area not visible from the ATCT. Visibility of this portion of the taxiway is impaired by the southern PEMCO hangar.

Taxiway S is a 75-foot wide partial parallel taxiway along the south side of Runway 10-28 that extends from the east end of the runway to its terminating point west of Runway 1R-19L at its intersection with Taxiway C. Taxiway S maintains a runway centerline-to-taxiway centerline separation of 424 feet and affords access to the north side of both the Landmark and Signature FBO facilities.

3.1.4.3 Taxiways Serving Runway 1L-19R

Runway 1R-19L is served by one full length parallel taxiway with affiliated connectors and a second partial length parallel taxiway which are described in the following sections.

Taxiway V

Taxiway V serves as a partial parallel taxiway along the east side of Runway 1L-19R. It was extended to the north approximately 2,800 feet from its former northern terminus at Taxiway B, to provide a dual parallel taxilane/taxiway system from the southwest portion of the terminal complex to the Runway 19R threshold. In addition to the northern extension, Taxiway J was also extended by approximately 750 feet to the south and running parallel to Taxiway W. Five connector taxiways were also constructed to connect Taxiway V to Taxiway W and the terminal complex. These taxiways are V8, V7, M, V3, and W3. The Taxiway V extension and connector taxiways are all 75 feet wide (or wider on connector taxiways to accommodate fillet geometry) with 35 foot wide asphalt shoulders. The 2005 Master Plan also depicted the extension of Taxiway V from its current southern terminus to the threshold of Runway 1L to provide a full dual parallel taxiway system for Runway 1L-19R. This extension has not been constructed.

Taxiway W

In addition to the partial parallel taxiway, Runway 1L-19R is also served by full-length parallel Taxiway W. Taxiway W maintains a runway centerline to taxiway centerline separation of 400 feet. Both ends of Taxiway W at the entrance onto the runway have been widened to provide for dual taxi lead in lines to the runway. This allows for two queuing lines at the runway hold line and also provides the ability to hold one aircraft while allowing others a bypass capability in the event of a ground hold or other issue. Taxiway W is 75 feet wide and has 35-foot asphalt shoulders along its entire length.

3.1.4.4 Cross-field Taxiways/Taxilane

At TPA, the parallel runways (1R-19L and 1L-19R) are widely spaced with the terminal located between the runways. There are times when the need exists to move aircraft from one side of the terminal area to a runway on the other side due to the aircraft's gate assignment or the destination the aircraft is departing to. To accommodate these movements, the airport has two existing taxiways and one taxilane that facilitate movements from the eastern runway (Runway 1R-19L) to the western runway (Runway 1L-19R). Taxiways and taxilanes of this type are commonly referred to as crossfield taxiways. The characteristics of each are summarized below:

Taxiway B

Taxiway B is a cross-field taxiway located north of the terminal complex running perpendicular to the alignment of Runways 1R-19L and 1L-19R, and providing connections to parallel Taxiways C, V, and W. Taxiway B facilitates the ability of ATCT to sort ground traffic between east and west destinations and in doing so can minimize the need to cross traffic once airborne. Taxiway B is 75 feet wide and has 35-foot asphalt shoulders. Subsequent to the completion of the 2005 Master Plan, Taxiway B was improved through the addition of a taxiway bridge over what will one day be the main transportation corridor between the Main Terminal and the north terminal development. The bridge span is 230 feet with two lanes running beneath it. The deck of full strength pavement is 214 feet wide, conforming to the design criteria for an ADG-V Taxiway Safety Area Width. The vertical clearance for the bridge over the roadway is 14 feet. Taxiway B is the first of what will be a set of dual parallel cross-field taxiways. A second proposed cross-field taxiway, Taxiway M, depicted on the current ALP, is set to replace Taxilane A for major east/west crossing taxi movements.

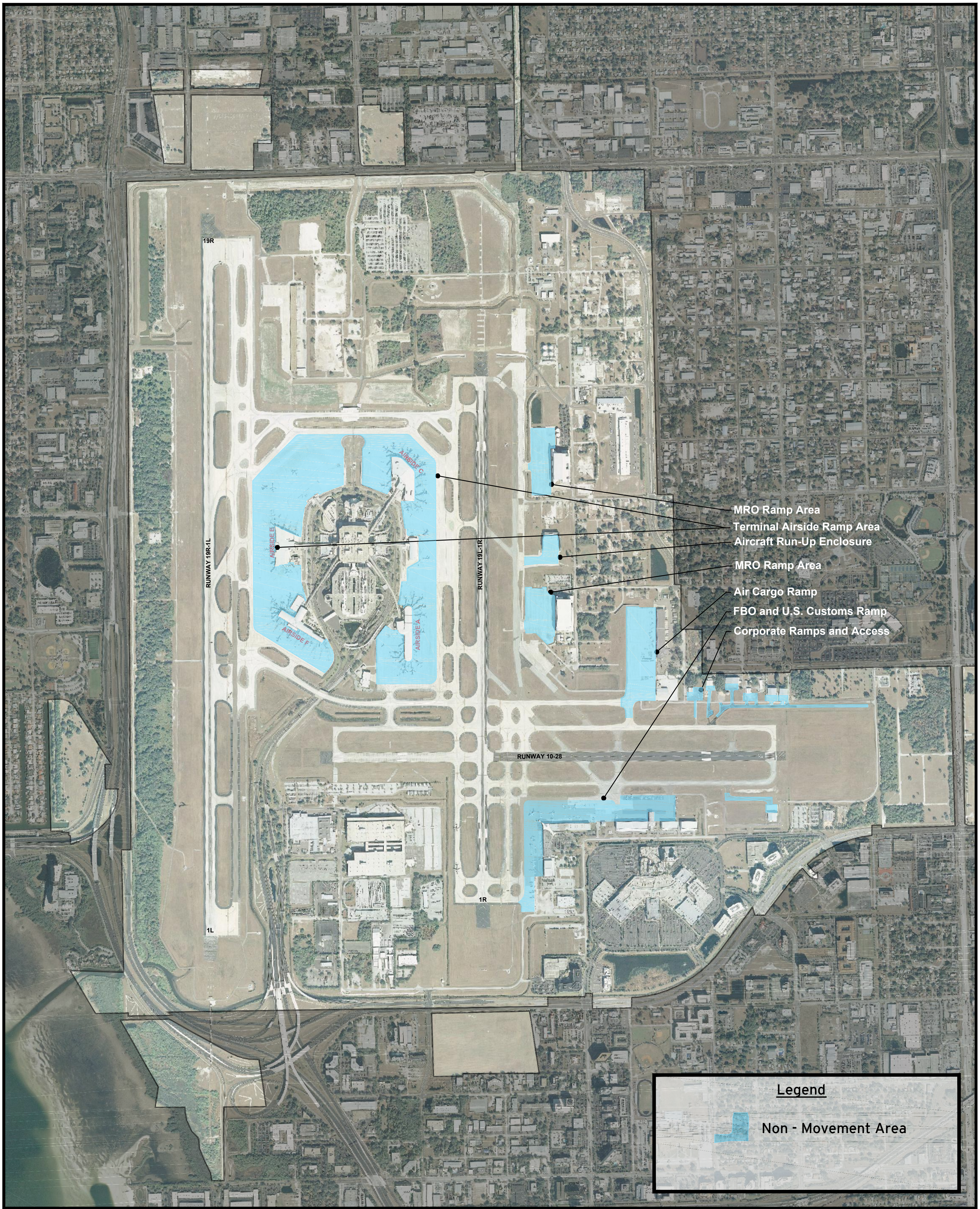
Taxiway J

Taxiway J which is located to the immediate south of the Main Terminal complex is the second cross-field taxiway at TPA. Taxiway J extends from the entrance into the air cargo ramp on the east to the alignment of parallel Taxiway W to the west. Taxiway J on the south side of the Main Terminal complex provides the only connection between parallel Taxiways E and C on the eastside of the terminal complex, and Taxiway V and W on the west. Taxiway J is 75 feet wide and crosses the George J. Bean Parkway via a concrete bridge structure. The taxiway has 35 foot wide shoulders with the exception of the portion of the taxiway situated to the east of Runway 1R-19L. Based on the 2005 Master Plan, Taxiway N which parallels Taxiway J is shown as being extended across the George J. Bean Parkway to provide a dual cross-field taxiway capability similar to the system depicted north of the Main Terminal.

Taxilane A

As described previously, Taxilane A is an apron edge taxilane that extends along the entire east and north side of the terminal complex. The portion of Taxilane A that lies along the north side of the apron area, north of Airside C and former Airside D, parallels the alignment of Taxiway B and is currently used as a second crossfield taxi route. The taxilane is 75 feet wide and has paved shoulders along the side away from the parking apron. Currently the taxilane is crossed by the alignment of a secure roadway that accesses airport support facilities and an employee parking area. Vehicles operating on this roadway must pass through checkpoints and yield to aircraft on the taxilane. The current ALP includes a proposed future crossfield taxiway that will run north of and parallel to Taxiway B and will negate the need for Taxilane A to accommodate crossfield movements.

Figure 3.2 provides a graphical depiction of the airport that depicts the locations of all major runways, taxiways, designated movement and non-movement areas at TPA. The configuration of the runway system and the complex of taxiways that facilitate movement of aircraft to and from the runway system is a key element in the assessment of airfield capacity that is discussed in the next section.



0' 1,000' 2,000'
SCALE: 1" = 2,000'

HNTB

EXISTING TAXIWAYS/TAXILANES/APRON AREAS

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
Jul 01, 2013

Figure:
3.2

C:\Temp\AcPublish_956\TPA_Airfield Figure.dwg 1 -- Aprons Jul 01, 2013 -- 6:01pm

3.2 Airfield Demand/Capacity Analysis

3.2.1 Introduction

The preceding overview of existing airfield facilities at TPA coupled with the aviation activity demand forecasts provide the foundation of requisite data needed to conduct an assessment of airfield capacity as set forth under Advisory Circular 150/5060-5a, Airport Capacity and Delay. This analysis is intended to define the extent of impact, if any, that the recession of 2007 and resultant slow recovery since has had on the timing of improvements to airfield capacity that were identified in the 2005 Tampa Master Plan. The demand/capacity analysis examines the capability of the airfield system at TPA to address existing and projected levels of activity without incurring adverse levels of aircraft delay that may trigger the need for taxiway enhancements or runway system enhancements at TPA. This assessment is conducted by comparing the results of several different methodologies. The following chapter, "Facility Requirements," will provide the specific recommendations intended to address any deficiencies identified in this analysis.

While elements of the traditional Federal Aviation Administration's (FAA) methodology for assessing airfield capacity have been conducted, this analysis does not focus solely on the definition of Annual Service Volume (ASV) as a measure of airfield capacity. The determination of ASV at TPA was undertaken to provide the basis for estimating the levels of delay that would result as the airport reached various operational levels over the course of the planning horizon. In the past, the emphasis on ASV as an absolute capacity value has tended to oversimplify the more complex considerations that drive decisions relative to undertaking an airfield capacity development improvement program. To address this, the process employed in this analysis includes the assessment of hourly as well as annual delay, and estimates the direct impact to users based on incurred minutes of delay per aircraft operation.

As a point of beginning, the current master plan effort has employed the same methodology that has been used in the past to assess the adequacy of the existing TPA runway and taxiway system to meet projected demand. The intent of this analysis is to define hourly aircraft operational capacities of the runway system during periods of both visual flight conditions and instrument flight conditions. Additionally, the current FAA measure of airfield capacity for long range planning as expressed by the ASV level is used to estimate the extent to which aircraft operations will incur increased operational delay as activity at the airport increases. The results of these analytical efforts are then compared to the previous master planning study to identify changes that have occurred since the last master plan relative to operational levels, aircraft fleet mix, operational procedures or other changes that would influence the need for, and timing of potential runway and taxiway improvements. As alluded to above, hourly and annual (ASV) values will be used to define the anticipated minutes of delay per aircraft operation and total annual delay figures.

3.2.2 Federal Aviation Administration Methodology

The FAA's standard method for determining airport capacity and delay for long range planning purposes is delineated in Advisory Circular (AC) 150/5060-5 Change 2, entitled "Airport Capacity and Delay." In this study, airfield capacity is calculated in terms of the hourly capacity of the runways, annual service volume of the current and future airfield system, and average aircraft delay, using the FAA's methodology. This approach utilizes the projections of annual operations by the specified fleet mix as presented in the Aviation Activity Forecasts while considering a variety of other elements including airfield configuration, meteorological and noise abatement restrictions that are described in the following sections.

3.2.3 Airfield Characteristics

In addition to the updated aviation activity forecasts, a number of the airport's airfield characteristics, operational practices and conditions are required in order to properly conduct the FAA capacity analyses. The elements that affect airfield capacity are listed below.

- Runway Configuration
- Aircraft Mix Index
- Taxiway Configuration
- Operational Characteristics
- Meteorological Conditions

When analyzed collectively, the above elements provide the basis for establishing the estimated operational capacity of an airport as expressed by ASV as set forth in FAA guidance. The following sections will evaluate each of these capacity related characteristics with respect to TPA.

3.2.3.1 Runway Configuration

The airfield configuration for TPA includes three paved runways. The primary runways at TPA consist of the parallel Runways 1R-19L and 1L-19R which are aligned along a north/south orientation. Both of these runways are fully air carrier capable with either non-precision or full precision approach capability on each runway end. Runway 10-28, the crosswind runway, is oriented along a more east to west alignment and is equipped with non-precision approach capability to both runway ends. The crosswind runway intersects the alignment of Runway 1R-19L approximately 2,300 feet north of the Runway 1R threshold, while the extended centerline of the crosswind runway passes over Runway 1L-19R approximately 2,800 feet north of the Runway 1L landing threshold.

3.2.3.2 Aircraft Mix Index

Most airports, including TPA, serve a diverse array of aircraft types that typically possess significant variations in their operational characteristics. These differences in operational characteristics are one element that is considered when assessing airfield capacity. The FAA capacity assessment guidance utilizes an aircraft classification system that is tied to the maximum certificated gross takeoff weight as a basis for defining four classes of aircraft used in assessing airfield capacity. The aircraft fleet mix at TPA was derived from the fleet mix projections contained in the aviation activity forecasts. Knowing the current and projected aircraft fleet, it is possible to calculate an aircraft fleet mix index as required as one element needed to compute the airfield's capacity in the FAA methodology. The aircraft mix index is calculated based on the gross weight of the specific aircraft expected to serve an airfield. **Figure 3.3** provides examples of typical aircraft for each of the FAA's four aircraft size/gross weight (maximum certified takeoff weight) classifications.

Figure 3.3

Aircraft Classifications

Aircraft Class	Aircraft Silhouette	Max Certified Takeoff Weight	Typical Aircraft in Category
A		Under 12,500 lbs Takeoff Weight	Cessna 150, Piper Arrow, Piper Mirage Cessna 172, Mooney Ovation, Piper Meridian Beechcraft Bonanza
B		Under 12,500 lbs Takeoff Weight	Beechcraft Baron, Phenom 100, King Air 200 HondaJet, Piper Seneca, Cessna 310 Cessna 402, Piper Seminole, Eclipse 500
C		Between 12,500 & 300,000 lbs Takeoff Weight	Airbus 319, Gulfstream 550, Falcon 900 Boeing 737, Citation VII, Boeing 757 Embraer 170/190, Dash 8 300/400, Airbus A320 CRJ 700/900, HS 125-700, Citation X
D		Over 300,000 lbs Takeoff Weight	Boeing 767, DC 10-10/30/40, Airbus A300-600F Boeing 777, Airbus A340, MD 11 Boeing 747, Boeing 787, Airbus 330

Source: HNTB Corporation

The formula as expressed in FAA guidance for calculating the mix index is the % (C class aircraft + 3 times the percentage of D class aircraft) where C is the percentage of aircraft over 12,500 pounds, but less than 300,000 pounds and D is the percentage of aircraft over 300,000 pounds. Aircraft under 12,500 pounds do not count towards the calculation of mix index. As can be seen by the typical aircraft types by Class delineated in Figure 3.3, the category of aircraft in Classes A and B consist primarily of single engine and small twin engine aircraft with a few small jets including the Very Light Jet (VLJ) category. The vast majority of the corporate business jet fleet is contained within the Class C aircraft classification. At TPA, the current and future operational fleet mixes include aircraft from all four aircraft classes.

Using the FAA formula, the aircraft mix index for TPA ranges from a 2011 index of 99 to a 2031 index of 102. As the mix index rises, the overall airfield capacity will typically diminish. This is primarily because air traffic control must provide greater separation between the C and D aircraft and other aircraft types due to the dangers of the wake turbulence associated with the operation of larger aircraft.

3.2.3.3 Taxiway Configuration

Key to the capacity of an airfield is the ability to move aircraft to and from the runway system quickly and efficiently. This requires a system of well positioned connector taxiways providing access to taxiways paralleling the runway alignment along with other movement taxiways accessing developed aviation facilities on the airport. Runway 1L-19R has a full-length parallel taxiway, which is designated as Taxiway W. Taxiway W is separated from the runway centerline of Runway 1L-19R by 400 feet, which meets FAA design requirements for lateral separation for aircraft up to Group V (B747-400) at airports at or below an elevation of 1,345 feet MSL. A second partial parallel Taxiway/Taxilane identified as Taxiway/Taxilane V is located to the east of Taxiway W and enhances movements from the terminal complex to the north end of Runway 1L/19R.

There are nine connector taxiways linking Runway 1L-19R with Taxiway W. Based on the FAA's criteria for appropriately located taxiway exits, the taxiway exit factor is maximized when a runway has four exit taxiways within a range determined by the mix index of the operations using that runway. For a mix index of 99 to 102, this range is between 5,000 feet to 7,000 feet from the landing threshold of both runway ends. Likewise, for both cases, each exit must be separated by at least 750 feet. Using the FAA criteria, arrivals to Runway 1L are considered to have three exits while arrivals to Runway 19R are considered to have two exits in the range.

Runway 1R-19L has a full-length parallel taxiway along it's western (Main Terminal) side, which is designated as Taxiway C and a second full length parallel taxiway designated as Taxiway E along its eastern side. Taxiway C is separated from the runway centerline of Runway 1R-19L by 400 feet which, as noted, conforms to FAA criteria for Group V aircraft. There are eleven connector taxiways linking Runway 1R-19L with Taxiway C. Based on the FAA's criteria for appropriately located taxiway exits, arrivals to Runway 1R are considered to have one exit while arrivals to Runway 19L are considered to have three exits in the range. It should be noted that current informal noise abatement procedures tend to limit the operational use of Runway 1R for arrivals due to a noise sensitive portion of the City of Tampa located to the south of the airport.

Applying the exit range criteria to Runway 10-28 results in two available exits within the FAA's criteria for appropriately located taxiway exits. The runway is seldom used by air carrier aircraft and is predominantly utilized by general aviation piston, turbo-prop and a portion of the business jet fleet. The majority of operations on this runway are by aircraft in Categories A and B, while the category C aircraft consist primarily of a limited percentage of total business jet activity opting not to use the primary runways.

3.2.3.4 Operational Characteristics

Significant operational characteristics that can affect an airfield's overall capacity include the manner in which the runways are utilized or runway use percentages, percentage of aircraft arrivals and the percentage of "touch and go" or local training operations.

Runway Use Percentages

Based on 2011 data provided by the HCAA, arrivals and departures to the north accounted for 51.5 percent of parallel runway operations and those to the south accounted for 48.5 percent of parallel runway operations. Thus, there is currently a roughly 50/50 split between north flow and south flow operations. See **Figure 3.4** for a depiction of the operational configuration of North Flow and South Flow.

The Airport operates under an Informal Runway Use Program that prioritizes runway use to minimize flights over noise sensitive areas. In North Flow under this program, departures use 1L and 1R while arrivals predominantly use 1L. In South Flow operations, departures predominantly use 19R and arrivals use both 19L and 19R. Smaller piston aircraft along with turbo-props and some jet activity use Runway 28 for both arrivals and departures. It should be noted that the majority of jet activity including that associated with business jets occurs on the two primary parallel runways at TPA. Arrivals and departures overflying the area to the southeast of the Airport are minimized. See Figure 3.4 for a depiction of the North Flow and South Flow following the Informal Runway Use configuration.

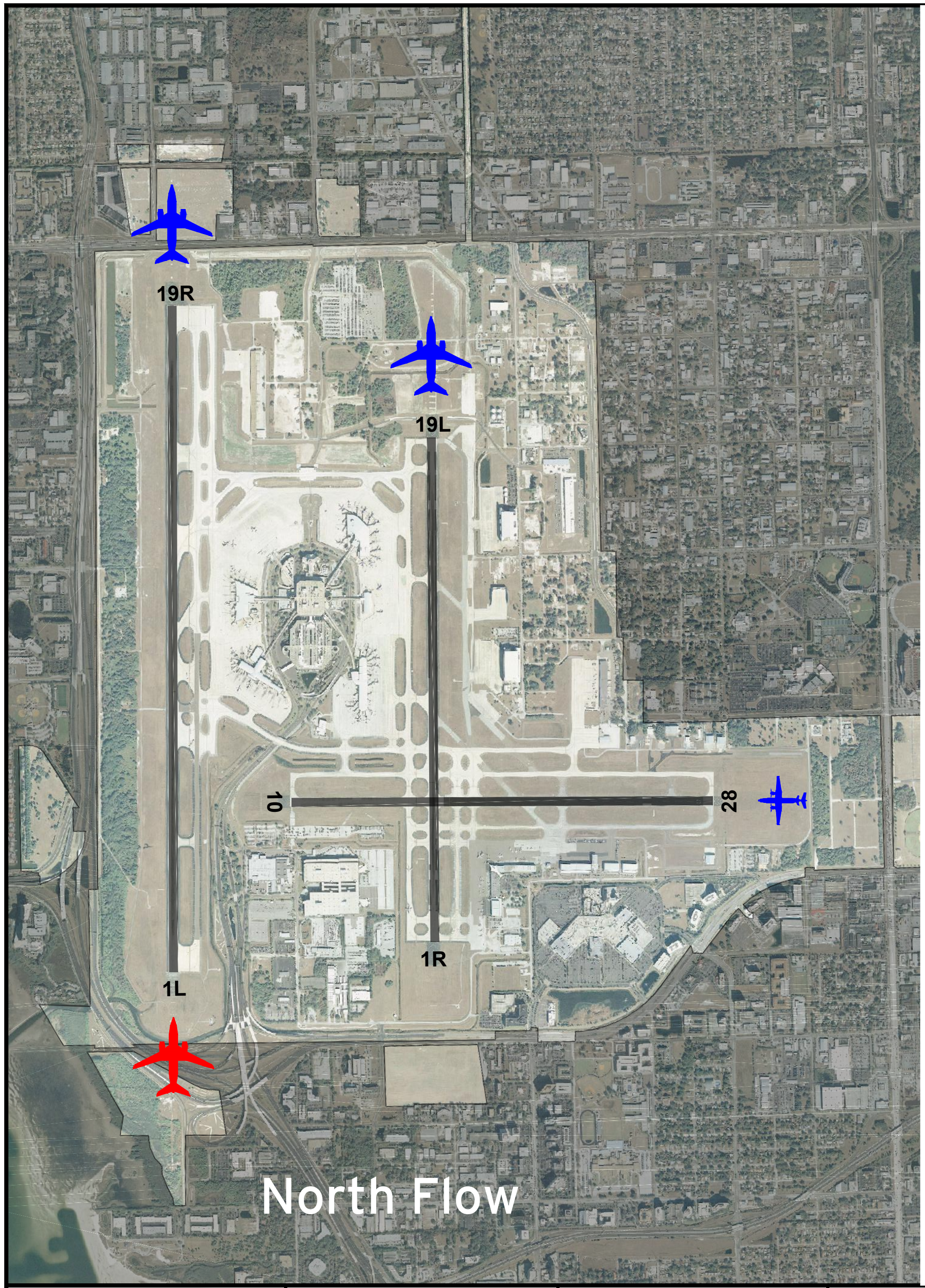
Percentage of Aircraft Arrivals

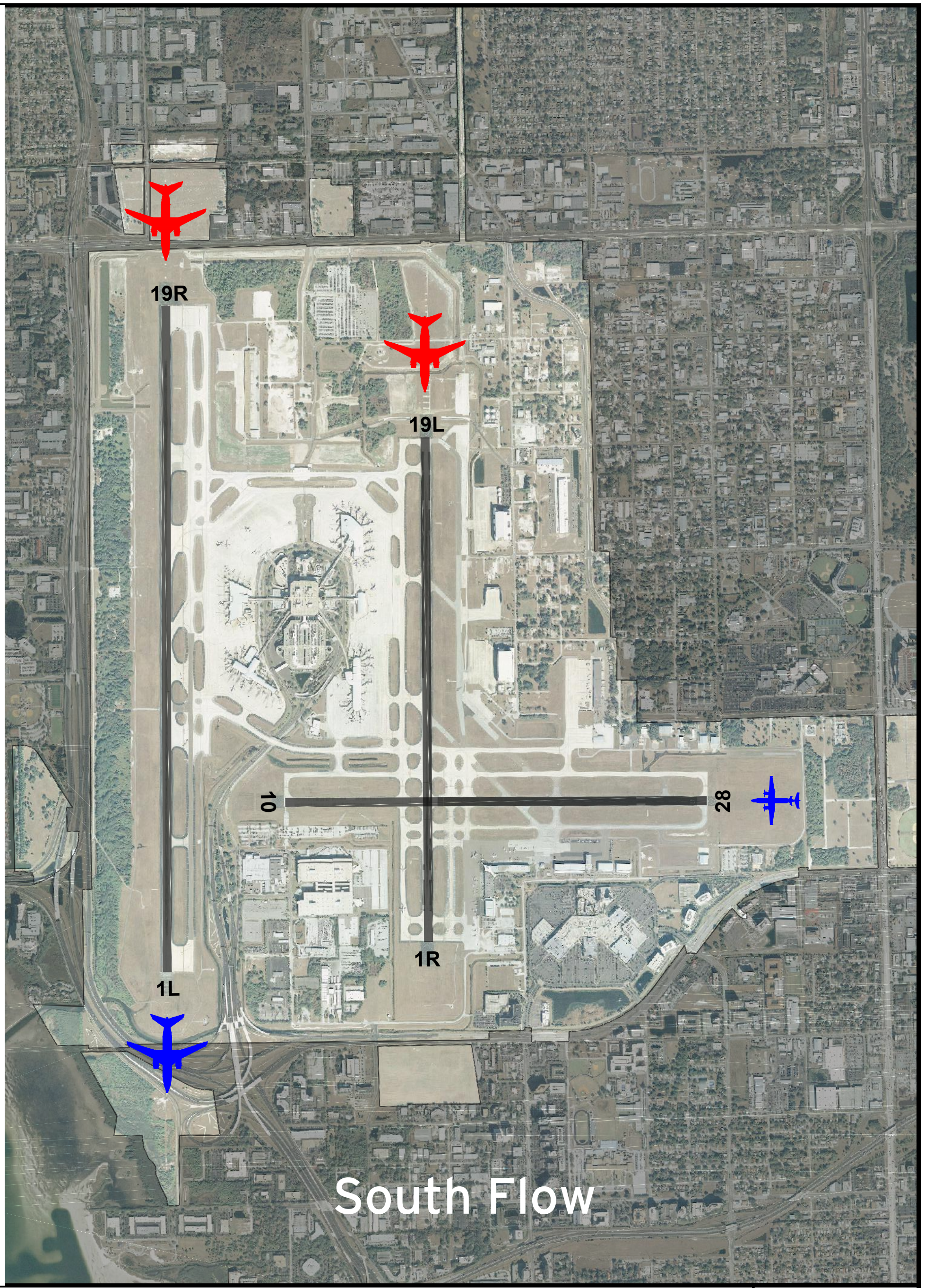
The percentage of aircraft arrivals is the ratio of landing operations to the total operations of the airport. This percentage is considered due to the fact that aircraft approaching an airport for landing require more runway occupancy time than an aircraft departing the airfield. The FAA methodology used herein provides for computing airfield capacity with a 40, 50, or 60 percent of arrivals figure. The 40 and 60 percent figures result in an average annual service volume variance of ±11 percent when compared to the 50 percent level, with the lower percentage (40) having the highest capacity.

After a review of the air traffic control tower data and the airline schedules, there are no significant peak periods when the airport is considered to have more arrivals than departures. In fact, due to the operational requirements of the airlines serving TPA, most of the commercial passenger flights serving TPA do not have significant dwell times. The vast majority of these flights are considered either origin or destination flights and as such, the various carriers try to hit the respective banks at the primary hubs or focus cities they fly into or from. This mode of operation is not expected to change significantly over the course of the planning period. Therefore, for the purposes of this analysis, the 50 percent of arrivals value was utilized as an average or neutral effect to determine the overall capacity at TPA.

Percentage of Touch and Go Operations

The percentage of “touch and go” operations plays a key role in the determination of airport capacity. “Touch and go” operations are counted as one landing and one takeoff (i.e., two operations) and are normally associated with flight training activities. Based on interviews with airport management there are no “touch and go” operations at TPA. These operations typically take place at one of the three HCAA owned and operated general aviation reliever airports. It is projected that there will be “no touch and go” operations at TPA throughout the entire planning period.





HNTB

2900 SOUTH QUINCY STREET,
SUITE 200
ARLINGTON, VIRGINIA 22206
PH (703) 824-5100
FAX (703) 671-6210

Informal Runway Use - North and South Flow

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
Jul 18, 2012

FIGURE:
3.4

3.2.3.5 Meteorological Conditions

Meteorological conditions influence the decision as to which runway end a pilot will choose to make an approach from based on wind and other weather related conditions. Thus, these conditions can have an effect on the overall capacity for the airfield. Runway utilization is normally determined by wind conditions while the cloud ceiling and visibility dictates spacing requirements.

Based on a review of wind data for TPA, the prevailing winds are slightly more frequent from the East and Northeast. Calm winds of less than 5 knots prevail approximately 33.4% of the time, while winds of between 5 and 10 knots are experienced 66.6% of the time, thereby providing air traffic controllers flexibility in determining which runway configuration to use.

There are three measures of cloud ceiling and visibility conditions recognized by the FAA in calculating the capacity of an airport. These include:

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

Based on 10-year meteorological data (January 1988 through December 1997) obtained from the National Climatic Data Center, TPA experiences VFR conditions 95.1 percent of the time, IFR conditions 3.3 percent of the time, and poor visibility and ceiling conditions 1.6 percent of the time. As noted in the airfield inventory section, TPA has instrument landing capabilities providing Category I landing minimums (200'ceiling and one-half mile visibility), Category II landing minimums (100' ceiling and 1,200' visibility) and Category III b minimums (600' horizontal visibility) on Runway 1L.

3.2.4 Airfield Capacity Analysis

The preceding airfield characteristics were used in conjunction with the methodology developed by the FAA to determine airfield capacity. As mentioned previously, this FAA methodology generates the hourly capacity of runways and the annual service volume for measuring airfield capacity.

3.2.4.1 Hourly Capacity of Runways

Hourly capacity of the runways measures the maximum number of aircraft operations that can be accommodated by the airport's runway configuration in one hour. Based on the FAA methodology, hourly capacity for runways is calculated by analyzing the appropriate VFR and IFR figures for the airport's runway configuration. From these figures, the aircraft mix index and percent of aircraft arrivals are utilized to calculate the hourly capacity base. When applicable, a "touch and go" factor is also determined based on the percentage of "touch and go" operations combined with the aircraft mix index. These figures also consider the taxiway exit factor.

For both VFR and IFR conditions, the hourly capacity for runways is calculated by multiplying the hourly capacity base, "touch and go" factor, and exit factor. This equation is:

Hourly Capacity = C* x T x E

where:
C* = hourly capacity base
T = "touch and go" factor
E = exit factor

An airport's mix index can substantially change the value of the hourly capacity base in the FAA capacity tables. However, the slight change in the fleet mix is not sufficient to change the hourly capacities shown in **Table 3.5** below. The weighted hourly capacities shown were calculated by taking into consideration the assumed continuation of the Informal Runway Use Noise Abatement Program associated primarily with operational activity on Runway 1R-19L. This program has been in place since 1959 and essentially discourages jet arrivals on Runway 1R and commercial/cargo jet departures on Runway 19L over noise sensitive areas south of the airport..

Table 3.5
Calculation of Hourly Capacity (With Informal Runway Use Program)

Year	VFR Operations/Hour	IFR Operations/Hour	Weighted Hourly Capacity (Cw)
Base Year			
2011	109	59	107
Forecast			
2031	109	59	107

Source: HNTB Analysis

3.2.4.2 Annual Service Volume

Under the FAA methodology, the most important value that must be computed in order to evaluate the capacity at an airport is the annual service volume (ASV). ASV represents a measure of the approximate number of total operations that the airport can support annually. In other words, the ASV represents the theoretical limit of operations that the airport can safely accommodate. Using the FAA's methodology to estimate ASV, first the ratio of annual operations to average daily operations, during the peak month, is calculated along with the ratio of average daily operations to average peak hour operations, during the peak month. These values are then multiplied together and the resulting product is multiplied by the weighted hourly capacity. This equation is:

Annual Service Volume = Cw x D x H

where: Cw = weighted hourly capacity
D = ratio of annual operations to average daily operations during the peak month
H = ratio of average daily operations to average peak hour operations during the peak month

For the equation, the weighted hourly capacities shown in Table 3.5 were utilized with the values calculated for the variables D and H. The following sections describe how these values were calculated for D and H.

The official Airport Traffic Records were obtained from the airport to evaluate the characteristics of peak month, and average day peak month (ADPM) operations. HCAA records show that March was the busiest month in 2011 and is typically the busiest month at TPA. Over the past five years, March has fluctuated from a low of 9.5 percent in 2009 and 2010 to a high of 10.2 percent of the annual operations in 2008. The 2011 percentage was 9.6 percent.

The average daily operations during the peak month were derived by taking the number of operations calculated for the peak month and dividing that figure by the number of days in the peak month, which for March is 31 days. For 2031, the average daily operations during the peak month were derived by assuming that the peak month share for each operational category (domestic passenger, international passenger, cargo, air taxi, general aviation and military) would remain constant and then taking a weighted average. Since the fastest growing category (international passenger operations) also has the highest degree of monthly peaking, the overall peak month percentage increases slightly. The above information was used to calculate the ratio of annual operations to average daily operations during the peak month (D) for the ASV calculation. The results are reflected in **Table 3.6**.

Table 3.6
Calculation of Demand Ratios

Element	2011	2031
Annual Operations	191,315	277,040
Average Daily Operations – Peak Month	592	862
Daily Demand Ratio (D)	**323**	**321**
Average Daily Operations – Peak Month	592	862
Average Peak Hour – Peak Month	49	71
Hourly Demand Ratio (H)	**12.17**	**12.17**

Source: HNTB Analysis

The hourly data for March 2011 was analyzed to determine the average peak hour operations that occurred during that peak month. Over the 31 days, the peak hour percentage ranged from a low of 7.4 percent to a high of 10.6 percent of daily operations. This resulted in an average 8.2 percent of daily operations occurring that month. The average peak hour percentage for 2031 is expected to remain essentially the same as in 2011. Therefore, by applying the same percentage to the already adjusted average daily operations (of the peak month) for 2031, the average peak hour (of the peak month) for 2031 was calculated. Since the same hourly percentage was used, the hourly demand ratio (H) for both 2012 and 2031 are the same. The results, reflected in Table 3.6, were then used in the calculations for ASV.The final ASV calculations are reflected in **Table 3.7** based on the assumed continuation of the existing Informal Runway Use Program. This value was then compared to the existing and forecast level of annual operations for TPA. According to the FAA methodology, a demand that exceeds the ASV will result in significant delays on the airfield. However, no matter how substantial an airport's capacity may appear, it should be realized that delays can occur even before an airport reaches its stated capacity. In fact, a number of projects that would increase the capacity at an airport are eligible for funding from the FAA well before an airport actually reaches its calculated airfield capacity. According to FAA Order 5090.3B, "Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)," this eligibility is achieved once the airfield has reached 60 percent of its current capacity and the general rule of thumb is that capacity projects should be under construction as the airfield reaches 80 percent of its defined capacity. This allows improvements to be made before demand levels exceed the capacity of the facility in order to avoid lengthy delays.

Table 3.7
Annual Service Volume

Year	Annual Operations	Annual Service Volume	Capacity Level
Base Year			
2011	191,315	419,741	46%
Forecast			
2031	277,040	417,595	66%

Source: HNTB Analysis

Future capacity levels for the airport have been calculated based on the forecasted annual operations and the calculated ASV for the airport. The calculated future airfield capacity levels are delineated in Table 3.7 based on the assumed continuation of the Informal Runway Use Program and are depicted in Figure 3.4. As delineated in Table 3.7 and **Figure 3.5**, the calculated ASV declines slightly over the forecast period because the increased share of international activity projected to occur at TPA slightly increases the overall degree of demand peaking.Table 3.7 along with Figure 3.5 show that the current airfield configuration provides a fully adequate level of operational capacity to accommodate the forecasted level of aircraft operations through the 2031 master planning horizon. With the Informal Runway Use Program in place, the airfield will just reach the 66 percent of the calculated annual airfield capacity by 2031 indicating that initial planning for a possible capacity enhancement action should be recommenced towards the last five years of the master planning horizon. It should be noted that the 2005 Tampa Airport Master Plan addressed future airfield capacity enhancement plans and recommended the development of a closely spaced parallel runway on the west side of the airport to be situated between the alignment of Runway 1L-19R and the Veterans Expressway. At the direction of the HCAA, the current master plan update is not re-evaluating the airfield recommendations from the previous planning study with the exception of defining the impact that changes in the forecast of aviation demand has on the timing of these previously defined capacity enhancement recommendations.

Figure 3.5
Projected Operations and Annual Service Volume

Source: HNTB Corporation

3.2.5 Annual Aircraft Delay

As an airport's level of annual operations increase, so do the times when the airfield experiences periods of delay. Calculating the average delay for each aircraft allows a total to be estimated for all of the delay incurred at the airport over a year. FAA AC 150/5060-5 Change 2 provides an abbreviated method by which the annual delay can be quantified. This estimate includes arriving and departing aircraft operations under both VFR and IFR conditions. Essentially the ratio of annual demand to ASV is utilized in FAA charts to determine the average delay per aircraft. This value is then applied to the actual or forecasted annual demand to calculate the total hours of annual delay for the airport. The results of these calculations are included in **Table 3.8**.

Table 3.8
Annual Aircraft Delay

Year	Average Delay Per Aircraft with Informal Runway Use Program (Minutes)	Total Annual Delay with Informal Runway Use Program (Hours)
Base Year		
2011	0.41 minutes	1,311 hours
Forecast Year		
2031	0.89 minutes	1,838 hours

Source: HNTB Analysis

3.2.6 Summary

The impact on TPA operational activity associated with the 2007/2008 recession and the tenuous recovery that has followed suggested the need to re-evaluate the timing of proposed airfield capacity enhancements recommended in the 2005 TPA Master Plan. Based on the preceding analysis, the need for undertaking significant capacity enhancements such as the proposed parallel north-south runway has shifted further into the future. TPA is currently projected to not reach a level of demand that would require a proposed parallel runway to be operational until beyond the 20-year planning horizon of the current planning effort. The proposed capacity improvements from the previous master plan will be carried forward in this planning effort, however the timing of constructing those improvements will be shown as occurring beyond the 20-year horizon. In doing so, reasonable protections can be maintained to ensure that the ability to provide the proposed future facilities will be protected which is both a logical and responsible public policy for the HCAA to follow.

3.3 Airfield Facility Requirements

The following section reviews changes in airfield facility requirements that have arisen since the completion of the 2005 Master Plan. This review takes into consideration the results of the airfield capacity analysis which identified the potential timing for consideration of a future parallel runway. The depth of the analysis of airfield facilities in this study has been limited. This is due in large part to the level of analytical effort that was expended during the 2005 Master Plan analyzing the existing airfield and defining future improvements to meet project operational demand.

The scope of the 2012 Master Plan Update was specifically focused on airport land use and terminal issues, notably addressing how to maximize the long term viability of the Main Terminal Complex and the preparation of concept development plans for the east and south development areas. Airfield related requirements and the actions to address potential long term needs were fully evaluated in the last master plan. While the timing may change, the identified configuration of the majority of the recommended airfield improvements was determined by the HCAA to remain appropriate. The North Terminal Complex remains as the recommended long-term action to address future demand beyond that which can be accommodated in the current Main Terminal Complex. Additionally, the recommended parallel runway and extension of Runway 1R to address future TERPs issues in the North Terminal area remain viable for addressing these long-term needs. Thus, the airfield requirements analysis in this effort has focused on a somewhat higher level of review of airfield facility recommendations contained in the 2005 Master Plan.

Recognizing the impact of the deep recession in 2007/2008 and the slow recovery since, the HCAA understood that the timing of capacity enhancement recommendations defined prior to the recession would have to be reconsidered. At the same time, it was recognized that the fundamental components and configuration of the identified airfield improvements remained generally valid. This is specifically the case in relation to the proposed parallel runway and northerly extension of Runway 1R-19L. Based on input from the HCAA, a more detailed level of review was defined for the proposed need for an extension of Runway 10-28. Finally, it was deemed important to address the timing that would be required for the airfield improvements carried forward, taking into consideration changes in operational activity that have occurred as a result of the recent recession.

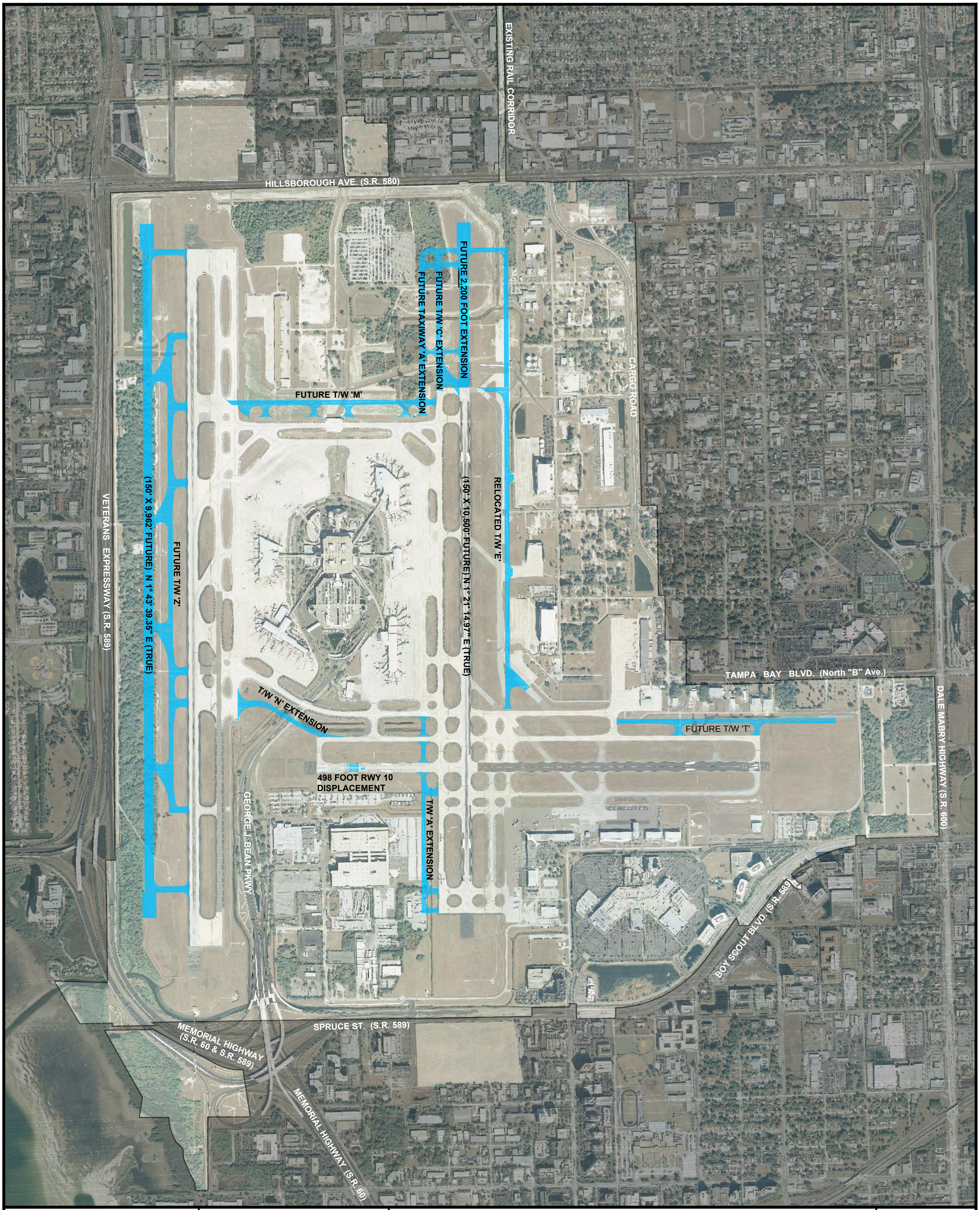
This updated airfield facilities evaluation is structured to identify those major projects from the 2005 Master Plan that are to be carried forward in the Master Plan Update, and to specifically evaluate the need for an extension to Runway 10-28. For detailed information on the basis, methodology and alternatives analysis associated with airfield improvements being carried forward, please refer to Volume Two – Airfield Planning of the 2005 Master Plan document.

As summarized in Section 3.2, Airfield Demand/Capacity Analysis, the forecast level of aircraft operational activity at TPA is not projected to reach a level that would trigger significant capacity improvements within the 20-year planning horizon covered by the Master Plan Update. However, activity is projected to surpass 60 percent of the airfield annual service volume (ASV) level in the 2025 timeframe. The 60 percent ASV level equates to approximately 250,000 operations and is the point in time when planning for a capacity improvement is typically recommended to begin. In the case of Tampa, significant planning has already occurred. While reaching the 60 percent threshold, activity is not anticipated to reach the more critical 80 percent threshold until after the 20-year planning horizon of the Master Plan Update. The 80 percent threshold is the level when actual construction should be commencing.

The HCAA performed extensive analysis during the 2005 planning effort. The 2005 Master Plan defined detailed airfield recommendations for improvements to add adequate capacity to meet long-term demand. These airfield recommendations are retained in the 2012 Master Plan Update to ensure that other recommended airport development takes them into consideration, so as not to preclude their development at the time that demand dictates their need.

3.3.1 Airfield Facility Improvements Carried Forward from the 2005 Master Plan

This section summarizes the airfield improvements from the 2005 Master Plan that are carried forward in the 2012 Master Plan Update. The majority of the projects remain as they were proposed in the previous plan. However, there are instances where taxiway improvements were omitted due to changes in the future development of the facilities that those improvements would serve. Additionally a follow-on study was conducted on the APM alignment that recommended an alternate Runway 10 displacement. This has been in corporated in the sections following. For an overview of the improvements being carried forward, please refer to **Figure 3.6**, Proposed Airfield Improvements and the items listed below.



0' 1,000' 2,000'

SCALE: 1" = 2,000'

HNTB

Proposed Airfield Improvements

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
Jul 17, 2013

Figure:
3.6

P:_Projects\57785 – Tampa MP\00-CADD\HNTB_Team_Dwg_files\Airfield Improvements.dwg 8.5x11 Jul 17, 2013 – 12:33pm

3.3.1.1 Future 150' X 9,962' Parallel Runway 17-35 and associated Parallel Taxiway Z

The assessment of airfield capacity in the Master Plan Update has clearly indicated that the forecast of demand does not result in the need for significant capacity enhancement. However, to ensure the continued protection of land area from alternative uses, to ensure airspace is protected and to ensure land area for the runway/taxiway system is preserved, it was determined that this proposed facility enhancement should be carried forward.

While the runway may not be needed during the 20 year planning horizon, it is imperative that the capability to provide added capacity not be lost or reduced. Unforeseen events can impact the timing of facility needs dramatically both in a negative and positive manner. For this reason, a master plan must be capable of responding to events that may not be able to be viably factored into a forecast or a demand capacity analysis. Therefore, preserving the site of the proposed runway and the airspace affiliated with the proposed alignment is a critical long term consideration. Extensive evaluations of this runway were conducted for the 2005 Master Plan. These evaluations can form the foundation of a revalidation of concept attributes and constraints once the need to re-engage capacity planning is needed.

Recent changes to FAA design criteria contained in AC 150/5300-13a relating to Runway Protection Zone requirements could impact the configuration of the proposed parallel runway. The proposed runway layout includes public roadways transiting the RPZ, which has recently been identified by the FAA as no longer a permitted use in a RPZ. While it is understood that revised planning for the proposed parallel runway may be necessary, this planning effort is best done closer to the actual time when the runway improvements are needed. Thus, the proposed parallel runway is being carried forward with the caveat that the future configuration and affiliated taxiway system will require additional planning in order to conform with guidance that may exist at a time closer to when the project is actually required.

3.3.1.2 Runway 1R-19L Extension – 150 ft. X 2,200 ft. (Total Length = 10,500)

The extension of Runway 19L north would be necessitated by an airspace issue associated with the ultimate development of the proposed 4th airside of the North Terminal Complex. Given the current location of the north end of Runway 1R-19L, the proposed 4th airside would penetrate airspace protection surfaces (United States Terminal Instrument Procedures (TERPS) surfaces) and could not be developed without the runway capability being significantly reduced. The 4th airside facility in the North Terminal Development Scheme is the last component of the overall phased terminal development program in the north. The facility would only be constructed when demand for added gates beyond those provided in the Main Terminal and the three other North Terminal Airsides (approximately 38 gates in the North Terminal) occurred. The need for the 4th airside will not occur until the airport approaches 38 to 40 MAP. Applying this value to the trend line associated with the forecasts in the Master Plan Update, the 4th airside would not be required until sometime around 2050 at the earliest.

However, it must always be recognized that trend lines change and facility needs can accelerate just as often as they can be delayed. The airspace associated with the defined long-term need is currently protected as a result of the inclusion of the proposed extension on the existing airport layout plan. It is important to ensure that the potential to extend this runway be preserved to protect the integrity of the long term terminal development program, beyond the maximization of the existing Main Terminal complex. To that end, and to ensure that off airport development actions do not preclude the viability of the long term terminal development program, the extension of Runway 1R-19L is recommended to be carried forward in this Master Plan Update and affiliated Airport Layout Plan.

Similar to the proposed 4th runway (17-35), the northerly extension of 1R-19L would result in a public roadway being located within the RPZ off the extended runway end, which the FAA has indicated is no longer permitted. The need for the runway extension will either be triggered by the final airside component of the north terminal or by some currently unforeseen runway length need. The proposed extension of Runway 1R-19L would need to be re-evaluated based on aircraft characteristics, operational demand and airport design criteria in effect at the time the extension is actually necessary. In the intervening period, the proposed extension will be carried forward recognizing that there are potential steps, albeit costly, that can be taken to address the roadway issue while maintaining the integrity of the proposed extension, protection of required airspace and the viability of the North Terminal fourth phase.

The proposed extension of Runway 1R-19L is recommended to be carried forward in the 2012 plan to retain the viability of the north terminal concept. However, it is recognized that both the north terminal and the proposed extension of the runway and affiliated taxiway improvements are well beyond the 20-year planning horizon. Protection of the airspace required for the runway extension aids in protecting a well-conceived and defined long-range development concept for TPA that maintains the viability of the airport when the current terminal area has to be supplemented. **Figure 3.6** shows the proposed alignment of the extension of Runway 1R/19L.

3.3.1.3 Taxiway A Extension to Runway 1R and Future Runway 19L End

Currently, Taxilane A serves as a partial parallel taxilane for aircraft taxiing along the outer portion of the terminal apron, on the east side of the Main Terminal complex. Taxilane A maintains a centerline separation from Taxiway C of 267’, conforming to Group V criteria. The taxilane currently extends from crossfield Taxiway J on the south to crossfield Taxiway B on the north. The 2005 Master Plan recommended the Taxilane be extended as a Taxiway from its intersection with Taxiway J south to the threshold of Runway 1R, to provide a dual parallel taxiway system from the Main Terminal complex to the east parallel runway. The 2005 Master Plan identified a project planning activity level that would drive the need for this improvement as consisting of the point in time when the airport reaches 370,000 annual operations. This trigger level is outside of the 20-year planning horizon associated with the current Master Plan Update

This proposed improvement is recommended to be carried forward in the Master Plan Update. Figure 3.6 depicts the proposed alignment of Taxiway A on both ends of Runway 1R-19L along with other affiliated taxiway improvements associated with this runway. Runway 1R-19L is used extensively for departures in north flow. The availability of a second parallel taxiway serving the Runway 1R departure flow could provide enhanced capacity to stage and queue aircraft departing to north and northeast destinations. Further, the availability of this added parallel alignment would provide the enhanced ability to bypass aircraft in the queue that might be experiencing departure delays due to flow control or weather conditions at their destination airport.

The extension of Taxiway A from its current terminus at the northeast corner of the Main Terminal apron to the future extended end of Runway 19L is also recommended to be carried forward in the 2012 Master Plan Update. Because the timing of the future North Terminal has significantly shifted, the the need for extending Runway 1R-19L has also shifted. The ALP should incorporate the current ultimate configuration of the North Terminal development and the affiliated airfield improvements to accommodate that concept to ensure the protection of land areas required to meet long range demand. At the time when the airport needs to move forward with a north complex, currently estimated at roughly 35 MAP, the number of aircraft movements to and from the current and future terminal facilities will have increased sharply. This will result in a level of demand that would be challenging to accommodate along a single parallel taxiway serving Runway 1R-35L.

3.3.1.4 Taxiway C Extension to Future Extended Runway 19L End

Taxiway C is a full length parallel taxiway that extends along the west side of Runway 1R-19L from the threshold of Runway 1R to the threshold of Runway 19L. The 2005 Master Plan called for the future extension of Taxiway C approximately 2,200 feet to the north of its current terminus to serve the future threshold of extended Runway 1R-19L. This taxiway maintains a runway to taxiway centerline separation of 400 feet along its entire current alignment. As depicted on the ALP, this separation would be maintained along the future northerly extension of the taxiway.

This proposed taxiway extension is recommended to be carried forward in the 2012 Master Plan Update. However, it is recognized that it would not be required until the alignment of Runway 1R-19L is extended to address the TERPs issues associated with the 4th airside in the North Terminal Complex. Based on the updated forecast of activity, this would fall well beyond the 2031 horizon for the current planning process.

Changes to FAA design guidance issued in September of 2012 indicate that taxiways serving runways with approach minimums below ½ mile visibility should have a centerline to centerline separation of 450’. The impact of having to shift this runway an additional 50 feet west of its current location coupled with affiliated impacts to Taxilane/Taxiway A and the terminal ramp could be significant and extremely detrimental. This is especially true given that there is limited space in the Main Terminal airside areas in their current configuration. As a result, it is recommended that the long-term extension of Taxiway C using the alignment depicted in the 2005 Master Plan of a 400 foot lateral separation from Runway 1R-19L be carried forward. A more detailed review of the proposed extension will be undertaken when the actual need for the extended taxiway becomes evident and a detailed consideration of existing standards should be undertaken at that time. If the past is any indication, there will be numerous changes in design criteria by the time the taxiway extension is actually needed. Improvements in aircraft approach technologies building on the strides that have occurred with RNP and RNAV could result in a relaxation of design criteria requirements over the next 30 years.

3.3.1.5 Relocated Taxiway E and Associated Extension to Future Runway 19L End

Taxiway E is located east of, and runs parallel to the full length of Runway 1R-19L. The runway maintains a varied lateral centerline to centerline separation ranging between 667 feet on the segment south of Runway 10-28 to approximately 530 feet along sections in front of the large

MRO hangars and ground run-up enclosure. The 2005 Master Plan recommended that the alignment of Taxiway E north of Runway 10-28 be shifted to maintain a consistent taxiway to runway centerline separation of 667' to the current north end of Runway 1R-19L, and ultimately maintain this separation to the future extended runway end.

The 2005 Master Plan identified the proposed reconstruction and realignment of Taxiway E as a "facility driven improvement" whose need was being driven by "future cargo facility development in the East Development Area". It should be noted that the 2005 Master Plan depicted significant cargo facility development in the East Development Area despite the cargo tonnage forecasts that called for very limited cargo growth. The extent of proposed cargo development in the East Development Area is markedly different in the 2012 Master Plan Update, even though the level of projected cargo activity set forth in the 2012 Update is generally consistent with the 2005 Master Plan. Both studies projected that the volume of dedicated freight at Tampa would grow modestly over the 20-year horizon and could be accommodated for in the immediate vicinity of existing dedicated freight facilities (FEDEX facility).

For purposes of the 2012 Master Plan Update, the proposed realignment of Taxiway E will be carried forward and will be done so consistent with the basis cited in the 2005 Plan. Shifting the taxiway to a 267' lateral separation would allow for the extension of partial parallel Taxiway D along the full length of Runway 1R-19L, which would increase the capacity for ground movements on the east side of the airfield. Maintaining this potential is a prudent and reasonable planning action and as such, has been carried forward.

3.3.1.6 Crossfield Taxiway M

Crossfield Taxiway M was not delineated in the 2005 Master Plan, but arose after the completion of that planning effort as a part of the north terminal planning process. Providing a dual crossfield capability between the Main Terminal and the future North Terminal will be essential for the efficient flow of traffic between the parallel runways and the terminal airsides. Currently TPA relies on crossfield Taxiway B and the alignment of Taxilane A for bi-directional movement between the east and west sides of the airfield to the north of the Main Terminal Complex. With the proposed future addition of Airside D, the need for this capability will increase. Further, movements of aircraft on Taxilane A between Airside C and future Airside D are impeded by the alignment of an on-airport secure road that passes across Taxilane A. This secure road provides access for employee buses, tugs and equipment between the terminal apron and facilities located in the north terminal area and east development area. These facilities include the Employee Parking Lot, Ground Service Equipment Maintenance Building, Belly Haul Cargo Building and Airport Maintenance and Warehouse facilities. The alignment of Taxilane A with the secure road results in interaction between taxiing aircraft and ground vehicles on an active taxilane, which is not ideal.

The timing of the need for Taxiway M will be largely driven by two factors. First, the need to replace existing Taxilane A as a result of potential expanded terminal airside development on the north side of the Main Terminal Complex. And second, the need to provide a viable north-south transportation corridor between the Main Terminal Complex and future development in the North Terminal Development Area. As aviation activity increases at TPA, the need for this taxiway will also grow. Taxiway M would provide the ability to sort ground traffic by east and west destinations rather than crossing aircraft in the air with attendant impacts to airfield capacity. Given the different potential triggers that could drive this facility enhancement, it is anticipated that Taxiway M will likely occur in the five to ten year timeframe as a quasi-enabling project for initial phases of the Airside D development. The alignment of proposed crossfield Taxiway M is depicted on Figure 3.6.

3.3.1.7 Crossfield Taxiway N Over Bean Parkway

The 2005 Master Plan proposed the development of dual crossfield taxiways at the north end and south end of the Main Terminal Complex. The proposed extension of Taxiway N via a bridge over the George J. Bean Parkway (essentially paralleling Taxiway J) was noted as being required when TPA reached the 340,000 annual aircraft operation level. Based on the revised forecasts, TPA reaches a projected level of 277,000 total aircraft operations by the end of the 20 year Master Plan horizon in 2031. This taxiway provides a second crossfield taxiway on the south side of the Main Terminal Complex and offers the ability for bi-directional ground movements from east to west via the simultaneous utilization of Taxiway N and Taxiway J. Further, as operations increase ATCT may opt to sort traffic on the ground by general geographic destination to avoid more time and capacity consuming crossings of aircraft in the airport vicinity airspace. Having bi-directional capability on the north and south side of the Main Terminal Complex will facilitate these ground sorting activities and in some cases reduce taxi distances and taxi times for arriving and departing aircraft. It is recommended that this project be carried forward in the 2012 Master Plan. However, it is recognized that it will not be required until beyond the Master Plan horizon, and as such, is shown as an ultimate development action.

3.3.1.8 Taxiway T Realignment and Extension

The final significant airfield element being carried forward from the 2005 Master Plan is the realignment and extension of Taxiway T. Taxiway T is located along the northern side of Runway 10-28 and angles off of Taxiway N at a point approximately 1,000 feet west of the east end of Runway 10-28/Taxiway N. Taxiway T runs along the frontage of the majority of the general aviation uses that are located along West Tampa Bay Blvd and provides these hangars with access to the airfield. The taxiway is roughly 40 feet in width and 2,300 feet in length, excluding the portion of the taxiway acting as a connector to Taxiway N.

As configured in the 2005 Master Plan, Taxiway T was proposed to be realigned to maintain a Taxiway N to Taxiway T centerline separation of 267 feet. Additionally, the alignment of Taxiway T was proposed to be extended to the west to perpendicularly intersect Taxiway K, thereby removing the existing angular section of Taxiway T. The taxiway extension would also provide access to all existing developed facilities from Taxiway K eastward, including a large tract of presently undeveloped land that is designated for future corporate aviation hangar development. The alignment of proposed Taxiway T is depicted on Figure 3.6.

The basis for these improvements to Taxiway T remain valid airfield enhancements and as such, they are being carried forward in the 2012 Master Plan. However, the following consideration should be noted. The taxiway, as configured on the Airport Layout Plan, was depicted as part of a dual parallel taxiway system serving an extended alignment of Runway 10-28. As such, the taxiway was shown having a width capable of accommodating up to, and including a B747-400. As discussed in the following section, the need to extend Runway 10-28 to a length of 8,200 feet has been re-evaluated. The demand for the runway extension, as well as the viability of the proposed extension has been found to have changed significantly. As a result, the HCAA may wish to consider the extension of Taxiway T, but with a reduced taxiway width. A 50 foot taxiway width consistent with operations by corporate jets up to and including the Gulfstream G650, 550 and Bombardier Global Express, would be appropriate.

3.3.2 Runway 10-28 Utilization and Runway Length Requirement

The most significant airfield element reviewed in the process of the Master Plan Update is the utilization and runway length required for Runway 10-28. Particularly, this effort aims to answer the question on whether the 1,200 foot runway extension recommended in the last master plan is needed. As a result of the increased focus by the FAA on providing full runway safety areas off the ends of runways at the nation’s airports, an additional question arose as to whether a reduction in operational length to 6,500 feet would negate the viability of the runway. The reduced length would be triggered by a requirement to provide a 1,000 foot long by 500 foot wide RSA on the west end of the runway along with a full 800 foot wide Runway Object Free Area (ROFA) based on the past and current aircraft fleet using the runway.

Using airport operations data collected from the Airport Noise and Operations Monitoring System (ANOMS) from 2005 through 2011, overall utilization of the airport runway system could be assessed by: runway end, operation type (PAX/GA/Cargo/Other), arrival vs. departure, and equipment. Given the tendency for commercial service aircraft to have the greatest runway length requirements an assessment of commercial passenger service operations was conducted. The assessment identified how and how often Runway 10-28 was being used by the air carriers. It should be noted that from a cost benefit perspective, the direct cost savings to the air carriers do not present a reasonable level of justification for a runway improvement. However, the analysis did not solely focus on the air carriers. Data was developed for business jet, turbo-prop and piston engine general aviation operations and the activity by these user groups also did not support a need for an extension. **Table 3.9** presents historic operations and percentage breakdowns of passenger commercial service operations on Runway 10-28. To summarize, commercial service operations on Runway 10-28 represent an average of approximately 0.8 percent of total passenger service operations at TPA over a seven year period between 2005 through 2011.

The analysis revealed several key factors affecting the extension of Runway 10-28:

- Overall utilization of Runway 10-28 by air carrier aircraft is very limited with the majority of the runway activity consisting of arrivals.
- The highest utilization occurs on Runway 28 (0.5% average over 2005 - 2011) with arrivals comprising the majority of activity.
- These arrivals are primarily the result of unique weather events when the prevailing weather pattern anomalies limit operational use of the parallel runways.
- Between 2005 and 2011, air carrier arrivals totaled 6,374 (75%) vs. 2,098 (25%) departures in all operational modes and direction.
- While 10-28 is a crosswind runway, it is not needed to achieve the typical 95 percent wind coverage required by the FAA. The parallel runways alone can achieve greater than 95 percent coverage for all-weather/VFR/IFR.

- Maintenance and/or improvements to Runway 10-28 are not eligible for FAA financial participation; thus, all improvements must be borne primarily by the airport sponsor.
- Any easterly extension of the runway would require the construction of a new ATCT due to line of sight obstructions from the current tower. An ATCT site was previously identified along with a considerably higher required tower height versus the current ATCT. This higher tower would adversely impact approach minimums on Runway 19R.
- Concentrations of densely developed incompatible land uses are located in proximity to the runway ends and beneath the runway extended centerlines.
- Changes in FAA design standards delineated in AC 150/5300-13a now prohibit the location of public roadways within the limits of a Runway Protection Zone. The RPZ for extended Runway 10-28 overlies the alignment of North Dale Mabry Highway. This is a seven lane major arterial roadway and state highway that is not viable for relocation given urban development patterns and would be excessively expensive to place in some form of tunnel structure.

Table 3.9
Total PAX (Passenger Service) Operations by Runway End

Total PAX Operations by Runway end by Approach/Departure by Year

	10		28		1L		19R		1R		19L		
Year	A	D	A	D	A	D	A	D	A	D	A	D	Grand Total
2011	224	106	484	96	33,323	13,977	14,271	30,240	3,329	21,206	20,776	2,730	140,762
2010	41	121	921	222	39,145	25,961	20,630	28,471	2,051	13,945	10,198	1,781	143,487
2009	297	117	740	141	29,311	13,466	16,466	37,063	2,775	18,846	22,310	3,483	145,015
2008	145	116	1,114	243	36,579	14,847	13,667	36,640	5,640	27,284	25,850	5,967	168,092
2007	51	40	340	64	30,876	14,219	3,631	31,097	6,393	35,596	17,205	4,440	143,952
2006	16	44	286	68	21,711	5,756	3,345	30,521	5,426	36,963	17,501	6,853	128,490
2005	99	228	1,616	492	35,093	17,663	10,953	34,404	6,190	24,163	17,805	6,144	154,850
Grand Total	**873**	**772**	**5,501**	**1,326**	**226,038**	**105,889**	**82,963**	**228,436**	**31,804**	**178,003**	**131,645**	**31,398**	**1,024,648**

% PAX Operations by Runway end by Approach/Departure by Year

	10		28		1L		19R		1R		19L		
Year	A	D	A	D	A	D	A	D	A	D	A	D	Grand Total
2011	0.2%	0.1%	0.3%	0.1%	23.7%	9.9%	10.1%	21.5%	2.4%	15.1%	14.8%	1.9%	100%
2010	0.0%	0.1%	0.6%	0.2%	27.3%	18.1%	14.4%	19.8%	1.4%	9.7%	7.1%	1.2%	100%
2009	0.2%	0.1%	0.5%	0.1%	20.2%	9.3%	11.4%	25.6%	1.9%	13.0%	15.4%	2.4%	100%
2008	0.1%	0.1%	0.7%	0.1%	21.8%	8.8%	8.1%	21.8%	3.4%	16.2%	15.4%	3.5%	100%
2007	0.0%	0.0%	0.2%	0.0%	21.4%	9.9%	2.5%	21.6%	4.4%	24.7%	12.0%	3.1%	100%
2006	0.0%	0.0%	0.2%	0.1%	16.9%	4.5%	2.6%	23.8%	4.2%	28.8%	13.6%	5.3%	100%
2005	0.1%	0.1%	1.0%	0.3%	22.7%	11.4%	7.1%	22.2%	4.0%	15.6%	11.5%	4.0%	100%
Grand Total	**0.1%**	**0.1%**	**0.5%**	**0.1%**	**22.1%**	**10.3%**	**8.1%**	**22.3%**	**3.1%**	**17.4%**	**12.8%**	**3.1%**	**100%**

While aircraft departures typically drive the length requirements of a runway, the small number of commercial service operations departing from Runway 10-28 could be accommodated on the parallel runways. An aircraft delayed for departure at the terminal is frustrating to the traveling public, but an arriving airline that is diverted to another airport entirely can be quite problematic for the receiving airport, the traveling public, the flight crew and the air carrier. Therefore, the emphasis for the Runway 10-28 analysis is placed on arrivals, which are arguably more critical. Interviews with Air Traffic Control personnel during the inventory supported this finding.

A landing length analysis was conducted on the most critical (in terms of landing length) commercial service aircraft that have at some point arrived on 10-28 during the period between 2005 and 2011. Shown in **Table 3.10** is a representative cross section of those air carrier aircraft and dry/wet landing length requirements at their max documented landing weight. It should be noted that using max landing weight (MLW) is an extremely conservative measure, as arriving aircraft are typically well below MLW on arrival depending on fuel burn and fuel reserve quantities used.

Some aircraft that were documented historically in the ANOMS database have been omitted from the analysis as they are being phased out. Additionally, while turboprops represent a large portion of the commercial traffic on 10-28, they have also been omitted due to their comparatively limited landing length requirements.

As noted, the review did not solely focus on the commercial service use of the runway, but also considered business jet and turboprop activity. Given the concentration of general aviation hangars and Fixed Base Operators along the alignment of 10-28, it was originally anticipated that business jet aircraft operating on 10-28 would comprise a significant component of total business jet operational activity at TPA. This assumption turned out not to be the case. Over the past seven years, business jet operations on Runway 10-28 accounted for an average of approximately 6% of all business jet operations occurring at TPA with the highest recorded percentage of 10.42% occurring in 2010.

The vast majority of all business jet operations occur on the parallel runways, which is not necessarily driven by a runway length deficiency on Runway 10-28. For example, in 2011 Runway 10-28 experienced a total of 33 operations by the Cessna 560 (all variants) out of a total of 1,082 operations on all runways. The Cessna 560 has a takeoff field length of 3,581 feet at its maximum takeoff weight. Similarly, the Beechcraft Beechjet 400 conducted a total of 28 operations on Runway 10-28 out of a total of 1,125 operations on all runways in 2011. The Beechjet 400 has a takeoff field length of 3,906 feet at maximum rated takeoff weight. Both takeoff field lengths are well within the existing available length on Runway 10-28.

In summary, it has been determined that the operational justification is not sufficient to warrant the proposed extension of Runway 10-28 given the operational use of the runway, the capability that is currently provided with the existing runway length, and the cost associated with the provision of the added length. The current runway length can meet the landing length requirements of the carriers and the operational requirements of the vast majority of all current business jet and turbo prop users of the runway.

Table 3.10
Runway 10-28 Aircraft Landing Length Requirements

Equipment	Max Landing Weights	Engines	Dry Landing Length (ft)	Wet Landing Length (ft)
737-300	114,000	CFM56-3B2	4,600	5,300
737-300	114,000	CFM56-3B1	5,400	6,200
737-300	114,000	CFM56-3B1	4,800	5,500
737-400	121,000	CFM56-3B2	5,200	5,900
737-400	121,000	CFM56-3C	5,400	6,200
737-400	121,000	CFM56-3C	6,100	6,975
737-700 ER	134,000	N/A	4,950	5,700
737-800	146,300	N/A	5,750	6,650
737-900	146,300	N/A	5,900	6,800
737-900 ER	157,300	N/A	5,600	6,450
757-200	210,000	PW 2040	5,075	5,900
757-300	224,000	PW 2040	5,650	6,525
767-200 ER	300,000	N/A	5,250	6,000
767-300	300,000	N/A	5,200	5,950
767-300 ER	320,000	N/A	5,650	5,975
767-300 F	326,000	N/A	5,700	6,550
767-400 ER	350,000	N/A	6,350	**7,250**
777-200 LR	492,000	GE90-110B1L	5,600	6,400
A319	134,481	CFM56-5A	4,450	4,600
A320-200	142,196	CFM56	4,700	4,800
A321-200	166,447	N/A	5,350	5,400
A300-600 F	304,230	N/A	5,125	5,895
A310	273,370	N/A	5,100	5,865
CRJ-900	78,000	GECF34-8C5	5,950	6,842
CRJ-700	67,000	GECF34-8C5	4,850	5,580
RJ 200 ER/LR	47,000	CF34-3B1	4,900	5,635
DC-10-40 CF	411,000	JT9D-59A	6,050	6,958
MD-81	128,600	N/A	4,900	5,550
MD-82	130,000	N/A	5,000	5,600
MD-83	139,500	N/A	5,150	6,000
MD-87	128,000	N/A	4,900	5,550
MD-88	130,000	N/A	5,000	6,050
MD-90-30	142,000	N/A	5,350	6,050
MD-90-30	142,000	N/A	5,500	6,225

Exceeds existing runway length of 6,999 feet

Exceeds 6,500 foot runway length associated with RSA

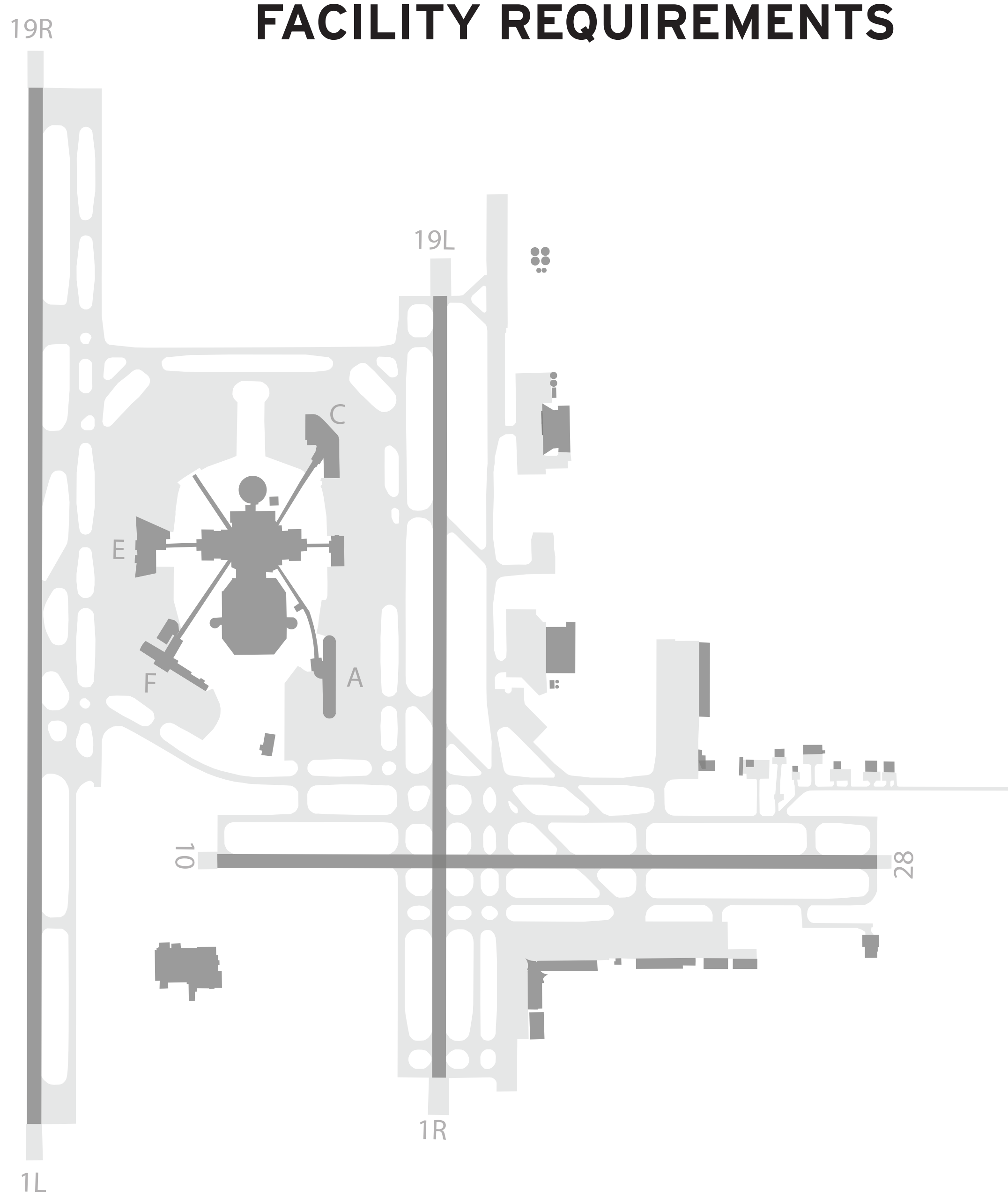
3.3.3 Summary

The level of analysis for airfield facilities that was undertaken in the Master Plan Update was limited, due to the extent to which these issues had been analyzed in the 2005 Master Plan. The focus of the Master Plan Update's analysis of airfield facilities was on two key items. First, the extent to which the 2007 recession and subsequent slow economic recovery has impacted the timing of the third parallel runway proposed in the 2005 Master Plan was assessed. Secondly, the need for the proposed 1,200 foot extension to Runway 10-28 (formerly 9-27) was analyzed.

Based on the analysis conducted, it has been determined that the need for the parallel runway based on current activity forecasts would not occur until beyond the 20-year planning horizon. However, the airport would need to initiate a detailed planning process for the proposed runway late in the 20 year planning horizon to address any standards that may have changed between 2005 and then.

Finally, the operational use and the capabilities afforded by Runway 10-28 , coupled with impacts associated with new FAA design criteria and the lack of federal funding support for any improvements to the runway were considered. It was determined that the proposed extension was not justifiable nor warranted and should not be incorporated into the future Airport Layout Plan. The runway 10 end however was found to require a 498-foot displacement as proposed in a previous study (conducted by others) to clear the proposed APM alignment that would traverse the extended runway 10-28 centerline.

SECTION 4 - INVENTORY AND FACILITY REQUIREMENTS



4 INVENTORY AND FACILITY REQUIREMENTS

The focus of this section is to document the existing conditions for key functional elements at the Airport and to develop associated facility requirements for each to accommodate the forecast demand at TPA over the course of the planning period (2011 through 2031). Typically these two sections, Existing Conditions and Facility Requirements are developed independent of one another, however for the sake of efficiency and convenience they have been combined for each functional area. First an inventory of the respective facility is provided, which is then followed by a discussion of the facility requirements for each facility. Airfield facilities are discussed in Section 3. The following functional areas are included in this section:

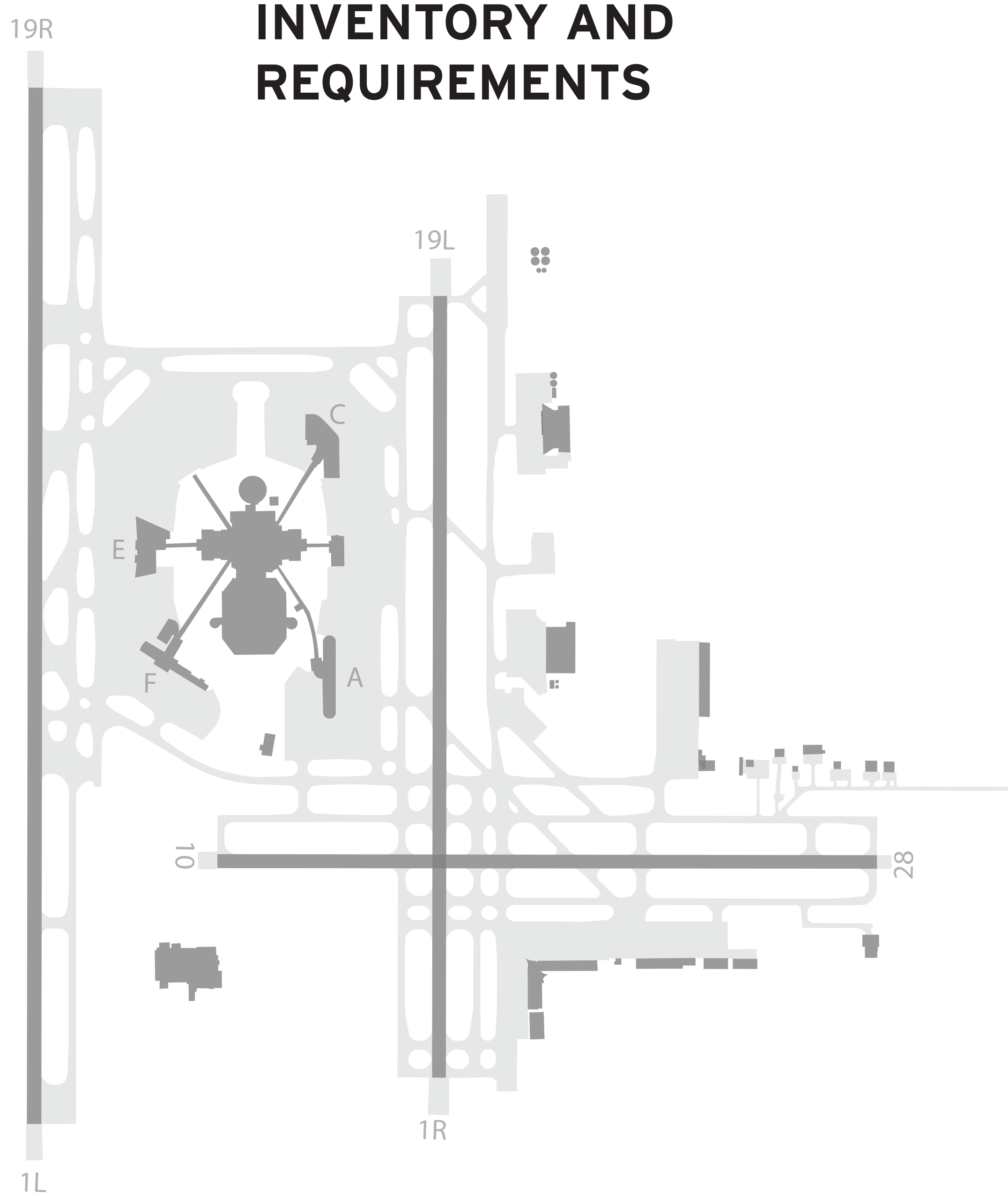
- Terminal Facilities
    - Landside Terminal
    - Administrative Office Building
    - Airside A
    - Airside A Bag Sortation Building
    - Airside C
    - Airside E
    - Airside F Bag Sortation Building
- Landside Terminal Facilities
    - Airport Roadways
    - Terminal Curbs
    - Public Parking
    - Employee Parking
    - On-airport Rental Car Facilities
- Airport Support Facilities
    - Air Cargo Facilities (Airline Belly Haul and Dedicated Air Freight)
    - Aircraft Maintenance/Maintenance Repair and Overhaul (MRO) Facilities
    - Ground Service Equipment (GSE) Storage and Maintenance Facilities
    - Airport Maintenance, Equipment Storage and Central Warehouse
    - RON Parking
    - Airport Rescue and Fire Fighting (ARFF) Facilities
    - Airport Fuel Farm
    - Airport Surveillance Radar (ASR)
    - Compressed Natural Gas (CNG) Fuel Facility
    - Airport Security and Police (K9 Training Facility and Range)
    - Ground Run-Up Enclosure
    - General Aviation Facilities
    - Fixed Base Operator (FBO) Facilities
    - Corporate Tenant Facilities

4.1 Overview of Inventory and Facility Requirement Development Process

Existing conditions information was generated from various sources including previous studies, such as the 2005 Airport Master Plan Update; as-built and other facility drawings; interviews with Airport staff and Airport tenants; and a series of site visits. At the direction of the HCAA, the focus of the inventory effort has been on the identification of changes that have occurred since the completion of the last master planning effort. Where changes have not occurred, the intent is to refer back to the previous master plan existing conditions data.

Facility requirements were developed by taking the aviation demand projections presented in Section 2 and performing demand/capacity analyses on the various functional airport areas (where appropriate). While the facility needs are discussed in this chapter, specific alternative methods of meeting these requirements are evaluated in Section 5, Alternatives Analysis.

TERMINAL FACILITIES INVENTORY AND REQUIREMENTS



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 forecasted passenger activity. Specific inventory detail is based on the existing terminal building envelope and the overall building systems as recorded in the spring of 2012 in conjunction with the Airport Master Plan Update. This inventory, including existing terminal layouts, area take-offs and gate capacity provides a baseline for the calculation of future facility requirements.

The planning standards and criteria discussed in this chapter include the following for each functional element in the terminal complex:

- 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; and
- Space planning standards and facility requirements for functional elements of the terminal, such as departure lounges, circulation spaces, and airline support areas.

A summary of planning assumptions agreed upon at the start of this project is outlined in **Table 4.1**. This table compares the planning assumptions used in this report to those used in the 2005 Master Plan Update.

Table 4.2 contains detailed terminal facility requirements for each milestone year of the planning study. Surplus/deficiency columns in the table indicate the amount of extra area or the shortfall of projected need for each functional component by year when the facility requirements are compared to the existing terminal. The “2011 Terminal Complex Total by Space Type” column summarizes the existing conditions in the terminal complex found during the inventory conducted in 2011 -2012. The “2016 Terminal Complex Total by Space Type” column incorporates additional area that will be available once the expansion of Airside F (new concessions, larger CBP, reconfigured SSCP) is complete.

Table 4.1
Terminal Programming Assumptions

Tampa International Airport Master Plan Update

HNTB

5/21/2012

Item No.	Planning Element/Processor	HNTB Proposed Planning Factor	HNTB Source	Comparison Planning Factor	Comparison Planning Factor Source	Comments
1.0 Ticketing/Check-in						
1.1	Passenger Earliness Arrival Distribution	See Table and Chart, Appendix 1	TransSolutions Passenger Intercept Surveys, December 14-16, 2011	See Table, Appendix 1	TIA Departing Passenger Survey, Quest Corporation of America, May19-22, 2004[1]	Similar. Passenger arrival curves were determined by passenger survey and are broken out by passengers with bags and without bags, and by flights departing before and after 9 AM in HNTB's analysis. In the 2005 Master Plan, passenger arrival curves are broken out by business vs. leisure passengers and by flights departing before and after 9 AM.
1.2	Passenger Group Size	See Table and Chart, Appendix 1	TransSolutions Passenger Intercept Surveys, December 14-16, 2011	See Table, Appendix 1	TIA Departing Passenger Survey, Quest Corporation of America, May19-22, 2004[1]	Similar. Passenger Group Size established by passenger surveys. 2005 Master Plan separated business and non-business travelers. TransSolutions survey does not distinguish between business and non-business passengers.
1.3	Well-Wishers	10%	2005 Master Plan[1]	10%	2005 Master Plan[1]	Same. % increase in total originating passengers going through SSCP.
1.4	Percentage of Passengers Using Landside Ticket Counters	68.5%	TIA 2010 Passenger Surveys[4]	84.0%	2005 Master Plan[1] (average)	Different. New survey data reflects evolution of passenger check-in methods. Simulation modeling will reflect airline-specific check-in survey data collected by TransSolutions.
1.5	Percentage of Passengers Checking Bags (average)	59.8%	TransSolutions Passenger Intercept Surveys, December 14-16, 2011 (average)	77.3%	TIA Departing Passenger Survey, Quest Corporation of America, May19-22, 2004[1]	Different. New survey data reflects recent trend of many carriers charging for checked baggage. Simulation modeling will reflect airline-specific checked baggage survey data collected by TransSolutions.
1.6	Check-in Method					
	Curbside	4.5%	TransSolutions Passenger Intercept Surveys, December 14-16, 2011 (average)	9%	2005 Master Plan[1] (average)	Different. New survey data reflects evolution of passenger check-in methods. Simulation modeling will reflect airline-specific check-in survey data collected by TransSolutions.
	Ticket Counter without embedded kiosk	11.8%	TransSolutions Passenger Intercept Surveys, December 14-16, 2011 (average)	65%	2005 Master Plan[1] (average)	Different. New survey data reflects evolution of passenger check-in methods. Simulation modeling will reflect airline-specific check-in survey data collected by TransSolutions.
	Self-Kiosk/Kiosk embedded at Ticket Counter	42.0%	TransSolutions Passenger Intercept Surveys, December 14-16, 2011 (average)	20%	2005 Master Plan[1] (average)	Different. New survey data reflects evolution of passenger check-in methods. Simulation modeling will reflect airline-specific check-in survey data collected by TransSolutions.
	Internet/Smartphone/Off-site Check-in	41.7%	TransSolutions Passenger Intercept Surveys, December 14-16, 2011 (average)	7%	2005 Master Plan[1] (average)	Different. New survey data reflects evolution of passenger check-in methods. Simulation modeling will reflect airline-specific check-in survey data collected by TransSolutions.
1.7	Check-in Processing Rates					
	Curbside Check-in (Surveyed/Proposed Processing Time in Minutes)	N/A/1.75	HNTB/TransSolutions Industry Experience	2.81/1.75	RS&H Data Collected June 2004[1]/2005 Master Plan[1] Proposed	Same. New curbside check-in data was not collected in by TransSolutions in December.
	Domestic Ticket Counter including embeded kiosk counters (Surveyed/Proposed Processing Time in Minutes)	2.66/2.66	TransSolutions Passenger Intercept Surveys, December 14-16, 2011 (average)	3.06/2.00	RS&H Data Collected June 2004[1]	Different. New survey data reflects current processing times. Simulation modeling will reflect airline-specific processing times survey data collected by TransSolutions.
	International Ticket Counter (Surveyed/Proposed Processing Time in Minutes)	N/A/3.00	HNTB/TransSolutions Industry Experience	3.70/3.00	RS&H Data Collected June 2004[1]	Same. New survey data reflects current processing times. Simulation modeling will reflect airline-specific processing times survey data collected by TransSolutions.
	Stand-alone Self-Kiosk (Surveyed/Proposed Processing Time in Minutes)	3.53/2.00	TransSolutions Passenger Intercept Surveys, December 14-16, 2011 (average)/HNTB & TransSolutions Industry Experience	2.43/1.50	RS&H Data Collected June 2004[1]	Different. New survey data did not match processing times typically seen in the industry. The 1.50 minutes used in 2005 Master Plan Update is seen as optimistic today due to seat and baggage fees and additional screens passengers must go through to check-in on a kiosk.
1.8	Average Checked Baggage per Passenger	0.66 bags	HCAA historical BHS data (2-year average)	N/A	Not stated in 2005 Master Plan[1]	N/A
1.9	Check-in Area per Passenger					
	Domestic Check-in Areas	14 sf/pax	IATA Airport Development Reference Manual[2]	14 sf/pax	IATA Airport Development Reference Manual[2]	Same
	International Check-in Areas	18.3 sf/pax	IATA Airport Development Reference Manual[2]	14 sf/pax	IATA Airport Development Reference Manual[2]	Different. Higher area per passenger requested at International check-in areas by HCAA.
2.0 Baggage Claim						
2.1	Percentage of Passengers Claiming Baggage (average)	59.8%	TransSolutions Passenger Intercept Surveys, December 14-16, 2011 (average)	77.3%	TIA Departing Passenger Survey, Quest Corporation of America, May19-22, 2004[1]	Different. New survey data reflects recent trend of many carriers charging for checked baggage. Simulation modeling will reflect airline-specific checked baggage survey data collected by TransSolutions.
2.2	Transport time for baggage from Airside to baggage claim. (average in minutes)	17 mins	TPA Airline Baggag Delivery Survey, May 11, 2012 (average)	12.2	2005 Master Plan[1]	Different. New survey data reflects current delivery times surveyed by HCAA.
2.3	Average Checked Baggage per Passenger	0.66 bags	HCAA historical BHS data (2-year average)	N/A	Not stated in 2005 Master Plan[1]	N/A
5.0 Departure Lounges						
5.1	Area per Seated Passenger	17 sf	HNTB Industry Experience	N/A	Not stated in 2005 Master Plan[1]	N/A
5.2	Area per Standing Passenger	12 sf	HNTB Industry Experience	N/A	Not stated in 2005 Master Plan[1]	N/A
5.3	Aircraft Seat Load Factor	90%	HNTB Industry Experience	N/A	Not stated in 2005 Master Plan[1]	N/A
5.4	Passengers Not in a Club (if applicable)	80%	HNTB Industry Experience	N/A	Not stated in 2005 Master Plan[1]	N/A
5.5	Percentage of Remaining Passengers that are Seated	90%	HNTB Industry Experience	N/A	Not stated in 2005 Master Plan[1]	N/A Equals 65% of seats on largest aircraft parked at the gate.
5.6	Podium and Exit Aisle for Narrowbody Gate	900 sf	HNTB Industry Experience	N/A	Not stated in 2005 Master Plan[1]	N/A
5.7	Podium and Exit Aisle for Widebody Gate	1,200 sf	HNTB Industry Experience	N/A	Not stated in 2005 Master Plan[1]	N/A
6.1 TSA Checked Baggage Inspection System						
6.1.1	BHS EDS Screening Processing Rate (3 level)	360 bags/hr	TPA Baggage Handling System Fact Sheet, August 2011	N/A	Not stated in 2005 Master Plan[1]	N/A
6.1.2	Average Checked Baggage per Passenger	0.66 bags	HCAA historical BHS data (2-year average)	N/A	Not stated in 2005 Master Plan[1]	N/A
6.1.3	Transport Rate from Landside to Airside (feet per minute)	320	TPA Baggage Handling System Fact Sheet, August 2011	N/A	Not stated in 2005 Master Plan[1]	N/A
6.2 Security Screening Checkpoints						
6.2.1	Checkpoint Queuing Capacity Goal	20 minutes	HNTB/TransSolutions Industry Experience	20 minutes	Airside F Customs Facility Improvements[3]	Same
6.2.2	Area per Passenger in SSCP Queue	10.8 sf/pax	IATA Airport Development Reference Manual[2]	10.5 sf/pax	Airside F Customs Facility Improvements[3]	Similar
6.2.3	SSCP Passenger Processing Rate	150 pax/ln/hr	HNTB Estimate for Future Lane Throughput	150 pax/ln/hr	Airside F Customs Facility Improvements[3]	Same.
6.2.4	Passenger Time in Queue Goal	95% spend 10 minutes or less	HNTB/TransSolutions Industry Experience	10 minutes or less	Airside F Customs Facility Improvements[3]	Similar. Planning goal is not specifically stated in Ricondo report. However, report mentions "leveling SSCP wait times to 10 minutes" as goal of the simulation modeling.
6.2.5	Time for All Passengers to Reach a Document Checker	15 minutes	HNTB/TransSolutions Industry Experience	N/A	Airside F Customs Facility Improvements[3]	Different. Planning goal is not specifically stated in Ricondo report.
6.3 Customs and Border Protection						
6.3.1	Aircraft Deplaning Rate					
	Widebody Aircraft	25 pax/min	HNTB Industry Experience	25 pax/min	Airside F Customs Facility Improvements[3]	Same
	Narrowbody Aircraft	20 pax/min	HNTB Industry Experience	20 pax/min	Airside F Customs Facility Improvements[3]	Same
6.3.2	Primary Processing (Immigration)					
	Area per passenger	10.8 sf/pax	IATA Airport Development Reference Manual[2]	11 sf/pax	Airside F Customs Facility Improvements[3]	Similar
	Primary Inspection Processing Time Goal	15 minutes	Industry Experience	10 minutes	Airside F Customs Facility Improvements[3]	Different. 95% of peak hour passengers should complete passport control processing within 15 minutes
	U.S. Citizen Processing Time	45 seconds	Airside F Customs Facility Improvements[3]	45 seconds	Airside F Customs Facility Improvements[3]	Same. Presuming based on Ricondo collected data or HCAA provided data.
	Non-Citizen Processing Time	80 seconds	Airside F Customs Facility Improvements[3]	80 seconds	Airside F Customs Facility Improvements[3]	Same. Presuming based on Ricondo collected data or HCAA provided data.
6.3.3	International Baggage					
	Passengers Claiming Baggage	95%	Airside F Customs Facility Improvements[3]	95%	Airside F Customs Facility Improvements[3]	Same. Presuming based on Ricondo collected data or HCAA provided data.
	Passengers Not Claiming Baggage	5%	Airside F Customs Facility Improvements[3]	5%	Airside F Customs Facility Improvements[3]	Same. Presuming based on Ricondo collected data or HCAA provided data.
	Bags per International Passenger	1.5 bags/pax	Airside F Customs Facility Improvements[3]	1.5 bags/pax	Airside F Customs Facility Improvements[3]	Same. Presuming based on Ricondo collected data or HCAA provided data.
	Baggage Claim Area per passenger	18.3 sf/pax	IATA Airport Development Reference Manual[2]	18 sf/pax	Airside F Customs Facility Improvements[3]	Similar
	First Baggage Delivered to Claim	10 minutes after STA	Airside F Customs Facility Improvements[3]	10 minutes after STA	Airside F Customs Facility Improvements[3]	Same. Presuming based on Ricondo collected data or HCAA provided data.
	Baggage Unloading Rate	8 - 12 bags/min	Airside F Customs Facility Improvements[3]	8 - 12 bags/min	Airside F Customs Facility Improvements[3]	Same. Presuming based on Ricondo collected data or HCAA provided data.
6.3.4	CBP Exit Control					
	Area per passenger	14 sf/pax	IATA Airport Development Reference Manual[2]	12 sf/pax	Airside F Customs Facility Improvements[3]	Different. Recommend IATA guideline, passengers with multiple large bags and carts will require more area
	Processing Time per passenger	7.5 seconds	Industry Experience	15 seconds	Airside F Customs Facility Improvements[3]	Different. ATL = 6 seconds, TransSolutions recommends 7.5 seconds based on observations at other airports
	Percentage of Transfer Passengers	5%	Airside F Customs Facility Improvements[3]	5%	Airside F Customs Facility Improvements[3]	Same. Presuming based on Ricondo collected data or HCAA provided data.
	Percentage of Terminating Passengers	95%	Airside F Customs Facility Improvements[3]	95%	Airside F Customs Facility Improvements[3]	Same. Presuming based on Ricondo collected data or HCAA provided data.
	Percentage of Baggage Recheck Users	80%	Airside F Customs Facility Improvements[3]	80%	Airside F Customs Facility Improvements[3]	Same. Presuming based on Ricondo collected data or HCAA provided data.
	Percentage Carrying Baggage on APM	20%	Airside F Customs Facility Improvements[3]	20%	Airside F Customs Facility Improvements[3]	Same. Presuming based on Ricondo collected data or HCAA provided data.
7.0 Commercial Program and Amenities						
7.1	Percentage of Passengers Spending Time on Transfer Level Prior to Boarding APM	29%	TIA 2010 Passenger Surveys[4]	24.4%	TIA Departing Passenger Survey, Quest Corporation of America, May19-22, 2004[1]	Different. New survey data used.
7.2	Average Time Spent on Transfer Level	37 minutes	TIA 2010 Passenger Surveys[4]	44.7 minutes	TIA Departing Passenger Survey, Quest Corporation of America, May19-22, 2004[1]	Different. New survey data used.
7.3	Use of Landside Concessions by Passengers Spending Time before Using APM	64.1%	TIA 2010 Passenger Surveys[4]	24.3%	TIA Departing Passenger Survey, Quest Corporation of America, May19-22, 2004[1]	Different. New survey data used.
7.4	Use of Airside Concessions	65.9%	TIA 2010 Passenger Surveys[4]	57.6%	TIA Departing Passenger Survey, Quest Corporation of America, May19-22, 2004[1]	Different. New survey data used.

Table 4.1
Terminal Programming Assumptions

HNTB

Tampa International Airport Master Plan Update

5/21/2012

Item No.	Planning Element/Processor	HNTB Proposed Planning Factor	HNTB Source	Comparison Planning Factor	Comparison Planning Factor Source	Comments
10.0 MEP and IT						
10.1	Area Dedicated to MEP and IT Spaces	10%	HNTB Industry Experience	N/A	Not stated in 2005 Master Plan[1]	**N/A.** Targeting 10% of total building area.
11.0 Circulation						
11.1	Area Dedicated to Circulation	25%	HNTB Industry Experience	N/A	Not stated in 2005 Master Plan[1]	**N/A.** Targeting 25% of total building area.
11.2	Vertical Circulation Choice					
	Escalator/Stair	90%	HNTB Industry Experience	90%	RS&H Data Collected June 2004[1]	**Same**
	Elevator	10%	HNTB Industry Experience	10%	RS&H Data Collected June 2004[1]	**Same**
11.3	Elevator Wait and Movement Time					
	Ticketing to Transfer (minutes)	1:25	RS&H Data Collected June 2004[1]	1:25	RS&H Data Collected June 2004[1]	**Same**
	Transfer to Baggage (minutes)	1:42	RS&H Data Collected June 2004[1]	1:42	RS&H Data Collected June 2004[1]	**Same**
11.4	Escalator Transition Time					
	Ticketing to Transfer (minutes)	0.73	RS&H Data Collected June 2004[1]	0.73	RS&H Data Collected June 2004[1]	**Same**
	Transfer to Baggage (minutes)	0.98	RS&H Data Collected June 2004[1]	0.98	RS&H Data Collected June 2004[1]	**Same**
	Transfer to Ticketing (minutes)	0.55	RS&H Data Collected June 2004[1]	0.55	RS&H Data Collected June 2004[1]	**Same**
	Baggage to Ticketing (minutes)	0.57	RS&H Data Collected June 2004[1]	0.57	RS&H Data Collected June 2004[1]	**Same**
11.5	Passenger Walking Speed	250 ft/min	Pedestrian Planning and Design, J.J. Fruin	250 ft/min	Pedestrian Planning and Design, J.J. Fruin	**Same**
12.0 Automated People Mover						
12.1	ID and Boarding Pass Checkpoint (seconds/passenger)	8.6 seconds	2005 Master Plan[1]	8.6 seconds	2005 Master Plan[1]	**Same**
12.2	Shuttle Capacity (for 2 cars)	107 pax	2005 Master Plan[1]	107 pax	2005 Master Plan[1]	**Same**
12.3	Passenger Dwell Time (minutes)	0.62	2005 Master Plan[1]	0.62	2005 Master Plan[1]	**Same**
12.4	Shuttle Travel Time (minutes)					
	Airside A	1.06	2005 Master Plan[1]	1.06	2005 Master Plan[1]	**Same**
	Airside C	1.06	2005 Master Plan[1]	1.06	2005 Master Plan[1]	**Same**
	Airside E	0.88	2005 Master Plan[1]	0.88	2005 Master Plan[1]	**Same**
	Airside F	0.93	2005 Master Plan[1]	0.93	2005 Master Plan[1]	**Same**
12.5	Shuttle Cycle Time (minutes)					
	Airside A	3.35	2005 Master Plan[1]	3.35	2005 Master Plan[1]	**Same**
	Airside C	3.35	2005 Master Plan[1]	3.35	2005 Master Plan[1]	**Same**
	Airside E	2.98	2005 Master Plan[1]	2.98	2005 Master Plan[1]	**Same**
	Airside F	3.08	2005 Master Plan[1]	3.08	2005 Master Plan[1]	**Same**

Bibliography

1 Skyward 2025: Tampa International Airport 2005 Master Plan Update - Volume III Terminal Facilities Planning Analyses, January 2006, FINAL - Ricondo and Associates
2 Airport Development Reference Manual, 9th Addition, 2004 - International Air Transport Association (IATA)
3 Airside F Customs Facility Improvements & Cost Estimate, October 2011 - Ricondo & Associates, Inc.
4 Tampa International Airport 2010 Passenger Surveys, Ricondo & Associates, Inc.

Table 4.2
Tampa International Airport Master Plan Update
Main Terminal and Airside Program Requirements by Space Type

	2011 Terminal Complex Total by Space Type	% of total	2016 Terminal Complex Total by Space Type	% of total	2011 Flight Schedule	% of total	Surplus/ (Deficiency) Existing vs. 2011 Flight Schedule	2016 Flight Schedule	% of total	Surplus/ (Deficiency) Existing vs. 2016 Flight Schedule	2021 Flight Schedule	% of total	Surplus/ (Deficiency) Existing vs. 2021 Flight Schedule	2026 Flight Schedule	% of total	Surplus/ (Deficiency) Existing vs. 2026 Flight Schedule	2031 Flight Schedule	% of total	Surplus/ (Deficiency) Existing vs. 2031 Flight Schedule
AIRLINE AREAS																			
1.0 Ticketing/Check-in Hall	**45,800 sf**	**2.4%**	**45,800 sf**	**2.4%**	**33,634 sf**	**2.5%**	**12,166 sf**	**35,170 sf**	**2.5%**	**10,630 sf**	**36,308 sf**	**2.4%**	**9,492 sf**	**38,489 sf**	**2.4%**	**7,311 sf**	**40,376 sf**	**2.4%**	**5,424 sf**
1.1 Standard, In-counter Kiosk and Bag Tagging Check-In Positions	20,640 sf		20,640 sf		15,333 sf		5,307 sf	16,315 sf		4,325 sf	17,003 sf		3,637 sf	18,085 sf		2,555 sf	18,871 sf		1,769 sf
1.2 Curbside Bag Tagging Check-In Positions	5,496 sf		5,496 sf		2,145 sf		3,351 sf	1,877 sf		3,619 sf	1,877 sf		3,619 sf	1,877 sf		3,619 sf	1,877 sf		3,619 sf
1.3 Airline Ticketing Offices (includes break rooms, communications rooms & storage)	19,664 sf		19,664 sf		16,157 sf		3,507 sf	16,978 sf		2,686 sf	17,428 sf		2,236 sf	18,528 sf		1,136 sf	19,628 sf		36 sf
2.0 Baggage Claim	**79,663 sf**	**4.2%**	**79,663 sf**	**4.1%**	**77,077 sf**	**5.8%**	**2,586 sf**	**79,753 sf**	**5.6%**	**(90) sf**	**80,088 sf**	**5.4%**	**(425) sf**	**80,753 sf**	**5.1%**	**(1,090) sf**	**81,418 sf**	**4.9%**	**(1,755) sf**
Number of Baggage Claim Devices	*14 ea*		*14 ea*		*14 ea*		*0 ea*	*14 ea*		*0 ea*	*14 ea*		*0 ea*	*14 ea*		*0 ea*	*14 ea*		*0 ea*
2.1 Baggage Claim Area (non-CBP)	56,495 sf		56,495 sf		56,495 sf		0 sf	56,495 sf		0 sf	56,495 sf		0 sf	56,495 sf		0 sf	56,495 sf		0 sf
2.2 Inbound Baggage Drop-off Area	16,246 sf		16,246 sf		16,246 sf		0 sf	16,246 sf		0 sf	16,246 sf		0 sf	16,246 sf		0 sf	16,246 sf		0 sf
2.3 Baggage Service Offices	6,922 sf		6,922 sf		4,336 sf		2,586 sf	7,012 sf		(90) sf	7,347 sf		(425) sf	8,012 sf		(1,090) sf	8,677 sf		(1,755) sf
3.0 Outbound Baggage Handling Areas	**202,843 sf**	**10.7%**	**202,843 sf**	**10.5%**	**135,177 sf**	**10.2%**	**67,666 sf**	**138,221 sf**	**9.8%**	**64,622 sf**	**141,838 sf**	**9.5%**	**61,005 sf**	**145,955 sf**	**9.2%**	**56,888 sf**	**150,072 sf**	**9.0%**	**52,772 sf**
3.1 Airline Make-Up Area	70,638 sf		70,638 sf		43,704 sf		26,934 sf	46,816 sf		23,822 sf	49,928 sf		20,710 sf	53,040 sf		17,598 sf	56,152 sf		14,487 sf
3.2 Airline Operations (Offices, Storage, Break Rooms)	118,810 sf		118,810 sf		91,473 sf		27,337 sf	91,405 sf		27,405 sf	91,910 sf		26,900 sf	92,915 sf		25,895 sf	93,920 sf		24,890 sf
4.0 Airline/VIP Clubs	**16,880 sf**	**0.9%**	**17,030 sf**	**0.9%**	**16,880 sf**		**0 sf**	**17,030 sf**		**0 sf**	**19,530 sf**		**(2,500) sf**	**19,530 sf**		**(2,500) sf**	**22,030 sf**		**(5,000) sf**
5.0 Hold Rooms	**183,802 sf**	**9.7%**	**184,153 sf**	**9.5%**	**115,708 sf**		**68,094 sf**	**122,513 sf**		**61,640 sf**	**129,719 sf**		**54,434 sf**	**137,348 sf**		**46,805 sf**	**145,426 sf**		**38,727 sf**
SUBTOTAL - AIRLINE AREAS	***528,988 sf***	***28.0%***	***529,489 sf***	***27.3%***	***378,476 sf***	***28.6%***	***150,512 sf***	***392,687 sf***	***27.8%***	***136,802 sf***	***407,483 sf***	***27.3%***	***122,006 sf***	***422,075 sf***	***26.7%***	***107,414 sf***	***439,321 sf***	***26.2%***	***90,168 sf***
SUPPORT AREAS (NON-AIRLINE)																			
6.0 DHS	**135,752 sf**	**7.2%**	**156,463 sf**	**8.1%**	**132,675 sf**	**10.0%**	**3,077 sf**	**145,186 sf**	**10.3%**	**11,277 sf**	**152,011 sf**	**10.2%**	**4,452 sf**	**158,771 sf**	**10.0%**	**(2,308) sf**	**162,671 sf**	**9.7%**	**(6,208) sf**
6.1 TSA Checked Baggage Inspection System	34,154 sf	1.8%	34,154 sf	1.8%	27,769 sf	2.1%	6,385 sf	27,769 sf	2.0%	6,385 sf	30,994 sf	2.1%	3,160 sf	34,154 sf	2.2%	0 sf	34,154 sf	2.0%	0 sf
TSA EDS Devices	*25 ea*		*25 ea*		*19 ea*		*6 ea*	*19 ea*		*6 ea*	*22 ea*		*3 ea*	*25 ea*		*0 ea*	*25 ea*		*0 ea*
6.2 TSA SSCP	38,292 sf	2.0%	46,492 sf	2.4%	41,600 sf	3.1%	(3,308) sf	41,600 sf	2.9%	4,892 sf	45,200 sf	3.0%	1,292 sf	48,800 sf	3.1%	(2,308) sf	52,400 sf	3.1%	(5,908) sf
6.2.1 SSCP	37,653 sf		44,942 sf		39,600 sf		(1,947) sf	39,600 sf		5,342 sf	43,200 sf		1,742 sf	46,800 sf		(1,858) sf	50,400 sf		(5,458) sf
SSCP Lanes	*27 sf*		*28 ea*		*22 ea*		*5 ea*	*22 ea*		*6 ea*	*24 ea*		*4 ea*	*26 ea*		*2 ea*	*28 ea*		*0 ea*
6.2.2 TSA Break Rooms/Offices/Lockers	639 sf		1,550 sf		2,000 sf		(1,361) sf	2,000 sf		(450) sf	2,000 sf		(450) sf	2,000 sf		(450) sf	2,000 sf		(450) sf
6.3 Customs and Border Protection	63,306 sf		75,817 sf		63,306 sf		0 sf	75,817 sf		0 sf	75,817 sf		0 sf	75,817 sf		0 sf	76,117 sf		(300) sf
7.0 Commercial Program and Amenities	**131,842 sf**	**7.0%**	**138,642 sf**	**7.2%**	**133,565 sf**	**10.1%**	**(1,723) sf**	**153,445 sf**	**10.9%**	**(14,803) sf**	**176,170 sf**	**11.8%**	**(37,528) sf**	**201,960 sf**	**12.8%**	**(63,318) sf**	**231,207 sf**	**13.8%**	**(92,565) sf**
7.1 Concessions	122,396 sf		129,196 sf		133,565 sf		(11,169) sf	153,445 sf		(24,249) sf	176,170 sf		(46,974) sf	201,960 sf		(72,764) sf	231,207 sf		(102,011) sf
7.1.1 Food & Beverage	73,389 sf		73,898 sf		55,304 sf		18,085 sf	62,949 sf		10,949 sf	72,042 sf		1,856 sf	82,448 sf		(8,550) sf	94,359 sf		(20,461) sf
7.1.2 News/Gifts/Retail	29,584 sf		35,144 sf		42,719 sf		(13,135) sf	48,624 sf		(13,480) sf	55,648 sf		(20,504) sf	63,686 sf		(28,542) sf	72,886 sf		(37,742) sf
7.1.3 Duty Free	1,361 sf		1,995 sf		914 sf		447 sf	2,090 sf		(95) sf	2,806 sf		(811) sf	3,466 sf		(1,471) sf	4,020 sf		(2,025) sf
7.1.4 Services	2,021 sf		2,021 sf		9,894 sf		(7,873) sf	11,366 sf		(9,345) sf	13,050 sf		(11,029) sf	14,960 sf		(12,939) sf	17,126 sf		(15,105) sf
7.1.5 Concessions Storage	16,041 sf		16,138 sf		24,734 sf		(8,693) sf	28,416 sf		(12,278) sf	32,624 sf		(16,486) sf	37,400 sf		(21,262) sf	42,816 sf		(26,678) sf
7.2 Car Rental	9,446 sf		9,446 sf		0 sf		9,446 sf	0 sf		9,446 sf	0 sf		9,446 sf	0 sf		9,446 sf	0 sf		9,446 sf
8.0 HCAA, Other Areas	**175,894 sf**	**9.3%**	**175,894 sf**	**9.1%**	**108,891 sf**	**8.2%**	**67,003 sf**	**109,441 sf**	**7.7%**	**66,453 sf**	**109,991 sf**	**7.4%**	**65,903 sf**	**110,541 sf**	**7.0%**	**65,353 sf**	**111,091 sf**	**6.6%**	**64,803 sf**
8.1 HCAA	106,067 sf		106,067 sf		106,067 sf		0 sf	106,617 sf		(550) sf	107,167 sf		(1,100) sf	107,717 sf		(1,650) sf	108,267 sf		(2,200) sf
8.2 Loading Dock	2,824 sf		2,824 sf		2,824 sf		0 sf	2,824 sf		0 sf	2,824 sf		0 sf	2,824 sf		0 sf	2,824 sf		0 sf
8.3 Unassigned/Unfinished Areas	55,758 sf		55,758 sf		0 sf		55,758 sf	0 sf		55,758 sf	0 sf		55,758 sf	0 sf		55,758 sf	0 sf		55,758 sf
8.4 Concessionaire Offices	3,077 sf		3,077 sf		9,894 sf		(6,817) sf	11,366 sf		(8,289) sf	13,050 sf		(9,973) sf	14,960 sf		(11,883) sf	17,126 sf		(14,049) sf
8.5 U.S.O	1,401 sf		1,401 sf		1,401 sf		0 sf	1,401 sf		0 sf	1,401 sf		0 sf	1,401 sf		0 sf	1,401 sf		0 sf
8.6 Miscellaneous (Business Center, Kids' Play Areas, etc.)	6,767 sf		6,767 sf		9,267 sf		(2,500) sf	9,267 sf		(2,500) sf	9,267 sf		(2,500) sf	9,267 sf		(2,500) sf	9,267 sf		(2,500) sf
9.0 Public Restrooms	**41,699 sf**	**2.2%**	**41,699 sf**	**2.2%**	**19,152 sf**	**1.4%**	**22,547 sf**	**22,181 sf**	**1.6%**	**19,518 sf**	**25,210 sf**	**1.7%**	**16,489 sf**	**28,239 sf**	**1.8%**	**13,460 sf**	**31,576 sf**	**1.9%**	**10,123 sf**
SUBTOTAL - SUPPORT AREAS (NON-AIRLINE)	***485,187 sf***	***25.6%***	***512,698 sf***	***26.5%***	***394,283 sf***	***29.8%***	***90,904 sf***	***430,253 sf***	***30.5%***	***82,445 sf***	***463,382 sf***	***31.0%***	***49,316 sf***	***499,511 sf***	***31.5%***	***13,187 sf***	***536,545 sf***	***32.0%***	***(23,847) sf***
AREAS DEPENDENT ON BUILDING CONFIGURATION																			
10.0 MEP and IT Services	**191,658 sf**	**10.1%**	**194,607 sf**	**10.1%**	**132,000 sf**	**10.0%**	**59,658 sf**	**141,000 sf**	**10.0%**	**53,607 sf**	**149,000 sf**	**10.0%**	**45,607 sf**	**158,000 sf**	**10.0%**	**36,607 sf**	**167,000 sf**	**10.0%**	**27,607 sf**
11.0 Circulation	**470,379 sf**	**24.9%**	**471,779 sf**	**24.4%**	**329,700 sf**	**24.9%**	**140,679 sf**	**351,800 sf**	**24.9%**	**119,979 sf**	**372,000 sf**	**24.9%**	**99,779 sf**	**395,000 sf**	**24.9%**	**76,779 sf**	**417,000 sf**	**24.9%**	**54,779 sf**
11.1 Public and Non-Public	423,648 sf	22.4%	424,281 sf	21.9%	296,700 sf	22.4%	126,948 sf	316,800 sf	22.4%	107,481 sf	335,000 sf	22.4%	89,281 sf	356,000 sf	22.5%	68,281 sf	376,000 sf	22.4%	48,281 sf
11.2 Vertical Circulation	46,731 sf	2.5%	47,498 sf	2.5%	33,000 sf	2.5%	13,731 sf	35,000 sf	2.5%	12,498 sf	37,000 sf	2.5%	10,498 sf	39,000 sf	2.5%	8,498 sf	41,000 sf	2.4%	6,498 sf
12.0 Tug Drives	**130,617 sf**	**6.9%**	**135,504 sf**	**7.0%**	**90,500 sf**	**6.8%**	**40,117 sf**	**97,000 sf**	**6.9%**	**38,504 sf**	**103,000 sf**	**6.9%**	**32,504 sf**	**109,000 sf**	**6.9%**	**26,504 sf**	**115,000 sf**	**6.9%**	**20,504 sf**
13.0 Misc. Space (Interstitial, wall cavities, etc.)	**85,259 sf**	**4.5%**	**92,128 sf**	**4.8%**	**60,000 sf**	**4.5%**	**25,259 sf**	**64,000 sf**	**4.5%**	**28,128 sf**	**67,000 sf**	**4.5%**	**25,128 sf**	**71,000 sf**	**4.5%**	**21,128 sf**	**75,000 sf**	**4.5%**	**17,128 sf**
SUBTOTAL - DEPENDENT AREAS	***877,913 sf***	***46.4%***	***894,018 sf***	***46.2%***	***552,200 sf***	***41.7%***	***325,713 sf***	***589,800 sf***	***41.7%***	***304,218 sf***	***624,000 sf***	***41.7%***	***270,018 sf***	***662,000 sf***	***41.8%***	***232,018 sf***	***699,000 sf***	***41.7%***	***195,018 sf***
TOTAL	***1,892,088 sf***	***100%***	***1,936,205 sf***	***100%***	***1,324,959 sf***	***100%***	***567,129 sf***	***1,412,740 sf***	***100%***	***523,465 sf***	***1,494,865 sf***	***100%***	***441,340 sf***	***1,583,586 sf***	***100%***	***352,619 sf***	***1,674,866 sf***	***100%***	***261,339 sf***

Source: HNTB Corporation, July 2012
Prepared by: HNTB Corporation, July 2012

Printed: 3/12/2013

4.2.1 Terminal Facilities Overview

The airport maintains a passenger terminal complex with a total enclosed building area of approximately 1.94 million square feet located between Runways 1L-19R and 1R-19L. The existing terminal complex opened in 1971 and has undergone several changes and expansions over the years to meet the evolving needs and expectations of the passengers and tenants it serves. Additionally, Tampa International Airport has routinely ranked high in industry surveys for the level of customer service that is provided in the terminal complex. The footprint of TPA's central terminal area shown in **Figure 4.1** has had limited changes since completion of the 2005 Master Plan Update; however, modifications to the terminal and airsides' interiors have been made to address many of the improvements identified during the previous Master Plan Update. Additionally, Airside F was being expanded during this Master Plan Update study, adding approximately 44,100 sf of additional concessions, security screening checkpoint area and Customs and Border Protection facilities.

Figures 4.2 through **4.17** depict the existing terminal facility areas as categorized in **Table 4.3**. **Figures 4.18 and 4.19** show the expanded Airside F under construction during the Master Plan Update. A functional area take-off of the expanded Airside F is also included in Table 4.3. The categories into which terminal space has been assigned are closely aligned with the definitions and assignment of space as described in the *TPA Airline- Airport Use and Lease Agreement* dated March 1, 2010. Current and pending terminal construction upgrades and internal modifications will contribute to creating discrepancies between the areas presented in this document and the actual allocation of space at points in the future.

The Main Terminal building is functionally divided into a Red side and a Blue side and has three levels for various passenger processing functions and activities. The function of each level is delineated below:

Level One – Baggage Claim Level

- Baggage claim carousels and baggage tug drop-off areas
- Airline baggage service offices
- Checked baggage inspection system (CBIS)
- Ground transportation facilities (Blue Side Rental Car, kiosks and information)

Level Two – Ticketing/Check-in Level

- Curbside check-in counters
- Ticketing/check-in counters
- Self-service kiosks
- Airline ticket offices
- Oversized checked baggage inspection system
- Network operations center
- United Services Organization (USO)

Level Three – Transfer Level

- Concessions
- Shuttle stations
- Aviation Authority staff offices
- Aviation Authority board room
- Waiting areas for meter/greeters and well-wishers
- Arcade (corridor to Marriott Hotel)
- Traveler's Aid
- HCAA Information Booths
- Observation Deck (facing Airside A Sortation Building)

An Arcade lined with shops, seating areas and a display area connects the north end of the Transfer Level to the Marriott Hotel. A two-level administrative office building is sited below the arcade and across the Red Ticketing and Baggage Claim curbs from the Main Terminal Building. This administrative office building contains the Red Side Rental Car counters, various HCAA offices, credential badging offices, airport police station, maintenance shops, loading docks, and mechanical facilities that support the Main Terminal.

There are currently four passenger airsides (Airsides A, C, E, & F) serving all commercial departing and arriving flights at TPA. Each airside is connected to the main passenger terminal by a pair of automated people mover (APM) trains running in tandem. There are two stand-alone baggage sortation buildings; one serving Airside A located on the former site of Airside B, and one adjacent to Airside F serving the carriers using that airside. Airsides C and E have baggage sortation areas located on the ramp level of the respective airside buildings.

Each airside has a ramp level containing airline operations areas, mechanical, electrical and plumbing rooms, loading docks and trash compactor areas, service areas for their respective APM systems, and other support spaces. Airsides A and C have apron-level holdrooms to serve airline commuter operations. The airport's Customs and Border Protection facility is located on the ramp level of Airside F and, at the time of the inventory, improvements to this facility were being designed and in the process of construction.

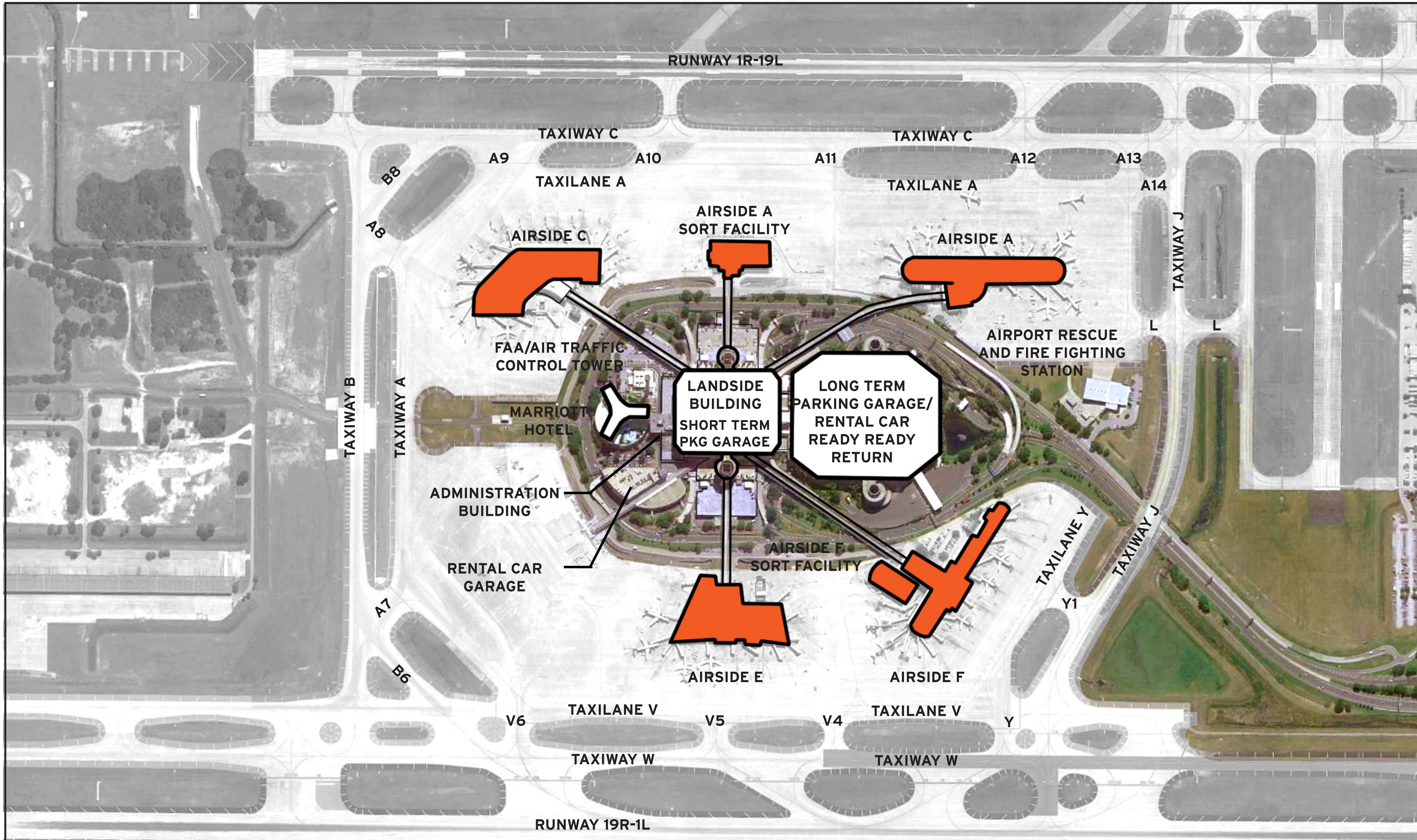
The Boarding Level of each airside typically consists of an APM station, security screening checkpoint, holdrooms, public restrooms, airline support spaces, and concessions, all connected by circulation corridors. Airside F also has a common-use club area primarily used by British Airways on the Boarding Level.

Airsides A, E and F each have a third, or Mezzanine, Level. Airside A's mezzanine level is unoccupied and is used for storage. The mezzanine levels at Airsides E and F contain airline or concessionaire offices and airline club space.

The terminal area complex provides a total of 59 contact gates and 19 remain overnight (RON) aircraft parking positions. The RON positions are located in proximity to the Airside A baggage sort facility and at the northwest portion of the terminal area apron, formerly the site of Airside

D. Additional detail on the RON parking positions is provided in the Airport Support Facilities discussion.

Table 4.4 summarizes the area of each facility in the Passenger Terminal Complex by level.



HNTB

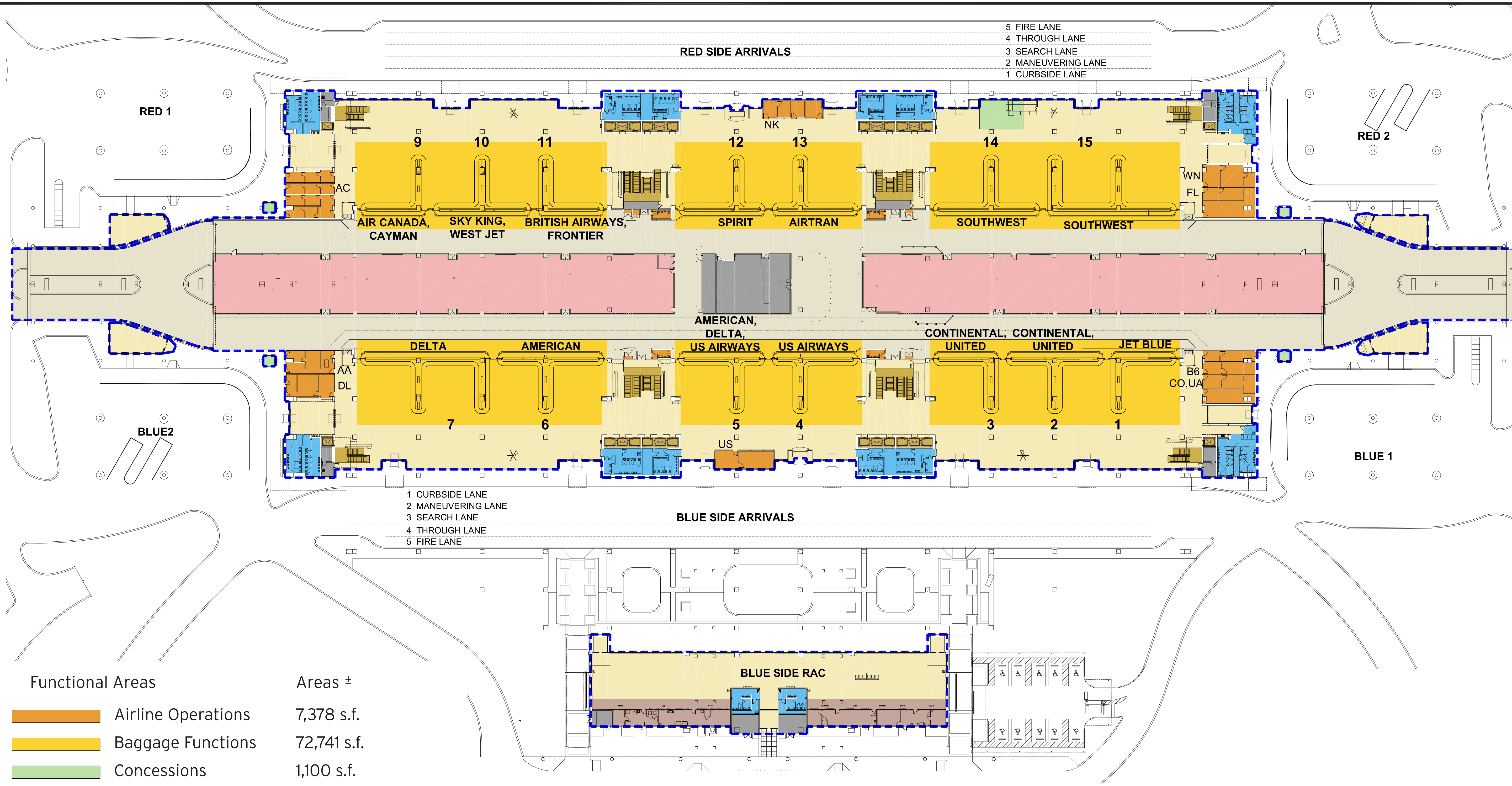
2900 SOUTH QUINCY STREET,
SUITE 200
ARLINGTON, VIRGINIA 22206
PH (703) 824-5100
FAX (703) 671-6210

TERMINAL AREA SITE PLAN

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
March 13,2013

FIGURE 4.1



Functional Areas	Areas ±
Airline Operations	7,378 s.f.
Baggage Functions	72,741 s.f.
Concessions	1,100 s.f.
Baggage Make-Up - Tug	67,060 s.f.
Security Functions	32,629 s.f.
MEP and IT Services	5,025 s.f.
Car Rental	4,396 s.f.
Misc. Space	7,712 s.f.
Gross Square Footage	275,321 s.f.

Public Areas	
Circulation	62,798 s.f.
Vertical Circulation	5,208 s.f.
Public Restrooms	9,274 s.f.
Public Space	77,280 s.f.

0' 75'
SCALE: 1" = 75'

N

HNTB

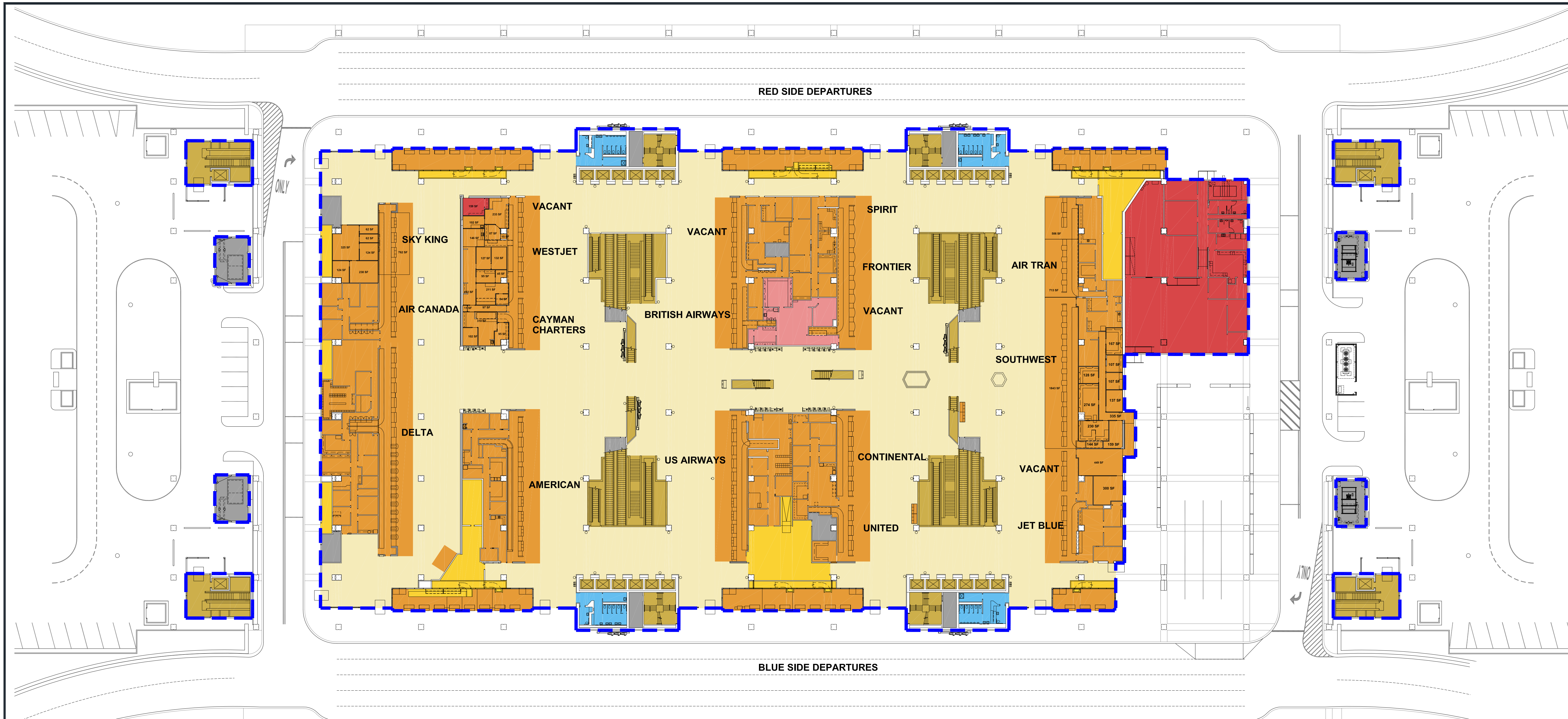
2900 SOUTH QUINCY STREET,
SUITE 200
ARLINGTON, VIRGINIA 22206
PH (703) 824-5100
FAX (703) 671-6210

LANDSIDE TERMINAL BUILDING
BAGGAGE CLAIM LEVEL

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
March 13,2013

FIGURE 4.2



Functional Areas	Areas ±
Airline Operations	45,800 s.f.
Baggage Functions	5,630 s.f.
MEP and IT Services	3,846 s.f.
H.C.A.A. Space	7,524 s.f.
U.S.O.	1,401 s.f.
Misc. Space	8,717 s.f.
Gross Square Footage	154,038 s.f.

Public Areas	
Vertical Circulation	14,760 s.f.
Public Restrooms	2,036 s.f.
Circulation Space	64,324 s.f.
Total Public Space	81,120 s.f.

0' 75'
SCALE: 1" = 75'

HNTB

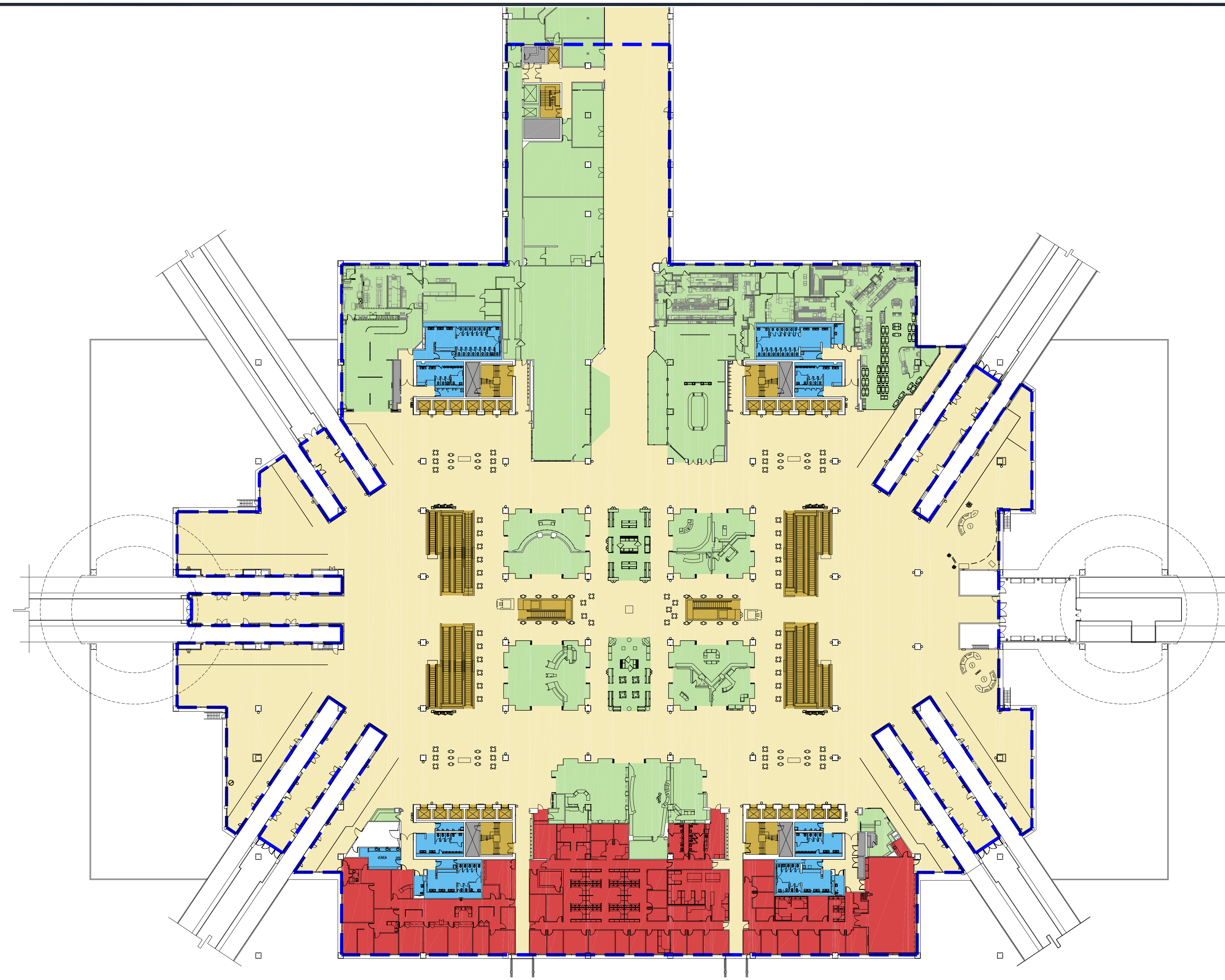
2900 SOUTH QUINCY STREET,
SUITE 200
ARLINGTON, VIRGINIA 22206
PH (703) 824-5100
FAX (703) 671-6210

LANDSIDE TERMINAL BUILDING
TICKETING LEVEL

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
March 13,2013

FIGURE 4.3



Functional Areas	Areas ±
H.C.A.A. Cost Center	18,758 s.f.
Concessions	43,346 s.f.
MEP and IT Services	1,380 s.f.
Misc. Space	9,158 s.f.
Gross Square Footage	187,856 s.f.

Public Areas	
Circulation	99,820 s.f.
Vertical Circulation	9,552 s.f.
Public Restrooms	5,836 s.f.
Total Public Space	115,208 s.f.

0' 75'
SCALE: 1" = 75'

N

HNTB

2900 SOUTH QUINCY STREET,
SUITE 200
ARLINGTON, VIRGINIA 22206
PH (703) 824-5100
FAX (703) 671-6210

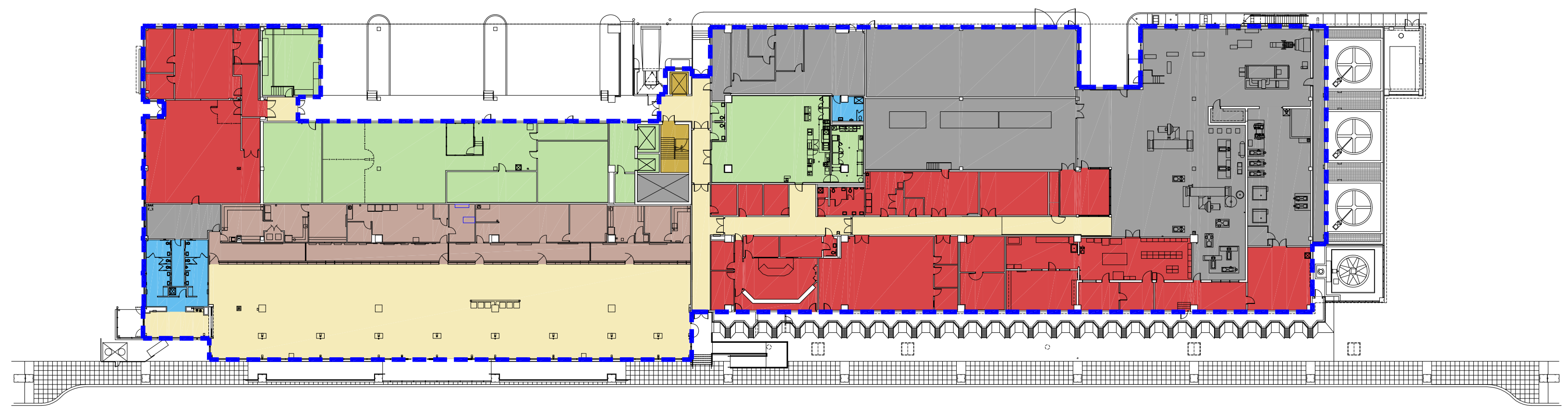
LANDSIDE TERMINAL BUILDING
TRANSFER LEVEL

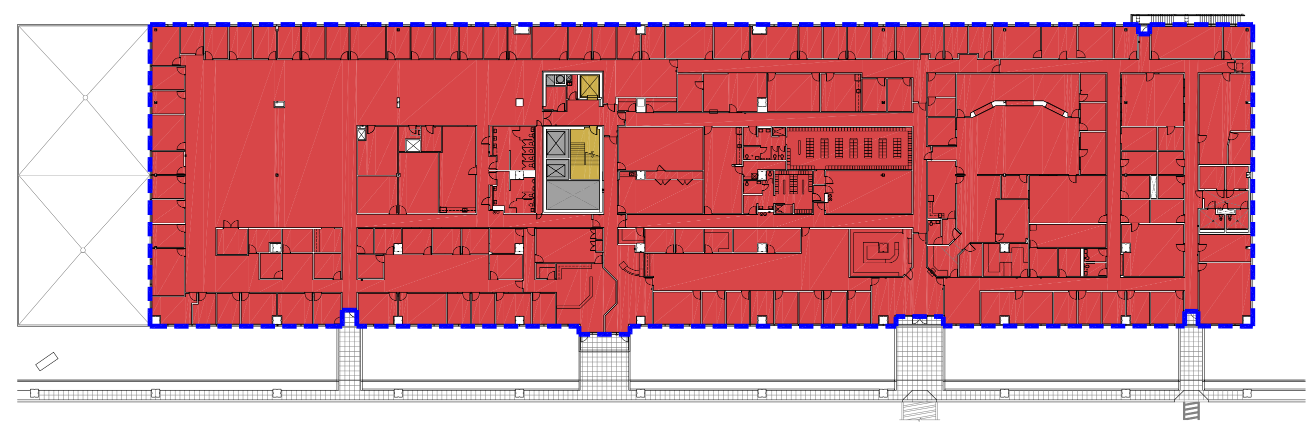
TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
March 13,2013

FIGURE 4.4

Functional Areas	Areas ±
Concessions	8,428 s.f.
H.C.A.A. Cost Center	13,300 s.f.
Restrooms	880 s.f.
Circulation	11,236 s.f.
Vertical Circulation	336 s.f.
Car Rental	5,050 s.f.
MEP and IT Services	16,590 s.f.
Misc. Space	3,572 s.f.
Gross Square Footage	59,392 s.f.





Functional Areas	Areas ±
H.C.A.A. Cost Center	51,207 s.f.
Vertical Circulation	334 s.f.
MEP and IT Services	484 s.f.
Misc. Space	4,483 s.f.
Gross Square Footage	56,508 s.f.

0' 75'
SCALE: 1" = 75'

HNTB

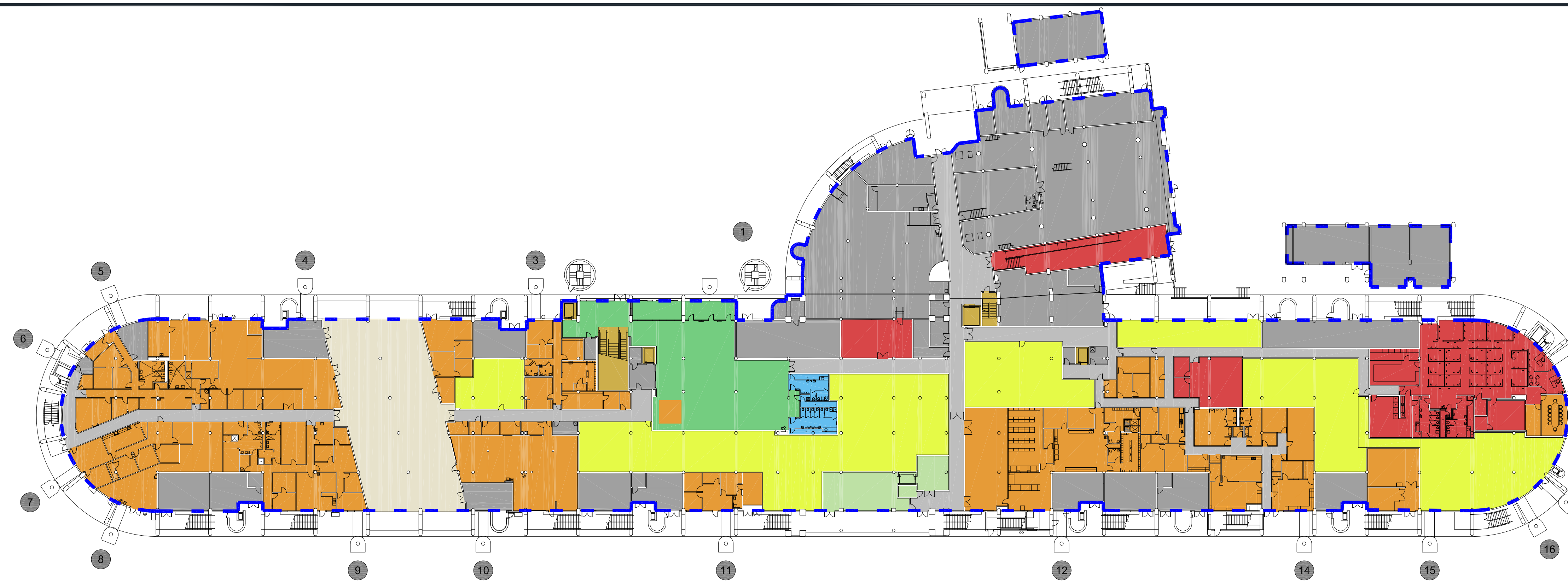
2900 SOUTH QUINCY STREET,
SUITE 200
ARLINGTON, VIRGINIA 22206
PH (703) 824-5100
FAX (703) 671-6210

ADMINISTRATIVE OFFICE BUILDING
LEVEL 1 & 2

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
March 13,2013

FIGURE 4.5



Functional Areas	Areas ±
Airline Operations	28,972 s.f.
Vertical Circulation	1,118 s.f.
Private Circulation	8,513 s.f.
Concessions	1,461 s.f.
Public Restrooms	742 s.f.
H.C.A.A	8,860 s.f.
MEP and IT Services	31,761 s.f.
Unfinished Space	18,319 s.f.
Holdroom Space	5,337 s.f.
Baggage Make-up - Tug	6,304 s.f.
Misc. Space	5,713 s.f.
Gross Square Footage	117,100 s.f.

0' 75'

SCALE: 1" = 75'

HNTB

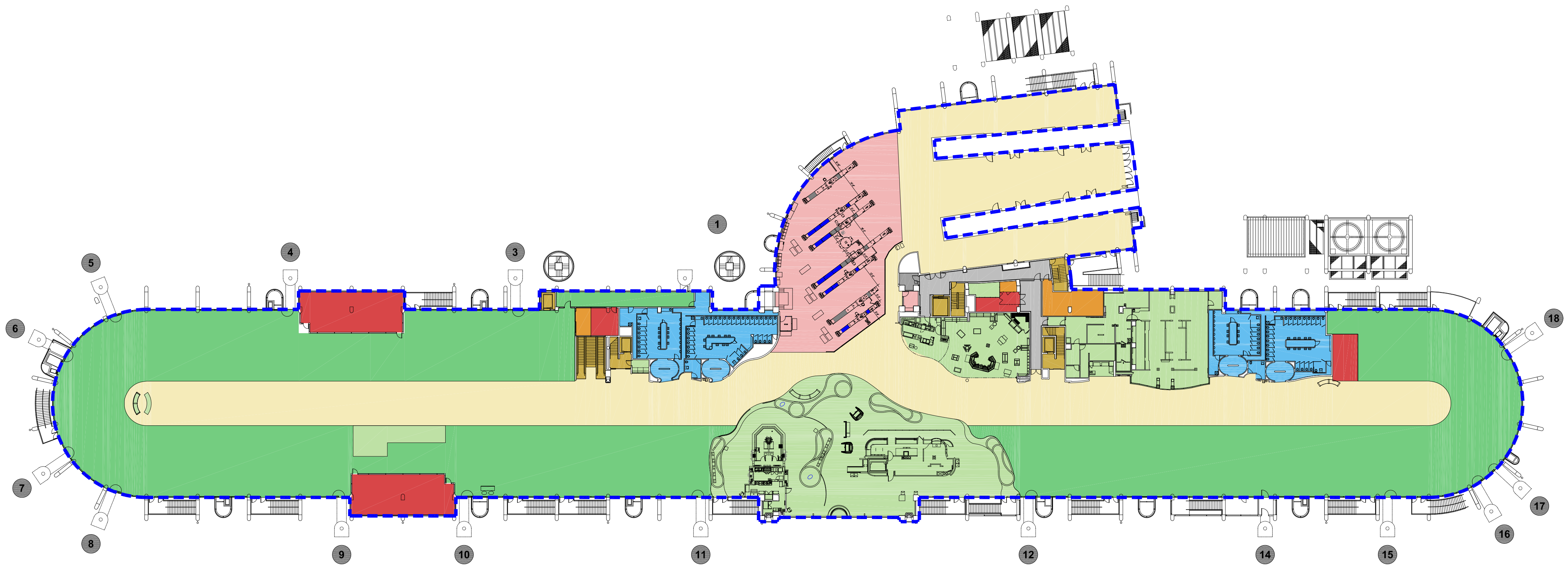
2900 SOUTH QUINCY STREET,
SUITE 200
ARLINGTON, VIRGINIA 22206
PH (703) 824-5100
FAX (703) 671-6210

AIRSIDE BUILDING A
RAMP LEVEL

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
March 13,2013

FIGURE 4.6



Functional Areas	Areas ±
Concessions	17,678 s.f.
Security Functions	7,119 s.f.
MEP and IT Services	95 s.f.
Hold Room Space	44,190 s.f.
H.C.A.A. Space / Other	3,682 s.f.
Airline Operations	753 s.f.
Misc. Space	4,083 s.f.
Gross Square Footage	116,216 s.f.

Public Areas	
Circulation	31,786 s.f.
Vertical Circulation	1,440 s.f.
Public Restrooms	5,390 s.f.
Total Public Space	38,616 s.f.

0' 75'
SCALE: 1" = 75'

HNTB

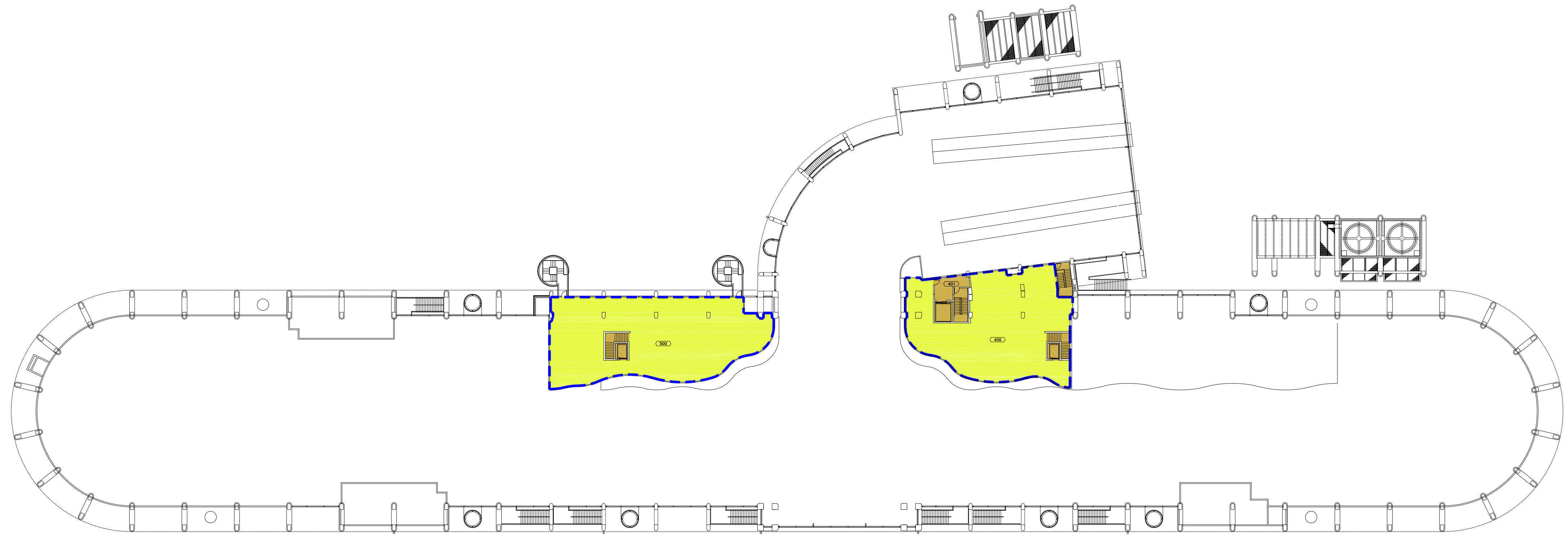
2900 SOUTH QUINCY STREET,
SUITE 200
ARLINGTON, VIRGINIA 22206
PH (703) 824-5100
FAX (703) 671-6210

AIRSIDE BUILDING A
BOARDING LEVEL

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
March 13,2013

FIGURE 4.7



Functional Areas	Areas ±
Vertical Circulation	1,005 s.f.
Unfinished Space	9,761 s.f.
Misc. Space	22 s.f.
Gross Square Footage	10,788 s.f.

0' 75'
SCALE: 1" = 75'

HNTB

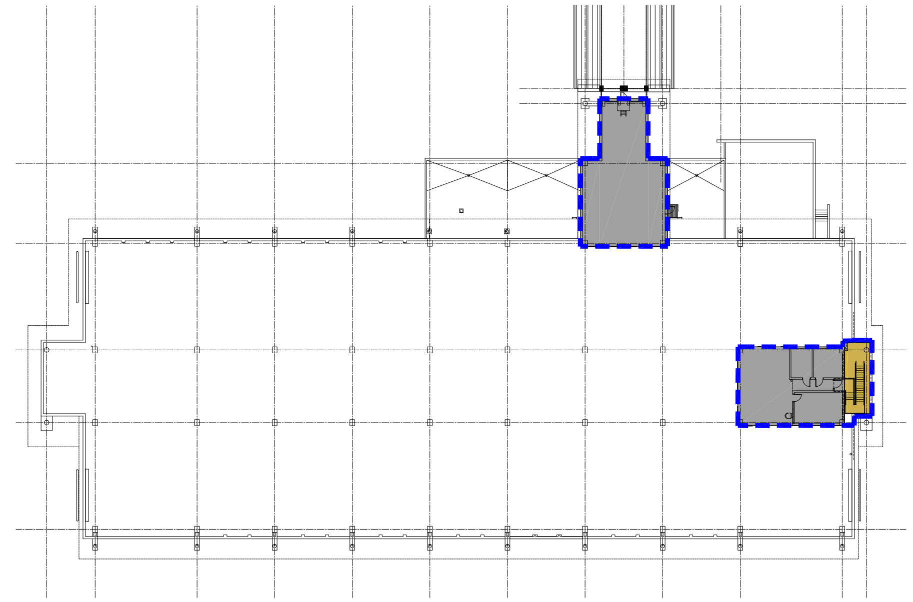
2900 SOUTH QUINCY STREET,
SUITE 200
ARLINGTON, VIRGINIA 22206
PH (703) 824-5100
FAX (703) 671-6210

AIRSIDE BUILDING A
MEZZANINE LEVEL

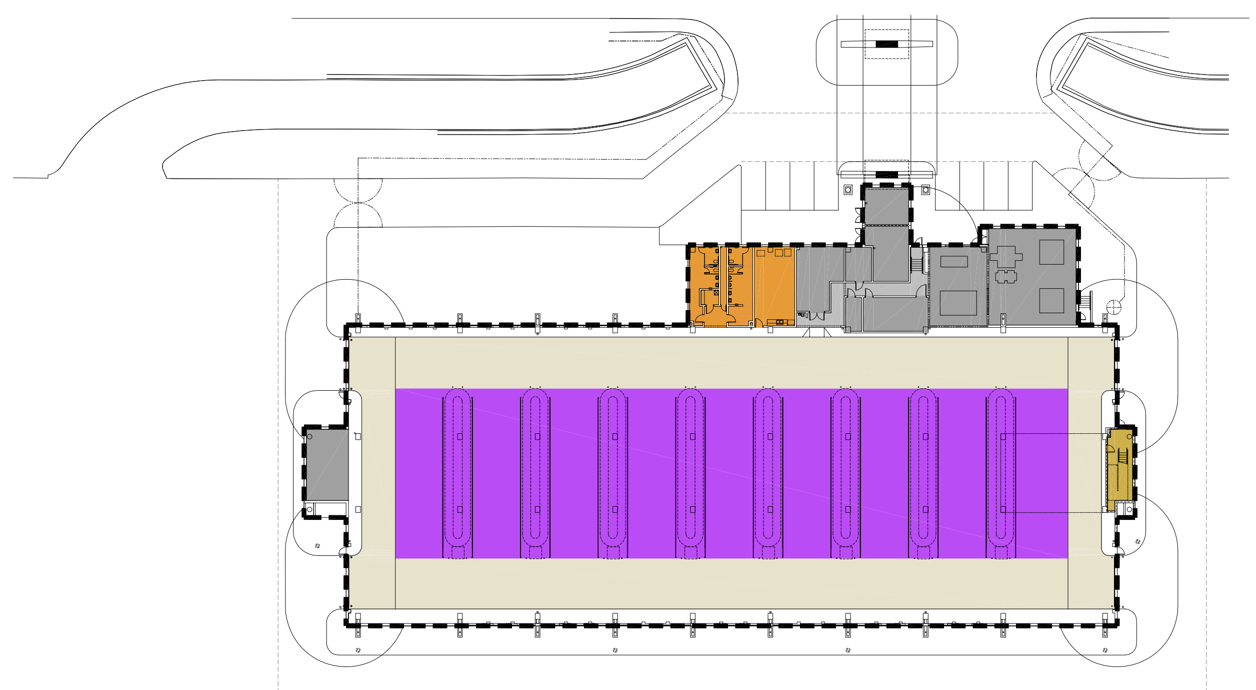
TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
March 13,2013

FIGURE 4.8



Functional Areas	Areas ±
MEP and IT Services	3,228 s.f.
Vertical Circulation	299 s.f.
Misc. Space	70 s.f.
Gross Square Footage	3,597 s.f.



Functional Areas	Areas ±
Baggage Make-up	19,486 s.f.
Baggage Make-up Tug	15,169 s.f.
Private Circulation	455 s.f.
Vertical Circulation	316 s.f.
Airline Operations	1,186 s.f.
MEP and IT Services	4,433 s.f.
Misc. Space	5,426 s.f.
Gross Square Footage	46,471 s.f.

0' 75'
SCALE: 1" = 75'

HNTB

2900 SOUTH QUINCY STREET,
SUITE 200
ARLINGTON, VIRGINIA 22206
PH (703) 824-5100
FAX (703) 671-6210

AIRSIDE BUILDING A
SORTATION BUILDING

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
March 13,2013

FIGURE 4.9

Functional Areas	Areas ±
Airline Operations	22,848 s.f.
Private Circulation	19,775 s.f.
Concessions	4, 559 s.f.
H.C.A.A	2,522 s.f.
MEP, IT Services, and Loading Dock	44,934 s.f.
Baggage Make Up	11,345 s.f.
Baggage Make Up - Tug	18,175 s.f.
Unfinished Space	15,652 s.f.
Holdroom Space	4,169 s.f.
Misc. Space	7,012 s.f.
Gross Square Footage	153,679 s.f.

Public Areas	
Vertical Circulation	1,908 s.f.
Public Restrooms	780 s.f.
Total Public Space	2,688 s.f.

0' 75'

SCALE: 1" = 75'

HNTB

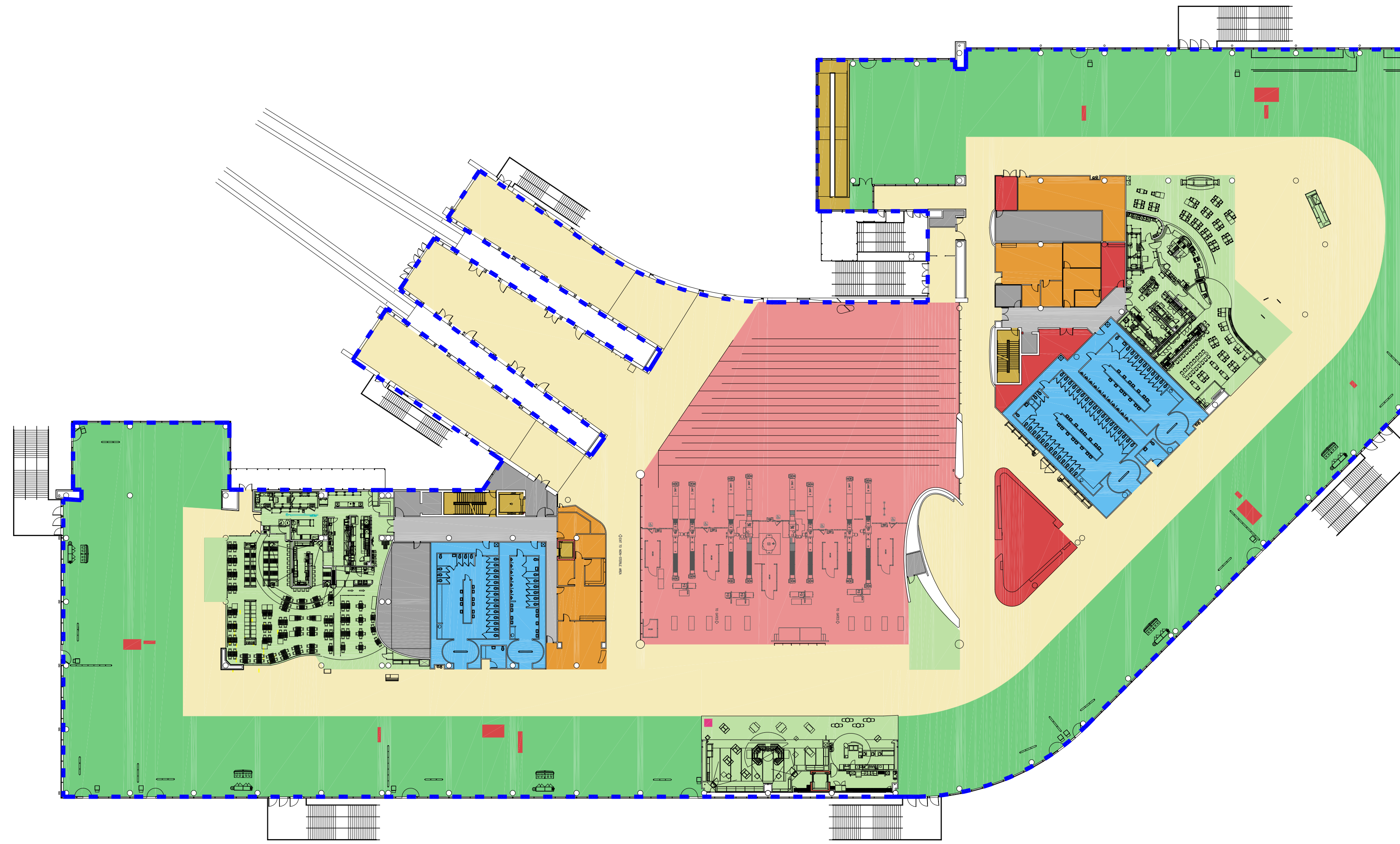
2900 SOUTH QUINCY STREET,
SUITE 200
ARLINGTON, VIRGINIA 22206
PH (703) 824-5100
FAX (703) 671-6210

AIRSIDE BUILDING C
RAMP LEVEL

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
March 13,2013

FIGURE 4.10



Functional Areas	Areas ±
Airline Operations	3,809 s.f.
Private Circulation	1,735 s.f.
Concessions	15,528 s.f.
Security	20,029 s.f.
H.C.A.A / Other	2,812 s.f.
MEP and IT Services	2,877 s.f.
Holdroom Space	50,211 s.f.
Misc. Space	4,299 s.f.
Gross Square Footage	154,695 s.f.

Public Areas	
Circulation	44,176 s.f.
Vertical Circulation	1,780 s.f.
Public Restrooms	7,439 s.f.
Total Public Space	53,395 s.f.

0' 75'
SCALE: 1" = 75'

HNTB

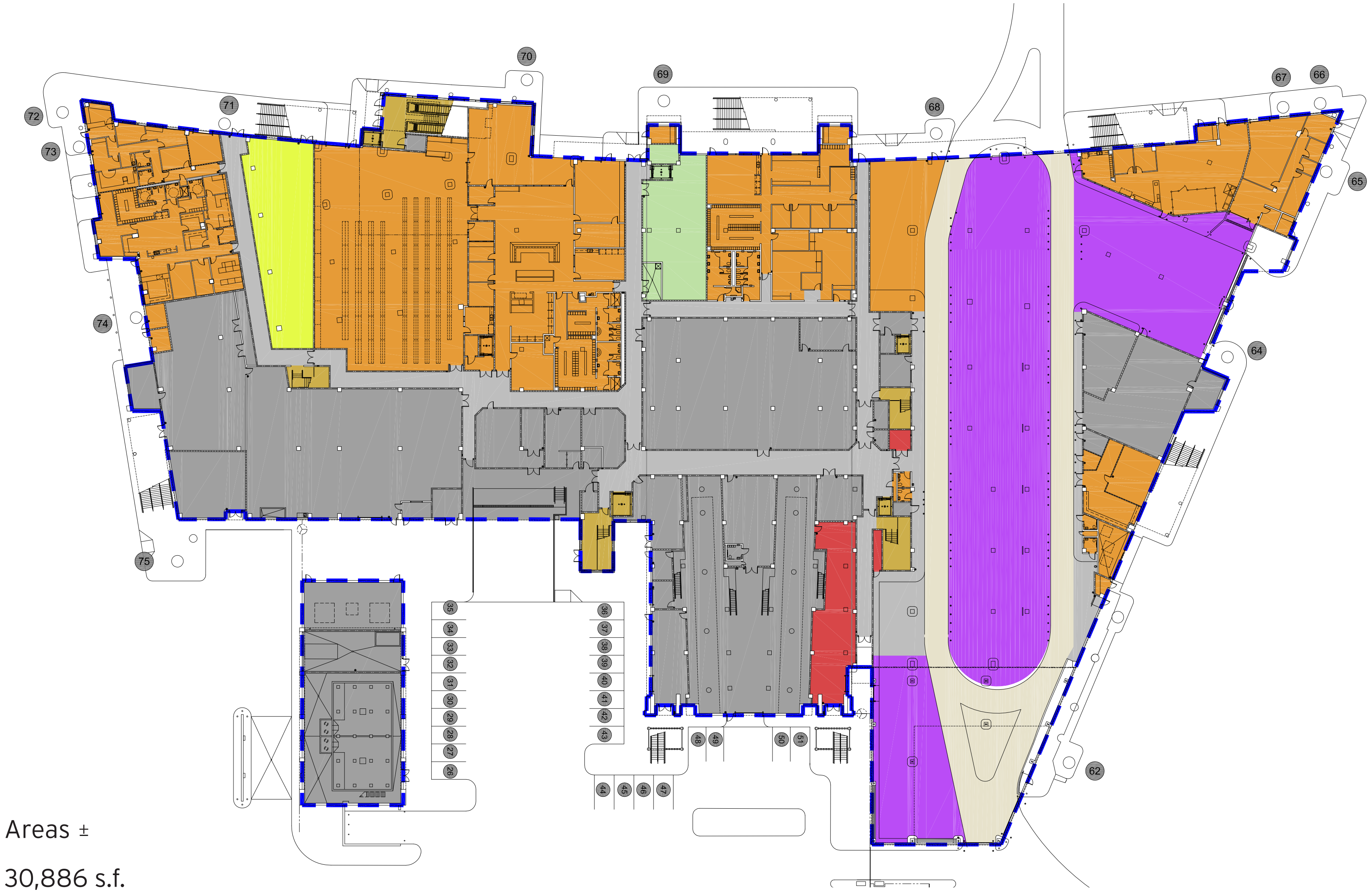
2900 SOUTH QUINCY STREET,
SUITE 200
ARLINGTON, VIRGINIA 22206
PH (703) 824-5100
FAX (703) 671-6210

AIRSIDE BUILDING C
BOARDING LEVEL

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
March 13,2013

FIGURE 4.11



Functional Areas	Areas ±
Airline Operations	30,886 s.f.
Private Circulation	10,093 s.f.
Vertical Circulation	2,342 s.f.
Concessions	2,353 s.f.
H.C.A.A	1,885 s.f.
MEP, IT Services, and Loading Dock	42,892 s.f.
Baggage Make Up	22,259 s.f.
Baggage Make Up - Tug	9,592 s.f.
Unfinished Space	3,040 s.f.
Misc. Space	3,361 s.f.
Gross Square Footage	142,098 s.f.

0' 75'

SCALE: 1" = 75'

HNTB

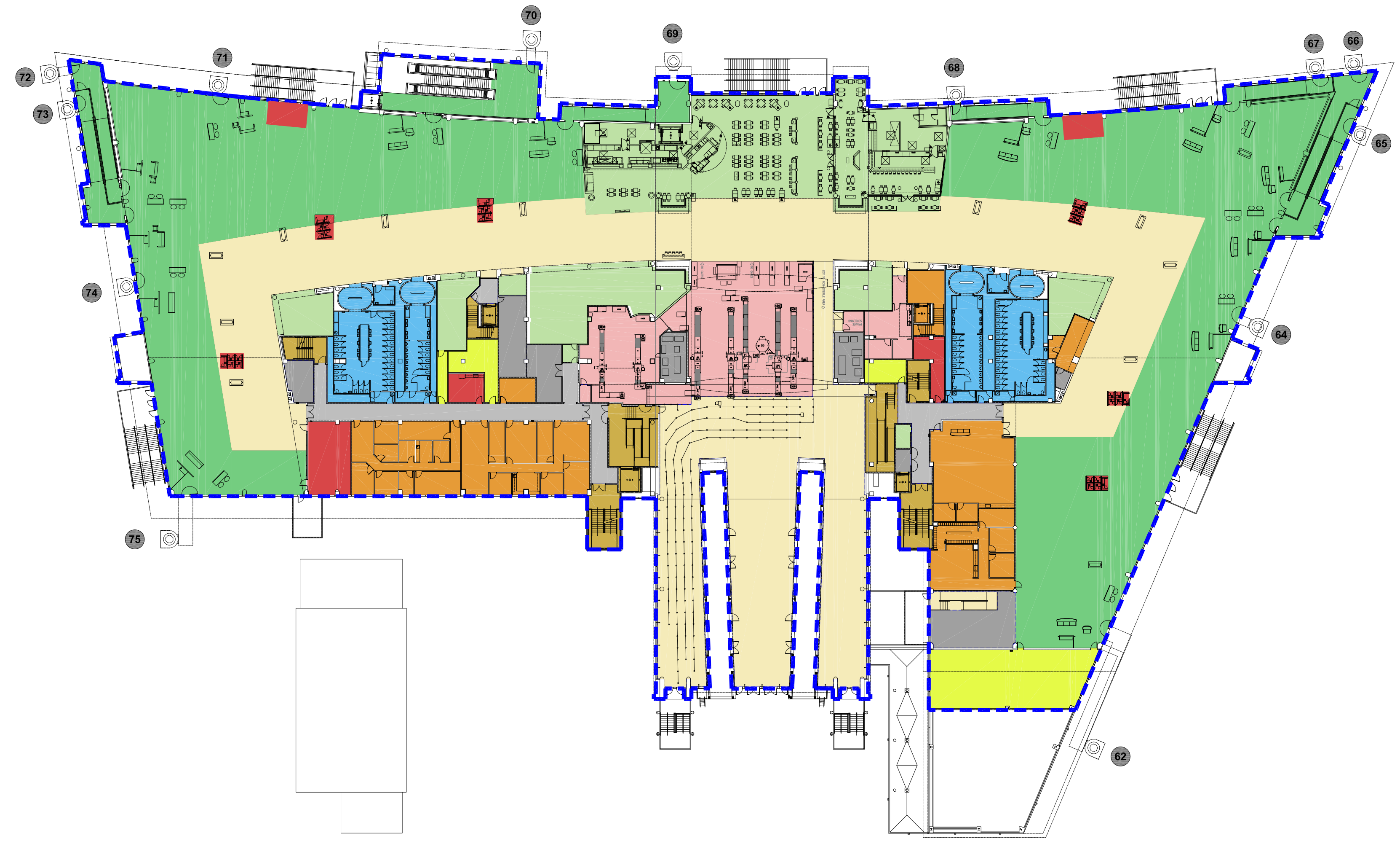
2900 SOUTH QUINCY STREET,
SUITE 200
ARLINGTON, VIRGINIA 22206
PH (703) 824-5100
FAX (703) 671-6210

AIRSIDE BUILDING E
RAMP LEVEL

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
March 13,2013

FIGURE 4.12



Functional Areas	Areas ±
Airline Operations	8,207 s.f.
Private Circulation	2,857 s.f.
Concessions	13,610 s.f.
H.C.A.A / Other	5,285 s.f.
Security	6,744 s.f.
MEP and IT Services	2,847 s.f.
Hold Room Space	40,669 s.f.
Unfinished Space	3,001 s.f.
Misc. Space	8,206 s.f.
Gross Square Footage	129,262 s.f.

Public Areas	
Circulation	32,025 s.f.
Vertical Circulation	3,119 s.f.
Public Restrooms	5,693 s.f.
Total Public Space	40,837 s.f.

0' 75'
SCALE: 1" = 75'

HNTB

2900 SOUTH QUINCY STREET,
SUITE 200
ARLINGTON, VIRGINIA 22206
PH (703) 824-5100
FAX (703) 671-6210

AIRSIDE BUILDING E
BOARDING LEVEL

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
March 13,2013

FIGURE 4.13

Functional Areas | Areas ±

Functional Areas	Areas ±
Airline/VIP Clubs	7,422 s.f.
Vertical Circulation	2,368 s.f.
Concessions	3,077 s.f.
MEP and IT Services	593 s.f.
Unfinished Space	4,206 s.f.
Private Circulation	1,814 s.f.
Misc. Space	3,373 s.f.
Gross Square Footage	22,853 s.f.

0' 75'
SCALE: 1" = 75'

HNTB

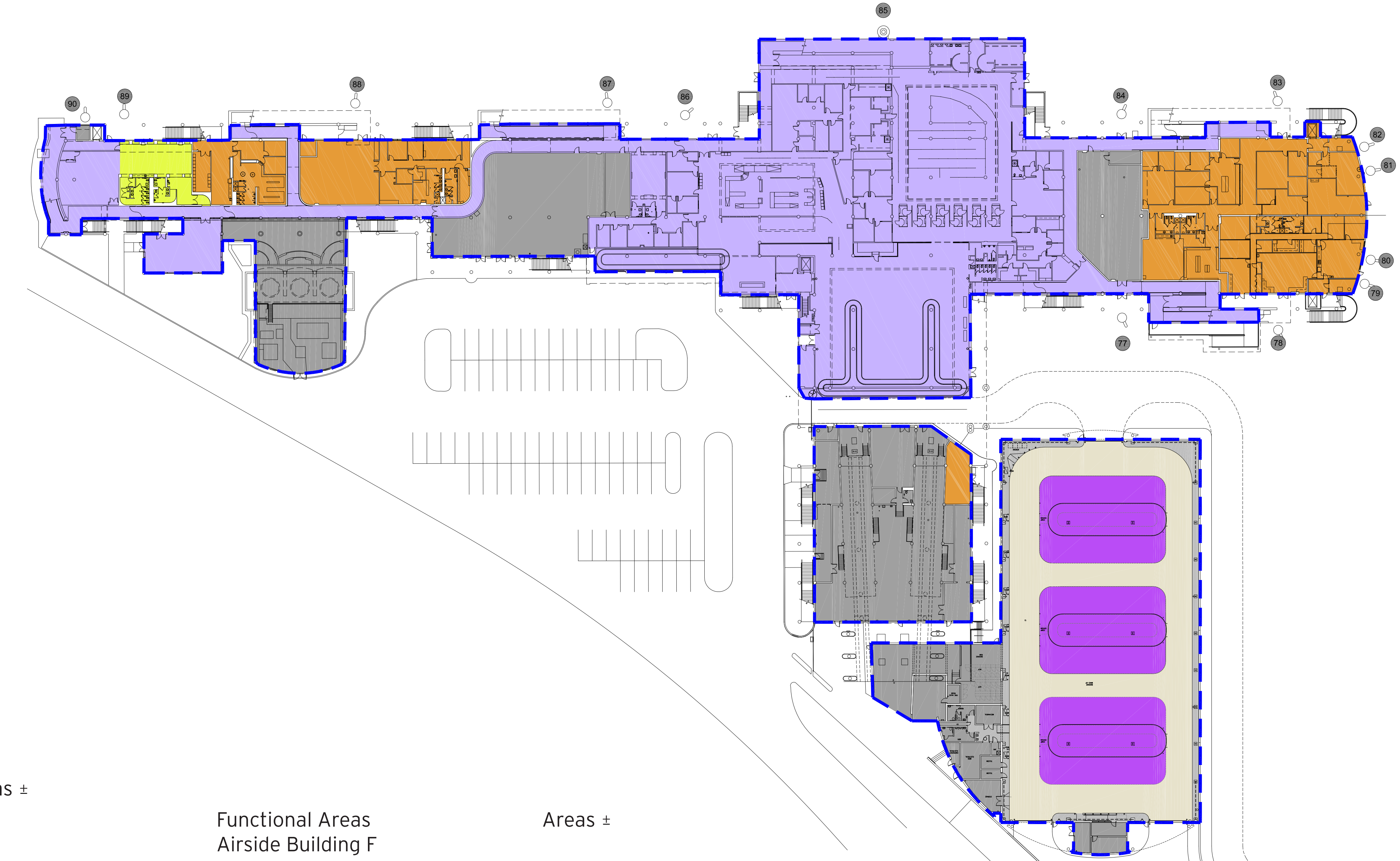
2900 SOUTH QUINCY STREET,
SUITE 200
ARLINGTON, VIRGINIA 22206
PH (703) 824-5100
FAX (703) 671-6210

AIRSIDE BUILDING E
MEZZANINE LEVEL

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
March 13,2013

FIGURE 4.14



Functional Areas
Airside Building F
Ramp Level

Functional Areas Airside Building F Ramp Level	Areas ±
Airline Operations	19,311 s.f.
CBP	58,748 s.f.
Unfinished Space	1,779 s.f.
MEP and IT Services	26,157 s.f.
Misc. Space	4,001 s.f.
Gross Square Footage	109,996 s.f.

Functional Areas
Airside Building F
Sortation Building

Functional Areas Airside Building F Sortation Building	Areas ±
Private Circulation	3,178 s.f.
Baggage Make-Up	13,443 s.f.
Baggage Make-Up - Tug	14,317 s.f.
MEP and IT Services	5,585 s.f.
Misc. Space	1,270 s.f.
Gross Square Footage	37,793 s.f.

0' 75'
SCALE: 1" = 75'

HNTB

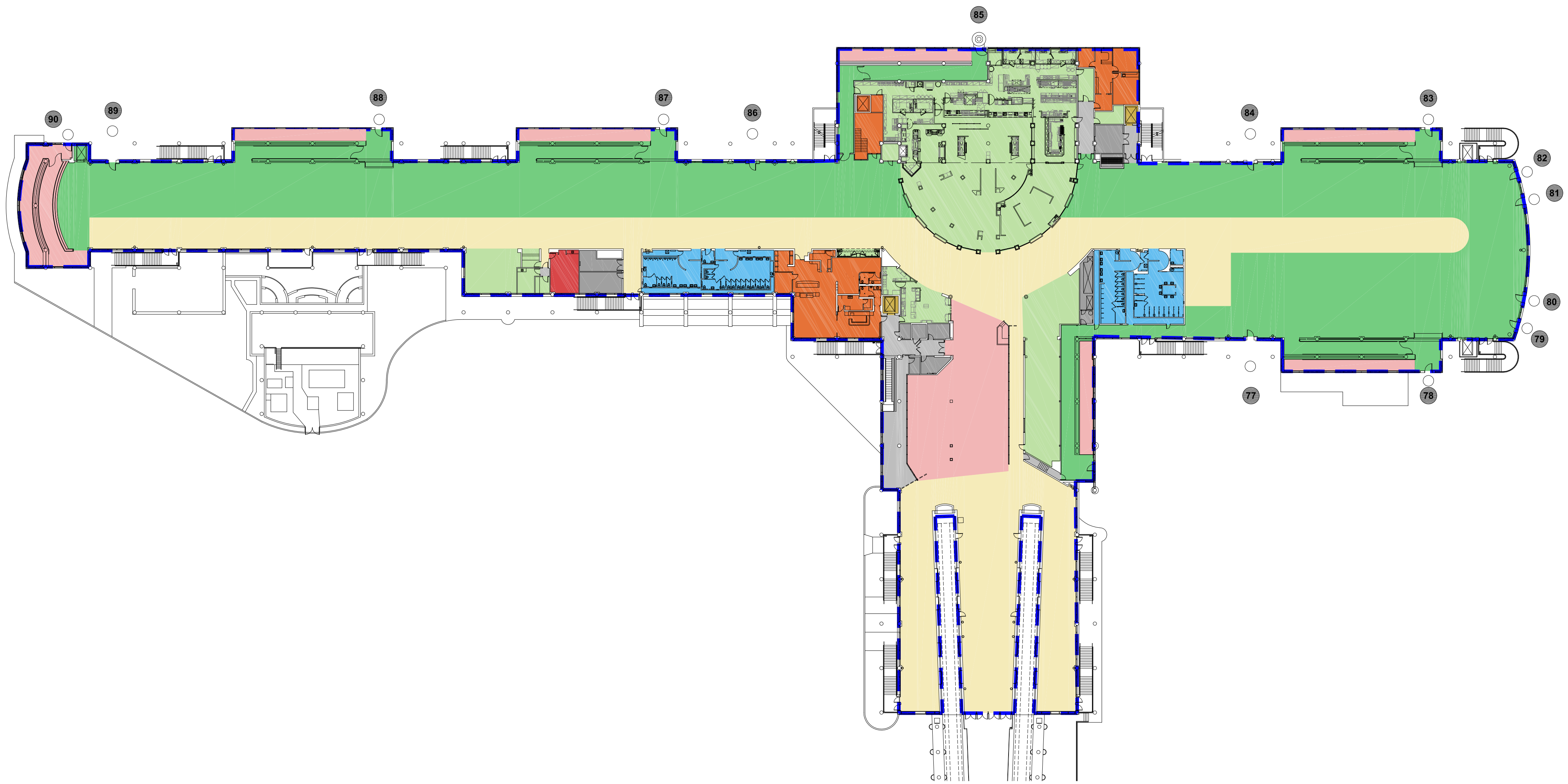
2900 SOUTH QUINCY STREET,
SUITE 200
ARLINGTON, VIRGINIA 22206
PH (703) 824-5100
FAX (703) 671-6210

AIRSIDE BUILDING F
RAMP LEVEL

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
March 13,2013

FIGURE 4.15



Functional Areas	Areas ±
Airline/VIP Clubs	3,780 s.f.
Private Circulation	1,783 s.f.
Concessions	14,333 s.f.
Security	4,400 s.f.
MEP and IT Services	1,546 s.f.
Hold Room Space	39,226 s.f.
CBP	4,558 s.f.
Misc. Space	4,523 s.f.
Gross Square Footage	105,219 s.f.

Public Areas	
Circulation	27,274 s.f.
Vertical Circulation	167 s.f.
Public Restrooms	3,629 s.f.
Total Public Space	31,070 s.f.

0' 75'
SCALE: 1" = 75'

HNTB

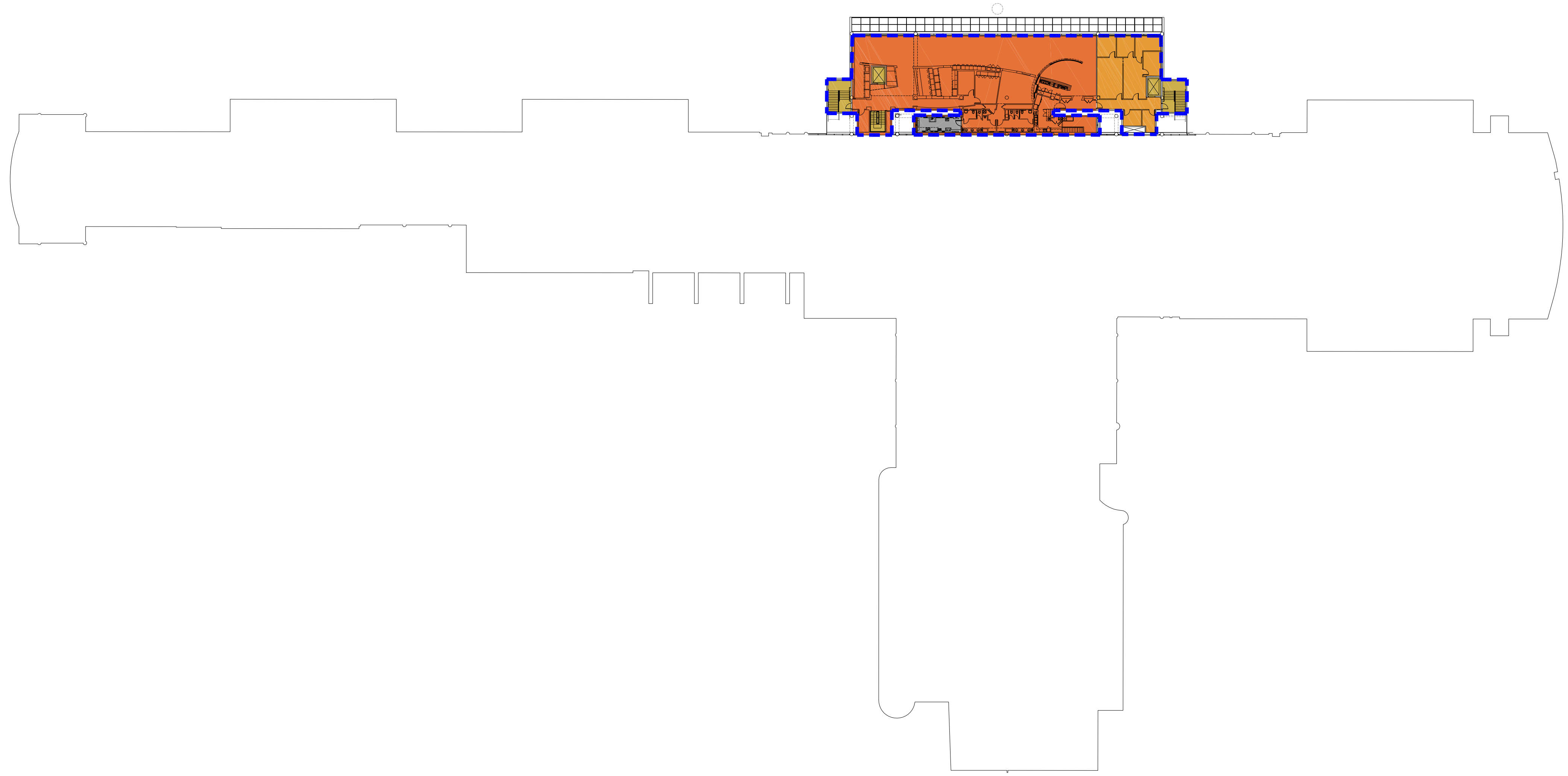
2900 SOUTH QUINCY STREET,
SUITE 200
ARLINGTON, VIRGINIA 22206
PH (703) 824-5100
FAX (703) 671-6210

AIRSIDE BUILDING F
BOARDING LEVEL

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
March 13,2013

FIGURE 4.16



Functional Areas	Areas ±
Airline Operations	1,492 s.f.
Airline/VIP Clubs	6,568 s.f.
Vertical Circulation	679 s.f.
MEP and IT Services	209 s.f.
Misc. Space	258 s.f.
Gross Square Footage	9,206 s.f.

0' 75'
SCALE: 1" = 75'

HNTB

2900 SOUTH QUINCY STREET,
SUITE 200
ARLINGTON, VIRGINIA 22206
PH (703) 824-5100
FAX (703) 671-6210

AIRSIDE BUILDING F
MEZZANINE LEVEL

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
March 13,2013

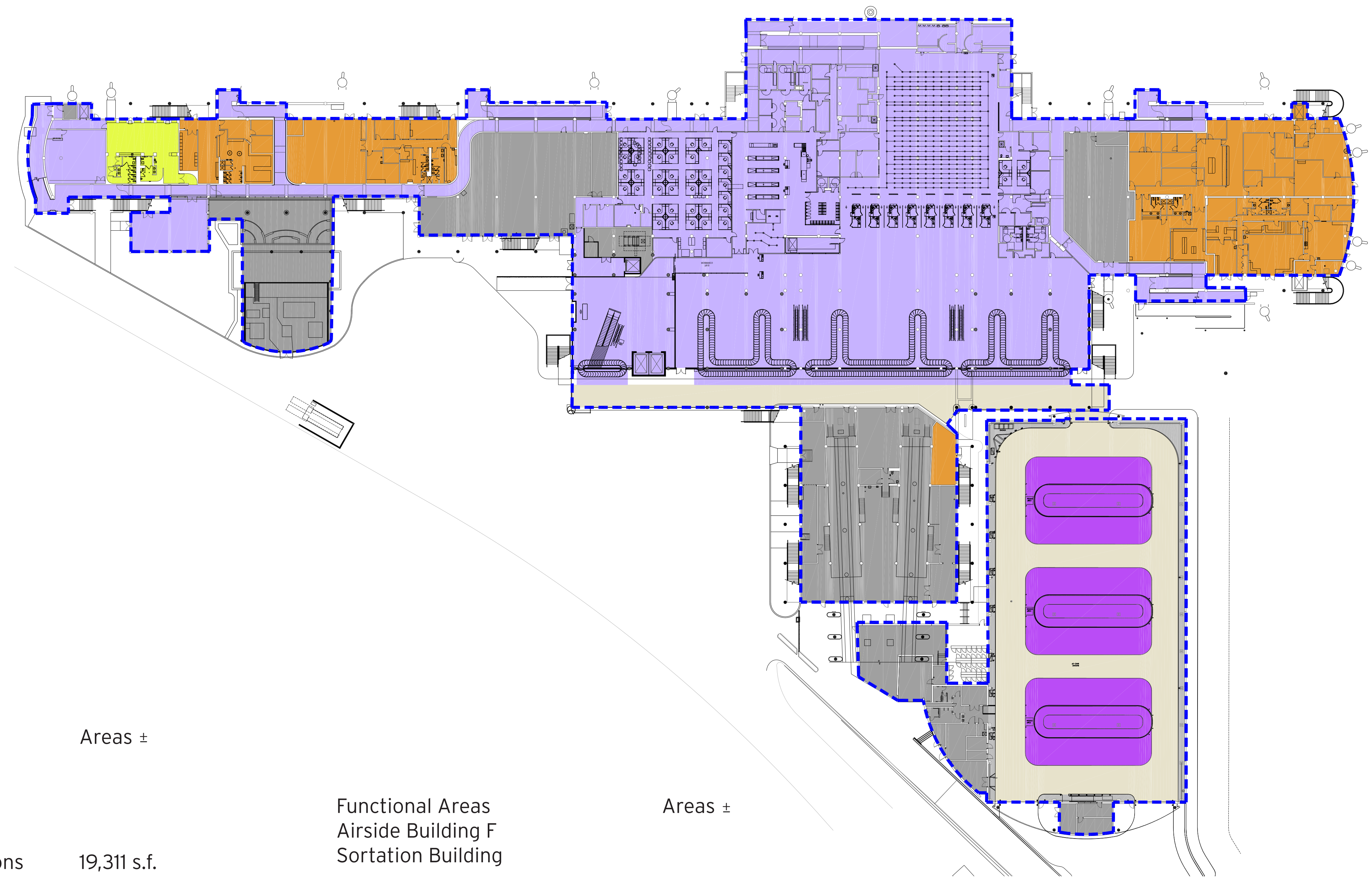
FIGURE 4.17

Table 4.3
Tampa International Airport Master Plan Update
Main Terminal and Airside Inventory by Space Type

	Main Terminal Building			Administrative Office Building		Airside A			Airside A Sortation Building		Airside C		Airside E			2011 Airside F			Airside F Sortation Building		2011 Terminal Complex Total by Space Type	% of total	2016 Airside F			2016 Terminal Complex Total by Space Type	% of total
	Baggage Claim Level	Ticketing Level	Transfer Level	Level 1	Level 2	Ramp Level	Boarding Level	Mezzanine Level	Level 1	Level 2	Ramp Level	Boarding Level	Ramp Level	Boarding Level	Mezzanine Level	Ramp Level	Boarding Level	Mezzanine Level	Ramp Level				Ramp Level	Boarding Level	Mezzanine Level		
AIRLINE AREAS																											
1.0 Ticketing/Check-in Hall	**-**	**45,800**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**sf**	**45,800 sf**	**2.4%**	**-**	**-**	**-**	**45,800 sf**	**2.4%**
1.1 Standard, In-counter Kiosk and Bag Tagging Check-In Positions	-	20,640	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	sf	20,640 sf		-	-	-	20,640 sf	
1.2 Curbside Bag Tagging Check-In Positions	-	5,496	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	sf	5,496 sf		-	-	-	5,496 sf	
1.3 Airline Ticketing Offices (includes break rooms, communications rooms & storage)		19,664	-	-	-			-	-	-	-	-	-	-	-	-	-	-	-	sf	19,664 sf		-	-	-	19,664 sf	
2.0 Baggage Claim	**79,663**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**sf**	**79,663 sf**	**4.2%**	**-**	**-**	**-**	**79,663 sf**	**4.1%**
Number of Baggage Claim Devices	*14*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*ea*	*14 ea*		-	-	-	*14 ea*	
2.1 Baggage Claim Area (non-CBP)	56,495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	sf	56,495 sf		-	-	-	56,495 sf	
2.2 Inbound Baggage Drop-off Area	16,246	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	sf	16,246 sf		-	-	-	16,246 sf	
2.3 Baggage Service Offices	6,922	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	sf	6,922 sf		-	-	-	6,922 sf	
3.0 Outbound Baggage Handling Areas	**456**	**4,105**	**-**	**-**	**-**	**28,972**	**753**	**-**	**20,672**	**-**	**34,193**	**3,809**	**66,540**	**8,207**	**-**	**19,311**	**890**	**1,492**	**13,443**	**sf**	**202,843 sf**	**10.7%**	**19,311**	**890**	**1,492**	**202,843 sf**	**10.5%**
3.1 Airline Make-Up Area	-	4,105	-	-	-	-	-	-	19,486	-	11,345	-	22,259	-	-	-	-	-	13,443	sf	70,638 sf		-	-	-	70,638 sf	
3.2 Airline Operations (Offices, Storage, Break Rooms)	456		-	-	-	28,972	753	-	1,186	-	22,848	3,809	30,886	8,207	-	19,311	890	1,492		sf	118,810 sf		19,311	890	1,492	118,810 sf	
4.0 Airline/VIP Clubs	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**7,422**	**-**	**2,890**	**6,568**	**-**	**sf**	**16,880 sf**	**0.9%**	**-**	**3,040**	**6,568**	**17,030 sf**	**0.9%**
5.0 Hold Rooms	**-**	**-**	**-**	**-**	**-**	**5,337**	**44,190**	**-**	**-**	**-**	**4,169**	**50,211**	**-**	**40,669**	**-**	**-**	**39,226**	**-**	**-**	**sf**	**183,802 sf**	**9.7%**	**-**	**39,577**	**-**	**184,153 sf**	**9.5%**
SUBTOTAL - AIRLINE AREAS	***80,119***	***49,905***	***-***	***-***	***-***	***34,309***	***44,943***	***-***	***20,672***	***-***	***38,362***	***54,020***	***66,540***	***48,876***	***7,422***	***19,311***	***43,006***	***8,060***	***13,443***	***sf***	***528,988 sf***	***28.0%***	***19,311***	***43,507***	***8,060***	***529,489 sf***	***27.3%***
SUPPORT AREAS (NON-AIRLINE)																											
6.0 DHS	**32,629**	**1,525**	**-**	**-**	**-**	**-**	**7,119**	**-**	**-**	**-**	**-**	**20,029**	**-**	**6,744**	**-**	**58,748**	**8,958**	**-**	**-**	**sf**	**135,752 sf**	**7.2%**	**71,415**	**17,002**	**-**	**156,463 sf**	**8.1%**
6.1 TSA Checked Baggage Inspection System	32,629	1,525	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	sf	34,154 sf	1.8%	-	-	-	34,154 sf	1.8%
TSA EDS Devices	*24*	*1*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*ea*	*25 ea*		-	-	-	*25 ea*	
6.2 TSA SSCP	-	-	-	-	-	-	7,119	-	-	-	-	20,029	-	6,744	-	-	4,400	-	-	sf	38,292 sf	2.0%	-	12,600	-	46,492 sf	2.4%
6.2.1 SSCP	-	-	-	-	-	-	7,119	-	-	-	-	20,029	-	6,105	-	-	4,400	-	-	sf	37,653 sf		-	11,689	-	44,942 sf	
SSCP Lanes	-	-	-	-	-	-	*7*	-	-	-	-	*8*	-	*7*	-	-	*5*	-	-	ea	*27 sf*		-	*6*	-	*28 ea*	
6.2.2 TSA Break Rooms/Offices/Lockers	-	-	-	-	-	-	-	-	-	-	-	-	-	639	-	-	-	-	-	sf	639 sf		-	911	-	1,550 sf	
6.3 Customs and Border Protection	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	58,748	4,558	-	-	sf	63,306 sf		71,415	4,402	-	75,817 sf	
7.0 Commercial Program and Amenities	**5,496**	**-**	**43,346**	**13,478**	**-**	**1,461**	**17,678**	**-**	**-**	**-**	**4,559**	**15,528**	**2,353**	**13,610**	**-**	**-**	**14,333**	**-**	**-**	**sf**	**131,842 sf**	**7.0%**	**-**	**21,133**	**-**	**138,642 sf**	**7.2%**
7.1 Concessions	1,100	-	43,346	8,428	-	1,461	17,678	-	-	-	4,559	15,528	2,353	13,610	-	-	14,333	-	-	sf	122,396 sf		-	21,133	-	129,196 sf	
7.1.1 Food & Beverage	780	-	25,092	-	-	-	14,289	-	-	-	-	13,203	-	10,034	-	-	9,991	-	-	sf	73,389 sf		-	10,500	-	73,898 sf	
7.1.2 News/Gifts/Retail	-	-	17,559	-	-	-	2,627	-	-	-	652	2,325	-	2,981	-	-	3,440	-	-	sf	29,584 sf		-	9,000	-	35,144 sf	
7.1.3 Duty Free	-	-	-	-	-	-	-	-	-	-	-	-	-	595	-	-	766	-	-	sf	1,361 sf		-	1,400	-	1,995 sf	
7.1.4 Services	320	-	695	-	-	144	762	-	-	-	100	-	-	-	-	-	-	-	-	sf	2,021 sf		-	-	-	2,021 sf	
7.1.5 Concessions Storage	-	-	-	8,428	-	1,317	-	-	-	-	3,807	-	2,353	-	-	-	136	-	-	sf	16,041 sf		-	233	-	16,138 sf	
7.2 Car Rental	4,396	-	-	5,050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	sf	9,446 sf		-	-	-	9,446 sf	
8.0 HCAA, Other Areas	**-**	**8,925**	**18,758**	**13,300**	**51,207**	**27,179**	**3,682**	**9,761**	**-**	**-**	**20,998**	**2,812**	**4,925**	**5,285**	**7,283**	**1,779**	**-**	**-**	**-**	**sf**	**175,894 sf**	**9.3%**	**1,779**	**-**	**-**	**175,894 sf**	**9.1%**
8.1 HCAA	-	7,524	18,758	13,300	51,207	8,860	509	-	-	-	2,522	952	1,885	550	-	-	-	-	-	sf	106,067 sf		-	-	-	106,067 sf	
8.2 Loading Dock	-	-	-	-	-	-	-	-	-	-	2,824		-	-	-	-	-	-	-	sf	2,824 sf		-	-	-	2,824 sf	
8.3 Unassigned/Unfinished Areas	-	-	-	-	-	18,319	-	9,761	-	-	15,652	-	3,040	3,001	4,206	1,779	-	-	-	sf	55,758 sf		1,779	-	-	55,758 sf	
8.4 Concessionaire Offices	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,077	-	-	-	-	sf	3,077 sf		-	-	-	3,077 sf	
8.5 U.S.O	-	1,401	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	sf	1,401 sf		-	-	-	1,401 sf	
8.6 Miscellaneous (Business Center, Kids' Play Areas,etc.)	-	-	-	-	-	-	3,173	-	-	-	-	1,860	-	1,734	-	-	-	-	-	sf	6,767 sf		-	-	-	6,767 sf	
9.0 Public Restrooms	**9,274**	**2,036**	**5,836**	**880**	**-**	**742**	**5,390**	**-**	**-**	**-**	**780**	**7,439**	**-**	**5,693**	**-**	**-**	**3,629**	**-**	**-**	**sf**	**41,699 sf**	**2.2%**	**-**	**3,629**	**-**	**41,699 sf**	**2.2%**
SUBTOTAL - SUPPORT AREAS (NON-AIRLINE)	***47,399***	***12,486***	***67,940***	***27,658***	***51,207***	***29,382***	***33,869***	***9,761***	***-***	***-***	***26,337***	***45,808***	***7,278***	***31,332***	***7,283***	***60,527***	***26,920***	***-***	***-***	***sf***	***485,187 sf***	***25.6%***	***73,194***	***41,764***	***-***	***512,698 sf***	***26.5%***
AREAS DEPENDENT ON BUILDING CONFIGURATION																											
10.0 MEP and IT Services	**5,025**	**3,846**	**1,380**	**16,590**	**484**	**31,761**	**95**	**-**	**4,433**	**3,228**	**42,110**	**2,877**	**42,892**	**2,847**	**593**	**26,157**	**1,546**	**209**	**5,585**	**sf**	**191,658 sf**	**10.1%**	**27,615**	**3,037**	**209**	**194,607 sf**	**10.1%**
11.0 Circulation	**68,006**	**79,084**	**109,378**	**11,572**	**334**	**9,631**	**33,226**	**1,005**	**771**	**299**	**21,683**	**47,691**	**12,435**	**38,001**	**4,182**	**-**	**29,224**	**679**	**3,178**	**sf**	**470,379 sf**	**24.9%**	**-**	**30,624**	**679**	**471,779 sf**	**24.4%**
11.1 Public and Non-Public	62,798	64,324	99,826	11,236		8,513	31,786	-	455	-	19,775	45,911	10,093	34,882	1,814	-	29,057	-	3,178	sf	423,648 sf	22.4%	-	29,690	-	424,281 sf	21.9%
11.2 Vertical Circulation	5,208	14,760	9,552	336	334	1,118	1,440	1,005	316	299	1,908	1,780	2,342	3,119	2,368	-	167	679		sf	46,731 sf	2.5%	-	934	679	47,498 sf	2.5%
12.0 Tug Drives	**67,060**	**-**	**-**	**-**	**-**	**6,304**	**-**	**-**	**15,169**	**-**	**18,175**	**-**	**9,592**	**-**	**-**		**-**	**-**	**14,317**	**sf**	**130,617 sf**	**6.9%**	**4,887**	**-**	**-**	**135,504 sf**	**7.0%**
13.0 Misc. Space (Interstitial, wall cavities, etc.)	**7,712**	**8,717**	**9,158**	**3,572**	**4,483**	**5,713**	**4,083**	**22**	**5,426**	**70**	**7,012**	**4,299**	**3,361**	**8,206**	**3,373**	**4,001**	**4,523**	**258**	**1,270**	**sf**	**85,259 sf**	**4.5%**	**7,899**	**7,494**	**258**	**92,128 sf**	**4.8%**
SUBTOTAL - DEPENDENT AREAS	***147,803***	***91,647***	***119,916***	***31,734***	***5,301***	***53,409***	***37,404***	***1,027***	***25,799***	***3,597***	***88,980***	***54,867***	***68,280***	***49,054***	***8,148***	***30,158***	***35,293***	***1,146***	***24,350***	***sf***	***877,913 sf***	***46.4%***	***40,401***	***41,155***	***1,146***	***894,018 sf***	***46.2%***
TOTAL	***275,321***	***154,038***	***187,856***	***59,392***	***56,508***	***117,100***	***116,216***	***10,788***	***46,471***	***3,597***	***153,679***	***154,695***	***142,098***	***129,262***	***22,853***	***109,996***	***105,219***	***9,206***	***37,793***	***sf***	***1,892,088 sf***	***100%***	***132,906***	***126,426***	***9,206***	***1,936,205 sf***	***100%***
																			224,421								

Source: HNTB Corporation, July 2012
Prepared by: HNTB Corporation, July 2012

Printed: 3/12/2013



Functional Areas
Airside Building F
Ramp Level

Functional Areas	Areas ±
Airline Operations	19,311 s.f.
CBP	71,415 s.f.
Unfinished Space	1,779 s.f.
MEP and IT Services	27,615 s.f.
Baggage Make-Up - Tug	4,887 s.f.
Misc. Space	7,899 s.f.
Gross Square Footage	132,906 s.f.

Functional Areas
Airside Building F
Sortation Building

Functional Areas	Areas ±
Private Circulation	3,178 s.f.
Baggage Make-Up	13,443 s.f.
Baggage Make-Up - Tug	14,317 s.f.
MEP and IT Services	5,585 s.f.
Misc. Space	1,270 s.f.
Gross Square Footage	37,793 s.f.

0' 75'
SCALE: 1" = 75'

HNTB

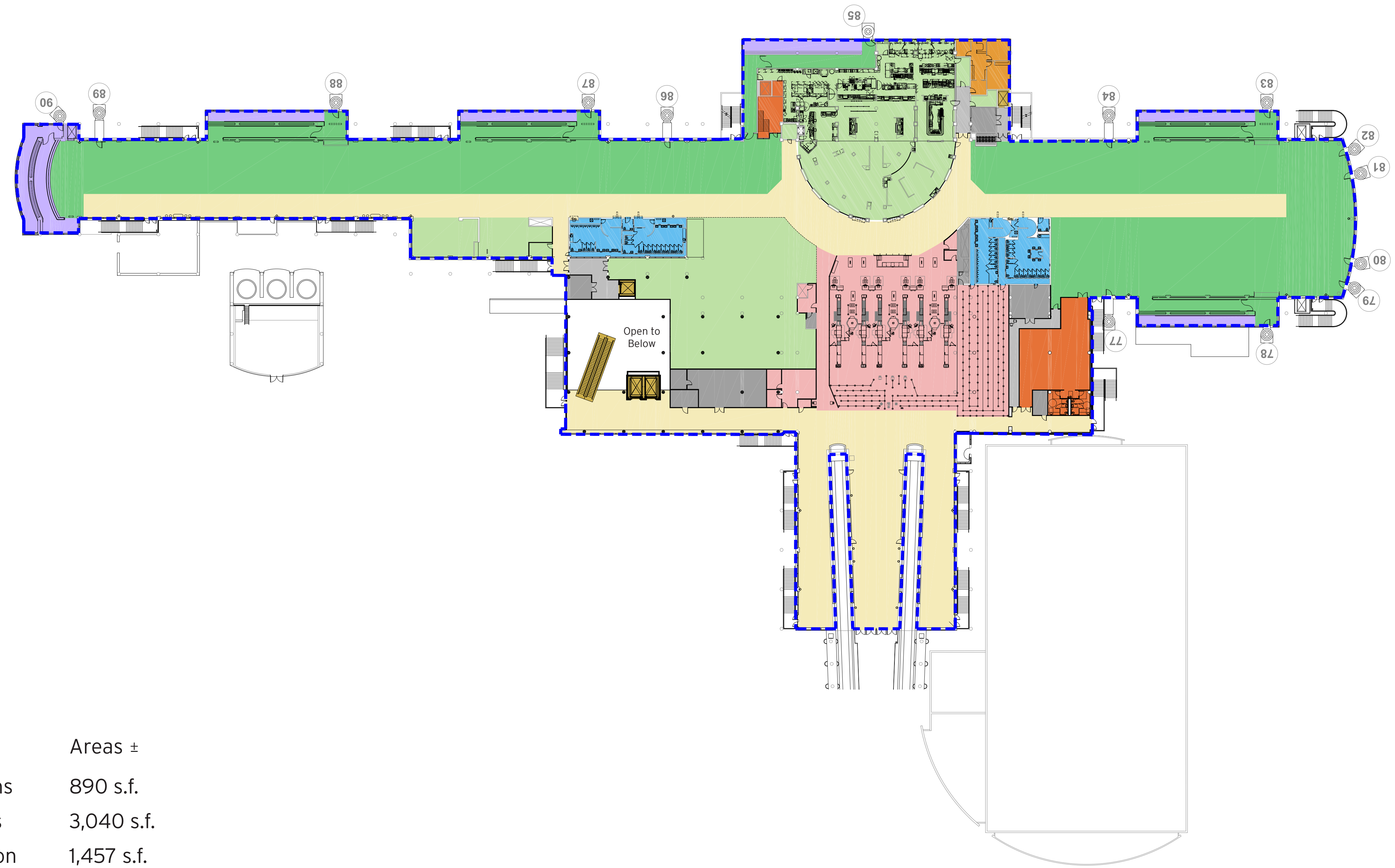
2900 SOUTH QUINCY STREET,
SUITE 200
ARLINGTON, VIRGINIA 22206
PH (703) 824-5100
FAX (703) 671-6210

AIRSIDE BUILDING F - EXPANSION
RAMP LEVEL

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
March 13,2013

FIGURE 4.18



Functional Areas	Areas ±
Airline Operations	890 s.f.
Airline/VIP Clubs	3,040 s.f.
Private Circulation	1,457 s.f.
Concessions	21,133 s.f.
Security	12,600 s.f.
MEP and IT Services	3,037 s.f.
Hold Room Space	39,577 s.f.
CBP	4,402 s.f.
Misc. Space	7,494 s.f.
Gross Square Footage	126,426 s.f.

Public Areas	
Circulation	28,233 s.f.
Vertical Circulation	934 s.f.
Public Restrooms	3,629 s.f.
Total Public Space	32,796 s.f.

0' 75'
SCALE: 1" = 75'

HNTB

2900 SOUTH QUINCY STREET,
SUITE 200
ARLINGTON, VIRGINIA 22206
PH (703) 824-5100
FAX (703) 671-6210

AIRSIDE BUILDING F - EXPANSION
BOARDING LEVEL

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
March 13,2013

FIGURE 4.19

Table 4.4
Terminal Area Space Summary (square feet)

Facility	Level Area	Building Area
Landside Terminal		
Baggage Claim Level	275,321	
Ticketing/Check-in Level	154,038	
Transfer Level	187,856	
Total		**617,215**
Administrative 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	
Mezzanine Level	9,206	
Total		**268,538**
Airside F Sortation Building		
Ramp Level	37,793	
Total		**37,793**
Grand Total		**1,936,205**

Notes: 1) Space allocations 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

4.2.2 2011 and 2031 Gated Flight Schedule Analysis

Requirements for the passenger terminal building are developed to meet the peak hour demand from passengers who originate or terminate their air travel segment at TPA. The peak month of operation at TPA is March when large numbers of Spring Break crowds pass through the airport. HNTB developed gated flight schedules (also referred to as Design Day Flight Schedules) for the average day during the peak month of 2011 and for the forecasted average day peak month (also in March) in 2031 for use in this analysis. Passenger traffic for intermediate years (2016, 2021 and 2026) were interpolated using a straight line (constant) growth rate between the 2011 and 2031 data points. **Table 4.5** summarizes the annual passenger demand shown in the TPA Aviation Forecast. Annual passenger numbers are used to calculate concession requirements. **Table 4.6** shows the number of available aircraft seats generated by the 2011 and 2031 flight schedules for domestic and international airline operations. Since the design day flight schedule is based on an average day in the peak month, which is typically a Tuesday, Wednesday or Thursday, the number of departing seats and arriving seats may not necessarily equal each other. This is because some flights do not operate on a daily schedule and others may have different equipment serving the airport on different days of the week.

The gated flight schedules allocate airlines to Airsides based on current assignment, available gates, and/or whether or not the flight is an international flight. See **Appendix B** for graphic depictions of estimated gate use by passenger aircraft. There are six new entrant international carriers in the schedule and all are assigned to Airside F because they require access to the Customs and Border Protection facility located therein. There is one domestic new entrant. It was also assigned to Airside F to take advantage of common-use gate space that is available during the periods when its flights are on the ground. Legacy carriers were accommodated in their existing airsides without the need for gate expansion.

Table 4.5
Annual Passenger Summary

Airside	Annual Passengers				
	2011	2016	2021	2026	2031
A	3,434,911	3,801,984	4,208,285	4,658,005	5,155,785
C	6,718,340	7,612,840	8,626,436	9,774,986	11,076,457
E	3,084,182	3,585,957	4,169,367	4,847,694	5,636,380
F	3,494,618	4,132,772	4,887,459	5,779,961	6,835,442
Total	**16,732,051**	**19,149,072**	**21,915,243**	**25,080,999**	**28,704,064**
Note: Includes both enplaning and deplaning passengers					

Source: HNTB Analysis

Table 4.6
Flight Schedule Daily Seats Summary

	2011 Schedule	2031 Schedule
Domestic Departing Seats	30,713	49,035
International Departing Seats	550	3,765
Domestic Arriving Seats	31,010	49,316
International Arriving Seats	550	3,835

Source: HNTB analysis.

4.2.3 Originating Passenger Activity

Facilities related to most airline functional requirements are calculated separately for originating (departing) and terminating (arriving) passengers. Most terminal facility processors are based on peak hour operations. Peak hour originating passengers are calculated using the design day flight schedule in two ways:

- The standard time of departure as shown in **Table 4.7 and Figure 4.20**, and
- Using applied passenger arrival profiles to more accurately distribute passengers arriving at the terminal prior to their flight:
  - Before 9 AM with and without bags
  - After 9 AM with and without bags

Passengers arriving at the airport prior to 9 AM for their flight typically arrive closer to their flight's departure time than passengers catching flights later in the day. Reasons for this phenomenon may include negotiating rush hour traffic, last minute packing, and the challenge some passengers experience in rising early before their flight. At some airports, this creates peaking conditions at ticket counters and the security screening checkpoint (SSCP) that must be properly modeled to ensure appropriate facilities are identified. To effectively model the passenger flows through the ticketing and SSCP, TransSolutions performed a data collection assignment to capture the passenger behavior and characteristics at TPA. More than 1,300 passengers were surveyed on December 15, 2011 (Thursday) and December 16, 2011 (Friday) to record passenger arrival curves, passenger group size, passenger check-in location, and number of checked bags. These non-peak travel times and days were chosen to provide a good indication of general passenger behavior and characteristics that are factored into planning assumptions and facility requirements development. Ideally, the surveys would be conducted during the peak travel month, which is March at TPA, but the planning project schedule did not allow for data collection during the peak month. Nonetheless, the data collected provides a good indication of airport specific factors that are essential to the planning process.

The passenger intercept survey was conducted at the end of the queue for each security screening checkpoint where passengers were interviewed using the following questions:

- Airline – “What airline are you flying today?”
- Flight departure time – “What time is your flight?”
- Passengers in group – “How many passengers are traveling together?”
- Number of checked bags per group - “How many bags were checked by your group?”
- Check-in location - “Where did you get your boarding pass?” And “Where did you check your bags (curbside / agent / kiosk -bag-drop-off)?”

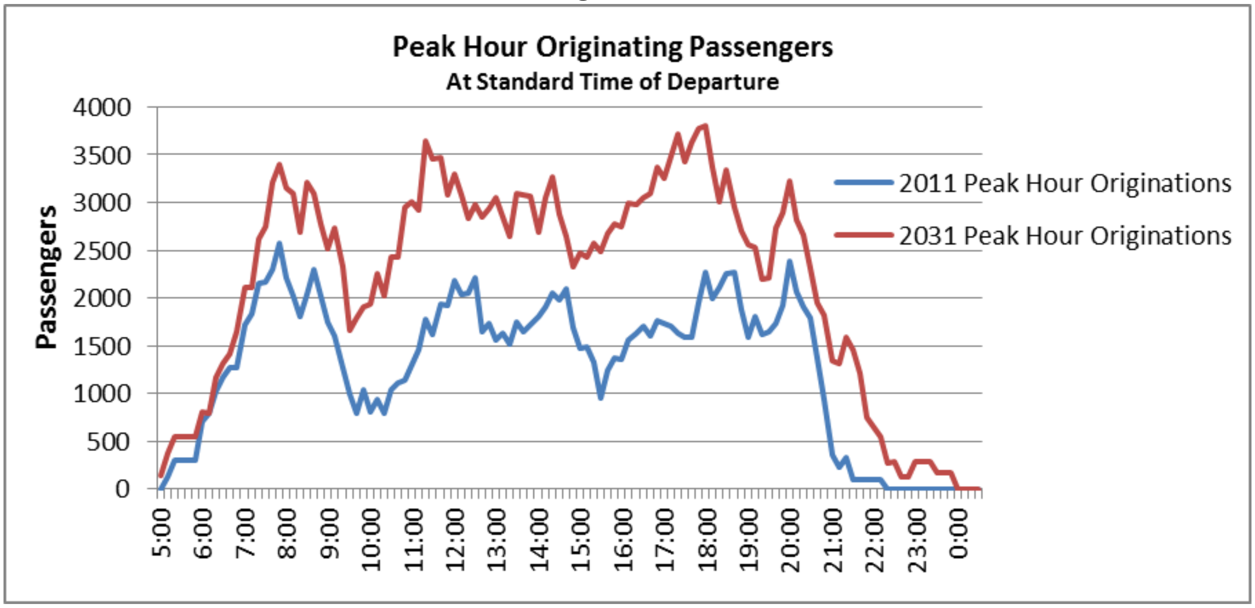
The interview time was noted to determine an approximate arrival time to the airport before departure.

Table 4.7
Originating Passengers at Standard Time of Departure

		2011	2016	2021	2026	2031
Total	Peak (10 min)	867	909	954	1,000	1,049
	Peak Hour	2,567	2,832	3,125	3,448	3,804

Source: HNTB analysis

Figure 4.20



Source: HNTB analysis

4.2.3.1 Originating Passenger Arrival Curves

Originating passengers arrive at the airport prior to their flights' scheduled departure time allowing for the time required to check in and proceed through security screening, and to conform to the check-in time rules dictated by the airlines. The distribution of times that passengers arrive before flight departure is referred to as an arrival curve.

Arrival curves tend to vary by airline and/or time of day. For this study, separate arrival curves have been developed for various airlines and based on flight departure time: Pre-9 AM and Post-9 AM. **Table 4.8** and **Figure 4.21** show the average time passengers arrive at the airport before their flight departure time by airline. **Appendix C** shows the distributions for the arrival patterns by airline.

As some of the airlines did not have enough flights during the peak periods in which passengers were surveyed, a combination of the legacy airlines' data is utilized to develop a distribution to be used for those airlines which do not show up in Table 4.4. Based on the passenger survey data:

- Passengers arrive on average between 59 and 75 minutes prior to scheduled flight departure time for flights that depart before 9 AM.
- For flights that depart after 9 AM, passengers arrive on average between 79 and 96 minutes before the flight departure time.

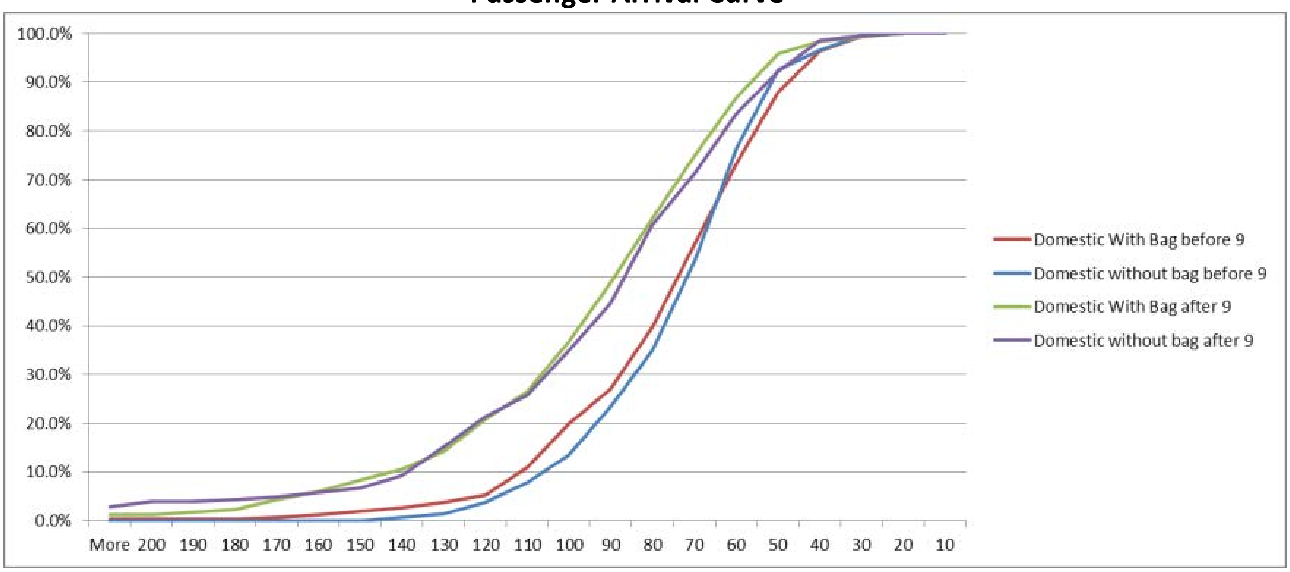
Table 4.8
Average Minutes before Departure for Originating Passenger Arrival

Airline	Pre 9 AM Flights	Post 9 AM Flights
AirTran	59.2	96.1
American	71.4	--*
United	69.5	90.3
Delta	61.3	91.1
JetBlue	65.2	87.9
Southwest	67.6	79.4
US Airways	74.7	--*
Major Airlines‡ Combined	67.0	92.6

Notes: * Not enough data to develop a distribution
‡ Airlines include American Airlines, United/Continental, Delta, and US Airways

Source: Data collected at TPA by TransSolutions in December 2011

Figure 4.21
Passenger Arrival Curve



Source: Passenger Arrival Curve developed by HNTB from passenger survey data collected by TransSolutions at TPA in December 2011

4.2.3.2 Originating Passenger Activity

Assuming all departing flights are on schedule, the peak hour departing passenger counts for each airline with arrival curves applied under the 2011 and 2031 flight schedules are shown in **Table 4.9**. **Table 4.10** shows the projected peak 10-minute and peak hour originating passenger activity with the passenger arrival curve applied for each Airside facility over the planning horizon. **Figures 4.22 – 4.25** illustrate peak hour originating passenger activity in 2011 and 2031 for each Airside facility across the average day of the peak month (ADPM). **Figure 4.26** provides a terminal-wide snapshot of passenger activity during the 2011 and 2031 ADPM. For comparison purposes, **Figures 4.27 and 4.28** overlay the passenger activity for each Airside facility and the whole terminal complex for 2011 and 2031, respectively. It should be noted that Southwest Airlines and AirTran Airways were in the process of merging and both carriers were co-located in Airside C during this study.

Table 4.9
Peak Hour Departing Passengers for 2011 and 2031 Flight Schedules

Airline	2011 Schedule		2031 Schedule	
	Rolling 60-Minute Peak Time	Rolling 60-Minute Number of Passengers	Rolling 60-Minute Peak Time	Rolling 60-Minute Number of Passengers
American Airlines	06:11 - 07:10	211	11:18-12:17	393
Air Canada	13:40 - 14:39	94	06:42-07:41	127
British Airways	18:01 - 19:00	145	16:31-17:30	181
jetBlue Airways	10:38 - 11:37	239	09:28-10:27	296
Continental & United Airlines	15:48 - 16:47	306	14:54-15:53	499
Delta Air Lines	06:49 - 07:48	609	10:13-11:12	806
AirTran Airways	09:32 - 10:31	353	-	-
Frontier Airlines	07:04 - 08:03	118	07:04-08:03	134
Spirit Airlines	12:54 - 13:53	118	13:11-14:10	126
US Airways	05:41 - 06:40	384	15:55-16:54	476
Southwest Airlines	06:04 - 07:03	958	09:26-10:25	1,845
WestJet	12:36 - 13:35	99	12:43-13:42	169
Cayman	13:30 - 14:29	79	13:13-14:12	56
Sky King	11:21 - 12:20	87	-	-
Domestic Entrant 1 (D1)	-	-	06:16-07:15	141
International Entrant 1 (I1)	-	-	16:01-17:00	63
International Entrant 2 (I2)	-	-	19:19-20:18	144
International Entrant 3 (I3)	-	-	15:47-16:46	54
International Entrant 4 (I4)	-	-	12:01-13:00	140
International Entrant 5 (I5)	-	-	19:01-20:00	151
International Entrant 6 (I6)	-	-	11:20-12:19	91

Source: TransSolutions analysis, May 2012

Table 4.10
Peak 10-Minute and Peak Hour Originating Passengers
(with Passenger Arrival Curve Applied)

Airside		2011	2016	2021	2026	2031
A	Peak (10 min)	97	103	110	117	124
	Peak hour	505	549	597	649	706
C	Peak (10 min)	151	173	199	228	261
	Peak hour	842	968	1,114	1,281	1,473
E	Peak (10 min)	112	122	133	145	158
	Peak hour	577	649	730	821	923
F	Peak (10 min)	127	135	143	151	160
	Peak hour	593	664	743	831	930
Total	**Peak (10 min)**	**433**	**466**	**502**	**540**	**582**
	Peak hour	**2,250**	**2,505**	**2,789**	**3,106**	**3,458**

Source: HNTB analysis

Figure 4.22

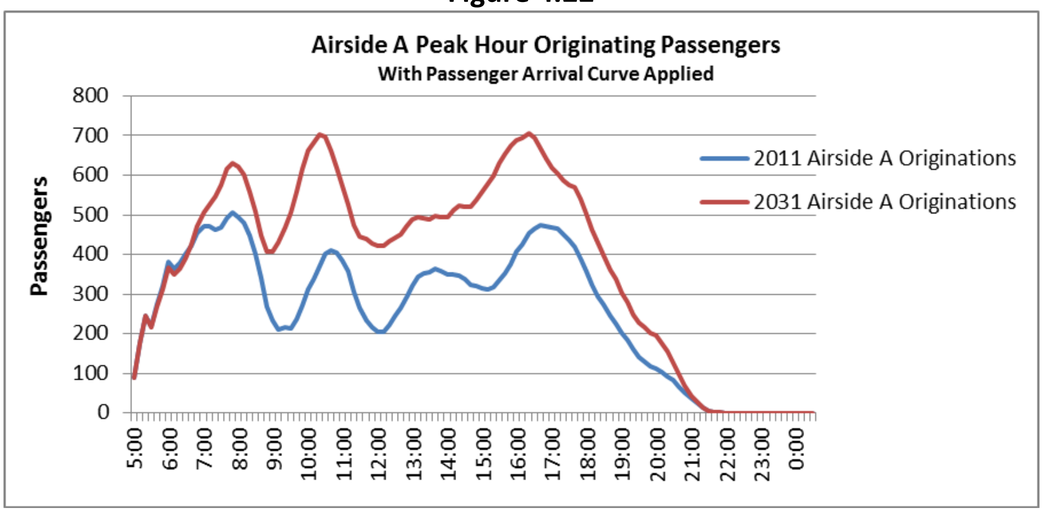


Figure 4.23

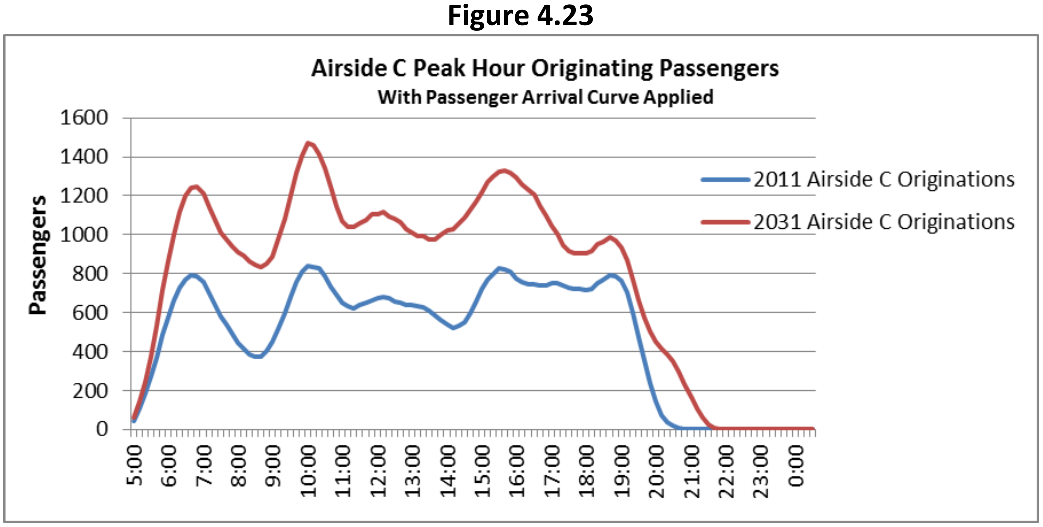


Figure 4.24

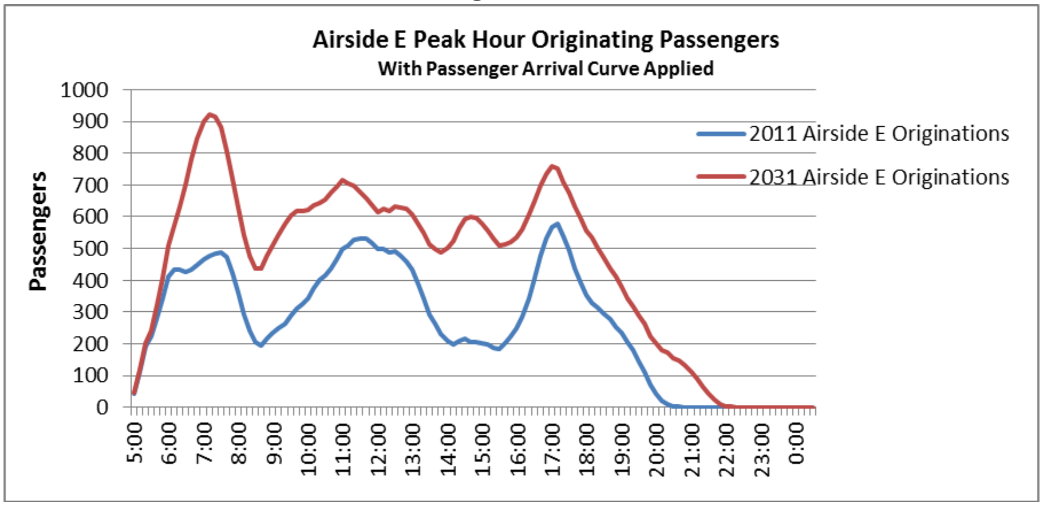


Figure 4.25

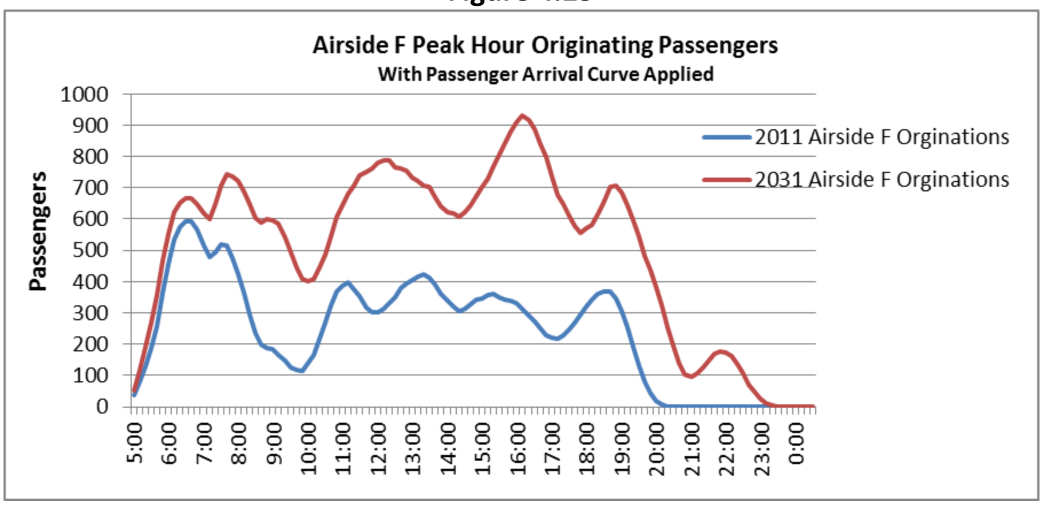


Figure 4.26

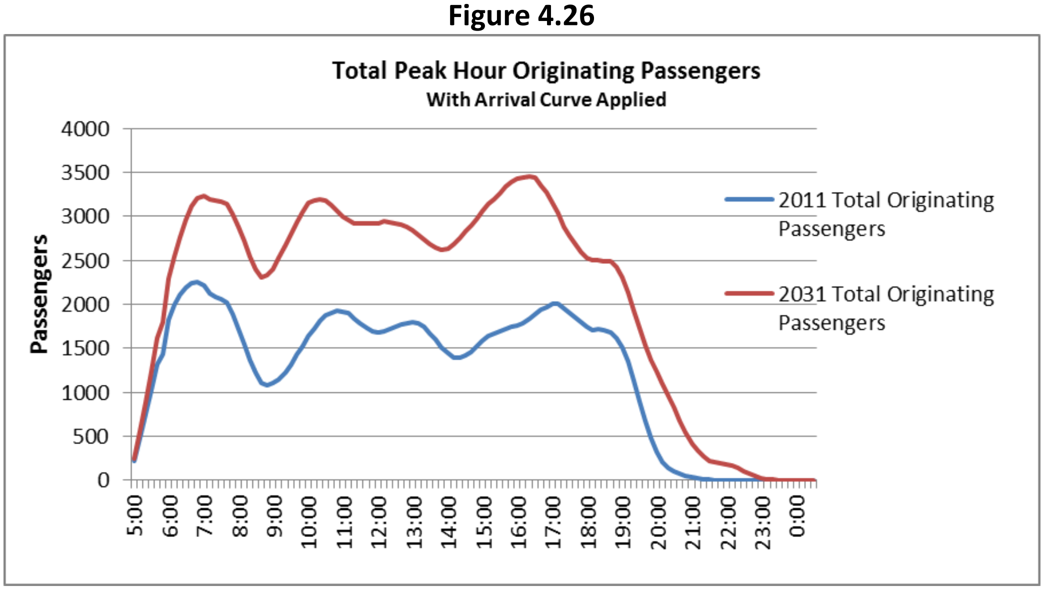
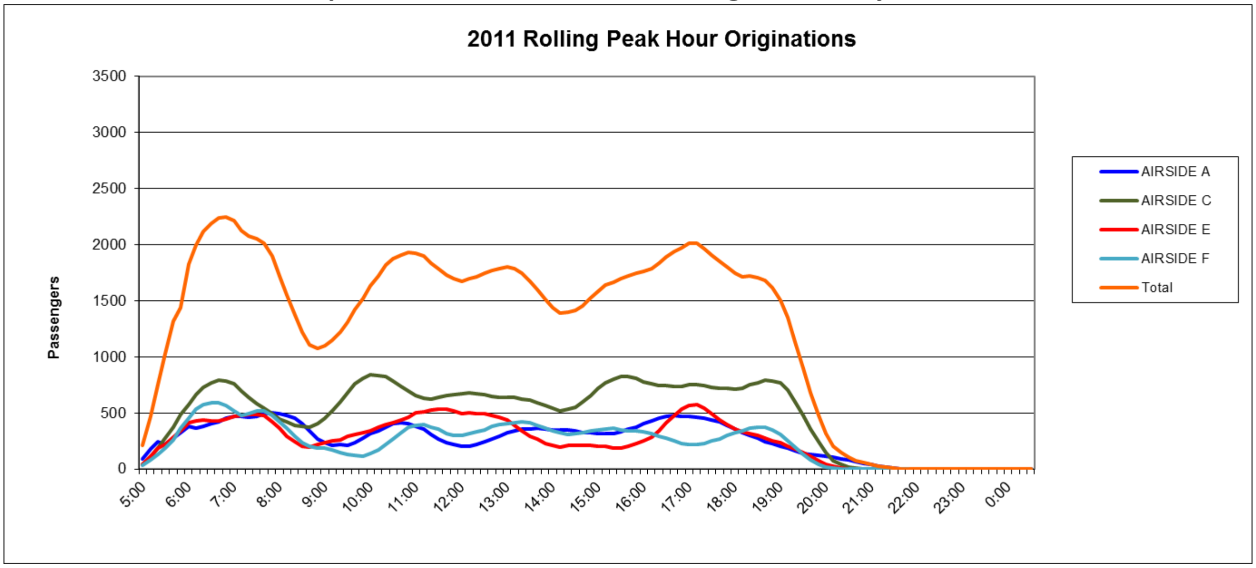
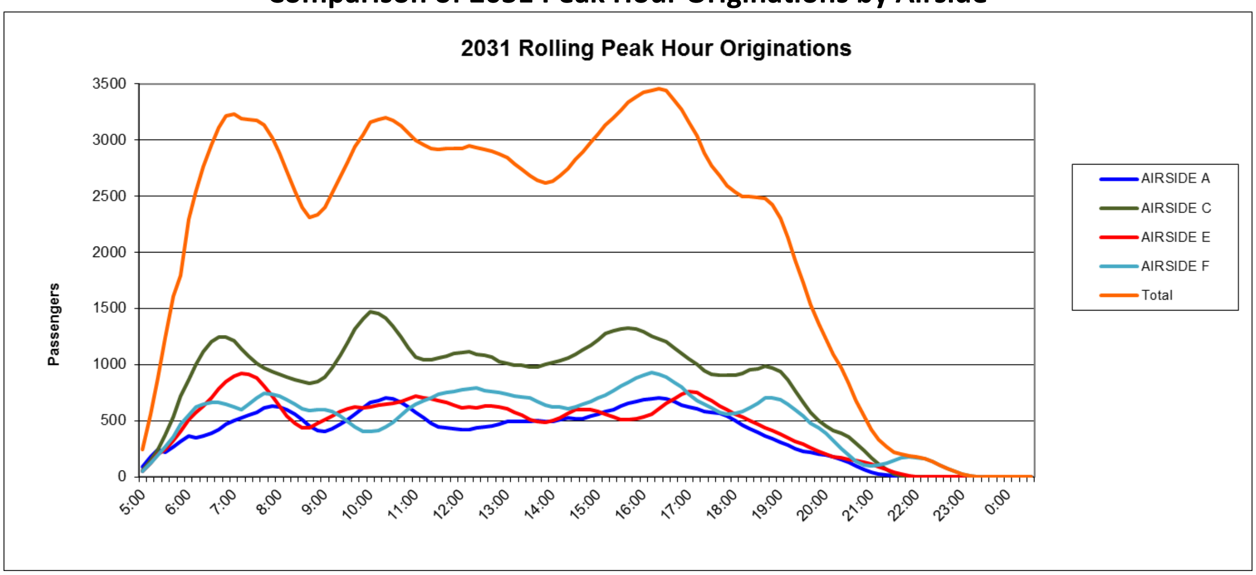


Figure 4.27
Comparison of 2011 Peak Hour Originations by Airside



Source: HNTB analysis

Figure 4.28
Comparison of 2031 Peak Hour Originations by Airside



Source: HNTB analysis

4.2.3.3 Departing Flight Activity

For some airline processors, such as baggage makeup areas, gates and ticket counters, the number of departing flights operating over a specific period of time is useful when developing facility requirements. **Table 4.11** shows the number of forecasted peak 10-minute and peak hour departing flights by airside and across the terminal complex as a whole.

Table 4.11
Peak 10-Minute and Peak Hour Departing Flights by Airside

Airside		2011	2016	2021	2026	2031
A	Peak (10 min)	3	3	3	3	3
	Peak hour	7	7	8	8	9
C	Peak (10 min)	5	5	5	6	6
	Peak hour	13	14	15	17	18
E	Peak (10 min)	2	2	2	2	2
	Peak hour	6	6	6	7	7
F	Peak (10 min)	3	3	3	3	3
	Peak hour	6	7	7	8	9
Total	**Peak (10 min)**	**9**	**9**	**9**	**9**	**9**
	Peak hour	**24**	**26**	**28**	**30**	**33**

Source: HNTB Corporation analysis, May 2012

4.2.4 Terminating Passenger Activity

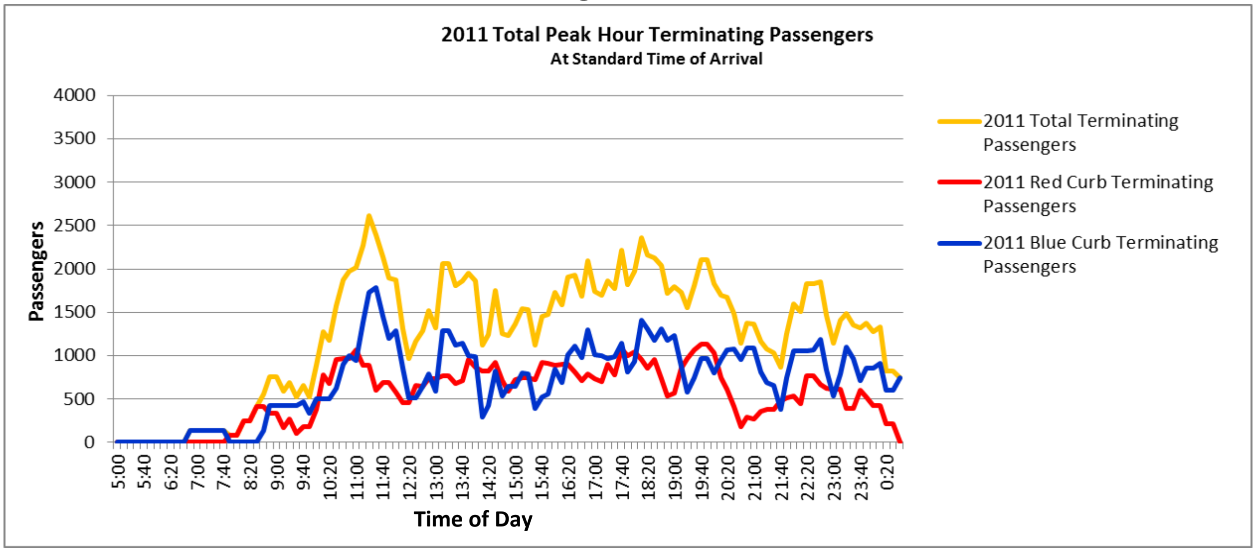
Peak hour terminating passengers are calculated by assigned baggage claim area/curbside (red or blue) and in total. Terminating flights were tallied in 10-minute increments and are shown using a rolling peak hour for the year 2011 in **Figure 4.29** and for the year 2031 in **Figure 4.30**. This data is summarized by yearly milestone in **Table 4.12.** **Appendix D** summarizes the departing and arriving flights for each design day forecast schedule by airline.

Table 4.12
Peak 10-Minute and Peak Hour Terminating Passengers by Assigned Curb

Curb		2011	2016	2021	2026	2031
Red	Peak (10 min)	425	495	578	673	785
	Peak hour	1,133	1,319	1,537	1,789	2,084
Blue	Peak (10 min)	704	749	796	846	900
	Peak hour	1,783	1,902	2,029	2,165	2,310
Total	**Peak (10 min)**	**826**	**893**	**965**	**1,043**	**1,127**
	Peak hour	**2,618**	**2,906**	**3,226**	**3,582**	**3,976**

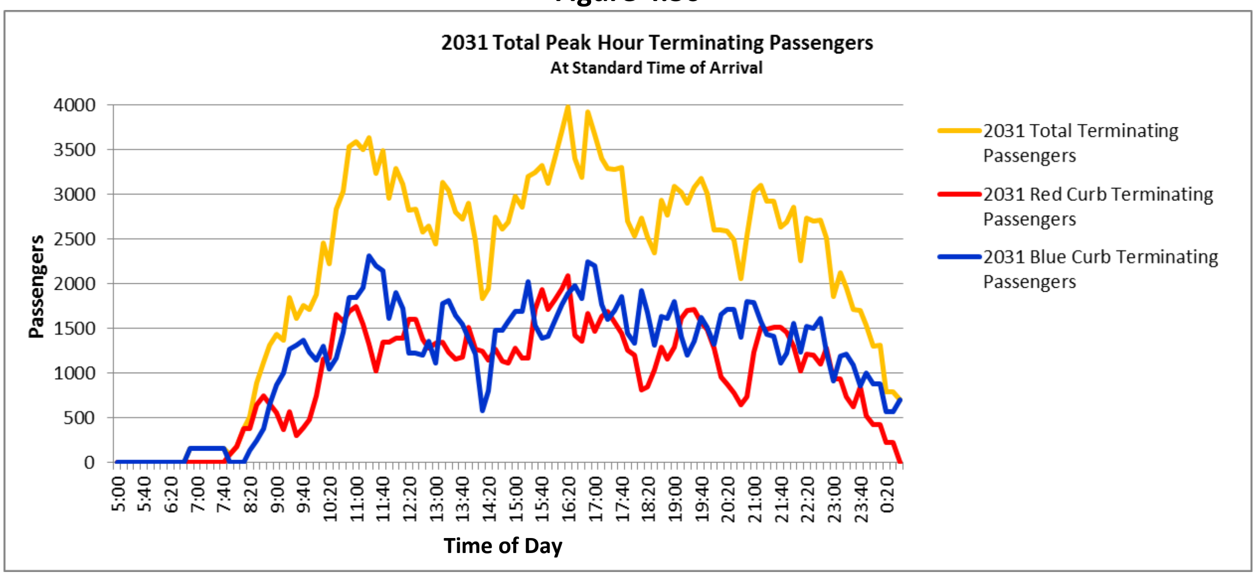
Source: HNTB Corporation analysis, May 2012

Figure 4.29



Source: HNTB analysis

Figure 4.30



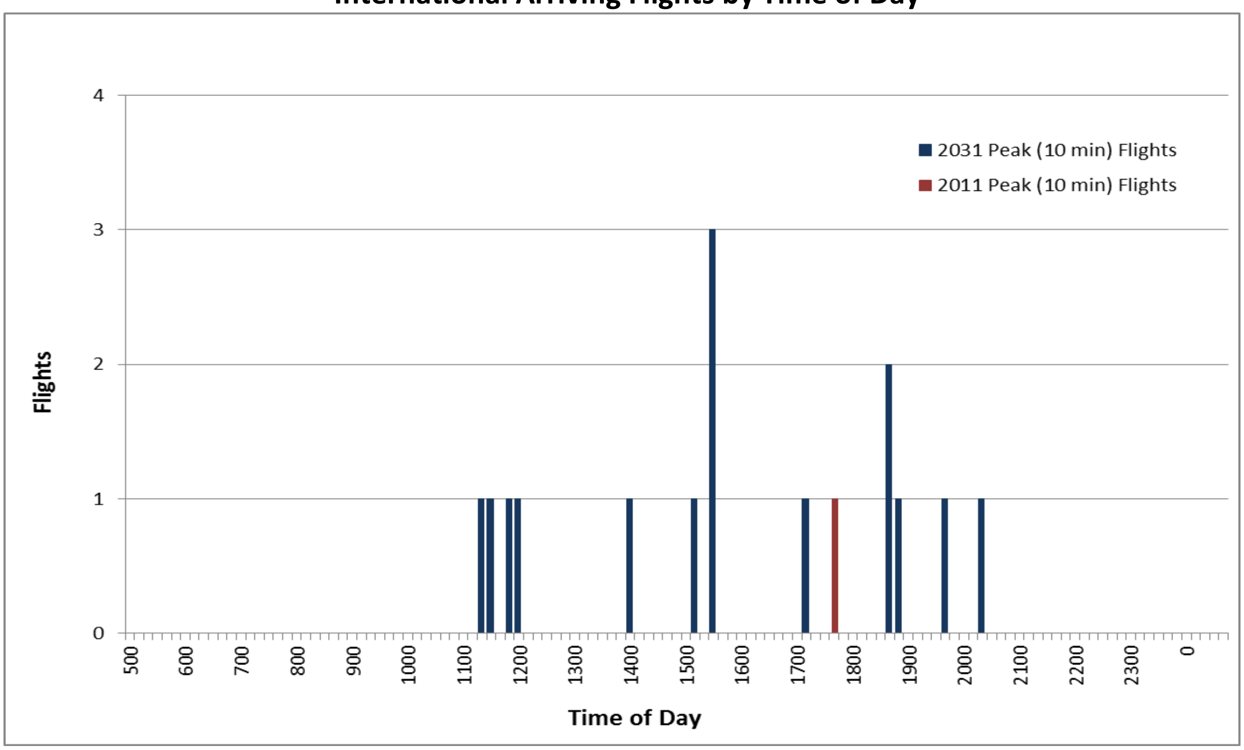
Source: HNTB analysis

In 2011, the peak period for international arriving passengers was at 17:40 with approximately 195 passengers using the Customs and Border Protection (CBP) facility. At the time the design day forecast was completed, Edelweiss Airlines was not yet serving TPA. International traffic is anticipated to significantly grow during the planning period and is forecasted to reach around 569 peak hour passengers by 2031 (not including Transborder passengers). This peak is projected to occur around 19:00 with several new flights arriving from Europe. **Figure 4.31** shows the forecasted international arriving passengers for 2011 and 2031. **Figure 4.32** shows the number of international flights arriving throughout the day in 10-minute increments.

Figure 4.31

Source: HNTB analysis

Figure 4.32
International Arriving Flights by Time of Day



Source: HNTB analysis

4.2.5 Level of Service (LOS) Criteria

Level of service is dependent on a range of assessments which describe the relative comfort and convenience of the facility. These assessments include both qualitative and quantitative aspects and combine the effects of space, time, passenger expectation, and perception.

Establishing a desired level of service requires determining the interplay between three planning criteria: (1) the interior space available per person; (2) the time required for passengers to accomplish each process involved in transferring between ground and air transport; and (3) passenger flow criteria including the ability of passengers to navigate through the terminal. Consideration should also be given to psychological effects of terminal environmental conditions on travelers.

4.2.5.1 Space per Person Criteria

The LOS criteria include space standards and guidelines to assess the performance and congestion levels within terminal facilities. The International Air Transport Association (IATA) reference manual *(Airport Development Reference Manual, 9th Edition, Effective January 2004)* system assigns a level of service grade from A through F to rank the efficiency of a facility and perceived level of passenger satisfaction and comfort based on space per person criteria. These grades are assigned to five key areas in the terminal building that include check-in/ticketing, wait/circulation areas, departure lounges, baggage claim, and inspection services. The IATA LOS grades are defined as follows:

- **LOS A** - Excellent level of service; condition of free flow; excellent level of comfort.
- **LOS B** - High level of service; condition of stable flow; very few delays; high level of comfort.
- **LOS C** - Good level of service; condition of stable flow; acceptable delays; good level of comfort.
- **LOS D** - Adequate level of service; condition of unstable flow; acceptable delays for short periods of time; adequate level of comfort.
- **LOS E** - Inadequate level of service; conditions of unstable flow; unacceptable delays; inadequate level of comfort.
- **LOS F** - Unacceptable level of service; condition of cross flows; system breakdown and unacceptable delays; unacceptable level of comfort.

These space standards have been adopted by airports, and endorsed by IATA and Airports Council International (ACI). The areas per passenger shown in **Table 4.13** were converted from square meters to square feet for interpretation.

Examples of the IATA level of service framework are shown in **Figures 4.33 and 4.34**.

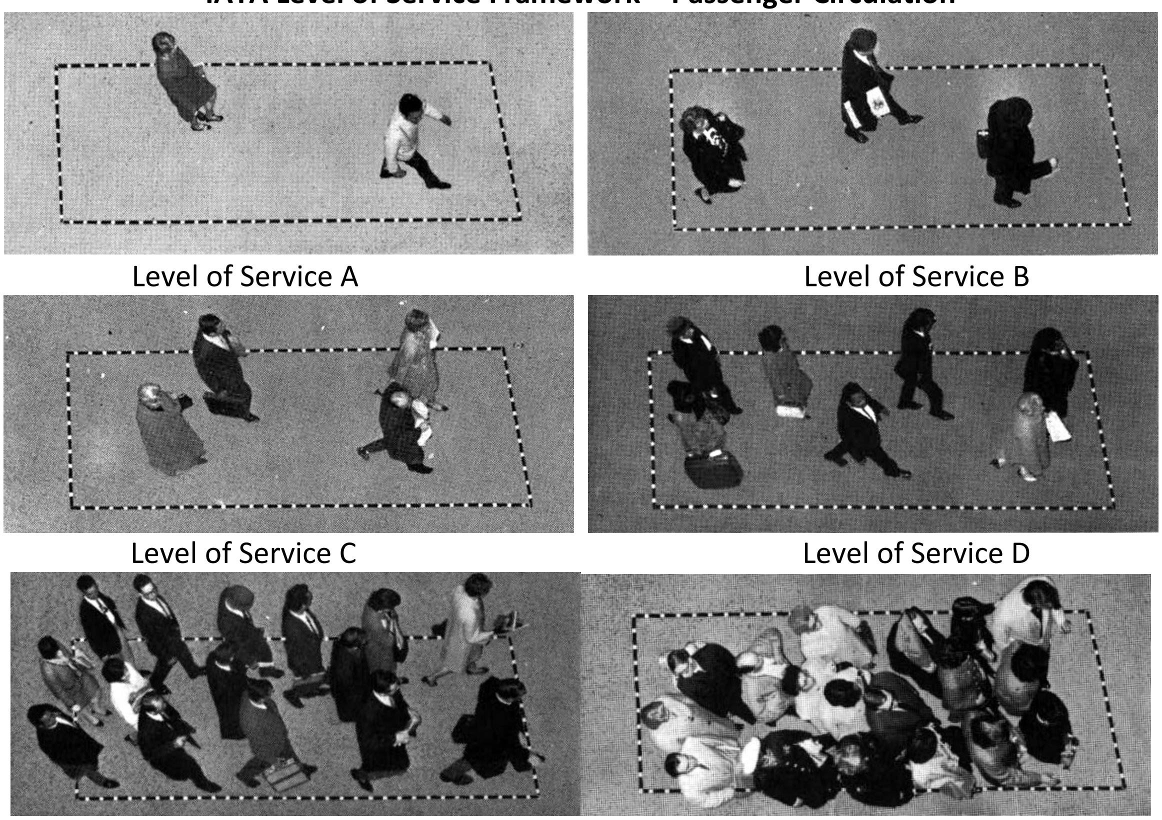
Airports generally plan to achieve and maintain LOS B or C standards. Achieving LOS A is often impractical due the economic constraints associated with developing the large areas required. The standards associated with LOS D, E and F are inadequate and unacceptable from a planning standard.

Table 4.13
Level of Service Space Standards (SF per passenger)

Terminal Area	A	B	C	D	E
Check-in/Ticketing	19.4	17.2	15.1	12.9	10.8
Wait/Circulation	29.1	24.8	20.5	16.1	10.8
Departure Lounge	15.1	12.9	10.8	8.6	6.5
Bag Claim Area	21.5	19.4	17.2	15.1	12.9
Inspection Services	15.1	12.9	10.8	8.6	6.5

Source: IATA Airport Development Reference Manual, 9th Edition, January 2004
Prepared by: HNTB, January 2013

Figure 4.33
IATA Level of Service Framework – Passenger Circulation



Level of Service A
Level of Service B
Level of Service C
Level of Service D
Level of Service E
Level of Service F

Source: John J. Fruin, Pedestrian Planning and Design, 1971
Prepared by: HNTB, February 2013

Figure 4.34
IATA Level of Service Framework – Passenger Queues

Level of Service A to B Range Level of Service C to D Range

4.2.5.2 Level of Service (LOS) Guidelines

The TPA Terminal and Airsides should be developed to meet LOS C or higher during normal travel demand periods. Brief (no more than 15 minutes in duration) periods of LOS D are permissible during the peak hour. Keeping this in mind, the facility should be developed so that service levels do not drop below LOS D space criteria during busy and peak travel periods.

For the most part, facility requirements were developed to accommodate the demand forecast to occur during the peak 10-minute period of the peak hour of activity on the average weekday of the peak month. Computer simulation was used to derive demand loads and performance data pertaining to numbers of passengers waiting for processing and related wait times, which were correlated to the IATA-prescribed level of service (LOS) framework. Desirable wait times and space requirements for passengers were simulated to equate to LOS C, unless otherwise indicated. For most U.S. passenger terminal facilities, LOS C equates to good service at reasonable cost.

4.2.5.3 Passenger Flow Criteria

Passenger flow criteria determine the relative ease by which passengers move through the terminal during the arrival and departure processes. The configuration and location of the ticket lobby, boarding areas and concession areas influence the passenger wayfinding and ability to circulate through the facility efficiently. There are five primary factors affecting passenger flow including:

- **Walking Distances** - According to the International Air Transport Association (IATA), the industry standard for maximum walking distances between major terminal functions is approximately 1,000 feet. This distance can be increased if a form of mechanical assistance, such as a moving walk, is provided. Since its inception, TPA has been known as the “Train Airport”, as it was the first airport to institute automated people mover (APM) trains to shuttle passengers to and from the airsides. Additionally, TPA has long prided itself by having very short walking distances. The original terminal was promoted as having unassisted walking distances that are no more than 700 feet long. HCAA has made it a goal that future terminal expansion and improvements will not increase unassisted walking distances beyond 700 feet.

- **Separation of Arriving and Departing Passengers** - Separation of arriving and departing passengers generally benefits passenger flow throughout the terminal and opportunities to expedite the flow of arriving passengers should be considered as planning progresses.
- **Changes in Level** - Passengers should not have to routinely change more than one level in transiting the terminal and should not have to be required to move baggage, other than carry-on baggage between levels.
- **Facilities for Disabled Passengers** - Design for accessibility includes good design practices to avoid the creation of barriers in facilities that impair the progress of travelers and may seriously impact travelers with disabilities (e.g., curb ramps for wheelchairs, carts, and rolling luggage, elimination of doors when possible, and avoiding backlighting and glare on signs). It also includes provision of specific equipment or construction that supports airport operational programs to facilitate travelers with disabilities, such as audible and visual paging, TDD telephones, and carts for the mobility-impaired.
- **Integrated Public Information** - An integrated public information system provides the information necessary to efficiently direct passengers and terminal occupants to their destinations. Current systems in place at TPA should be modified and expanded to incorporate new programmatic areas and functions.

4.2.5.4 Space Standards

The space standards can be determined by either function or geometry or both. The majority of terminal areas are sized by function, essentially applying space standards to the predicted demand. Other spaces are determined by how people or vehicles circulate or how equipment operates. Establishing the size of these spaces requires an understanding of dimensional criteria, geometry, and system operations.

As the planning process moves forward, the LOS space criteria, performance standards, and space standards are tested and modified to ensure the overall LOS standard for the passenger terminal complex is met.

4.2.6 Passenger Characteristics

TransSolutions was retained by the HNTB to assist with the Master Plan Update by performing computer simulation analyses of the check-in lobby, security screening checkpoint (SSCP), outbound baggage system, inbound baggage claim devices, Transfer Level circulation areas, and Customs and Border Protection (CBP) facility. TransSolutions collected passenger data at TPA on December 14th through 16th, 2011. This survey data, typical industry standards and flight schedules were used in a high-level discrete event simulation to establish the recommended facility requirements for demand levels at 2011 and 2031. The simulation analyses takes into account future facility configuration and demand, as well as the inherent variability in passenger behavior, characteristics and processing. This section summarizes the data collected and used in the simulation modeling.

4.2.6.1 Group Sizes

Originating passengers at TPA travel in groups of one to more than eight. Group size refers to the number of passengers traveling and checking-in together at the terminal. The overall average group size ranges from 1.3 and 1.8 for different airlines. **Table 4.14** shows the distribution of the passenger group sizes by airline. As some of the airlines did not have enough flights during the peak periods in which the passengers were surveyed, a combination of the legacy airlines' data was utilized to develop a distribution to be used for those airlines which do not show up in Table 4.14. The distributions are also depicted in **Figure 4.35**.

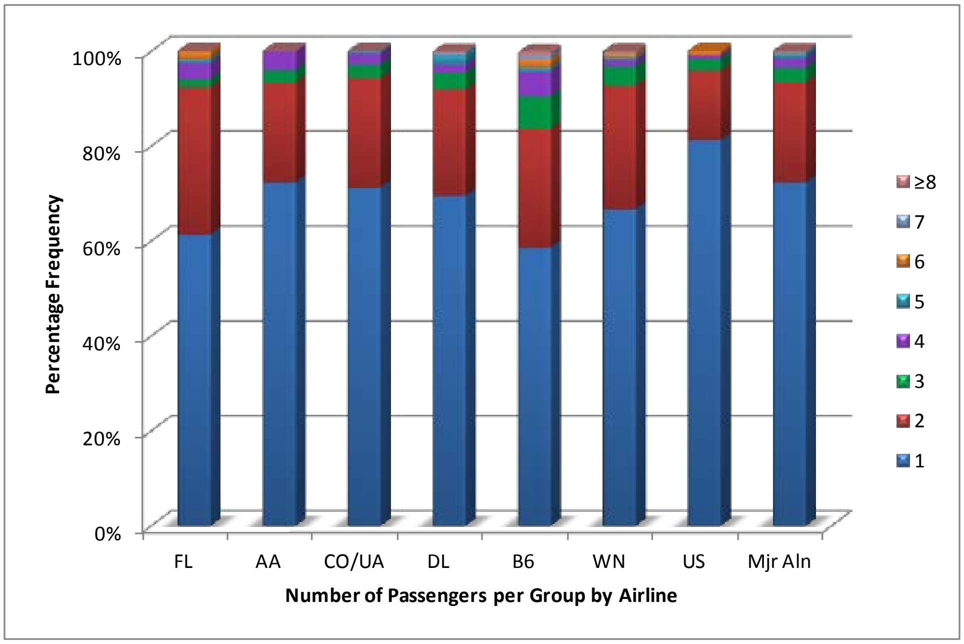
Table 4.14
Group Size Distribution by Airline

Passengers in Group	AirTran	American	United/ Continental	Delta	JetBlue	Southwest	US Airways	Major‡ Airlines
1	61.3%	72.4%	71.2%	69.6%	58.6%	66.7%	81.3%	72.3%
2	31.1%	21.1%	23.1%	22.4%	25.0%	26.1%	14.6%	21.2%
3	1.7%	2.6%	2.8%	3.5%	6.9%	4.0%	2.4%	3.0%
4	3.4%	3.9%	2.4%	1.6%	5.2%	1.3%	0.8%	1.9%
5	0.8%	0.0%	0.5%	2.2%	0.9%	0.5%	0.0%	1.1%
6	1.7%	0.0%	0.0%	0.0%	1.7%	0.8%	0.8%	0.1%
7	0.0%	0.0%	0.0%	0.3%	0.9%	0.3%	0.0%	0.1%
≥8	0.0%	0.0%	0.0%	0.3%	0.9%	0.3%	0.0%	0.1%
Average Pax/Group	**1.6**	**1.4**	**1.4**	**1.5**	**1.8**	**1.5**	**1.3**	**1.4**

Note: ‡ The airlines include American Airlines, United/Continental, Delta, and US Airways

Source: Data collected at TPA by TransSolutions in December 2011

Figure 4.35
Group Size Distribution by Airline



4.2.6.2 Boarding Pass Print Location

Originating passengers obtain their boarding passes at different locations depending upon their airline:

- In recent years, online/mobile phone check-in has become popular among passengers. The analysis of collected data indicates that Online check-in has the highest (or close to highest) frequency among passengers.
- As some of the airlines did not have enough flights during the peak periods in which passengers were surveyed, a combination of the legacy airlines' data is utilized to develop a distribution for the other airlines which do not show up in Table 4.14.
- At the United/Continental check-in lobby, all the positions were equipped with kiosks.

Table 4.15 and **Figure 4.36** show the distribution of the boarding pass print locations by airline.

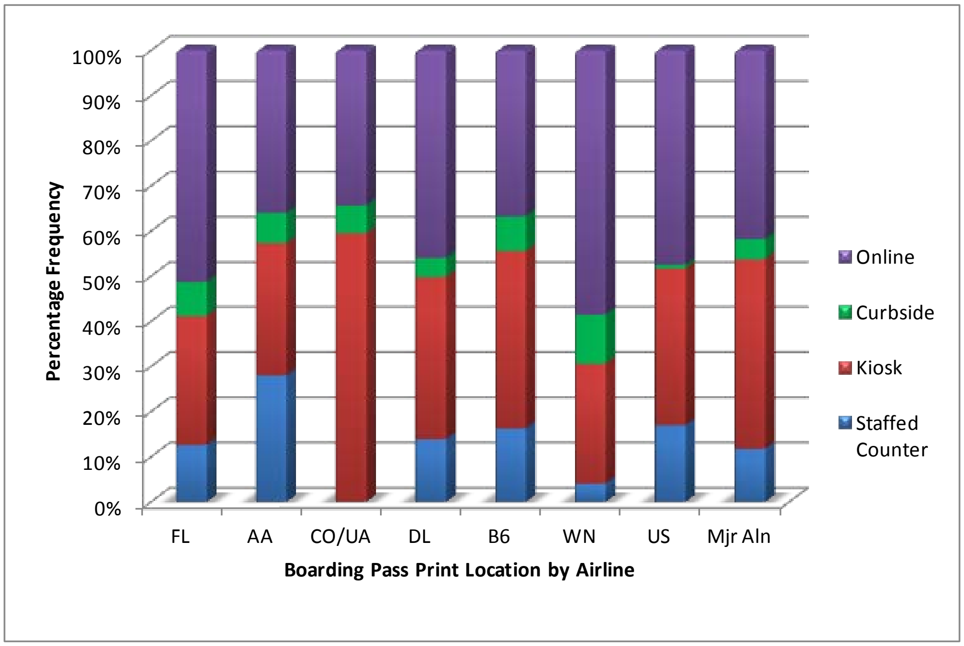
Table 4.15
Boarding Pass Location

Boarding Pass Location	AirTran	American	United/ Continental	Delta	JetBlue	Southwest	US Airways	Major‡ Airlines
Staffed Counter	12.6%	28.0%	0.0%	13.8%	16.2%	4.1%	16.9%	11.8%
Kiosk*	28.6%	29.3%	59.5%	36.0%	39.3%	26.6%	34.7%	42.0%
Curbside	7.6%	6.7%	6.2%	4.2%	7.7%	10.8%	0.8%	4.5%
Online**	51.3%	36.0%	34.3%	46.0%	36.8%	58.5%	47.5%	41.7%

Notes: ‡ The airlines include American, United/Continental, Delta, and US Airways.
*Includes "inline" kiosks, the kiosks attached to the ticket counters.
**Includes mobile devices.

Source: Data collected at TPA by TransSolutions in December 2011

Figure 4.36
Boarding Pass Location



Source: Data collected at TPA by TransSolutions in December 2011

4.2.6.3 Checked Baggage

The amount of check-in baggage per passenger group distribution is summarized in **Table 4.16** for each airline.

- Considering those passengers who do not check bags, the average baggage/group numbers represent the average number of bags that overall passengers checked per passenger group. If these numbers are divided by the average group size in Table 4.14, the average bags/passenger is calculated.

- The average number of checked baggage per passenger varies by airline and is mostly affected by the airlines' baggage fee policies. Southwest, which has no fee for the first two checked bags, has the highest average bags per passenger.
- As some of the airlines did not have enough flights during the peak periods in which the data collection was conducted, a combination of the legacy airlines data is utilized to develop a distribution to be used for those airlines which do not show up in Table 4.16.

Table 4.16 shows the distribution of the checked bags per passenger group by airline. This information is also depicted in **Figure 4.37**.

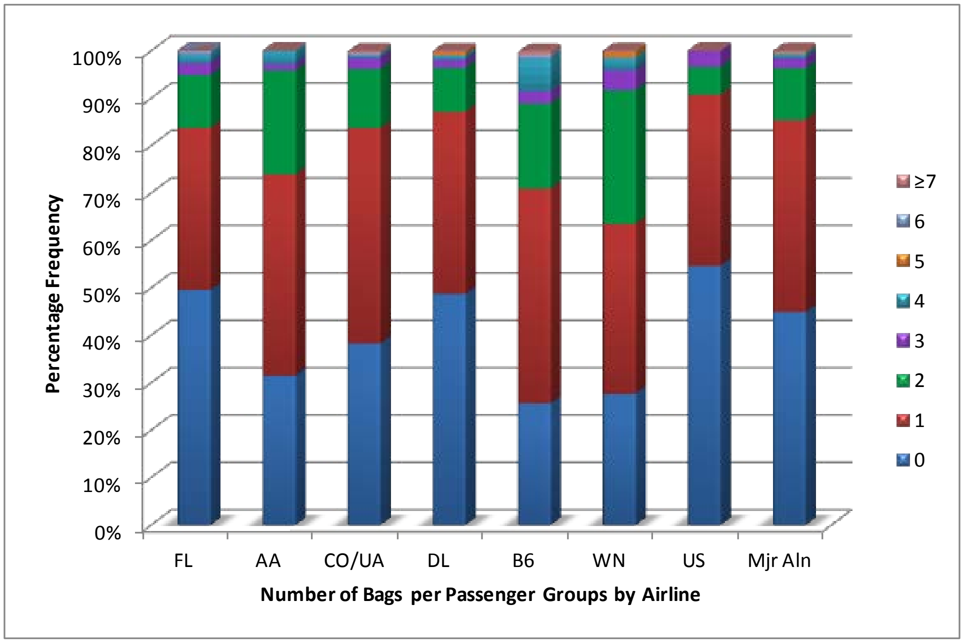
Table 4.16
Checked Baggage per Passenger Group

Number of Bags per Group	AirTran	American Airline	United	Delta	JetBlue	Southwest	US Airways	Major‡ Airlines
0	49.6%	31.5%	38.3%	48.7%	25.6%	27.7%	54.6%	44.9%
1	34.2%	42.5%	45.5%	38.5%	45.3%	35.9%	36.1%	40.5%
2	11.1%	21.9%	12.4%	9.3%	17.9%	28.2%	5.9%	10.9%
3	2.6%	1.4%	2.4%	1.6%	2.6%	4.1%	3.4%	2.1%
4	1.7%	2.7%	0.5%	1.0%	6.8%	2.7%	0.0%	0.8%
5	0.0%	0.0%	0.0%	0.6%	0.0%	1.1%	0.0%	0.3%
6	0.9%	0.0%	0.5%	0.0%	0.9%	0.0%	0.0%	0.1%
≥7	0.0%	0.0%	0.5%	0.3%	0.9%	0.3%	0.0%	0.3%
Average Bags/Group	**0.76**	**1.01**	**0.86**	**0.71**	**1.27**	**1.23**	**0.58**	**0.76**
Average Bags/Pax	**0.49**	**0.73**	**0.62**	**0.48**	**0.71**	**0.83**	**0.46**	**0.54**

Note: ‡ The airlines include American, United/Continental, Delta, and US Airways.

Source: Data collected at TPA by TransSolutions in December 2011.

Figure 4.37
Checked Baggage per Passenger Group



Source: Data collected at TPA by TransSolutions in December 2011.

4.2.7 Airline Areas

Airline Areas refer to those areas and facilities of the terminal leased to an airline for its sole or preferential use and occupancy, or as part of a common-use lease policy. The terminal and airside areas considered to be Airline Areas at TPA include:

- Airline Ticketing/Check-in Counters
- Airline Self-service Check-in Kiosks
- Curbside Check-in Counters
- Airline Ticket Offices (ATOs)
- Domestic Baggage Claim
- Domestic Inbound Baggage Drop-off
- Baggage Service Offices
- Outbound Baggage Makeup Areas
- Ramp and Boarding Level Airline Operations/Support Space
- Airline/VIP Clubs and Lounges
- Holdrooms

Table 4.17 lists the terminal and airside facilities in which each airline operates. It also lists the IATA 2-letter airline code for each airline serving Tampa at the time this Master Plan Update was conducted.

Table 4.17
Existing Airline Locations

Airline	Ticketing and Baggage Claim	Airside	Baggage Screening Pod	Baggage Makeup Device
Air Canada (AC)	RED	E	AS1	E-Pier 1
AirTran (FL)	RED	C	AS6	MUC 3
American Airlines (AA)	BLUE	F	AS3	MUF 3
British Airways (BA)	RED	F	AS4	MUF 2
Cayman Airways (KX)	RED	F	AS3	MUF 2
Delta Air Lines (DL)	BLUE	E	AS2	E-Pier 3,4,5,6,7, 8,9,10 & E-FP2
Edelweiss Air (WK)	RED	F	AS1	MUF 2
Frontier (F9)	RED	A	AS8	MUA 6
JetBlue (B6)	BLUE	A	AS8	MUA 3
Sky King (5K)	RED	F	AS1	MUF 2
Southwest Airlines (WN)	RED	C	AS5	MUC 1 & MUC 2
Spirit Airlines (NK)	RED	A	AS8	MUA 6
United Airlines (UA)	BLUE	A	AS8	MUA 7 & MUA 8
US Airways (US)	BLUE	F	AS4	MUF 1
WestJet (WS)	RED	F	AS4	MUF 2

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

4.2.7.1 Airline Ticketing/Check-in

Existing Conditions

Airline ticketing and check-in operations occur on the Ticketing Level (Level Two) of the Main Terminal Building. Airlines at TPA utilize a combination of traditional ticket counters, counter-embedded self-service kiosks, curbside check-in counters, curbside check-in kiosks, and free-standing self-service kiosks to facilitate passengers in retrieving their boarding passes and checking their baggage. The current lease agreement includes 10-feet of circulation/standing area directly in front of the ticket counters. All stanchioned queue areas are included as part of the public circulation area. The typical two-position counter is six feet wide with a three-foot baggage well, or pass-through, on each side. Some airlines utilize custom counter widths and many carriers have implemented integrated self-service kiosks in place of the traditional ticket counter. Most counters have direct access to one or more baggage conveyors running behind the ticket counters that transport bags to the checked baggage inspection system (CBIS) located on Level One of the terminal. There is an oversized baggage inspection area on the south (Blue) side near the US Airways and United Airlines ticket offices with an oversize baggage belt capable of transporting out-of-gauge bags and objects to the tug drive located on the Baggage Claim Level below.

Upon arrival at the ticketing level, originating passengers either proceed to the airlines' check-in area to receive their boarding pass and/or check their baggage, or they proceed directly to the Transfer Level if they have checked-in online and have no bags to check. **Table 4.18** shows the number of check-in positions currently in use as well as unassigned positions per check-in hall section.

The layout of the existing ticketing/check-in processing area and curbside positions is shown in **Figure 4.38**.

Table 4.18
Check-In Positions by Airline (East to West)

Airline	Agent	Bag Drop	Kiosk	Curbside
Empty	2	-	-	-
AirTran	2 business	-	8	2
Southwest (Bag Drop)	-	1	4	-
Southwest	5	-	10	4
Empty	6	-	-	-
JetBlue	4	-	4	2
Empty	-	-	-	1
Empty	-	-	-	4
Spirit	2	-	4	-
Frontier	4	-	-	-
Empty	8	-	-	-
United/Continental	-	-	17	2
Empty	-	-	-	2
Empty	10	-	-	4
British	8	-	-	-
US Airways (First Class)	10	-	-	-
US Airways	-	-	12+2 outside	1
Empty	-	-	-	2
Empty	6	-	-	4
West Jet	6	-	-	-
Cayman Charters	6	-	-	-
American (Cuba)	4	-	-	-
American (First Class)	4	-	-	-
American	-	-	10	2
Empty	-	-	-	4
Sky King	8	-	-	-
Air Canada	8	-	-	-
Delta	8	4	24 + 4 boarding	3
Empty	-	-	-	3

Figure 4.38
Existing Ticketing/Check-in Lobby and Curbside Airline Locations

Source: HCAA

Planning and Performance Criteria

Originating passengers departing on flights from TPA check in at an agent position, curbside position, self-service kiosks, or via the internet/mobile device. Likewise, bags are checked at an agent position or a bag drop position.

As passengers become more proficient in using the internet and mobile devices, the use of these for check-in is increasing. As was shown in Table 4.15, for some of the airlines, this percentage is more than 50% of the surveyed passengers.

For purposes of this study, approximately 15% passengers using the kiosk are assumed to need agent assistance requiring them to wait in the staffed counter/kiosk assist queue as well.

For purposes of this study, passengers who check in online and have to check bags go directly to the Baggage Drop/Staffed positions in the check-in lobby. This is a conservative approach since a portion of passengers may drop their checked bags at the curbside, if available. Passengers who check in at a kiosk and have to check bags will have their bags checked at the same kiosk position when they perform the check-in process.

Over 800 check-in transaction times were recorded by time study for processing times at staffed counters and kiosks for available airlines during December 14, 2011 morning and afternoon observations. The time that it takes a passenger group to be processed at these locations is shown in **Table 4.19**. These times include the check-in processing time only, not the time passengers wait in the queue to access an agent or kiosk.

Some of the airlines did not have enough flights during the peak periods in which the data collection was conducted. A combination of the legacy airlines data is utilized to develop a distribution to be used for those airlines which do not show up in Table 4.19. **Appendix E** shows the distribution of these processing times.

Table 4.19
Average Check-In Processing Time per Passenger Group

Airline	Staffed Counter (minutes)	Kiosk** (minutes)
AirTran	2.6	3.7
American	2.7	--*
Continental/United	N/A	3. 9
Delta	2.6	3.4
Frontier	3.1	N/A
JetBlue	1.6	2.5
Southwest	--*	2.5
US Airways	--*	2.3
Major‡ Airlines	2.7	3.5

Notes: * Not enough data-points to develop a distribution
** Includes bag tagging time if passenger has bag(s)
‡ The airlines include American, United/Continental, Delta, and US Airways

Source: Data collected at TPA by TransSolutions - Dec 2011

The check-in lobby areas were evaluated using the following criteria:

- The time each passenger spends in the queue waiting to check-in was tracked and compared to the following criteria:
  - **Full/Special Service Counter** – 95% of passengers wait less than 10 minutes for a full/special service agent
  - **Kiosk** – 95% of passengers wait less than 3 minutes to access a kiosk
- Passenger queuing and circulation area in the check-in lobby should provide an IATA LOS C or better at all times. This is defined by IATA as at least 14.0 ft^2 of personal space in an organized check-in queue (based on a few carts and 1 or 2 pieces of check-in luggage per passenger). The IATA LOS definitions for check-in areas are shown in **Table 4.20**.

Table 4.20
Check-in IATA Level of Service Standards (ft^2/pax)

Terminal Area	A	B	C	D	E
Domestic Check-in Queue	19.4	16.2	14.0	12.9	11.8
International Check-in Queue	19.4	16.2	14.0	12.9	11.8

Source: IATA Airport Development Reference Manual, 9th edition, 2004, based on few carts and 1 or 2 pieces of luggage per passenger.

Facility Requirements

Existing capacity appears adequate throughout the Master Plan period with 192 out of 210 agent/kiosk positions utilized by 2031. IATA recommended Level of Service (LOS) C or better is achieved for all airlines. Full service agent positions for JetBlue, Frontier, Southwest, and new International Entrant #5 will operate at LOS C in 2031. There is adequate space to allow for further evolution of the check-in process in the future.

Six additional international new entrant airlines and one domestic new entrant airline are shown in the 2031 flight schedule. The existing check-in lobby vacant areas were assigned to these new airlines. It is assumed that the new entrants will utilize a proposed shared-use passenger processing system (SUPPS).

The value of shared use technology at the ticketing/check-in area includes:

- Increased efficiency of ticket counter utilization
- Facilitation of new carrier market entry and existing operators expansion
- Flexibility for re-assignment of ticket counter positions due to irregular operations

Most new entrant carriers have only one daily flight and are able to utilize SUPPS to share ticket counters and gate facilities. The layout of the future check-in processing area is shown in **Figure 4.39** with the new airlines shown. No AirTran or SkyKing flights are included in the 2031 flight schedule

The passenger waiting times for each check-in location in the ticket lobby for the 2011 Flight Schedule are shown in **Table 4.21**. The maximum passenger queues and the resulting level of service for each location in the check-in lobby for the 2011 Flight Schedule are shown in **Table 4.22**. The number of active positions is based on demand considerations and observations made during data collection.

The passenger waiting times for each check-in location in the ticket lobby for the 2031 Flight Schedule are shown in **Table 4.23**. The maximum passenger queues and the resulting level of service for each location in the check-in lobby for the 2031 Flight Schedule are shown in **Table 4.24**.

Figure 4.39
Future Check-in Lobby

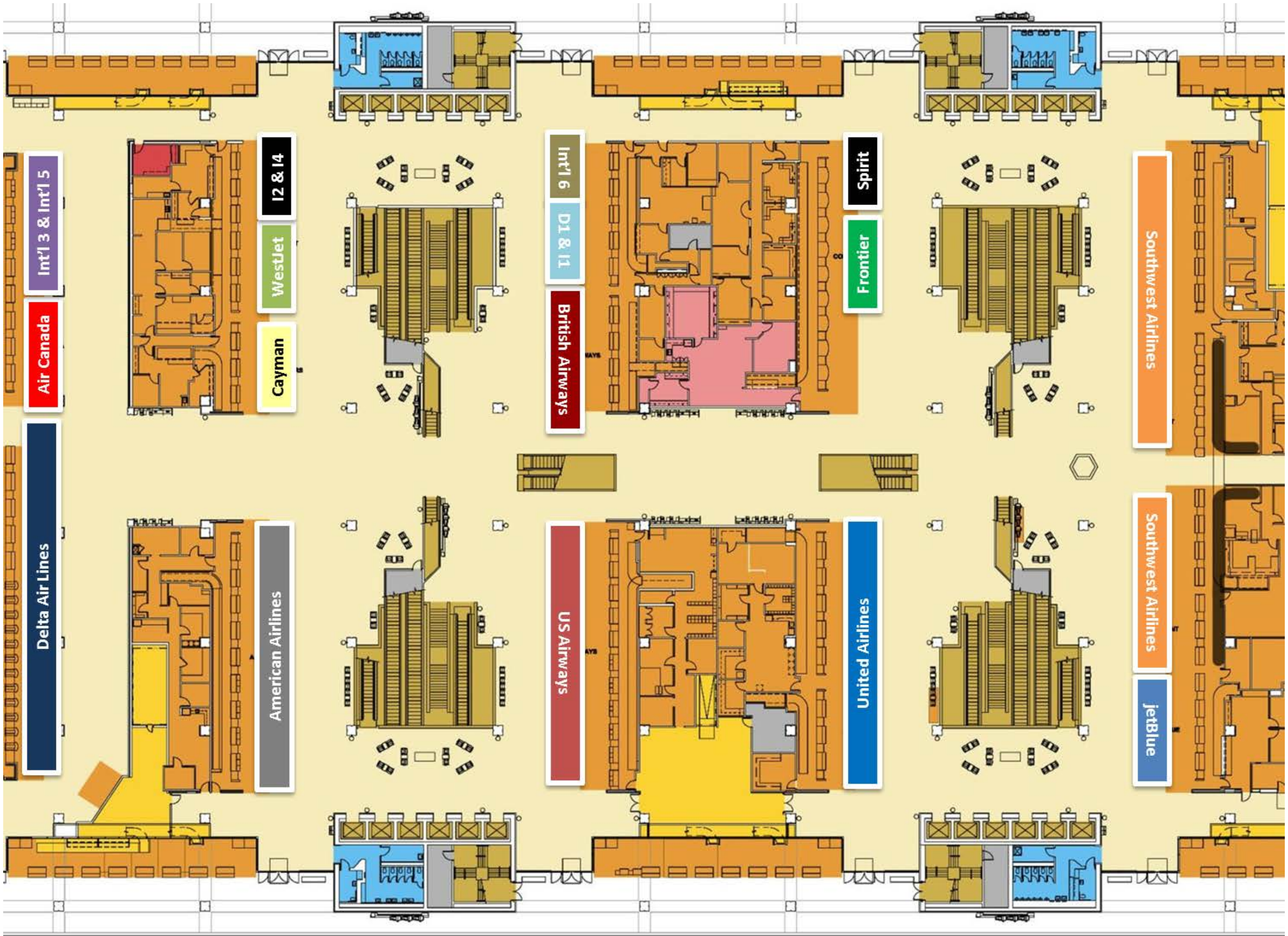


Table 4.21
Check-in Lobby Wait Time Performance – 2011 Flight Schedule

Airline	Service Area	Number of Available Positions	Number of Active Positions	Passenger Wait Times (minutes)			Meets Criteria?
				Average	95%	Maximum	
AA	Agent	8	4	0.8	4.5	10.3	Yes
	In-line Kiosk	10	10	0	0	0	Yes
	Curbside	4	2	0.4	4.1	8.4	Yes
AC	Agent	8	2	0.5	3.5	6.5	Yes
BA	Agent	8	2	1.5	5.5	10.4	Yes
B6	Agent	4	4	0.6	4.3	11.0	Yes
	In-line Kiosk	4	4	0	0	0.3	Yes
	Curbside	4	2	0	0	0	Yes
CO/UA	In-line Kiosk	16	8	0	0	0.2	Yes
	Kiosk	4	4	0	0	0	Yes
	Curbside	2	2	0.2	1.5	5.8	Yes
DL	Agent	12	10	0.2	1.8	3.5	Yes
	In-line Kiosk	24	24	0	0	0	Yes
	Kiosk	4	4	0	0	0	Yes
	Curbside	6	3	0.3	3.5	5.3	Yes
FL	Agent	2	4*	3.1	10.9	14.7	No
	In-line Kiosk	8	8	0	0	0	Yes
	Curbside	4	2	0.6	3.9	9.4	Yes
F9	Agent	4	2	0.3	2.3	3.3	Yes
NK	Agent	2	2	1.2	5.3	8.9	Yes
	Kiosks	4	4	0	0	0.5	Yes
	In-line Kiosk	3	3	0	0	0	Yes
US	Agent	10	6	0.1	0.6	2.7	Yes
	In-line Kiosk	12	12	0	0	0	Yes
	Kiosk	2	2	0	0	0	Yes
	Curbside	2	1	0	0	0	Yes
WN	Agent	6	12**	0.9	7.4	11.9	Yes
	Inline Kiosk	14	14	0	0	0	Yes
	Kiosk	2	2	0	0	0	Yes
	Curbside	10	4	1.6	6.8	11.6	Yes
WS	Agent	6	2	0.2	1.7	5.5	Yes
KX	Agent	6	2	0.4	2.6	4.9	Yes
5K	Agent	8	2	0.1	1.2	1.9	Yes

Notes: *2 available and 2 adjacent vacant, 4 agents are required to meet the wait time performance goal.
** 6 available and 6 adjacent vacant, 12 agents are required to meet the wait time performance goal.

Table 4.22
Check-in Lobby Queuing Performance – 2011 Flight Schedule

Airline	Service Area	Number of Available Positions	Number of Active Positions	Available Queuing Area (ft^2)	Maximum Queue (pax)	Queuing Area Per Passenger (ft2)	LOS
AA	Agent	8	4	600	24	25.0	A
	In-line Kiosk	10	10	450	0	-	A
	Curbside	4	2	150	5	30.0	A
AC	Agent	8	2	550	7	78.6	A
BA	Agent	8	2	550	12	45.8	A
B6	Agent	4	4	450	23	19.6	A
	In-line Kiosk	4	4	200	2	100.0	A
	Curbside	4	2	150	0	-	A
CO/UA	In-line Kiosk	16	8	1,100	0	-	A
	Kiosk	4	4	300	0	-	A
	Curbside	4	2	150	6	25.0	A
DL	Agent	12	10	800	20	40.0	A
	In-line Kiosk	24	24	850	0	-	A
	Kiosk	4	4	300	0	-	A
	Curbside	6	3	225	6	37.5	A
FL	Agent	2	4*	500	34	14.7	C
	In-line Kiosk	8	8	250	0	-	A
	Curbside	4	2	150	4	37.5	A
F9	Agent	4	2	300	6	50.0	A
NK	Agent	2	2	150	9	16.7	B
	In-line Kiosk	4	4	150	1	150.0	A
	Kiosk	3	3	225	0	-	A
US	Agent	10	6	550	7	78.6	A
	In-line Kiosk	12	12	550	0	-	A
	Kiosk	2	2	150	0	-	A
	Curbside	2	1	75	0	-	A
WN	Agent	6	12**	1,550	108	14.4	C
	In-line Kiosk	14	14	300	0	-	A
	Kiosk	2	2	150	0	-	A
	Curbside	10	4	300	17	17.6	B
WS	Agent	6	2	400	5	80.0	A
KX	Agent	6	2	400	5	80.0	A
5K	Agent	8	2	550	5	110.0	A

Notes: *2 available and 2 adjacent vacant, 4 agents are required to meet the wait time performance goal.
** 6 available and 6 adjacent vacant, 12 agents are required to meet the wait time performance goal.

Table 4.23
Check-in Lobby Wait Time Performance – 2031 Flight Schedule

Airline	Service Area	Number of Available Positions	Number of Active Positions	Passenger Wait Times (minutes)			Meets Criteria?
				Average	95%	Maximum	
AA	Agent	8	7	1.1	5.5	8.3	Yes
	In-line Kiosk	10	10	0	0	0	Yes
	Curbside	4	2	0.7	4.9	8.8	Yes
AC	Agent	8	4	0	0.1	2.7	Yes
BA	Agent	8	4	0.2	1.5	3.7	Yes
B6	Agent	4	4	1.1	5.7	9.5	Yes
	In-line Kiosk	4	4	0	0	1.2	Yes
	Curbside	4	2	0.1	0	5.3	Yes
CO/UA	Inline Kiosk	16	10	0	0	0.6	Yes
	Kiosk	4	4	0	0	0	Yes
	Curbside	4	2	0.4	2.8	7.7	Yes
DL	Agent	12	12	0.3	2.4	5.1	Yes
	In-line Kiosk	24	24	0	0	0	Yes
	Kiosk	4	4	0	0	0	Yes
	Curbside	6	3	0.1	0.5	2.7	Yes
F9	Agent	4	2	0.6	3.8	7.8	Yes
NK	Agent	2	2	0.6	3.1	6.0	Yes
	Inline Kiosk	4	4	0	0	0.5	Yes
	Kiosk	3	3	0	0	0	Yes
US	Agent	10	8	0.4	2.8	5.3	Yes
	In-line Kiosk	12	12	0	0	0	Yes
	Kiosk	2	2	0	0	0	Yes
	Curbside	2	1	0	0	0	Yes
WN	Agent	22	22*	1.0	5.1	7.0	Yes
	In-line Kiosk	12	12	0	0	0	Yes
	Kiosk	2	2	0	0	0	Yes
	Curbside	8	8	0.8	5	8.6	Yes
WS	Agent	6	4	0.2	1.3	6.6	Yes
KX	Agent	6	2	1.1	9.3	10.2	Yes
D1	Agent	6	2	0.2	1.7	2.8	Yes
I1	Agent	4	2	0.2	1.8	2.1	Yes
I2	Agent	6	2	1.4	7.1	9.3	Yes
I3	Agent	6	2	0	0.1	1.1	Yes
I4	Agent	6	2	1.5	6.6	10.9	Yes
I5	Agent	4	2	1.1	3.4	4.3	Yes
I6	Agent	4	2	0.4	2.3	4.3	Yes

Note: *6 available, 6 adjacent vacant, 2 kiosk transfers, and 8 counters previously assigned to AirTran, totaling 22 available agent positions. Twenty-two active agents are required to meet the wait time performance goal

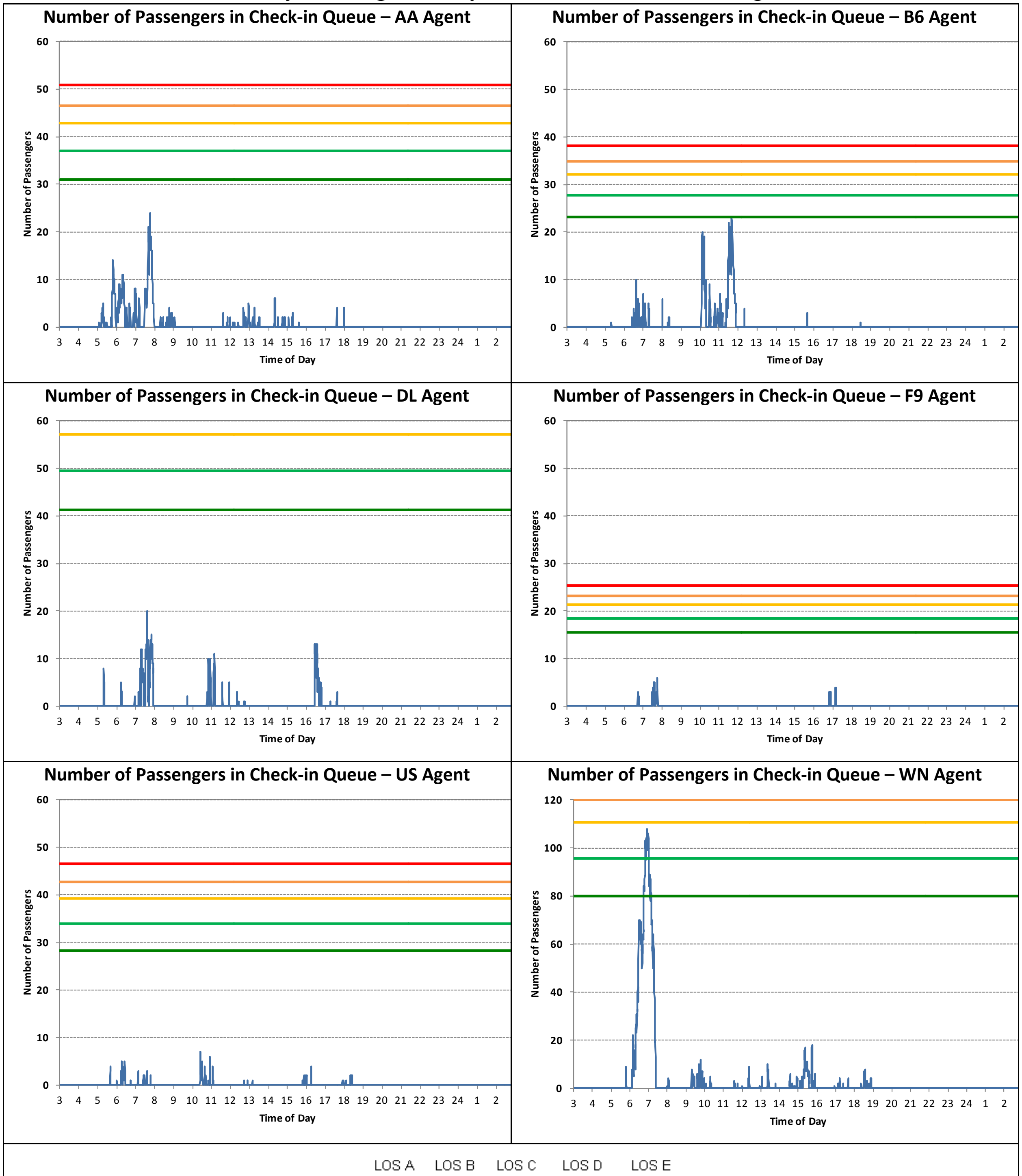
Table 4.24
Check-in Lobby Queuing Performance – 2031 Flight Schedule

Airline	Service Area	Number of Available Positions	Number of Active Positions	Available Queuing Area (ft^2)	Maximum Queue (pax)	Queuing Area Per Passenger (ft^2)	LOS
AA	Agent	8	7	600	34	17.6	B
	In-line Kiosk	10	10	450	0	-	A
	Curbside	4	2	150	7	21.4	A
AC	Agent	8	4	550	5	110.0	A
BA	Agent	8	4	550	8	68.8	A
B6	Agent	4	4	500	33	15.2	C
	In-line Kiosk	4	4	200	1	200.0	A
	Curbside	4	2	150	7	21.4	A
CO/UA	Inline Kiosk	16	10	1,100	3	366.7	A
	Kiosk	4	4	300	0	-	A
	Curbside	4	2	100	5	20.0	A
DL	Agent	12	12	800	43	18.6	B
	In-line Kiosk	24	24	850	0	-	A
	Kiosk	4	4	300	0	-	A
	Curbside	6	3	225	6	37.5	A
F9	Agent	4	2	300	19	15.8	C
NK	Agent	2	2	150	8	18.8	B
	Kiosk	3	3	225	0	-	A
	In-line Kiosk	4	4	150	2	75.0	A
US	Agent	10	8	550	20	27.5	A
	In-line Kiosk	12	12	550	0	-	A
	Kiosk	2	2	150	0	-	A
	Curbside	2	1	75	0	-	A
WN	Agent	22	22*	1,800	114	15.8	C
	In-line Kiosk	12	12	300	0	-	A
	Kiosk	2	2	150	0	-	A
	Curbside	8	8	600	26	23.1	A
WS	Agent	6	4	400	12	33.3	A
KX	Agent	6	2	400	12	33.3	A
D1	Agent	6	2	400	8	50.0	A
I1	Agent	4	2	250	8	31.3	A
I2	Agent	6	2	400	19	21.1	A
I3	Agent	6	2	400	2	200.0	A
I4	Agent	6	2	400	21	19.0	B
I5	Agent	4	2	250	16	15.6	C
I6	Agent	4	2	250	7	35.7	A

Note: *6 available, 6 adjacent vacant, 2 kiosk transfers, and 8 counters previously assigned to AirTran, 22 available agent positions. Twenty-two active agents are required to meet the queuing performance goal.

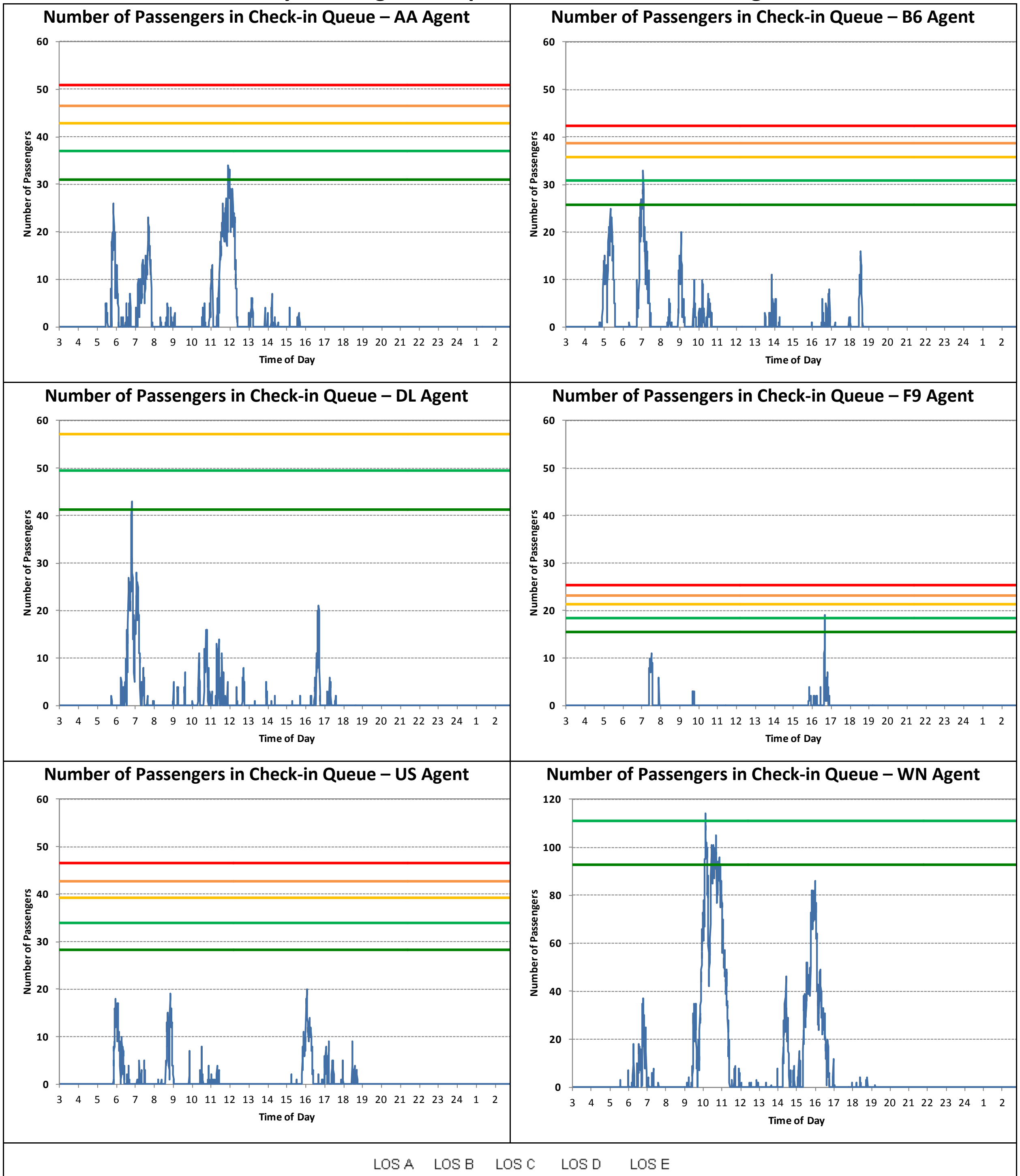
The numbers of passengers waiting to check-in at check-in locations for airlines that have considerable check-in passenger queue sizes throughout the day are shown in **Figures 4.40** and **4.41**. The LOS thresholds are based on the available queuing and circulation space for each area as shown in the above tables.

Figure 4.40
Check-in Lobby Passenger Occupancies and LOS – 2011 Flight Schedule



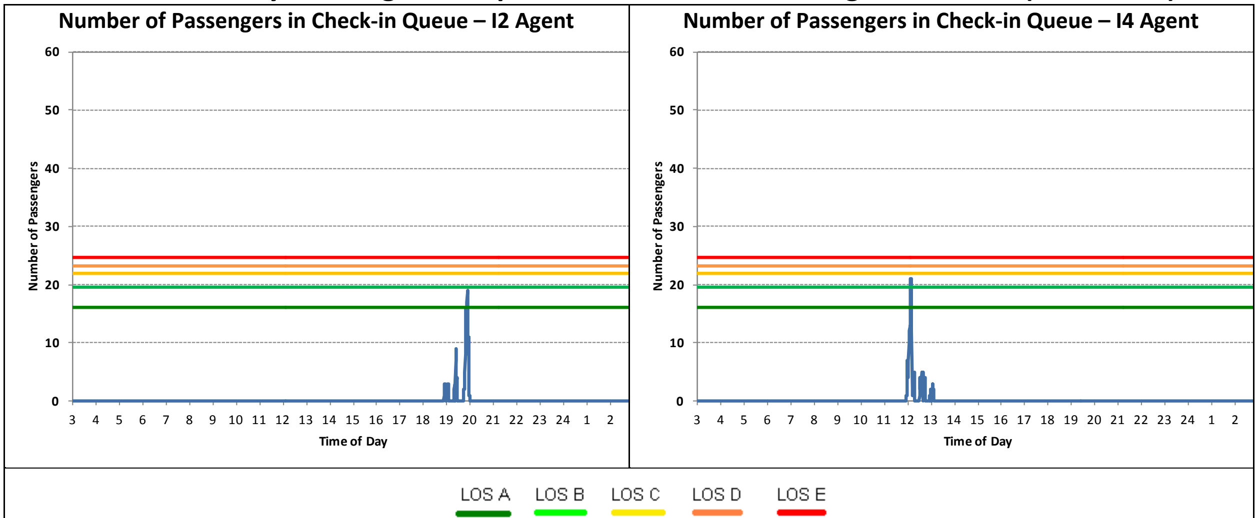
Source: TransSolutions

Figure 4.41
Check-in Lobby Passenger Occupancies and LOS – 2031 Flight Schedule



Source: TransSolutions

Figure 4.41 (continued)
Check-in Lobby Passenger Occupancies and LOS – 2031 Flight Schedule (continued)



Source: TransSolutions

4.2.7.2 Curbside Check-in Counters

Existing Conditions

Curbside check-in counters located on the curb of the Red and Blue departure roadways are utilized by several, but not all of the airlines. Table 4.18 indicates the total number of curbside check-in counters available for each airline. Most counters have access behind the counters to two inbound conveyor belts feeding two different checked baggage inspection system pods.

Planning and Performance Criteria

TPA was designed with curbside counters in mind. In most cases, sufficient depth of curb provides a safe area for passengers to check their baggage before entering the terminal. Curbside counters should have adequate access to the inbound baggage system behind the counter and sufficient area in front of the counters for passengers to queue and circulate without spilling over into the driveway. Utilization of curbside check-in counters ranges from 0.8% (US Airways) to 10.8% (Southwest Airlines) as shown in Table 4.15.

Facility Requirements

Curbside check-in growth is anticipated to remain relatively flat throughout the Master Plan period, mainly due to baggage fees resulting in fewer bags being checked. Southwest is expected to take over the AirTran curbside check-in positions once their merger is complete. Overall, there is a surplus of curbside check-in positions with a maximum of 32 of the existing 82 curbside positions occupied during the Master Plan period. The number of active curbside check-in positions required is shown for each airline in Table 4.22 for 2011 and Table 4.24 for 2031.

4.2.7.3 Airline Ticket Offices

Existing Conditions

Airline ticket offices (ATO) containing managerial offices, support functions and break rooms are located behind each airline ticket counter on Level Two of the Main Terminal Building.

Planning and Performance Criteria

ATO space may be located remotely from ticket counters. Some carriers may reduce their ATO lease over time, but they are not expected to eliminate their ATO space entirely. There will continue to be a need for break rooms, offices and communications closets associated with ticket counter operations in the foreseeable future.

Facility Requirements

Table 4.25 shows ATO requirements projected between 2011 and 2031. No additional ATO space is planned for existing carriers. With the pending merger for Southwest Airlines and AirTran Airways, it is anticipated that approximately half of AirTran's ATO space will be leased by Southwest. For planning purposes, new entrants are allotted 550 sf of ATO space when they begin service. There is a recent trend by airlines to reduce their ATO leaseholds. However, to be conservative, the same amount of ATO space requirement for each carrier is projected throughout the planning period.

Existing ATO capacity appears to be adequate throughout the Master Plan period. However, by 2031 nearly all vacant ATO space on the Ticketing/Check-in Level will be occupied by new entrant airlines.

Table 4.25
Airline Ticketing Office (ATO) Area Requirements (sf)

Entity	Existing ATO Area (sf)	2011	2016	2021	2026	2031
ABC Charters	93	93	93	93	93	93
AirTran	524	524	-	-	-	-
Air Canada	732	732	732	732	732	732
American	1,386	1,386	1,386	1,386	1,386	1,386
ASMO	87	87	87	87	87	87
British Airways	528	528	528	528	528	528
Cayman	100	100	100	100	100	100
Continental/United	2,152	2,152	2,152	2,152	2,152	2,152
Delta	3,795	3,795	3,795	3,795	3,795	3,795
Frontier	502	502	502	502	502	502
Island Travel & Tours	62	62	62	62	62	62
JetBlue	681	681	681	681	681	681
Sky King	100	100	100	-	-	-
Southwest *	2,555	2,555	2,800	2,800	2,800	2,800
Spirit	788	788	788	788	788	788
US Airways	1,789	1,789	1,789	1,789	1,789	1,789
WestJet	132	132	132	132	132	132
Xael Charters	151	151	151	151	151	151
Subtotal (Existing)	**16,157**					
New Entrant Airlines	**Proposed ATO Area (sf)**	**2011**	**2016**	**2021**	**2026**	**2031**
International 1 (I1)	550		550	550	550	550
International 2 (I2)	550		550	550	550	550
International 3 (I3)	550			550	550	550
International 4 (I4)	550				550	550
International 5 (I5)	550				550	550
Domestic 1 (D1)	550					550
International 6 (I6)	550					550
Total ATO Requirements		**16,157**	**16,978**	**17,428**	**18,528**	**19,628**

Note: * Added area for AirTran Merger by 2016

Source: Analysis by HNTB (May 2012)

4.2.7.4 Baggage Claim Area

Existing Conditions

There are 14 flat-plate baggage claim devices on the baggage claim level. Seven are located on the Blue Side and seven are located on the Red Side. There is also a large flat-plate baggage claim device in the Customs and Border Protection facility at Airside F that is being expanded to three claim units under an on-going construction project. Each device is approximately thirty inches wide. The claim units are assigned on a common-use basis. Airlines routinely use the same baggage claim units on a daily basis, but on occasion may utilize other claim units if necessary. The current airline assignments are shown in **Table 4.26.** The number of domestic claim devices and their characteristics (length of passenger claim frontage, overall length, baggage capacity and belt speed) are noted in **Table 4.27.**

Table 4.26
Domestic Baggage Claim Hall Assignments

	Baggage Claim Unit Number	Current Airline Assignments	Lineal Feet of Passenger Claim Length	Lineal Feet of Off-load Area
Blue Side	1	JetBlue	130'	52'
	2	United/Continental	152'	77'
	3	United/Continental	130'	52'
	4	US Airways	143'	68'
	5	American, Delta, US Airways	143'	68'
	6	American	159'	84'
	7	Delta	249'	102'
Red Side	9	Air Canada, Cayman	130'	52'
	10	Sky King, West Jet	152'	76'
	11	British Airways, Frontier	130'	52'
	12	Spirit	143'	68'
	13	AirTran	143'	68'
	14	Southwest	159'	84'
	15	Southwest	249'	102'

Source: HNTB Analysis, June 2012

Table 4.27
Domestic Baggage Claim Characteristics

Claim Device Characteristics	Blue Claim Hall			Red Claim Hall		
	L-Shape Device	Single Loop Device	Double Loop Device	L-Shape Device	Single Loop Device	Double Loop Device
Number of devices[1]	2	4	1	2	4	1
Overall length (feet)[1]	169	204	309	169	204	309
Presentation length (feet)[1]	112	132	222	112	132	222
Baggage capacity of claim device[2]	60	75	112	60	75	112
Claim belt speed (feet per minute)	90	90	90	90	90	90

Source: [1] Design drawings
[2] TSA baggage standards (assuming 33" per bag)

Table 4.28 shows the number of claim devices and their characteristics in the international Baggage Claim Hall once renovations and expansion is complete.

Table 4.28
Baggage Claim Characteristics – International Bag Claim Hall

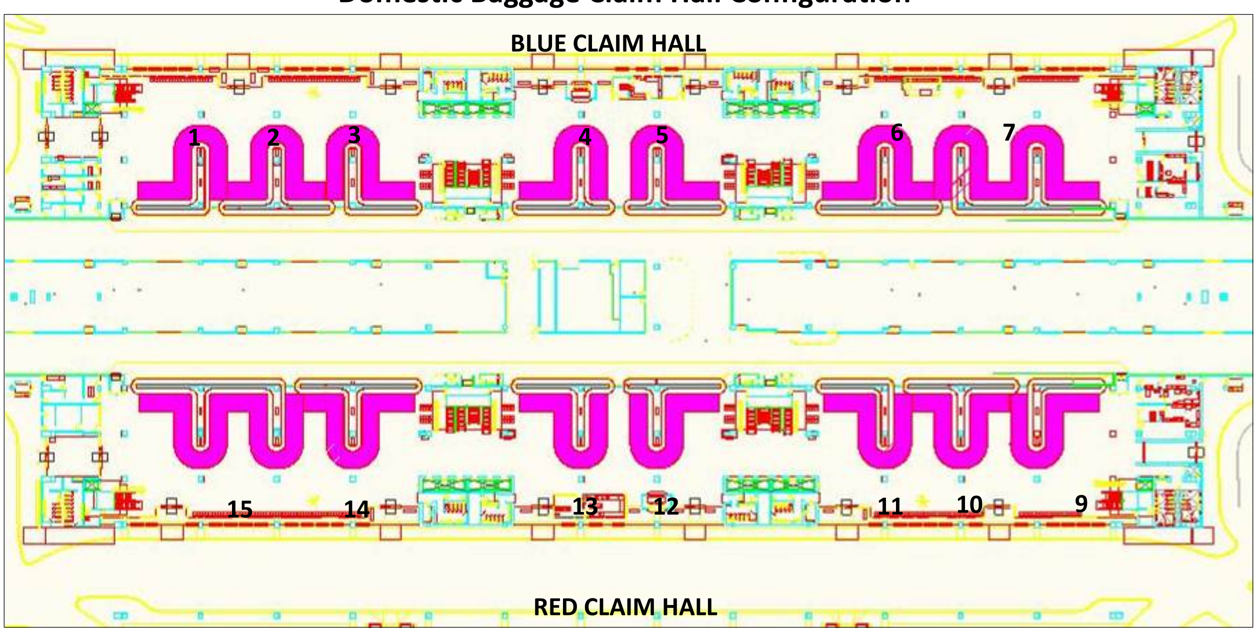
Claim Device Characteristics	Double Loop Device
Number of devices[1]	3
Overall length (feet)[1]	309
Presentation length (feet)[1]	222
Baggage capacity of claim device [2]	112
Claim belt speed (feet per minute)	90

Source: [1] Design drawings
[2] TSA baggage standards (assuming 33" per bag)

Domestic baggage delivery from the aircraft was modeled to predict the loading patterns onto the carousels. Terminating arriving passengers were modeled to determine the performance and level of service of the baggage claim areas.

For purposes of determining Level of Service around each baggage claim device, IATA recommends using an 11.5' perimeter from the edge of each claim device to determine the area that passengers queue while waiting for their baggage. This results in a passenger queuing area of approximately 1,400 ft^2 per L-shape device, 1,550 ft^2 per single-loop claim device and 2,700 ft^2 per double-loop claim device as shown in **Figure 4.42**.

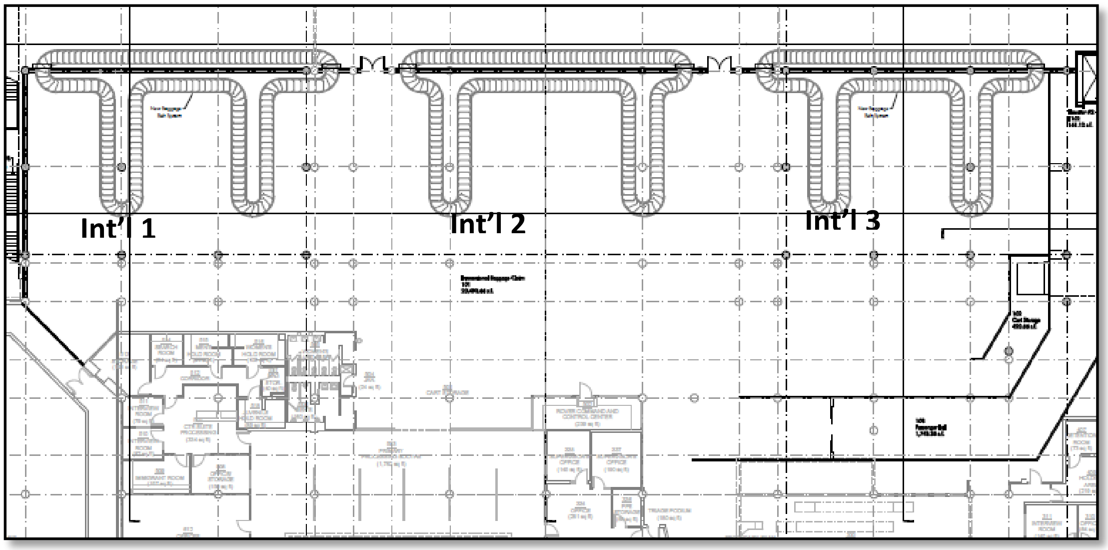
Figure 4.42
Domestic Baggage Claim Hall Configuration



Source: HCAA

Figure 4.43 shows the layout of the future international bag claim devices.

Figure 4.43
Future International Baggage Claim Hall Configuration



Source: HCAA

Upon entering the baggage claim area, some passenger groups will use a baggage cart. IATA recommends that 40% of passengers use baggage carts but previous data collection at TPA indicated the value was closer to 2%. While the use of baggage carts was not explicitly modeled, their use is important in determining level of service since passengers with bag carts occupy more space than those passengers who do not use them.

Planning and Performance Criteria

Aircraft Unloading

Once an aircraft parks at a gate and before bags can be unloaded, 3.0-5.0 minutes are required to chock the aircraft, open doors, and position ramp equipment.

The time required to unload bags from a flight is based on the size of the aircraft and the number of bags on the arriving flight. Bags are unloaded from one hold at a time for commuter, narrow-body and mid-body flights and from two holds at a time for a wide-body flight.

On commuter, narrow-body, and mid-body aircraft, bags are bulk- or free-loaded. The unloading rate per hold is 8-9 bags per minute. Once unloaded, bags are placed into carts, each with a capacity of approximately 40-50 bags per cart. The first delivery of bags to the claim devices consists of one full cart. All subsequent deliveries to the claim devices consist of three carts (or all carts – whichever is smaller).

On wide-body aircraft, bags are containerized with approximately 30-35 bags per container for an international arrival. It is assumed that containers are unloaded in pairs. The time required to unload each pair of containers per hold (i.e. the cycle-time for the container lift) is 2.0

minutes for all wide-body aircraft. The first delivery of bags to the claim devices consists of two full containers. All subsequent deliveries to the claim devices consist of four containers (or all containers – whichever is smaller).

Baggage Delivery to Claim Devices

Tug drivers travel via the designated traffic routes from the arrival gate to the baggage claim drop-off area. Drivers travel at an average of 10-15 mph. The distance from aircraft gates to the feeder belts vary. For the purpose of this study, it is assumed that the tug driving time is between 2 - 4 minutes. All bags from a flight are assigned to the same claim device. Once a driver reaches the drop-off belt for their assigned claim device, 15-30 seconds is required for setup before bags begin to be unloaded onto the feeder belt. Bags are assumed to be unloaded from a cart at an input rate of 12-18 bags per minute.

If a claim device fills to capacity, cart unloading will stop until passengers start unloading the carousel. Once bags appear on a claim device, they continue to circulate until claimed by the appropriate passenger group.

Performance Criteria

Existing baggage claim hall assignments were maintained during this analysis. New entrants were assigned to the least busy baggage claim correlating with their ticketing curb assignment.

The baggage claim areas were evaluated using the following criteria:

- Passengers in queue at the baggage claim should be provided a LOS C or better at all times. The IATA LOS definition for baggage claims is shown in **Table 4.29**.

Table 4.29
IATA Baggage Claim Level of Service Standards (ft^2/passenger)

Level of Service	A	B	C	D	E
Space Standard (t^2/occupant)	24.8	20.5	18.3	17.2	16.2

Source: IATA Airport Development Reference Manual, 9th Edition, dated January 2004

- Brief (no more than 15 minutes of duration) periods of LOS D are permissible during the peak hour. LOS E and F are not acceptable.

Facility Requirements

Domestic Baggage Claim Performance – 2011 Flight Schedule

The distribution of time that passengers wait in the domestic baggage claim halls is shown in **Figure 4.44**. 90.05% of passengers wait less than 10 minutes to claim their bags and 99.96% wait less than 15 minutes. **Table 4.30** shows the wait time in minutes for passengers at each baggage claim device. The average wait time, the 90th percentile and the maximum wait time are shown for each carousel. The performance of the domestic baggage claim hall is shown in **Table 4.31**. All claim devices perform at a LOS A or B.

Figure 4.44
Domestic Passenger Wait Time to Claim Bags – 2011 Flight Schedule
(from Passenger Arrival at Claim Device)

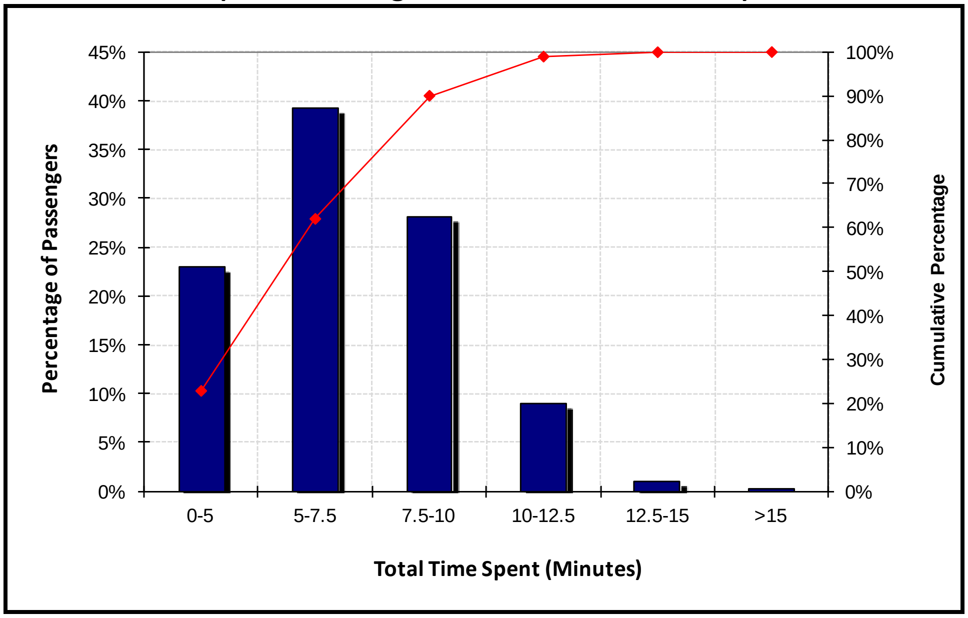


Table 4.30
Domestic Baggage Claim Hall Wait Time Performance Summary – 2011 Flight Schedule

Baggage Claim Hall / Baggage Claim Number	Wait Times (minutes)		
	Average	90%	Maximum
Blue / Baggage Claim 1	5.9	8.9	14.3
Blue / Baggage Claim 2	6.6	9.7	14.9
Blue / Baggage Claim 3	6.8	10.0	14.7
Blue / Baggage Claim 4	8.1	11.2	15.4
Blue / Baggage Claim 5	6.6	9.7	14.7
Blue / Baggage Claim 6	6.2	9.1	14.3
Blue / Baggage Claim 7	8.4	11.5	17.3
Red / Baggage Claim 9	6.3	9.2	13.2
Red / Baggage Claim 10	6.4	9.1	13.0
Red / Baggage Claim 11	6.5	9.4	13.8
Red / Baggage Claim 12	6.3	9.2	14.3
Red / Baggage Claim 13	6.2	9.0	12.9
Red / Baggage Claim 14	6.6	9.5	13.7
Red / Baggage Claim 15	7.2	10.3	14.7

Note: [1] Assumed usable queuing depth of up to 11.5’ around each device as recommended by IATA

Source: HNTB

Table 4.31
Domestic Baggage Claim Hall Queuing Performance Summary – 2011 Flight Schedule

Baggage Claim Hall / Baggage Claim Number	Length (ft)	Available Queuing Area1 (ft^2)	Maximum Queue (pax)	Available Queuing Area Per Passenger (ft^2)	LOS
Blue / Baggage Claim 1	112	1,400	58	24.1	B
Blue / Baggage Claim 2	132	1,600	59	27.1	A
Blue / Baggage Claim 3	112	1,400	64	21.9	B
Blue / Baggage Claim 4	132	1,600	58	27.6	A
Blue / Baggage Claim 5	132	1,600	60	26.7	A
Blue / Baggage Claim 6	132	1,600	54	29.6	A
Blue / Baggage Claim 7	222	2,700	70	38.6	A
Red / Baggage Claim 9	112	1,400	50	79.4	A
Red / Baggage Claim 10	132	1,600	49	28.0	A
Red / Baggage Claim 11	112	1,400	50	32.7	A
Red / Baggage Claim 12	132	1,600	50	28.0	A
Red / Baggage Claim 13	132	1,600	59	32.0	A
Red / Baggage Claim 14	132	1,600	56	27.1	A
Red / Baggage Claim 15	222	2,700	53	28.6	A

Source: HNTB

The time it takes for bags to reach the claim devices and passengers to retrieve bags from claim devices are shown in **Table 4.32**. Note that all times are relative to aircraft arrival time to the gate.

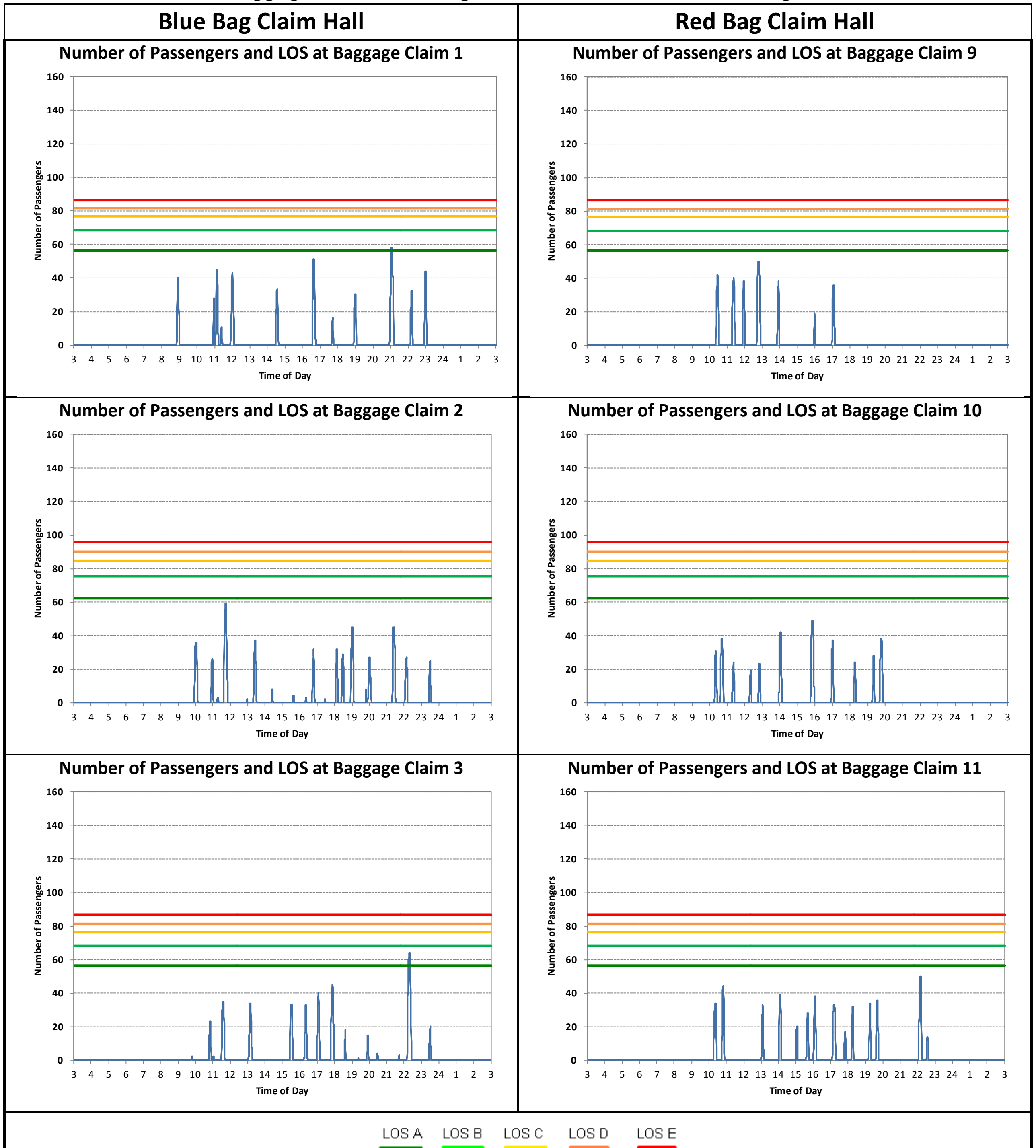
Table 4.32
Domestic Bag Claim Device Delivery Performance – 2011 Flight Schedule

Statistics	Time (in minutes)[1]			
	Minimum	Average	95%	Maximum
Bags				
First Bag to Claim Device	6.6	11.2	13.3	14.7
Last Bag to Claim Device	6.8	14.9	18.9	21.5
Passengers				
First Passenger Exiting Claim Area	7.2	11.6	13.7	15.1
Last Passenger Exiting Claim Area	7.2	15.3	19.3	21.9

Note: [1] All times are relative to the arrival time of aircraft to the gate

The number of passengers waiting at each claim device throughout a representative day is shown in **Figure 4.45**. The LOS thresholds are based on available queuing space for each area as shown in Table 4.29.

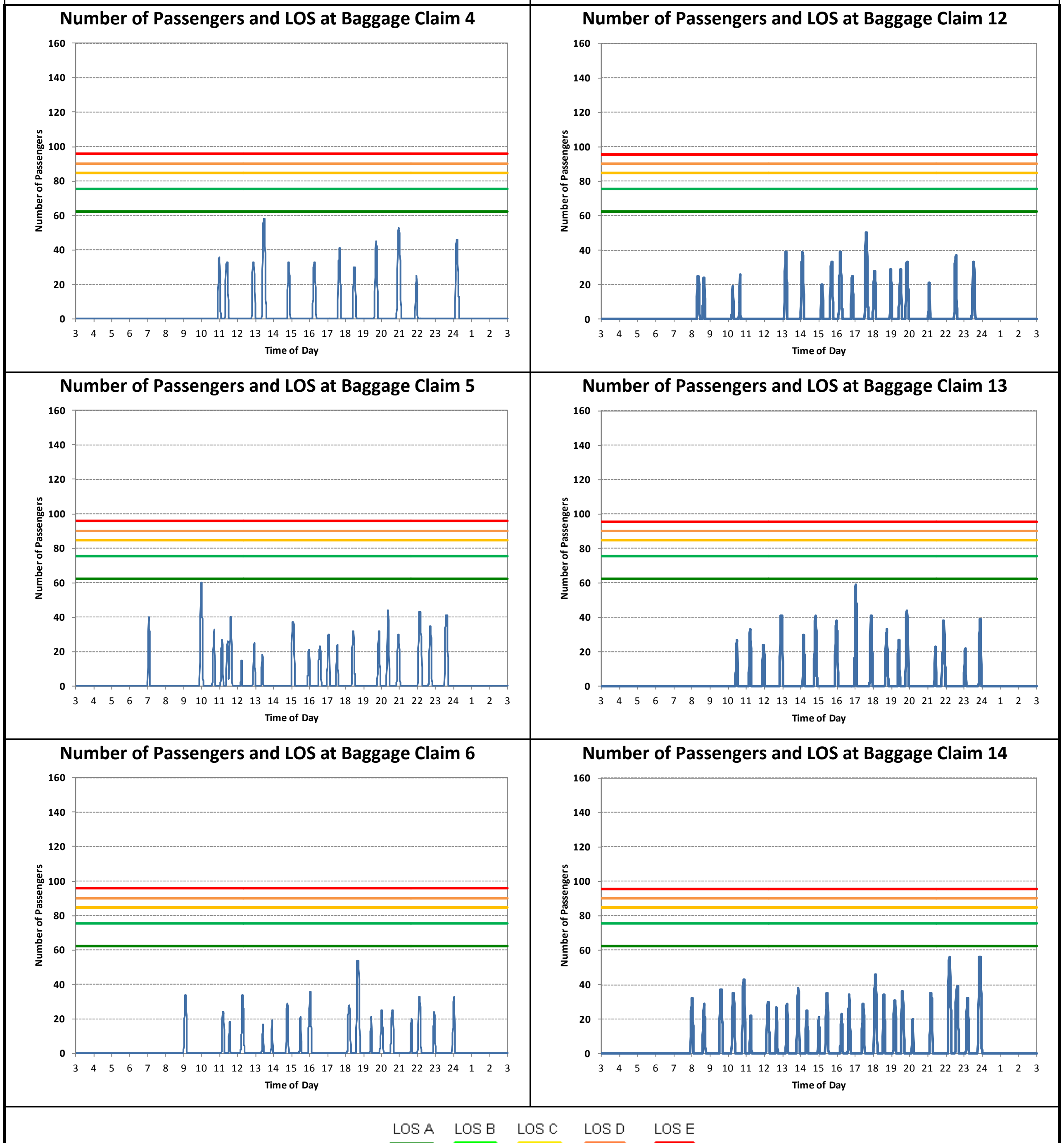
Figure 4.45
Domestic Baggage Claim Passenger Queues and LOS – 2011 Flight Schedule



Source: TransSolutions

Figure 4.45 (continued)
Domestic Baggage Claim Passenger Queues and LOS – 2011 Flight Schedule

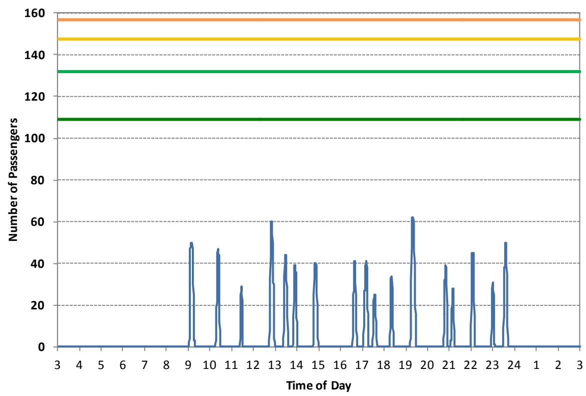
Blue Bag Claim Hall	Red Bag Claim Hall

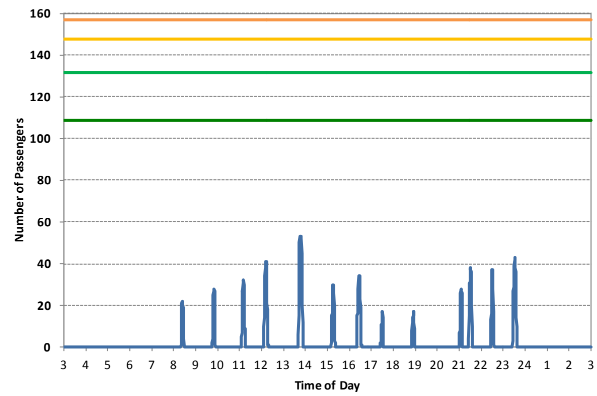


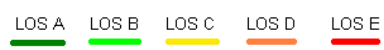
Source: TransSolutions

Figure 4.45 (continued)
Domestic Baggage Claim Passenger Queues and LOS – 2011 Flight Schedule

Blue Bag Claim Hall	Red Bag Claim Hall
Number of Passengers and LOS at Baggage Claim 7	Number of Passengers and LOS at Baggage Claim 15







Source: TransSolutions

Domestic Baggage Claim Performance – 2031 Flight Schedule

The distribution of times that passengers wait in the domestic bag claim halls is shown in **Figure 4.46**. 87.55% of passengers wait less than 10 minutes to claim their bags and 99.96% wait less than 15 minutes. **Table 4.33** shows the wait time in minutes for passengers at each baggage claim device. The average wait time, the 90th percentile and the maximum wait time are shown for each carousel. The performance of the domestic baggage claim hall is shown in **Table 4.34**. All claim devices perform at a LOS A or B.

Figure 4.46
Domestic Passenger Wait Time to Claim Bags – 2031 Flight Schedule
(from Passenger Arrival at Claim Device)

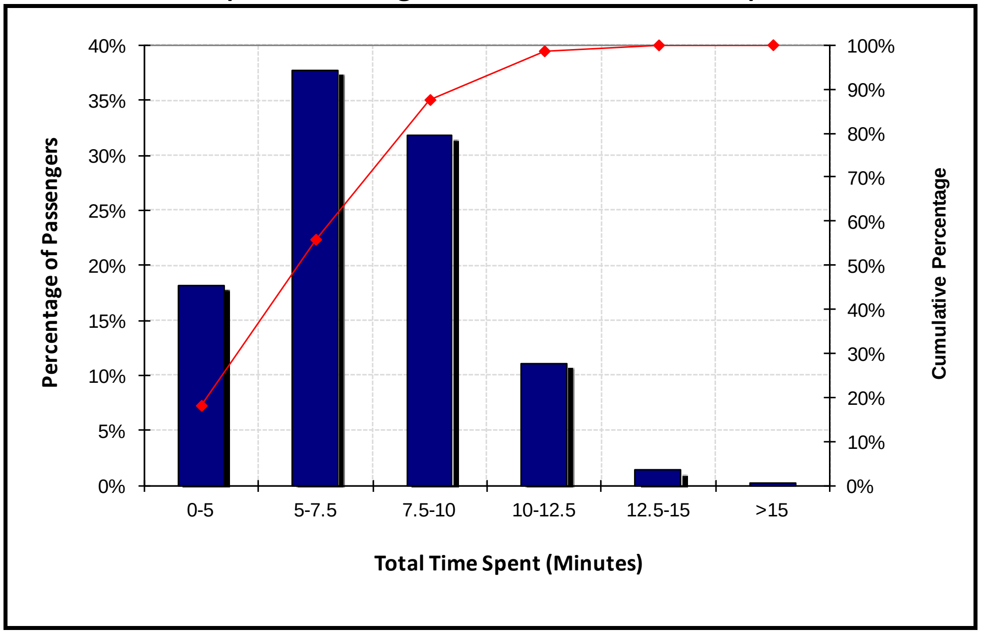


Table 4.33
Domestic Baggage Claim Hall Wait Time Performance Summary – 2031 Flight Schedule

Baggage Claim Hall / Baggage Claim Number	Wait Times (minutes)		
	Average	90%	Maximum
Blue / Baggage Claim 1	6.3	9.3	14.7
Blue / Baggage Claim 2	6.9	10.0	14.6
Blue / Baggage Claim 3	6.8	9.9	14.2
Blue / Baggage Claim 4	8.0	11.2	16.1
Blue / Baggage Claim 5	7.4	10.5	15.7
Blue / Baggage Claim 6	6.8	10.1	15.9
Blue / Baggage Claim 7	8.1	11.1	16.9
Red / Baggage Claim 9	7.2	10.3	13.8
Red / Baggage Claim 10	7.1	9.9	13.6
Red / Baggage Claim 11	6.9	9.8	14.0
Red / Baggage Claim 12	6.9	9.8	15.4
Red / Baggage Claim 13	7.0	10.0	14.8
Red / Baggage Claim 14	6.7	9.5	13.8
Red / Baggage Claim 15	7.6	10.6	15.3

Table 4.34
Domestic Baggage Claim Hall Queuing Performance Summary – 2031 Flight Schedule

Baggage Claim Hall / Baggage Claim Number	Length (ft)	Available Queuing Area1 (ft2)	Maximum Queue (pax)	Queuing Area Per Passenger (ft2)	LOS
Blue / Baggage Claim 1	112	1,400	66	21.2	B
Blue / Baggage Claim 2	132	1,600	71	22.5	B
Blue / Baggage Claim 3	112	1,400	57	24.6	B
Blue / Baggage Claim 4	132	1,600	61	26.2	A
Blue / Baggage Claim 5	132	1,600	64	25.0	A
Blue / Baggage Claim 6	132	1,600	77	20.8	B
Blue / Baggage Claim 7	222	2,700	93	29.0	A
Red / Baggage Claim 9	112	1,400	58	65.9	B
Red / Baggage Claim 10	132	1,600	60	24.1	A
Red / Baggage Claim 11	112	1,400	62	26.7	B
Red / Baggage Claim 12	132	1,600	56	22.6	A
Red / Baggage Claim 13	132	1,600	59	28.6	A
Red / Baggage Claim 14	132	1,600	57	27.1	A
Red / Baggage Claim 15	222	2,700	92	28.1	A

Note: [1] Assumed usable queuing depth of up to 11.5' around each device as recommended by IATA.

The time it takes for bags to reach the baggage claim devices and passengers to retrieve bags from claim devices are shown in **Table 4.35**. Note that all times are relative to aircraft arrival time to the gate.

Table 4.35
Domestic Bag Claim Device Delivery Performance – 2031 Flight Schedule

Statistics	Time (in minutes)[1]			
	Minimum	Average	95%	Maximum
Bags				
First Bag to Claim Device	6.7	11.6	13.5	16.8
Last Bag to Claim Device	7.0	15.7	19.2	23.4
Passengers				
First Passenger Exiting Claim Area	7.0	12.0	13.9	17.2
Last Passenger Exiting Claim Area	7.6	16.1	19.6	23.8

Note: [1] All times are relative to the arrival time of aircraft to the gate.

The number of passengers waiting at each claim device throughout a representative day is shown in **Figure 4.47**. The LOS thresholds are based on available queuing space for each area as shown in Table 4.29.

Figure 4.47
Domestic Baggage Claim Passenger Queues and LOS – 2031 Flight Schedule

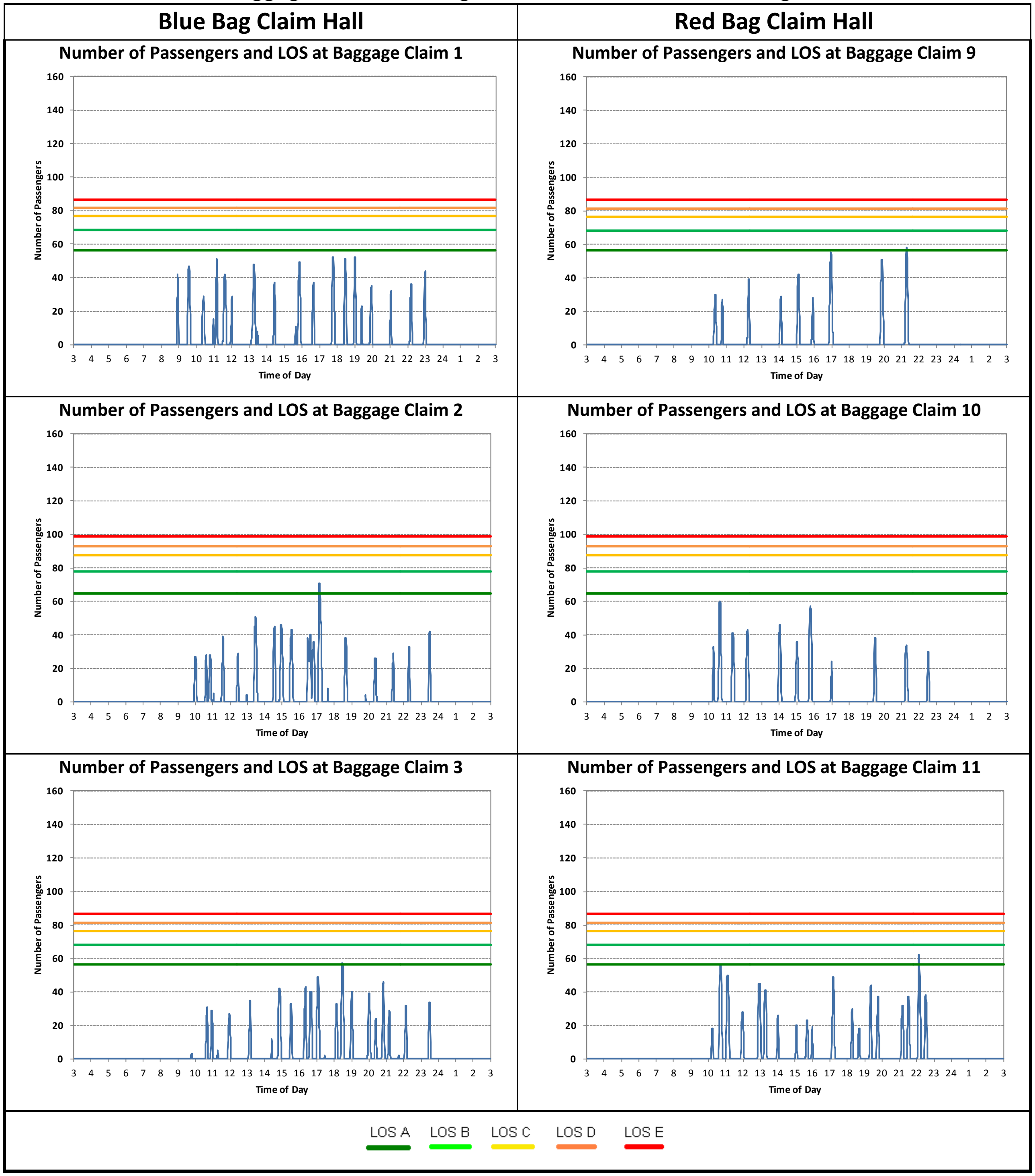
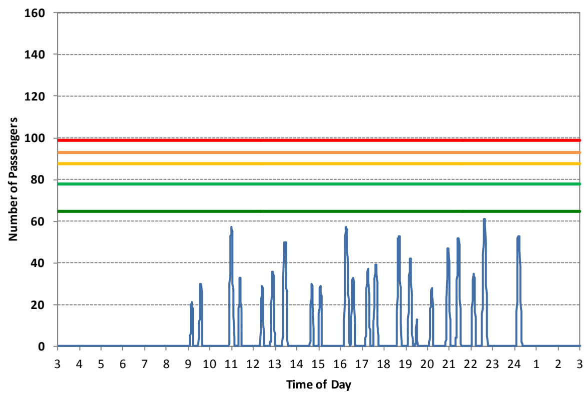


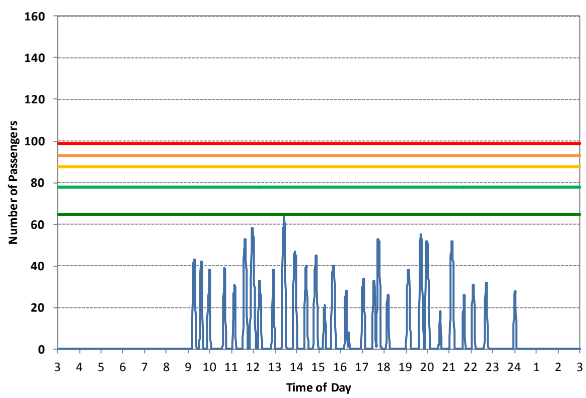
Figure 4.47 (continued)
Domestic Baggage Claim Passenger Queues and LOS – 2031 Flight Schedule

Blue Bag Claim Hall

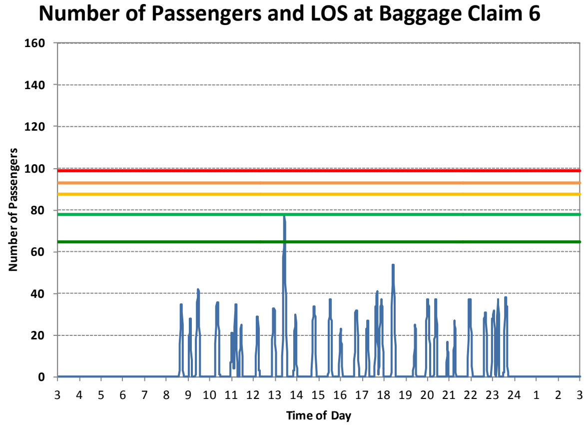
Number of Passengers and LOS at Baggage Claim 4



Number of Passengers and LOS at Baggage Claim 5

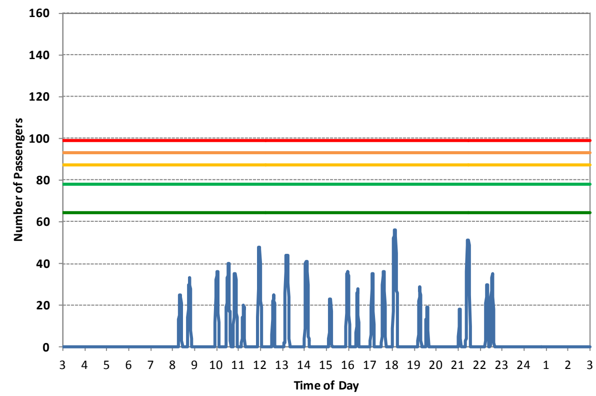


Number of Passengers and LOS at Baggage Claim 6

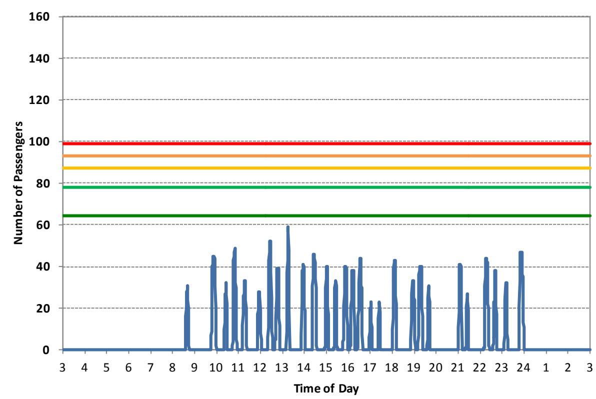


Red Bag Claim Hall

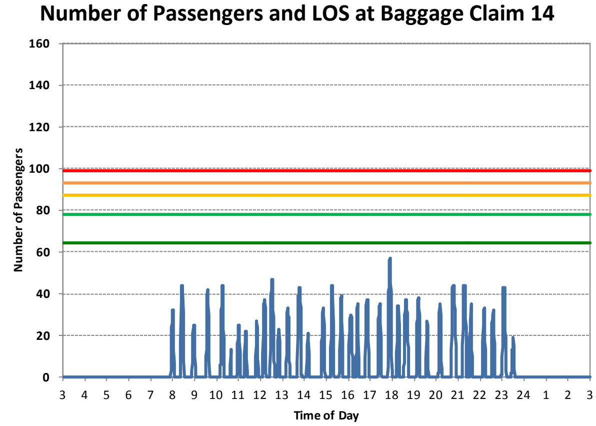
Number of Passengers and LOS at Baggage Claim 12



Number of Passengers and LOS at Baggage Claim 13



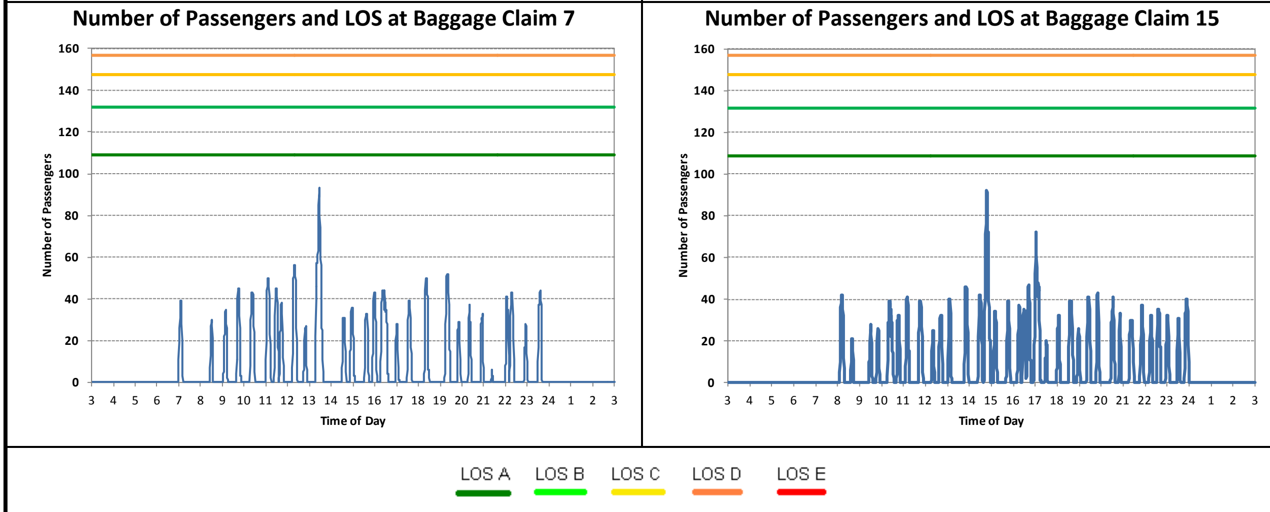
Number of Passengers and LOS at Baggage Claim 14



LOS A LOS B LOS C LOS D LOS E

Figure 4.47 (continued)
Domestic Baggage Claim Passenger Queues and LOS – 2031 Flight Schedule

Blue Bag Claim Hall	Red Bag Claim Hall



In summary, existing domestic baggage claim capacity is adequate with a LOS B or better through 2031. No additional baggage claim devices are required.

International Baggage Claim Performance

The international Baggage Claim Hall facility requirements may be found in Section 4.2.5.3.

4.2.7.5 Inbound Baggage Drop-off Area

Existing Conditions

The inbound baggage drop-off area includes a ten foot deep load area in front of the baggage claim device on the tug road side of the device. The load area is generally divided so as to provide a three-foot work area for the airline employee to unload the baggage carts onto the flat-plate baggage claim devices and approximately seven feet for the tug and carts to park in front of each device.

Planning and Performance Criteria

L-shape baggage claim devices each have one unloading point and the double loop baggage claims have sufficient length for two unloading points allowing for multiple deliveries of bags to be unloaded simultaneously.

Facility Requirements

The number and size of baggage claim devices and the amount of inbound baggage drop-off area is sufficient for the planning period.

4.2.7.6 Baggage Service Offices

Existing Conditions

Baggage service offices (BSO) are located proximate to most carriers' assigned baggage claim unit on the Baggage Claim Level. These offices are used to address passenger claims of lost and damaged baggage and to store lost or unclaimed baggage until the passenger comes to claim it or it is delivered to the passenger.

Planning and Performance Criteria

BSO space is not expected to change significantly over time. There will continue to be a need for baggage storage and a baggage claim proximate space to address baggage issues for the foreseeable future. New entrants may or may not require BSO lease space. To be conservative, each new entrant airline is allotted 330 sf of baggage service office space upon market entry.

Facility Requirements

Table 4.36 shows BSO requirements projected between 2011 and 2031. No additional BSO space is planned for existing carriers. New entrants are allotted 330 sf of BSO space when they begin service. Existing BSO capacity appears to be adequate throughout the Master Plan period. However, by 2031 nearly all vacant BSO space will be occupied by new entrant airlines.

Table 4.36
Baggage Service Office Requirements

Airline	Existing BSO Area		2011	2016	2021	2026	2031
AirTran	330	sf	330	330	330	330	330
Air Canada	330	sf	330	330	330	330	330
American	495	sf	495	495	495	495	495
United/CO	495	sf	495	495	495	495	495
Delta	674	sf	674	674	674	674	674
JetBlue	401	sf	401	401	401	401	401
Southwest	660	sf	660	660	660	660	660
Spirit	338	sf	338	338	338	338	338
US Airways	613	sf	613	613	613	613	613
Subtotal (Existing)	**4,336**	**sf**					
New Entrant Airlines	**Proposed BSO Area (sf)**		**2011**	**2016**	**2021**	**2026**	**2031**
International 1 (I1)	330	sf		330	330	330	330
International 2 (I2)	330	sf		330	330	330	330
International 3 (I3)	330	sf			330	330	330
International 4 (I4)	330	sf				330	330
International 5 (I5)	330	sf				330	330
Domestic 1 (D1)	330	sf					330
International 6 (I6)	330	sf					330
Total BSO Requirements			**4,336**	**4,996**	**5,326**	**5,986**	**6,646**

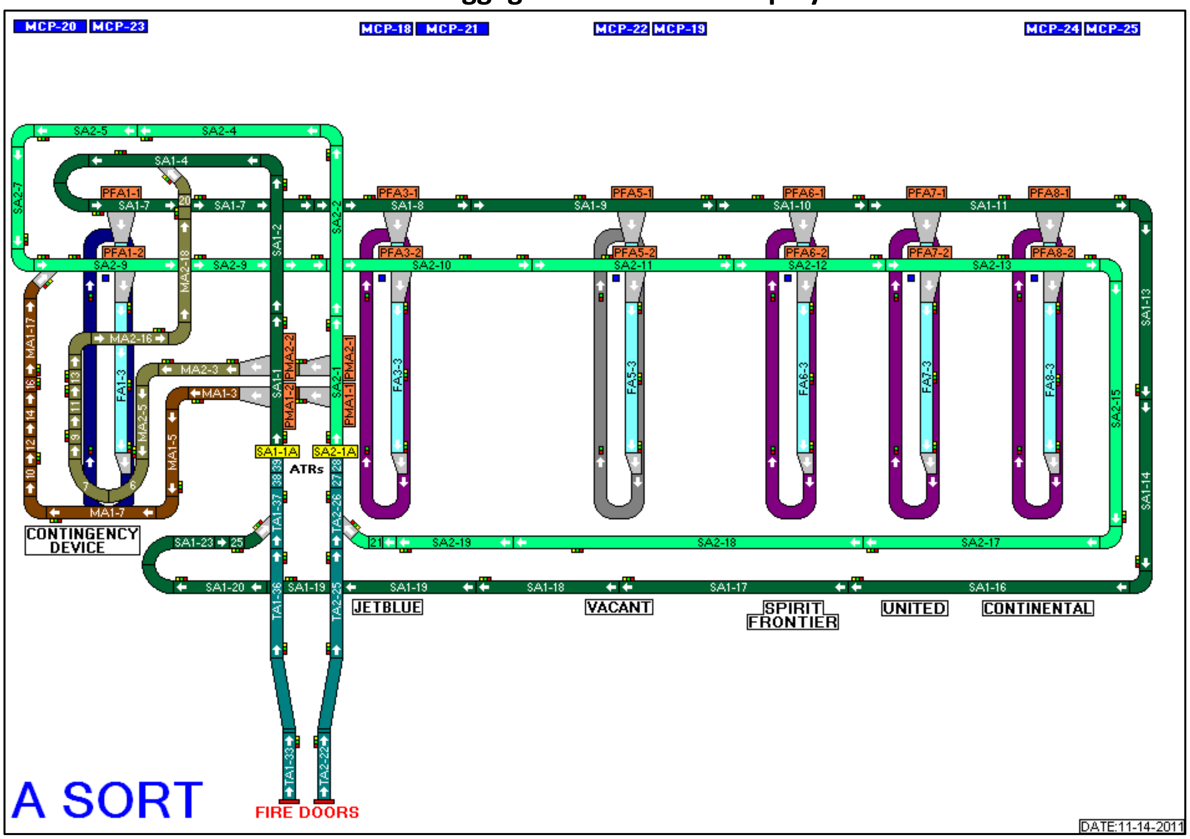
Prepared by: HNTB Corporation, May 2012

4.2.7.7 Outbound Baggage Make-up Areas

Existing Conditions

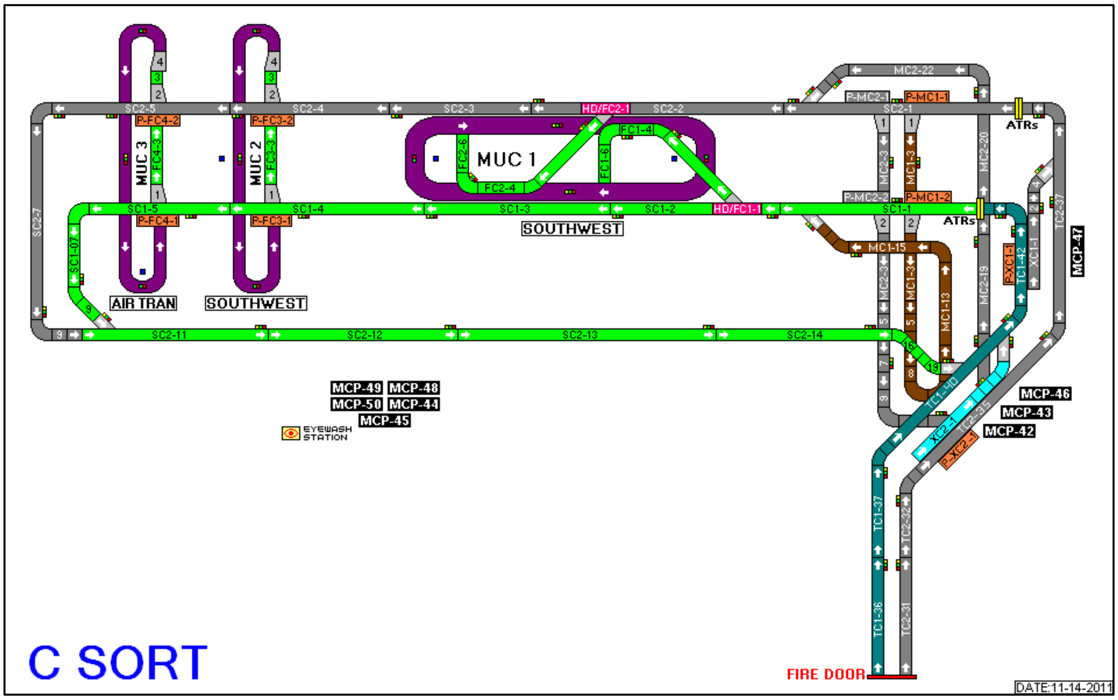
The baggage make-up area for each airside consists of flat-plate carousels or pier conveyors where baggage is sorted and placed on carts for delivery to the aircraft. Airsides C and E each have baggage make-up facilities located on the ramp level beneath the airside. Airside A's baggage is sorted in a building located on the former site of Airside B. Airside F has an adjacent ramp level sortation building. The baggage system configuration of each airside make-up area is shown in **Figures 4.48 – 4.51**.

Figure 4.48
Airside A Baggage Sort and Make-up System



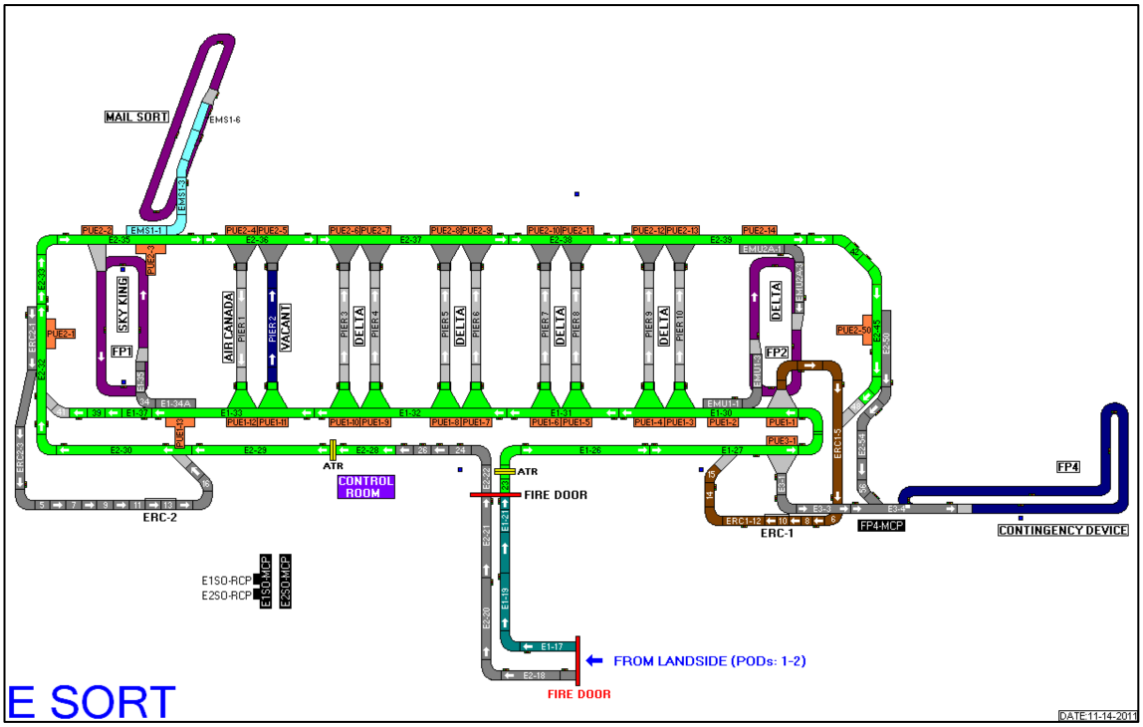
Source: Hillsborough County Aviation Authority Maintenance Department

Figure 4.49
Airside C Baggage Sort and Make-up System



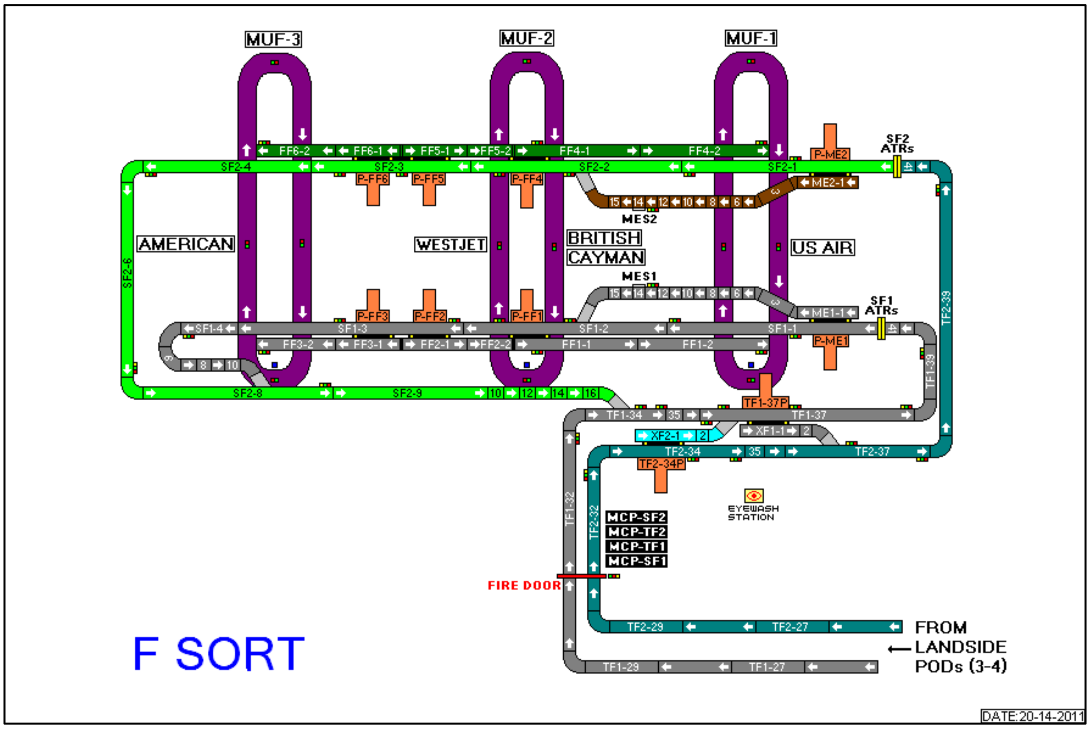
Source: Hillsborough County Aviation Authority Maintenance Department

Figure 4.50
Airside E Baggage Sort and Make-up System



Source: Hillsborough County Aviation Authority Maintenance Department

Figure 4.51
Airside F Baggage Sort and Make-up System



Source: Hillsborough County Aviation Authority Maintenance Department

Baggage generated by originating and connecting passengers was modeled to determine the load on the input lines from the check-in hall, the demand requiring EDS screening, as well as the loads on the outbound makeup devices.

The airsides themselves contain a total of 26 sortation devices. Belt speeds from the Main Terminal to the airside facilities reach speeds of 320 feet per minute. The cart capacity for each airline's existing baggage make-up area is documented in **Table 4.37**. The flight schedule was analyzed to determine the predominate aircraft used by each airline. The typical number of carts or dollies was assigned based on industry planning standards and the number of bags exiting the checked baggage inspection system in the peak hour.

Planning and Performance Criteria

According to a 2-year average of HCAA historical baggage handling system data, the average passenger checks 0.66 bags. TransSolutions determined in their passenger intercept surveys (December 14-16, 2011) that 59.8% of passengers check bags.

A baggage make-up device is typically utilized three hours prior to departure time. Therefore, the flight schedule was filtered to identify the peak 3-hour period for each airline. Depending on the airline, time of day and baggage make-up area, some or all of a flight's carts may be staged at the device. Carts typically hold approximately 40 bags and dollies, used on international wide-body flights hold, on average, 30 bags.

Parking arrangements around the carousels vary depending on the configuration of the baggage make-up area. Most airlines prefer to park their carts parallel to the baggage make-up device to reduce the distance required for hauling bags from the make-up unit to the cart. However, higher volume operations may require carts to be parked perpendicular to the carousel, space permitting. The Airside F baggage make-up area is sized to allow perpendicular parking of carts and dollies. Consequently, approximately 10 carts may park around the carousel in parallel, but up to 22 carts may be parked perpendicularly.

Southwest's make-up area is sized such that carts may be parked perpendicular to the largest carousel. However, the Southwest operation double-parks carts around the device, providing approximately 46 cart positions around the three make-up devices under Airside C.

Facility Requirements

Facility requirements for baggage make-up operations are described in Table 4.37 for 2011 and 2031. The Airside A sortation building will reach capacity by 2031 as configured today, but an additional baggage make-up carousel may be added in the future to accommodate additional demand. Airside C is nearly at capacity today and will require a 6,500 sf baggage make-up area expansion to meet Southwest Airlines' growing baggage make-up needs in the future, even after the merger with AirTran is completed. Airside E has surplus capacity throughout the Master Plan period. If shared-use by multiple international airlines is mandated at Airside F, the number and configuration of carousels is sufficient to meet forecasted demand through 2031. However, some airlines have voiced a preference not to share carousels. Accommodating this preference drives the need for three additional carousels at 2,300 sf each (6,900 sf total additional area). **Table 4.37** assumes Airside F carousels are shared by multiple carriers.

Table 4.37
Baggage Make-up Analysis

				2011						2031					
Airside	Airline	Typical Aircraft	Existing Make-up Cart Capacity	Pk Hr Flights	Pk 3-Hr Flights	Pk Hr Bags	Cart Req't (40 bags)	Dolly Req't (30 bags)	Surplus/ (Deficiency)	Pk Hr Flights	Pk 3-Hr Flights	Pk Hr Bags	Cart Req't (40 bags)	Dolly Req't (30 bags)	Surplus/ (Deficiency)
A	United	739-321	16	5	10	155	20	-	(4)	7	16	290	30	-	(14)
	Frontier	319	4	1	1	53	3	-	1	1	2	62	4	-	0
	JetBlue	320	8	2	4	133	8	-	0	3	5	189	11	-	(3)
	Spirit	319	4	1	2	65	4	-	0	1	2	56	4	-	0
	Unassigned	*-*	*16*	*-*	*-*	*-*	*0*	*-*	*16*	*-*	*-*	*-*	*0*	*-*	*16*
A Total			**48**	9	17	406	35	0	**13**	12	25	597	49	0	***(1)***
C	Southwest/ AirTran	738	46	13	27	853	47	-	(1)	18	40	1448	67	-	(21)
C Total			**46**	13	27	853	47	0	**(1)**	18	40	1448	67	0	**(21)**
E	Delta	738-739	40	6	13	297	25	-	15	7	15	392	29	-	11
	Air Canada	320	4	1	1	49	3	-	1	1	2	72	4	-	0
	Unassigned	*-*	*26*	*-*	*-*	*-*	*0*	*-*	*26*	*-*	*-*	*-*	*0*	*-*	*26*
E Total			**70**	7	14	346	28	0	**42**	8	17	464	33	0	**37**
F	American	738	22	2	6	145	10	-	12	4	8	261	16	-	6
	US Airways	320-321	22	4	6	171	14	-	8	5	10	210	20	-	2
	British Airways	777-763	22	1	1	76	-	3	16	1	2	82	-	3	8
	Cayman	736		1	1	37	3	-		1	2	23	4	-	
	Sky King	736		1	1	27	3	-		-	-	-	-	-	
	West Jet	738		1	1	37	3	-		2	3	83	7	-	
	I1	332		-	-	-	-	-		1	1	59	-	3	
	I2	763		-	-	-	-	-		1	1	75	-	3	
	I3	738		-	-	-	-	-		1	1	59	3	-	
	I4	319		-	-	-	-	-		1	1	27	3	-	
	I5	73G		-	-	-	-	-		1	1	34	3	-	
	D1	739		-	-	-	-	-		1	1	57	3	-	
	I6	343		-	-	-	-	-		1	1	69	-	3	
F Total			**66**	10	16	493	33	3	**36**	20	32	1039	59	12	**16**

Source: HNTB Analysis

4.2.7.8 Airline Operations Office and Support Space

Existing Conditions

Airline operations offices, break rooms, storage spaces and workshops are located on each airside and typically contain operational functions in support of airside activities. The majority of these spaces are located on the ramp level, but some are located on the boarding and mezzanine levels of the airsides of which the airline operates. The top portion of **Table 4.38** indicates the existing airline operations areas as documented in HCAA Exhibit A lease plans dated October 1, 2011.

Planning and Performance Criteria

Some carriers may increase or reduce their airside operations area lease over time. However, no indication of changes was expressed during the Master Plan Update. Each new entrant carrier is expected to require approximately 500 sf of ramp operations space when they begin service.

Facility Requirements

Table 4.38 shows Airline Operations Area requirements projected between 2011 and 2031. No additional operations space is planned for existing carriers, except for Southwest Airlines once they complete their merger with AirTran. Unfinished or unassigned space is available for growth of airline operations space at Airsides A, C and E. However, there is insufficient ramp level area to accommodate airside operations space for the forecasted domestic entrant and six international entrant airlines at Airside F.

Table 4.38
Airline Operations Areas

Airline	Existing Ops Area (sf)	2011	2016	2021	2026	2031
AirTran	2,120	2,120	-	-	-	-
Air Canada	709	709	709	709	709	709
American	7,070	7,070	7,070	7,070	7,070	7,070
British Airways	175	175	175	175	175	175
Continental/United	10,143	10,143	10,143	10,143	10,143	10,143
Delta	28,322	28,322	28,322	28,322	28,322	28,322
JetBlue	5,172	5,172	5,172	5,172	5,172	5,172
Southwest *	19,953	19,953	21,000	21,000	21,000	21,000
Spirit	514	514	514	514	514	514
US Airways	15,284	15,284	15,284	15,284	15,284	15,284
Subtotal (Existing)	**89,462**					
Airline	**Proposed Ops Area (sf)**	**2011**	**2016**	**2021**	**2026**	**2031**
International 1 (I1)	500		500	500	500	500
International 2 (I2)	500		500	500	500	500
International 3 (I3)	500			500	500	500
International 4 (I4)	500				500	500
International 5 (I5)	500				500	500
Domestic 1 (D1)	500					500
International 6 (I6)	500					500
Total Airline Ops Area Requirements		**89,462**	**89,389**	**89,889**	**90,889**	**91,889**
Note: * Added area for AirTran Merger by 2016						

Prepared by: HNTB Corporation, May 2012

4.2.7.9 Airline/VIP Clubs

Existing Conditions

There are currently three airline/VIP clubs at TPA. Delta operates a 7,010 square foot club on the mezzanine of Airside E, US Airways has a 6,568 square foot club on the Mezzanine Level at Airside F, and the HCAA currently operates a 2,890 square foot common-use VIP club on Airside F that is primarily used by British Airways passengers. Once Airside F expansion is completed, a new 3,040 square foot common-use VIP club will replace the existing club.

Facility Requirements

Existing airline clubs are assumed to remain. All new club space is assumed to be common-use accommodating new entrant international carriers on Airside F. An additional 5,000 sf of common-use club expansion at Airside F is recommended by 2031 to support the growth of international traffic. For purposes of timing this expansion, it is assumed that three new entrant international carriers will serve TPA by 2021 driving the need for 2,500 sf of additional common-use club near the international gates. It is assumed an additional three new entrant international carriers will serve TPA by 2031 driving the need for the final 2,500 sf of club space.

4.2.7.10 Holdrooms and Gates

Existing Conditions

Most holdrooms are located on the boarding level of each airside. There are ramp level hold rooms located on Airsides A and C. The size and layout of each hold room varies depending on the size aircraft served. **Table 4.39** lists each holdroom, the current airline occupant and the range of aircraft accommodated. The highest capacity aircraft for which the holdroom is sized is designated with an "O". Other aircraft for which the apron has been striped are designated by an "x".

A graphical representation of the terminal area's aircraft parking positions (both gates and remain overnight (RON) hardstand positions) is shown in **Figure 4.52**. In addition to the 59 gate positions in the terminal area, there are 7 hardstand positions around the Airside A Sortation Building and 15 hardstand positions designated at the former site of Airside D.

Table 4.39
Gate Allocations and Capabilities

Gate	Airline	BE1	CRJ-900	EMB-175	DC-9	B717-200	MD-80	MD-88	MD-90	B737	B737-300	B737-400	B737-500W	B737-700	B737-800	B737-800W	A318	A320-319	A321-200	B757-200	B757W	B757-300	B767-200	B767	B767-300	B767-300ERW	B767-400	B767-400ER	A310	A300-6	A330-200	A330-300	B777-200	B777-300	B747	B747-400	Notes
		19	90	86	125	117	140	142	160	144	137	144	122	137	175	175	114	150	198	193	193	224	203	203	261	221	235	235	210	247	283	294	348	264	436	436	<<<Estimated Seats
Airside A																																					
1	HCAA/3M/9K	O																																			No PBB, Up to 2 turboprops
2																																					No Gate 2
3	HCAA/3M	x					x			x								x		x	x		x						x	O							
4	HCAA						x			x								x		x	x			x					x	O							
4WB	HCAA																																O				Gate 4WB replaces Gates 4 and 5
5	CO/UA						x			x								x		x	x		x	x					O								
5WB	CO/UA																										x						x		O		Gate 5WB replaces Gates 5 and 6
6	CO/UA						x			x	x							x		x	O																
6WB	CO/UA																							x					x				x		O		Gate 6WB replaces Gates 6 and 7
7	HCAA															x		x			O																
8	UA															x		x			x		O														
8WB	UA																																			O	Gate 8WB replaces Gates 7 and 8
9	UA															x		x			x		O														
10	HCAA				x													x	O	x																	
10Alt	HCAA		x	O																																	Gate 10Alt replaces Gate 10
11	HCAA				x		x			x						x		x	O																		
12	B6																	x	O																		
13																																					No Gate 13
14	B6																	x	O																		
15	HCAA															x		x	O																		
16	HCAA																	x	O																		
17	NK							x										x	O																		
18	HCAA/F9															x		x	O																		
Airside C																																					
30	WN														x			O																			
31	WN															O																					
32	HCAA															O																					
33	WN															O																					

Table 4.39
Gate Allocations and Capabilities

Gate	Airline	BE1	CRJ-900	EMB-175	DC-9	B717-200	MD-80	MD-88	MD-90	B737	B737-300	B737-400	B737-500W	B737-700	B737-800	B737-800W	A318	A320-319	A321-200	B757-200	B757W	B757-300	B767-200	B767	B767-300	B767-300ERW	B767-400	B767-400ER	A310	A300-6	A330-200	A330-300	B777-200	B777-300	B747	B747-400	Notes
		19	90	86	125	117	140	142	160	144	137	144	122	137	175	175	114	150	198	193	193	224	203	203	261	221	235	235	210	247	283	294	348	264	436	436	<<<Estimated Seats
34	WN															O																					
35	HCAA															O																					
36	WN															O																					
37	WN															O																					
38	WN															O																					
39	WN															O																					
40	HCAA		x			x					x		x			x	x	x	O																		
41	HCAA						x									x	x	x	O	x		x															
41A (WB)	HCAA																											x			x		x	x		O	Gate 41A replaces Gates 40 and 41
42	FL					x					x		x			O																					
43	FL					x					x		x			O																					
44	FL					x					x		x			O																					
44A (WB)	HCAA																						x		x			O									Gate 44A replaces Gates 43 and 44
45	HCAA		x				x									O	x	x	x	x		x															
45A (WB)	HCAA																								O												Gate 45A replaces Gates 44 and 45
Airside E																																					
62	DL		x	x	x			x	x							x		x			x	x	x		O	x		x									
64	DL			x	x			x	x							x		x		x	x	x	x		O	x		x									
65	DL		x	x	x			x	x							x		x			x	x	x		O	x		x									
65A (WB)	DL																														x	x	O				Gate 65A replaces Gate 65
65B (WB)	DL																																x	x		O	Gate 65B replaces Gate 65 and 66
66	DL		x	x	x			x	x							x		x		O																	
67	DL		x	x	x			x	x							x		x		O																	
68	DL			x	x			x	x							x		x		O																	
69	DL			x	x			x	x							x		x		O																	
70	DL			x	x			x	x							x		x		O																	
71	HCAA							x		x								x	O	x																	
72	HCAA							x		x								x	x	x			x		O												

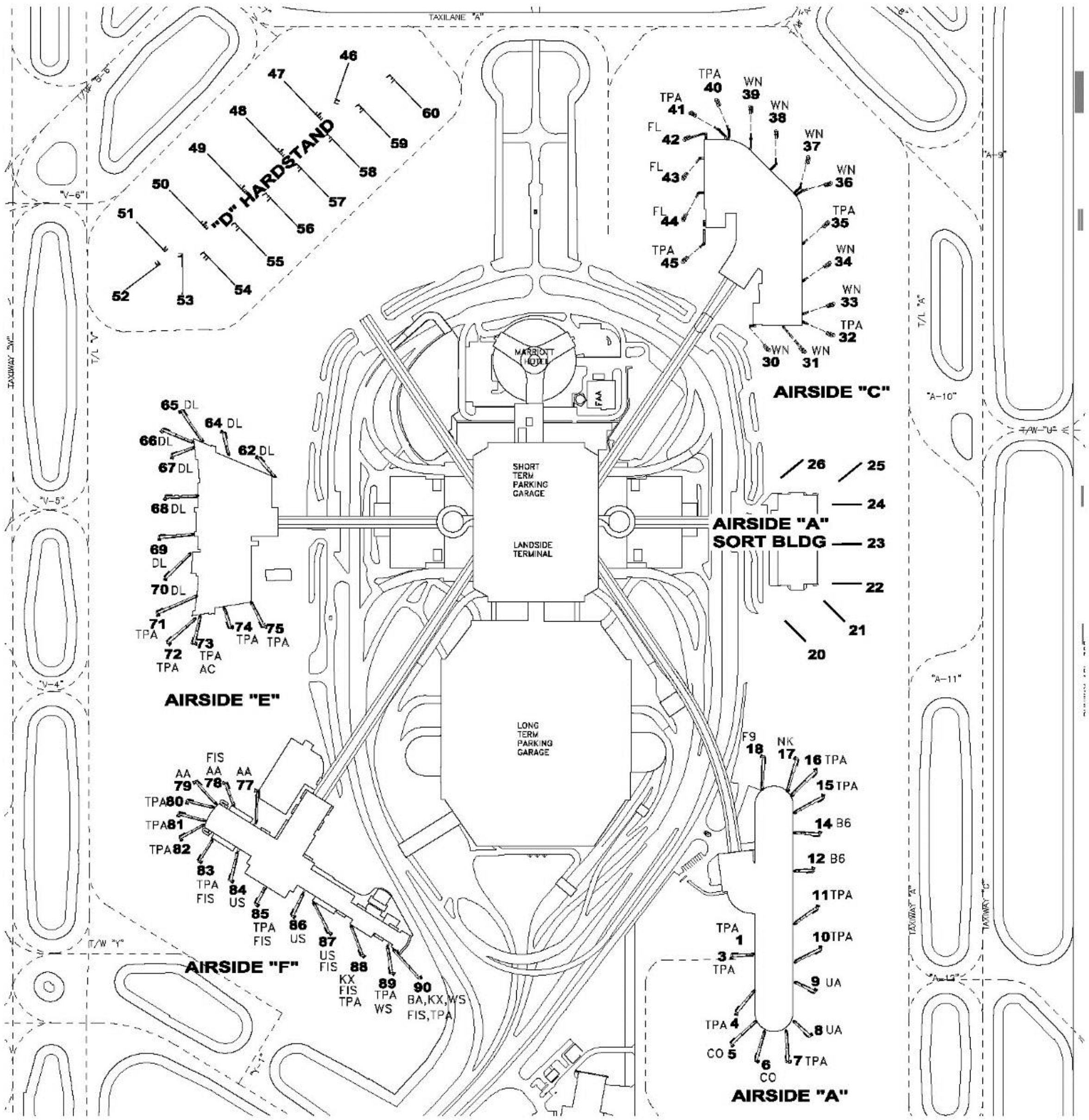
Table 4.39
Gate Allocations and Capabilities

Gate	Airline	BE1	CRJ-900	EMB-175	DC-9	B717-200	MD-80	MD-88	MD-90	B737	B737-300	B737-400	B737-500W	B737-700	B737-800	B737-800W	A318	A320-319	A321-200	B757-200	B757W	B757-300	B767-200	B767	B767-300	B767-300ERW	B767-400	B767-400ER	A310	A300-6	A330-200	A330-300	B777-200	B777-300	B747	B747-400	Notes
		19	90	86	125	117	140	142	160	144	137	144	122	137	175	175	114	150	198	193	193	224	203	203	261	221	235	235	210	247	283	294	348	264	436	436	<<<Estimated Seats
73	HCAA/AC									x								x	x	x		O															
74	HCAA									x								x	x	O																	
75	HCAA									x								x	x	O																	
Airside F																																					
76																																					No Gate 76
77	AA		x				x	x							O																						
78	HCAA/AA		x				x									O				x																	FIS Access, B757 impacts adjacent gates
79	AA		x				x									O				x																	B757 impacts adjacent gates
80	HCAA		x				x								x						O																
81	HCAA						x				x	O																									
82*	HCAA							x										x	O																		
83*	HCAA						x				x							x	O																		FIS Access
83WB*	HCAA																																x			O	Gate 83WB replaces Gates 83 and 84 (FIS)
84*	US						x				x							x	O																		
85*	HCAA										x							O																			FIS Access
85WB*	HCAA																							O													Gate 85WB replaces Gates 85 and 86 (FIS)
86*	US						x				x							x	x	x	O																
87*	HCAA/US						x				x							x	x	x	O																FIS Access
88	HCAA/KX/WS													x				x		O																	FIS Access
88WB	HCAA																						x										x			O	Gate 88WB replaces Gates 88 and 89 (FIS)
89	HCAA						x					x	x					x	O																		
90A	HCAA/BA/KX/WS						x	x						x		x		x		O			x														FIS Access
90B (WB)	HCAA/BA/KX/WS																																x			O	Gate 90B (WB) replaces Gates 89 and 90A (FIS)

Note: * Wingtip clearance between US Airways Gates F82 through F87 is less than 20'-0"

Prepared by: HNTB Corporation, May 2012

Figure 4.52
Existing Airline Gate and Hardstand Locations



AIRLINE	AIRSIDE/GATE	AIRLINE	AIRSIDE/GATE		AIRSIDE/GATE
AIR CANADA (AC)	E 73	GULFSTREAM (3M)	A 1	TPA Per-Use Gates	A 1,3,4,7,10,11, 15,16,18
AIR TRAN (FL)	C 42 - 44	JETBLUE (B6)	A 12, 14		C 32, 35, 40, 41, 45
AMERICAN (AA)	F 77 - 79	SOUTHWEST (WN)	C 30,31,33,34, 36-39		E 71 - 75
BRITISH AIRWAYS (BA)	F 90				F 80 - 83, 85, 88 - 90
CAYMAN (KX)	F 88, 90	SPIRIT (NK)	A 17		
CONTINENTAL (CO)	A 5 - 6	UNITED (UA)	A 8, 9		
DELTA (DL)	E 62 - 70	US AIRWAYS (US)	F 84, 86 - 87	F.I.S. Gates	F 78, 83, 85, 87, 88, 90
FRONTIER (F9)	A 18	WEST JET (WS)	F 89, 90		
				"B" Remote Parking	20 - 26
				"D" Hardstand Parking	46 - 60

rev. 11/29/11

Source: HCAA Operations Department, November 29, 2011

Planning and Performance Criteria

Holdroom size is calculated based upon aircraft capacity, not passenger growth. The number of seats that should be provided in each holdroom is defined on the basis of the aircraft that can be accommodated. Using the estimated seating counts for the highest capacity aircraft found in Figure 4.39 (designated with an "O" in the table), each holdroom grouping was tested using the following methodology:

- Total number of aircraft seats
- Multiply by a 90% aircraft load factor to reach the number of "design" passengers
- Of these "design" passengers:
    - 80% are assumed to be accommodated by seating at 17 sf per passenger
    - 20% are assumed to be standing, requiring 12 sf per passenger
- The total area required for seated and standing passengers is then reduced by 10% if there is a contiguous holdroom. All holdrooms at TPA are contiguous with at least one other adjacent holdroom, so this deduction is applied to all holdroom calculations.

This results in an adjusted seating/standing area requirement.

The following methodology is used to calculate the podium and queue area:

- Podium width = 5 ft.
- Depth of podium to back wall = 8 ft.
- Podium queue depth = 15 ft.
- Area per podium position = 115 sf
- Number of podiums positions per gate:
    - Narrowbody gate: 2 positions (230 sf)
    - Widebody gate: 4 positions (460 sf)

The following methodology is used to calculate the area required for each gate's boarding/egress corridor:

- Boarding/egress corridor width = 6 ft.
- Average depth of holdroom = 30 ft.
- Typical boarding/egress corridor area = 180 sf

An additional 240 sf of boarding area is assigned to each Southwest Airlines gate to account for the 'boarding by number' operation that occurs within their holdrooms. This airline specific operation requires additional space within the holdroom, but reduces the spillover of passengers into the circulation corridor during the passenger boarding process.

Facility Requirements

The facility requirements for holdrooms are summarized in **Figure 4.53**. Holdrooms at Airsides A and C accommodate passengers at LOS B or higher throughout the Master Plan period. Holdrooms E62 – E68 (at north end of Airside E) serve passengers at a LOS A during normal operations, but holdrooms E69 – E75 have a deficiency of 1,318 sf. Holdrooms F77 – F84 (northwest end of Airside F) do not meet the recommended LOS C, requiring an additional 3,732 sf of area to accommodate the maximum size aircraft at each gate simultaneously. The remaining holdrooms at Airside F (F85 – F90) accommodate passengers at slightly below LOS C in 2031 with a deficiency of 906 sf. Two new entrant international flights included in the 2031 flight schedule cannot be accommodated at Airside F and will require additional widebody gate facilities connected to the Customs and Border Protection Facility. It is assumed these two additional widebody gates will be needed after 2021 and are shown as gates F91 and F92 in Figure 4.53.

Figure 4.53
Holdroom Requirements

Airside A

Area	Gate Nos.	Existing Area	Area Required	Surplus/ (Deficiency)
Level 1 Holdroom	A1	5,337 sf	1,313 sf	4,024 sf
South Holdrooms	A3 – A11	28,704 sf	28,211 sf	493 sf
North Holdrooms	A12 – A18	18,185 sf	17,857 sf	328 sf

Airside C

Area	Gate Nos	Existing Area	Area Required	Surplus/ (Deficiency)
South Holdrooms	C30 – C35	19,871 sf	16,839 sf	3,032 sf
North Holdrooms	C36 – C45	30,751 sf	29,574 sf	1,177 sf

Source: HNTB

Figure 4.53 (continued)
Holdroom Requirements

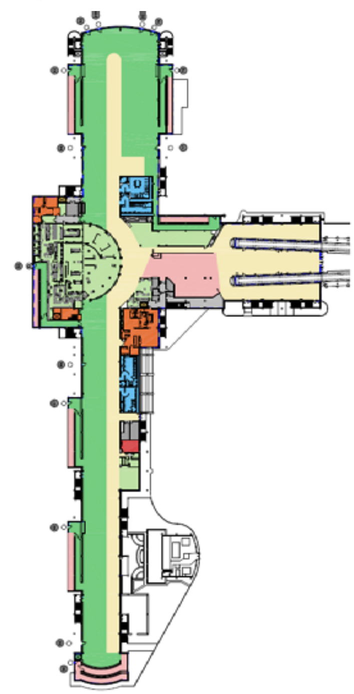
Airside E

Area	Gate Nos.	Existing Area	Area Required	Surplus/ (Deficiency)
North Holdrooms	E62 – E68	22,341 sf	21,240 sf	1,101 sf
South Holdrooms	E69 – E75	20,409 sf	21,727 sf	(1,318 sf)

Airside F

Area	Gate Nos.	Existing Area	Area Required	Surplus/ (Deficiency)
North Holdrooms	F77 – F84	18,017 sf	21,749 sf	(3,732 sf)
South Holdrooms	F85 – F90	15,610 sf	16,516 sf	(906 sf)
(2) New Entrants*	F91 – F92	0 sf	6,610 sf	(6,610 sf)

* 2 widebody gates required per 2031 gated forecast



Source: HNTB

4.2.8 Support Areas (Non-Airline)

Non-Airline Support Areas include government space, the airport's commercial program and amenities, public restrooms, HCAA and other unassigned areas in the terminals. The following spaces have been classified under this category:

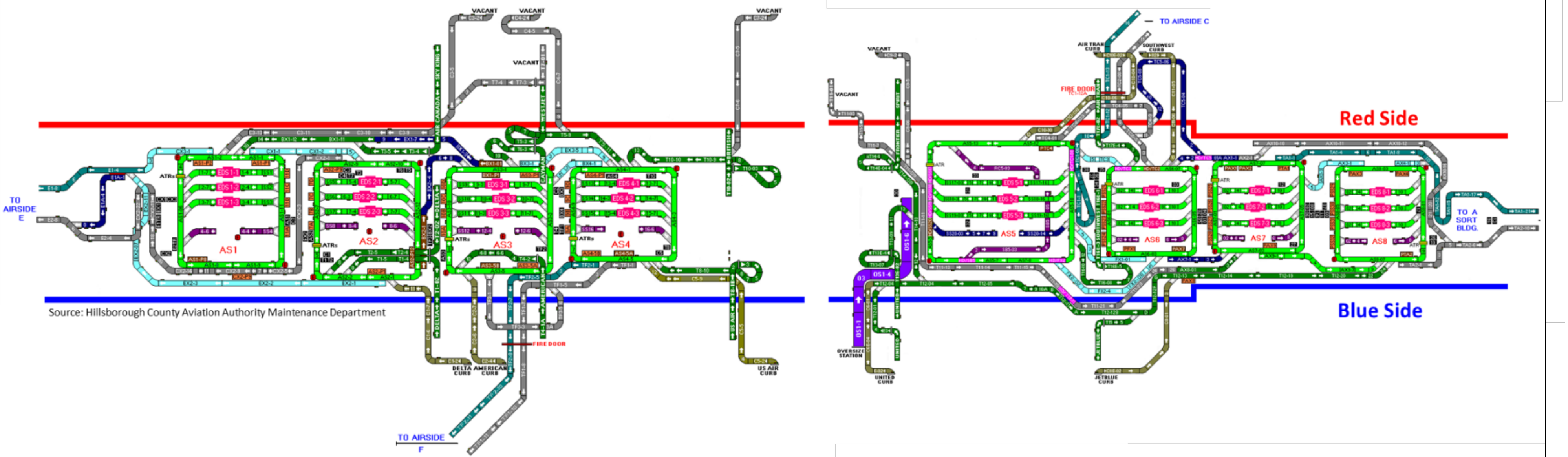
- Department of Homeland Security (DHS):
  - Transportation Security Administration (TSA) Checked Baggage Inspection System (CBIS)
  - TSA Security Screening Checkpoints (SSCP)
  - Customs and Border Protection (CBP)
- Commercial Program and Amenities (including car rental areas)
- HCAA Offices and Support Areas
- Loading Docks
- Unassigned/Unfinished Areas
- Concessionaire Offices
- United Services Organization (USO) Space
- Miscellaneous Spaces (Business Centers, Children's Play Areas, etc.)
- Public Restrooms

4.2.8.1 DHS - TSA Checked Baggage Inspection System (CBIS)

Existing Conditions

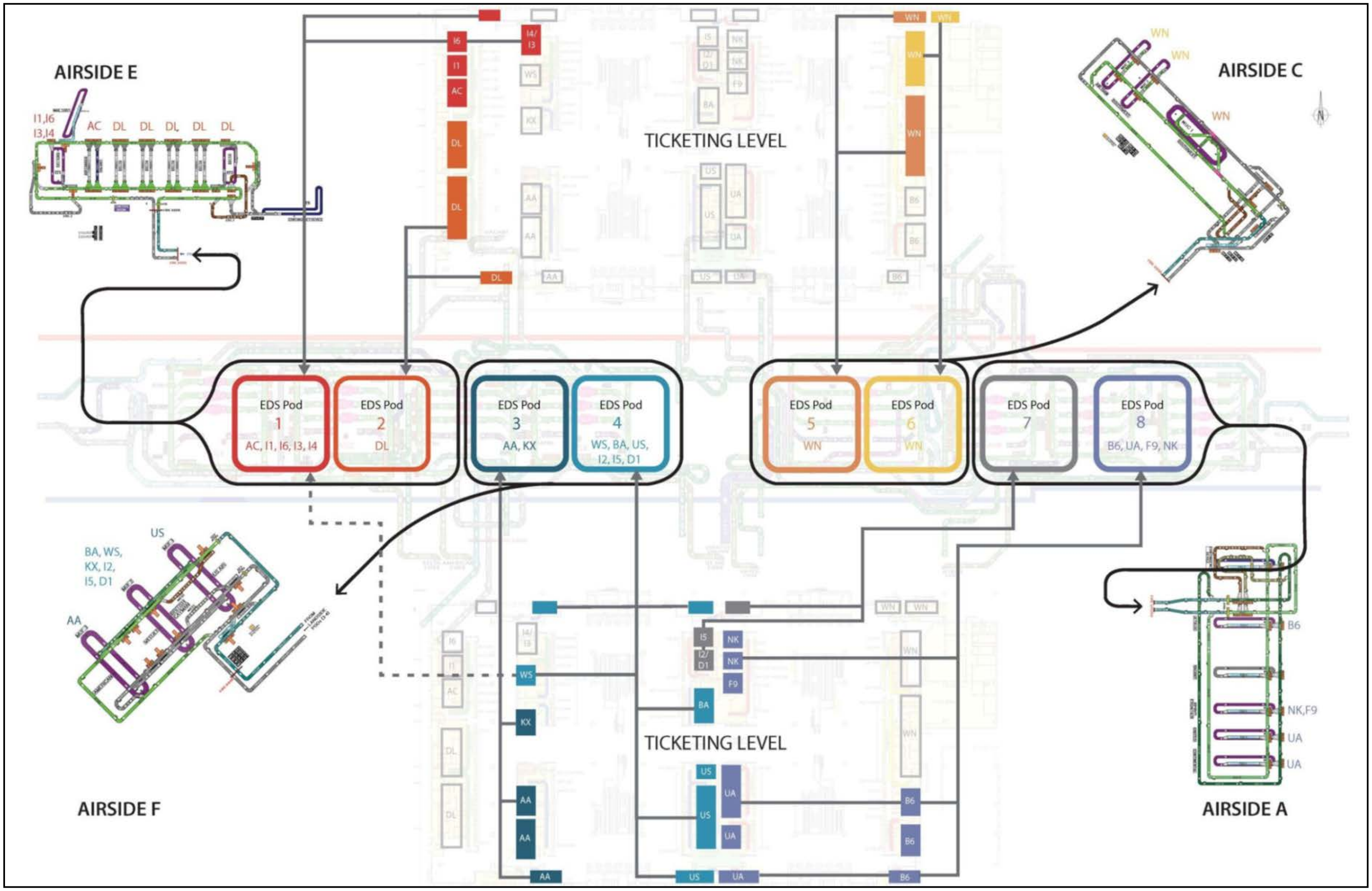
The outbound baggage handling system (BHS) at TPA is a multi-user system with a centralized checked baggage inspection system located on the Baggage Claim Level of the Main Terminal. The CBIS has eight screening loops, each containing three L-3 eXaminer 6000 explosive detection system (EDS) devices capable of screening up to 360 bags per EDS per hour. The eight loops are divided into two groups of four loops, called pods; pods 1-4 serve airlines on Airsides E and F, while Pods 5-8 serve airlines on Airsides A and C. There is a single centralized odd sized/oversized baggage EDS located on the Ticketing Level and a total of twenty-four inline EDS machines on the Baggage Claim Level. The EDS and BHS are illustrated in **Figure 4.54**. The overall baggage handling system is schematically represented in **Figure 4.55.** Once bags have been successfully screened, they are taken by high-speed conveyor to their respective airline's airside where they are sorted by carrier and/or flight.

Figure 4.54
Existing Checked Baggage Inspection System – Main Terminal



Source: HNTB

Figure 4.55
Baggage Handling System Ticket Counter Assignments and Airside Allocations



Source: HNTB

Planning and Performance Criteria

Current Planning Guidelines and Design Standards for Checked Baggage Inspection Systems (PGDS) regarding on-screen resolution (OSR) and Level 3 screening were used to determine system performance. Estimated outbound baggage system throughputs associated with each airside are shown in **Table 4.40** for the 2011 flight schedule and the proposed 2031 flight schedule in **Table 4.41**. HNTB reviewed extensive data provided by HCAA Maintenance to determine the maximum practical throughput for each screening pod. These tables indicate the airlines assigned to each pod, estimated baggage processed per EDS per hour, and the average throughput available to each airside.

Table 4.40
Existing (2011) Outbound Baggage System per Airside

Screening Loops	Airside	System (Pods)	Airline	Bags/EDS/ hour	Avg. (Airside)
West	E	1	Air Canada, Sky King*	200	225
		2	Delta Air Lines	250	
	F	3	American, Cayman	220	225
		4	WestJet, British Airways, and US Airways	230	
East	C	5	Southwest Airlines	300	270
		6	AirTran	240	
	A	7	(All feeding ticket counters are currently vacant)**	250	240
		8	United/Continental Airlines, JetBlue, Frontier, and Spirit	230	

Notes: *Bags transfer to Terminal F after screening.
**Currently, Pod 7 is shut down to save power costs. However, any of the airlines utilizing Pod 8 may have their bags pushed to Pod 7 prior to merging onto Pod 8 if the capacity of Pod 8 is reached or if there is a mechanical issue at Pod 8.

Source: HNTB throughput estimates

Table 4.41
Outbound Baggage System per Airside – 2031 Flight Schedule

Screening Loops	Airside	System (Pods)	Airline	Bags/EDS/ hour	Avg. (Airside)
West	E	1	Air Canada, Int'l Entrant 3, Int'l Entrant 5	200	225
		2	Delta Air Lines	250	
	F	3	American Airlines, Cayman, Int'l Entrant 2, Int'l Entrant 4	220	225
		4	WestJet, British Airways, US Airways, Int'l Entrant 1, Domestic Entrant 1, Int'l Entrant 6	230	
East	C	5	Southwest Airlines	300	270
		6	JetBlue**	240	
	A	7	(All feeding ticket counters are currently vacant)	250	240
		8	United/Continental Airlines, Frontier, Spirit	230	

Notes: * No AirTran or SkyKing flight is included in 2031 flight schedule.
** Move to screening loops assigned to AirTran for the 2011 flight schedule

Facility Requirements

Assuming all departing flights are on schedule, the peak hour outbound baggage counts at screening loops for Airside A, C, E and F for the 2011 and 2031 flight schedules are shown in **Table 4.42**.

Figure 4.56 presents the rolling demand for each pod with associated processing capacity. The horizontal red line indicates the pod's capacity.

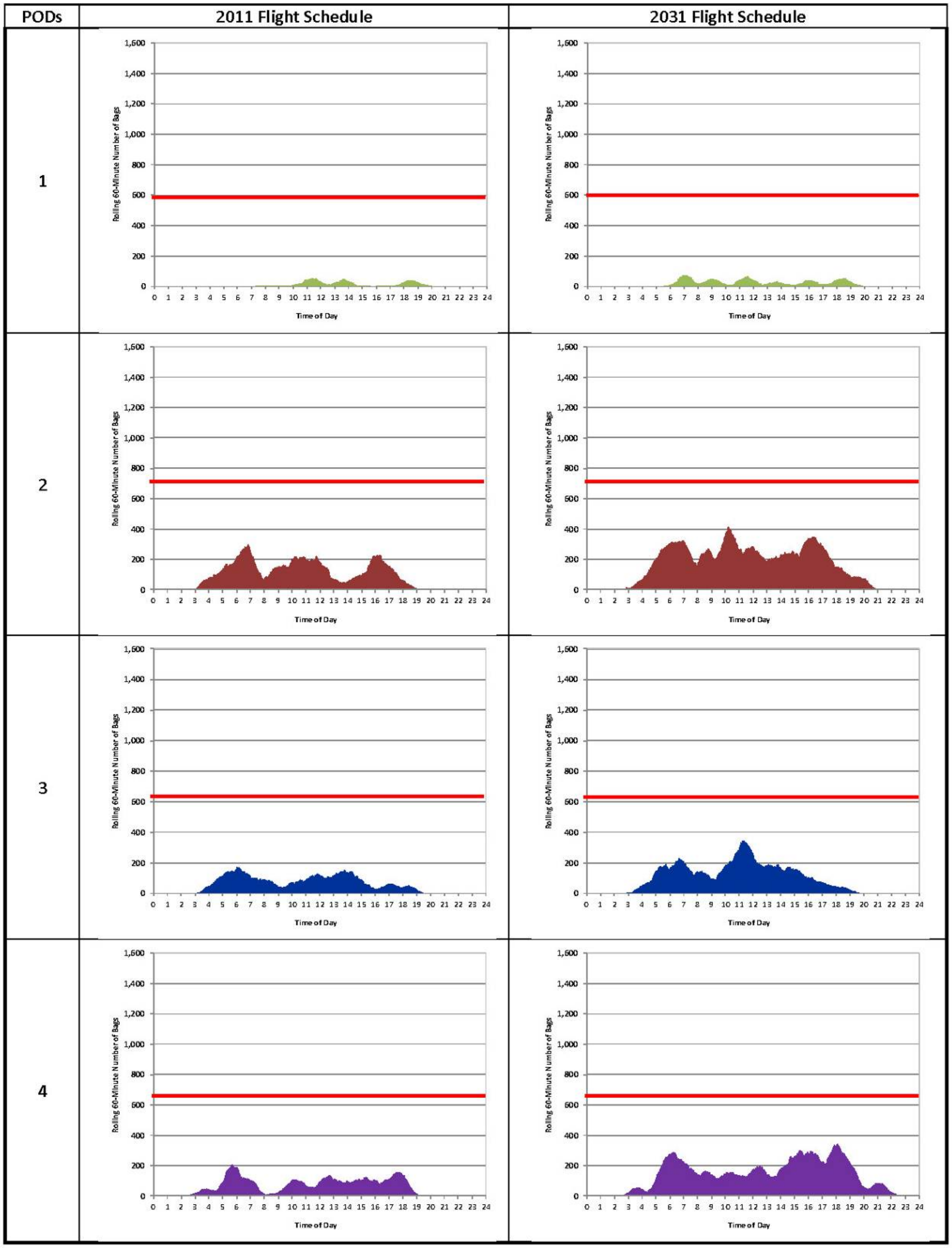
Table 4.42
Peak Hour Outbound Baggage Counts at Screening Loops (Pods)

Pod Location	2011 Schedule			2031 Schedule		
	Rolling 60-Minute Peak Time	Rolling 60-Minute Number of Bags	EDS Throughput Capacity	Rolling 60-Minute Peak Time	Rolling 60-Minute Number of Bags	EDS Throughput Capacity
West System						
Pod 1	11:20 - 12:19	54	600	06:55 - 07:54	74	600
Pod 2	06:51 - 07:50	299	750	10:12 - 11:11	416	750
Pod 3	06:10 - 07:09	173	660	11:15 - 12:14	343	660
Pod 4	05:41 - 06:40	207	690	18:07 - 19:06	341	690
East System						
Pod 5	06:04 - 07:03	767	900	09:20 - 10:19	**1501**	900
Pod 6	16:38 - 17:37	223	720	09:28 - 10:27	**735**	720
Pod 7	09:32 - 10:31	12	750	09:31 - 10:30	140	750
Pod 8	15:57 - 16:56	316	690	15:36 - 16:35	330	690

Source: TransSolutions simulation modeling, July 2012

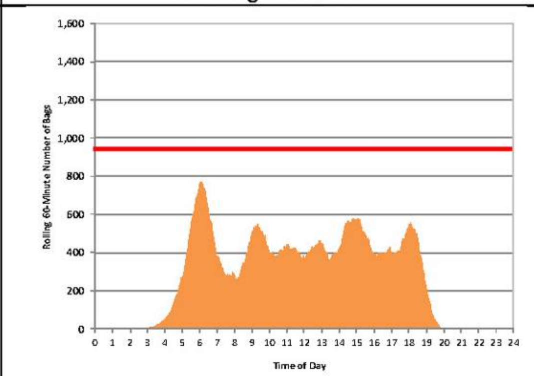
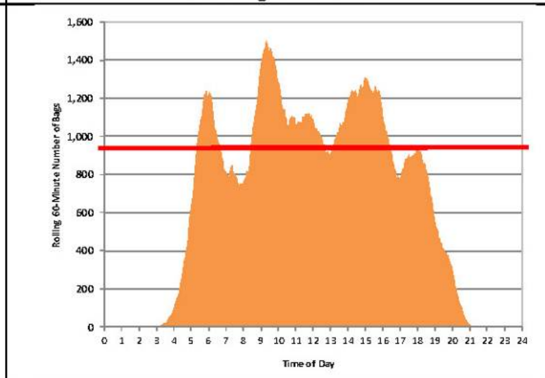
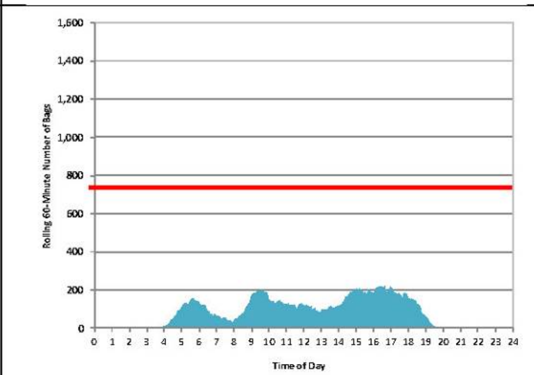
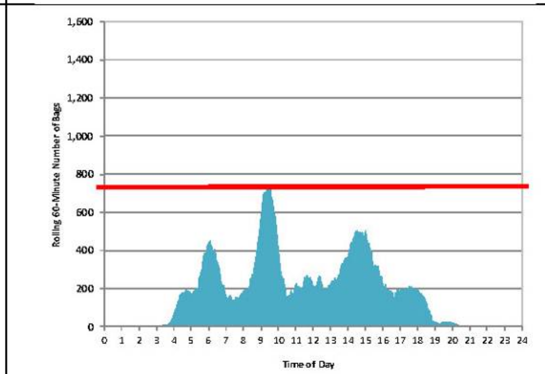
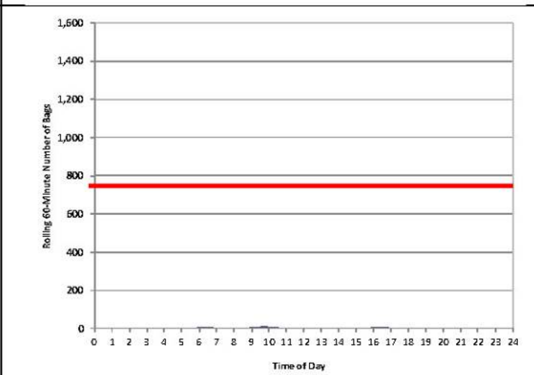
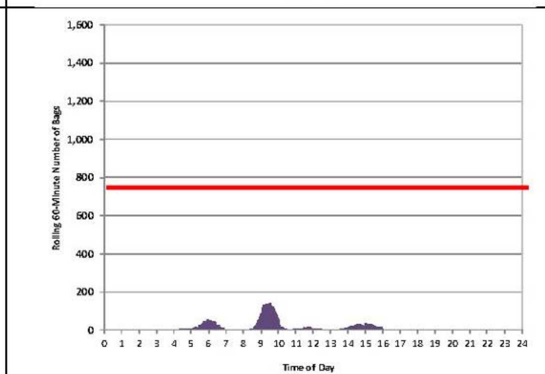
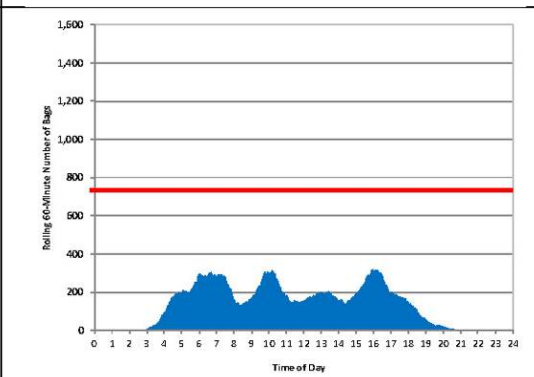
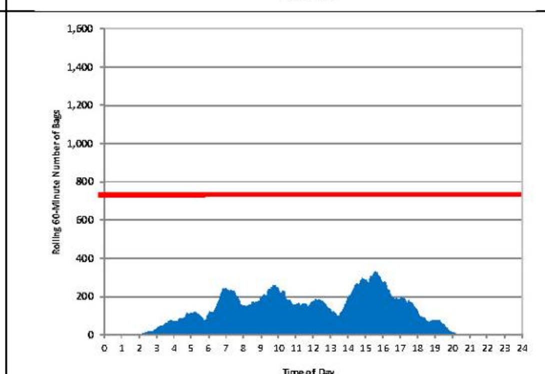
The CBIS serving Airsides A, E and F have adequate screening capacity throughout the Master Plan period. Baggage demand at Pods 5 and 6, serving Airside C, is estimated to exceed screening capacity by around 2021. Further exploration is required to determine if excess demand can be accommodated by nearby Pods 7 and 8 and then routed to the Airside C.

Figure 4.56
Peak Hour Rolling-60 Minutes Number of Bags



Source: TransSolutions Simulation Modeling, July 2012

Figure 4.56 (continued)
Peak Hour Rolling-60 Minutes Number of Bags

PODs	2011 Flight Schedule	2031 Flight Schedule
5		
6		
7		
8		

Source: TransSolutions Simulation Modeling, July 2012

4.2.8.2 DHS - TSA Security Screening Checkpoints

Existing Conditions

Security Screening Checkpoints (SSCP) are located at each Airside directly after exiting the Automated People Mover station. All originating passengers departing on flights from TPA are required to be screened through the checkpoints. Each primary station comprises of a walk-through metal detector, a pair of AT X-Ray units and, when space allows, an Advanced Imaging Technology (AIT) device. Secondary screening is conducted manually by TSA personnel. Each airside has a slightly different lane configuration depending on the building configuration and passenger demand levels. **Table 4.43** provides an inventory of each SSCP, describing the general configuration.

Table 4.43
Security Screening Checkpoint Inventory

Airside	Single Lanes with WTMD Only	Single Lanes with WTMD and AIT	Double Lanes with WTMD Only	Double Lanes with WTMD and AIT	Total Number of Lanes
A	1			3	**7**
C		2		3	**8**
E	1			3	**7**
F[1]				3	**6**

Note: [1] Airside F data reflects proposed improvements that were in design during the inventory process.

Source: HNTB Analysis, June 2012

At the time of this study, Airside F was being expanded to contain six lanes and three AIT/walk-through metal detectors as shown in **Figure 4.57**. These six lanes were used for the 2016, 2021, 2026, and 2031 forecast levels.

TransSolutions collected throughput rates at the existing checkpoints at all four airsides.

- During data collection, the lanes observed were both single and double lane configurations.
- Throughput at each checkpoint was collected only during those times when a continuous queue was present at the checkpoint and passengers were waiting to be processed, therefore ensuring uninterrupted passenger demand.

Based on over 330 data points collected, TransSolutions observed that the average throughput for a single-lane configuration varies between 124 and 212 passengers per hour (pph). Note that the data to estimate the single lane throughput includes data points collected when a double lane was operating in single-lane mode (one of the two x-ray machines was not being used).

The distributions of the inter-arrival time between passengers walking through the walk-through metal detector/AIT for the single lanes by checkpoint are presented in **Table 4.44**. These distributions are depicted in figures shown in **Appendix F**.

Figure 4.57
Airside F Proposed Security Screening Checkpoint

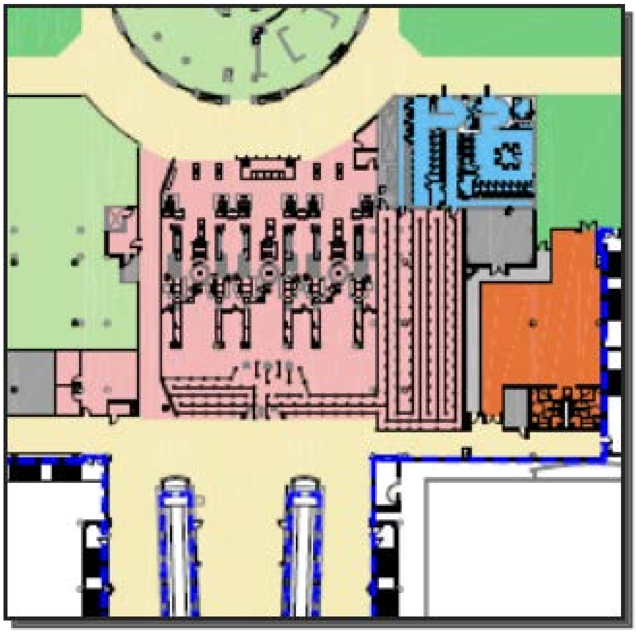


Table 4.44
Single Lane Throughput

Time Between Passengers (Seconds)	Percentage of Passengers			
	Terminal A	Terminal C	Terminal E	Terminal F
0 - 5	38%	15%	14%	-
5 - 10	19%	15%	15%	-
10 - 15	3%	13%	25%	-
15 - 20	6%	10%	18%	-
20 - 25	7%	8%	11%	-
25 - 30	4%	3%	8%	-
30 - 35	5%	0%	3%	-
35 - 40	5%	8%	2%	-
40 -45	3%	2%	2%	-
45 - 50	3%	5%	1%	-
50 - 55	1%	5%	1%	-
55 - 60	3%	3%	0%	-
>60	5%	12%	0%	-
Average	**19 seconds**	**29 seconds**	**17 seconds**	**-**
Throughput	**189 pph**	**124 pph**	**212 pph**	**-**

Source: Data collected at TPA by TransSolutions in December 2011

Based on over 2,700 data points collected, TransSolutions observed that the average throughput for a double-lane configuration varies between 225 and 300 passengers per hour (pph) at the different airsides.

The distributions of the inter-arrival time between passengers walking through the walk-through metal detector/AIT for the double lanes by checkpoint are presented in **Table 4.45**. These distributions are also depicted in figures shown in Appendix F.

Table 4.45
Double Lane Throughput

Time Between Passengers (Seconds)	Percentage of Passengers			
	Terminal A	Terminal C	Terminal E	Terminal F
0 - 5	35%	35%	23%	18%
5 - 10	17%	19%	30%	21%
10 - 15	18%	15%	20%	19%
15 - 20	12%	10%	14%	14%
20 - 25	6%	7%	6%	10%
25 - 30	4%	4%	3%	5%
30 - 35	2%	4%	1%	5%
35 - 40	2%	2%	1%	2%
40 -45	1%	1%	1%	1%
45 - 50	1%	1%	0%	1%
50 - 55	0%	1%	0%	1%
55 - 60	1%	0%	0%	0%
>60	1%	2%	0%	2%
Average	**13 seconds**	**14 seconds**	**12 seconds**	**16 seconds**
Throughput	**277 pph**	**257 pph**	**300 pph**	**225 pph**

Source: Data collected at TPA by TransSolutions in December 2011.

Planning and Performance Criteria

Most facility requirements use the design day forecast to determine the number of passengers processed through each functional area during the peak hour. This industry standard planning practice makes sense for most functional components. However, depending on the airport, the average day peak month represents somewhere between an 82nd to an 85th percentile day. In other words, out of 365 days in a year, between 55 and 66 days of the year are busier, often with a significantly higher peak hour – this usually encompasses major holidays and most Monday mornings. With regard to planning the security screening checkpoint, HNTB prefers to plan the checkpoint for the 95th percentile day. This provides a good level of service for all but the busiest holidays and Monday mornings. The SSCP was evaluated using the following criteria:

- Flight schedule load factors are increased to represent the 95th percentile day.
- 95% of passengers during the peak hour should spend 10 minutes or less in queue at the SSCP. This is a typical SSCP planning goal since September 11, 2001.
- 100% of passengers reach a TSA document checker within 15 minutes or less.
- TSA adequately staffs available lanes to meet passenger demand (an SSCP's breakpoint is based on the lack of lanes and not a lack of staffing)
- Passengers in the queue at the SSCP should be provided a LOS C or better at all times. This is defined by IATA as 10.8 ft^2 of personal space per passenger. The IATA LOS definition for SSCP is shown in **Table 4.46**.

Table 4.46
IATA SSCP Level of Service Standards (sf/pax)

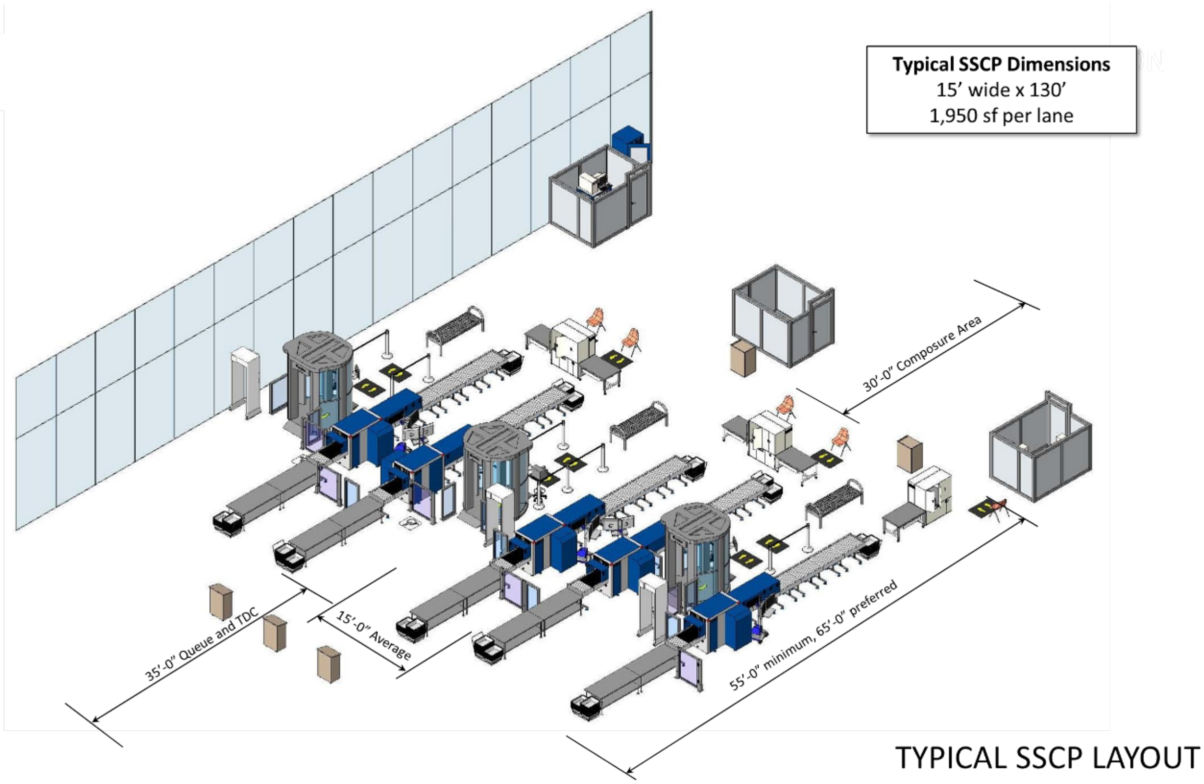
Level of Service	A	B	C	D	E
Space Standard (t^2/occupant)	15.0	12.9	10.8	8.6	6.5

Source: IATA Airport Development Reference Manual, 9th Edition, dated January 2004.

The simulation model assumed a throughput rate of 300 passengers per hour per double lanes and 150 passengers per hour per single lane.

The typical SSCP layout shown in **Figure 4.58** is based upon the Transportation Security Administration's *Checkpoint Design Guide (CDG), Revision 3, March 10, 2011*. Each lane is assumed to be 15 feet wide. This conservative width accommodates handicap access, structural columns and other obstacles that may be present in the SSCP area. The depth for passenger queuing, travel document checkers (TDC) and cross circulation should be a minimum of 35 feet deep and equal in width to the total width of the checkpoint. The screening area is 65 feet long (55 feet minimum) containing two or three divesting tables, an AT X-Ray unit, exit rollerbeds, Explosive Trace Detector (ETD) tables, and bin carts. Each lane or pair of lanes consists of a (1) walk-through metal detector and an Advanced Imaging Technology (AIT) unit for primary processing. An additional 30-foot deep composure area is located at the rear of the checkpoint containing benches and tables for passengers to use while composing their belongings after screening. Law enforcement officer and TSA supervisor counters are also provided in this zone. The average lane occupies 1,950 sf of floor area.

Figure 4.58
Typical Security Screening Checkpoint Layout



Source: *TSA Checkpoint Design Guide (CDG), Revision 3, March 10, 2011*
Annotations by HNTB Corporation, October 2012

Facility Requirements

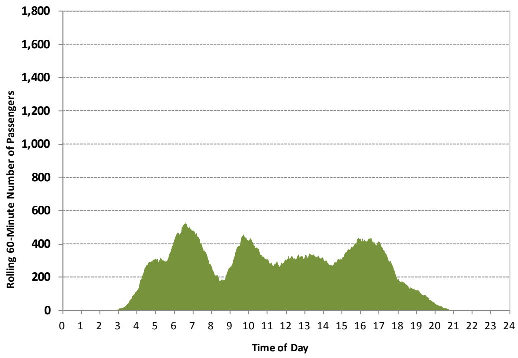
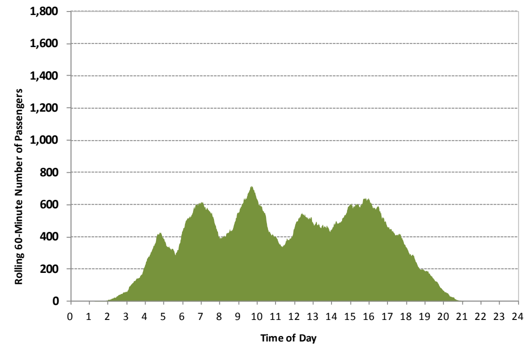
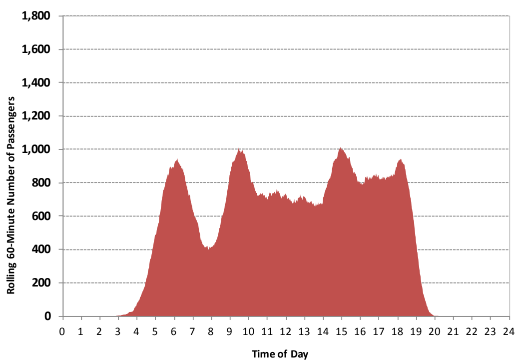
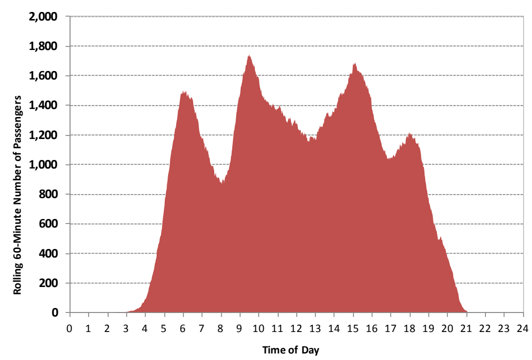
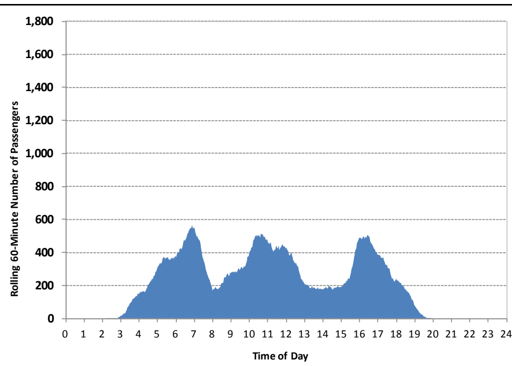
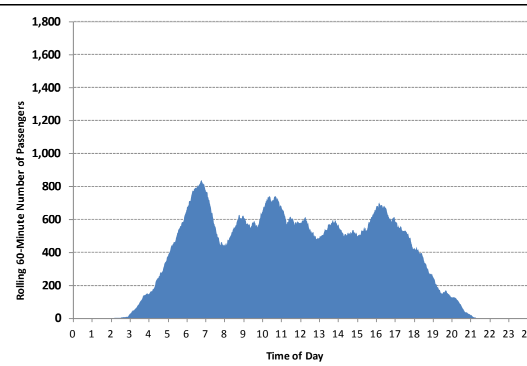
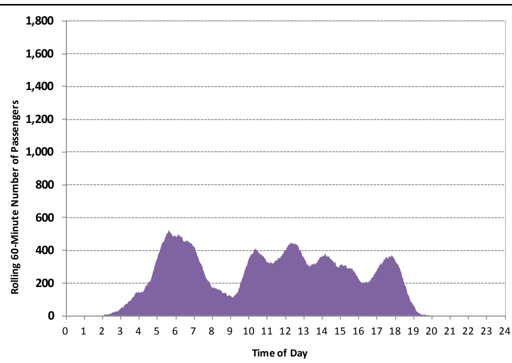
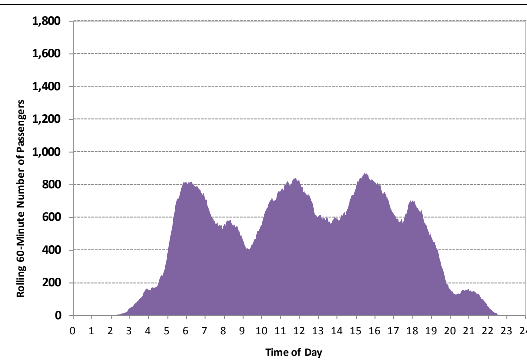
Assuming all departing flights are on schedule, the peak hour departing passenger counts at Airside A, C, E and F SSCPs for the 2011 and 2031 flight schedules are shown **Table 4.47** and **Figure 4.59**.

Table 4.47
Peak Hour Passenger Counts at SSCP

SSCP Location	2011 Schedule		2031 Schedule	
	Rolling 60-Minute Peak Time	Rolling 60-Minute Number of Passengers	Rolling 60-Minute Peak Time	Rolling 60-Minute Number of Passengers
Airside A	06:27 - 07:26	546	15:14 - 16:13	739
Airside C	15:20 - 16:19	876	09:17 - 10:16	1,624
Airside E	06:59 - 07:58	602	06:34 - 07:33	886
Airside F	05:32 - 06:31	539	16:07 - 17:06	928

Source: TransSolutions Simulation Modeling, July 2012.

Figure 4.59
SSCP Rolling-60 Minute Numbers of Passengers

Airside	2011 Flight Schedule	2031 Flight Schedule
A		
C		
E		
F		

Source: TransSolutions Simulation Modeling, July 2012

The performances of the SSCP operations for Airside A, C, E and F peak hours given the 2011 and 2031 demands are shown in **Tables 4.48 – 4.51**.

Table 4.48
Peak Hour SSCP Wait Time Performance – 2011 Flight Schedule

Airport Area	Number of Double / Single Lanes Open	Passenger Wait Times (minutes)			Meets Criteria?
		Average	95%	Maximum	
SSCP Airside A	2/0	0.8	1.5	4.4	Yes
SSCP Airside C	3/2	0.6	0.8	1.2	Yes
SSCP Airside E	2/1	0.6	0.8	1	Yes
SSCP Airside F	2/1	0.6	0.8	1.1	Yes

Source: TransSolutions Simulation Modeling, July 2012.

Table 4.49
Peak Hour SSCP Queuing Performance – 2011 Flight Schedule

Airport Area	Number of Double / Single Lanes Open	Available Queuing Area (ft2)	Maximum Queue (pax)	Queuing Area Per Passenger (ft2)	LOS
SSCP Airside A	2/0	1,800	23	78.3	A
SSCP Airside C	3/2	3,600	27	133.3	A
SSCP Airside E	2/1	1,200	18	66.7	A
SSCP Airside F	2/1	1,000	17	58.8	A

Source: TransSolutions Simulation Modeling, July 2012.

Table 4.50
Peak Hour SSCP Wait Time Performance – 2031 Flight Schedule

Airport Area	Number of Double / Single Lanes Open	Passenger Wait Times (minutes)			Meets Criteria?
		Average	95%	Maximum	
SSCP Airside A	2/1	0.7	0.8	2.1	Yes
SSCP Airside C (Existing)	3/2	32.5	94.2	489.1	No
SSCP Airside C (Proposed)	6/0*	0.6	0.8	1.2	Yes
SSCP Airside E	3/0	2	7.1	31.3	Yes
SSCP Airside F (Planned)	3/0	0.6	0.8	1.2	Yes
Note: * 6 double lanes (12 lanes) required to meet performance criteria for 2031 flight schedule.					

Source: TransSolutions Simulation Modeling, July 2012.

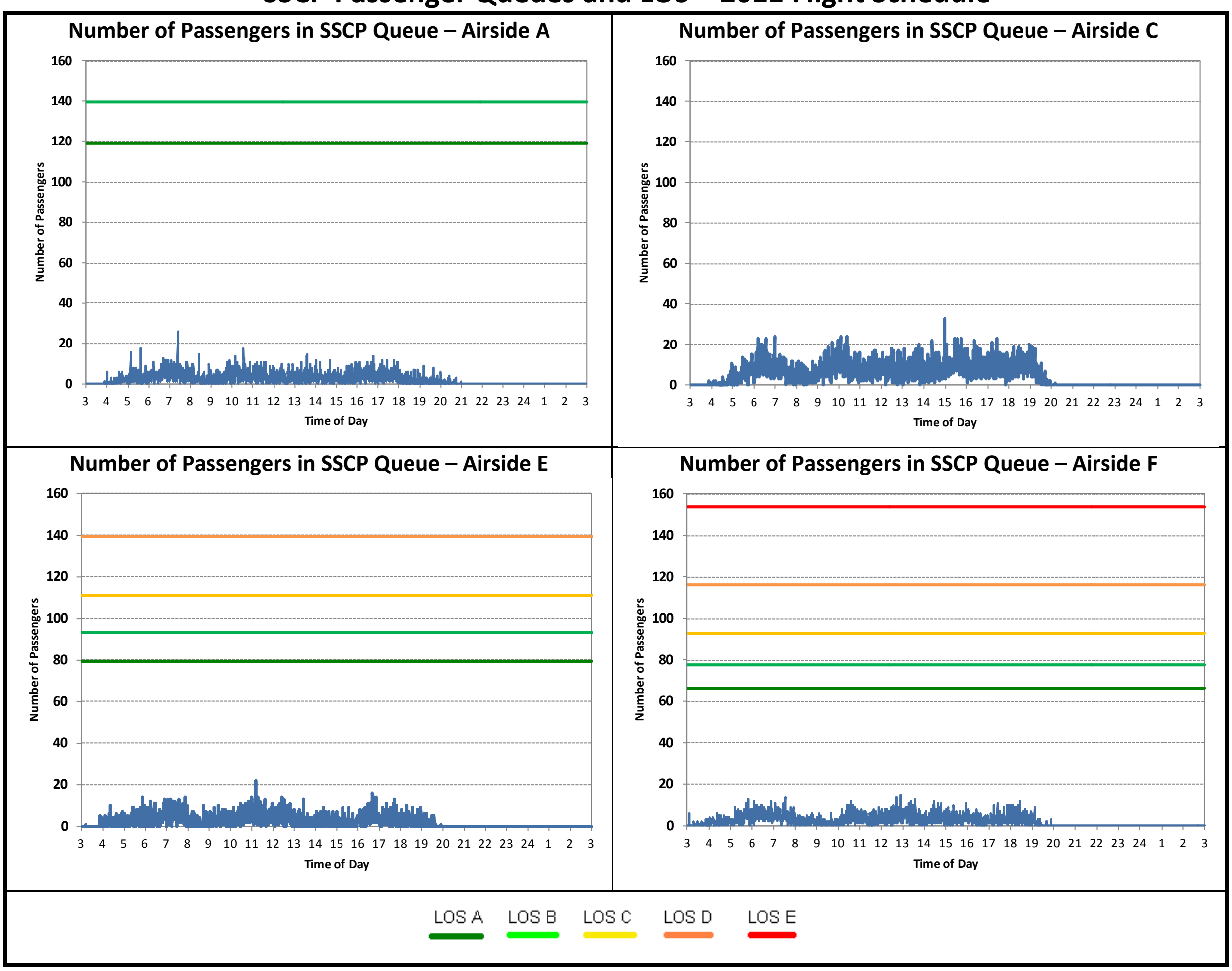
Table 4.51
Peak Hour SSCP Queuing Performance – 2031 Flight Schedule

Airport Area	Number of Double / Single Lanes Open	Available Queuing Area (ft2)	Maximum Queue (pax)	Queuing Area Per Passenger (ft2)	LOS
SSCP Airside A	2/1	1,800	27	66.7	A
SSCP Airside C (Existing)	3/2	3,600	2857	1.3	F
SSCP Airside C (Proposed)	6/0*	3,600	40	90.0	A
SSCP Airside E (Proposed)	3/0	1,200	91	13.2	B
SSCP Airside F (Planned)	3/0	1,000	27	37.0	A
Note: * 6 double lanes (12 lanes) required to meet performance criteria for 2031 flight schedule.					

Source: TransSolutions Simulation Modeling, July 2012.

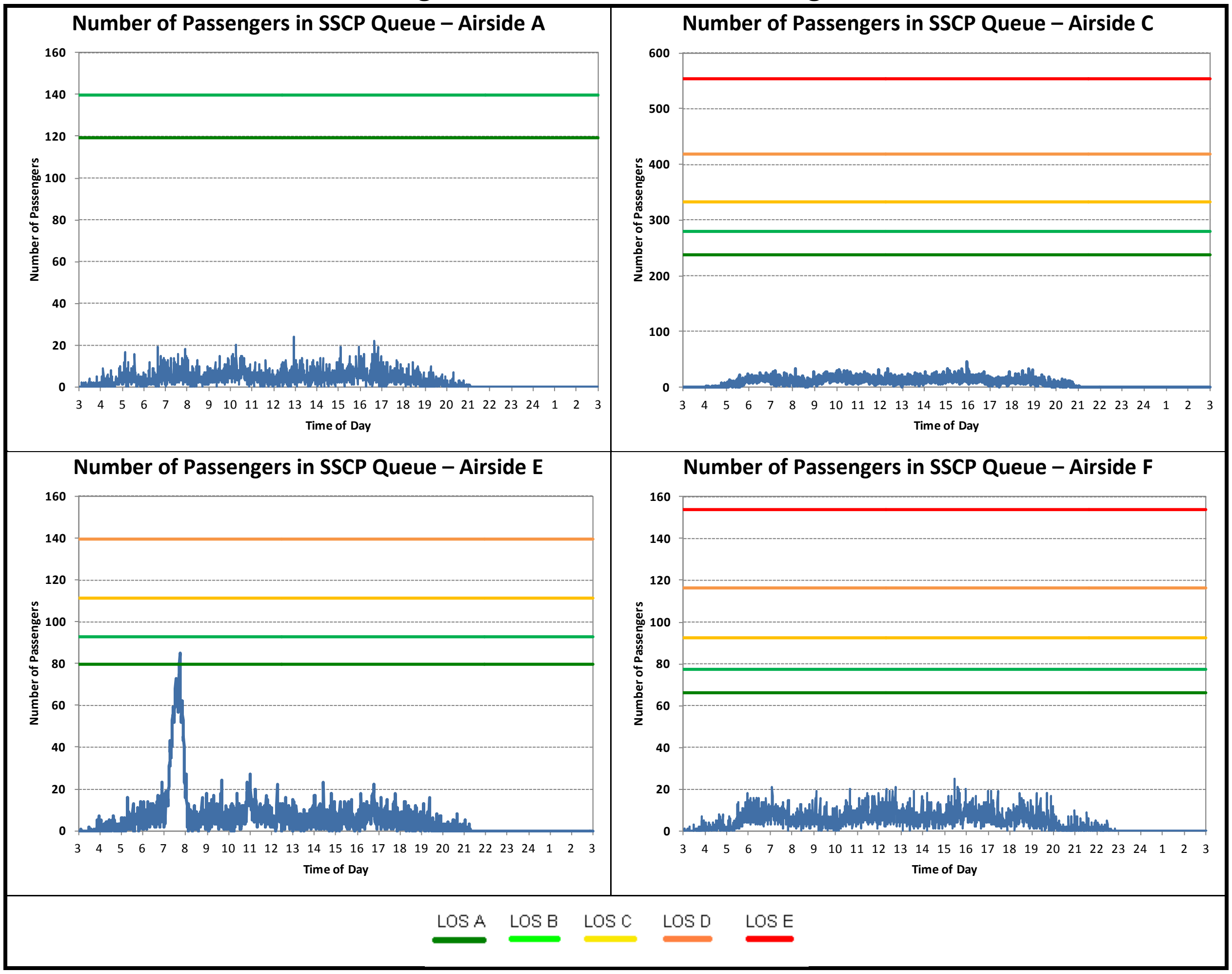
The numbers of passengers waiting in the SSCP queues throughout the day for the 2011 and 2031 demands are shown in **Figure 4.60** and **Figure 4.61**, respectively. The LOS thresholds are based on the available queuing space for each area as shown in the above tables.

Figure 4.60
SSCP Passenger Queues and LOS – 2011 Flight Schedule



Source: TransSolutions Simulation Modeling, July 2012

Figure 4.61
SSCP Passenger Queues and LOS – 2031 Flight Schedule



Source: TransSolutions Simulation Modeling, July 2012

The current SSCP's at Airsides A and E, and the proposed new SSCP at Airside F meet the 2031 forecast using a 95th percentile peak hour passenger demand at LOS A or B. The SSCP at Airside C will need to grow from 8 lanes to 12 lanes to serve 2031 passenger levels.

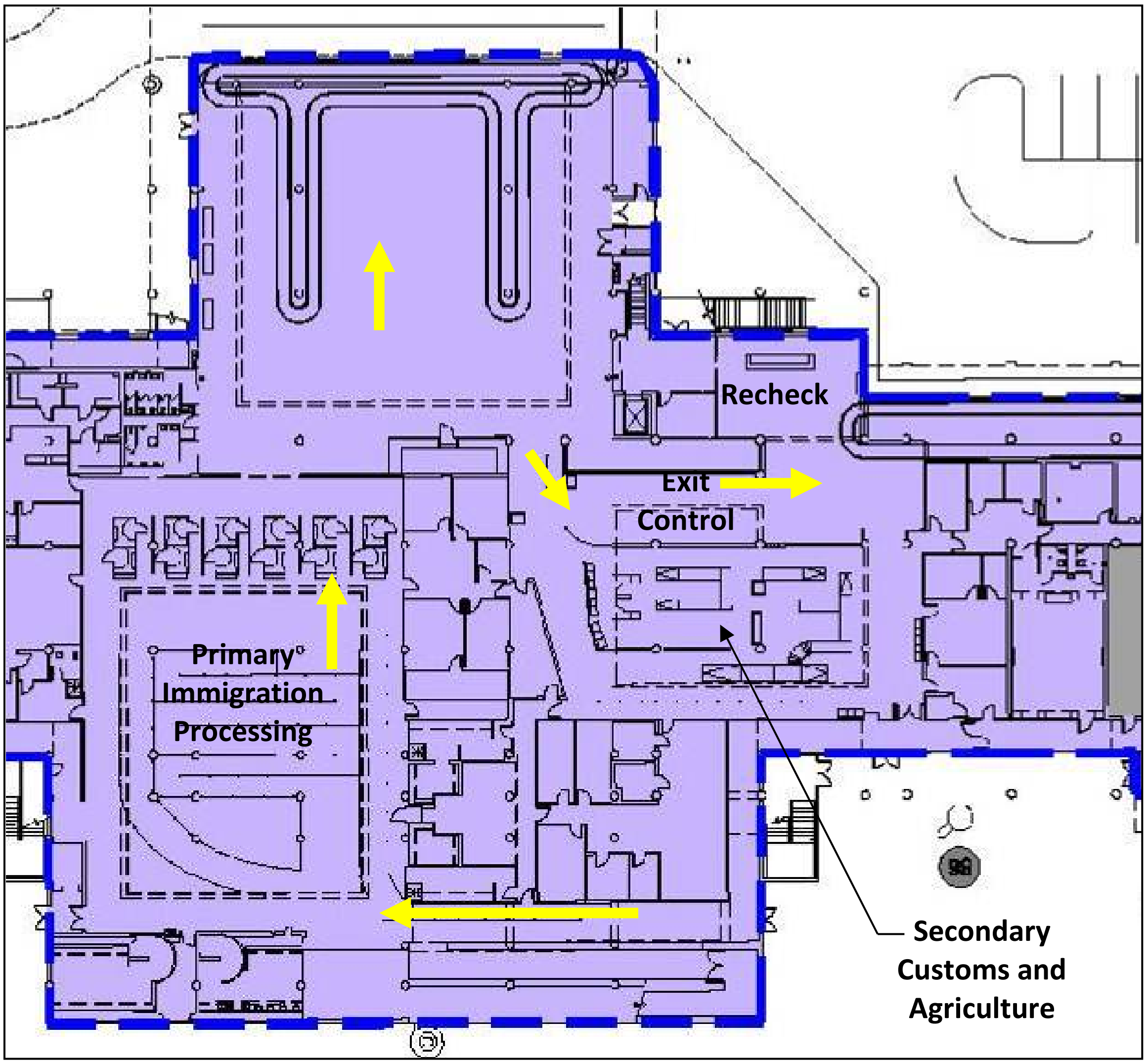
4.2.8.3 DHS - Customs and Border Protection (CBP)

Existing Conditions

Figure 4.62 shows the existing layout and **Figure 4.63** shows the proposed layout of the CBP on the Ramp Level of Airside F. The original facility was constructed in 1987 to serve 600 passengers per hour and included passenger processing facilities, office space, an agricultural inspection room, restrooms, baggage claim area, and baggage recheck area. Expansion of the facility was underway during the facility inventory and the HCAA requested the proposed expansion be included in this inventory. The existing CBP contains 12 stations for primary processing (passport control). The original baggage claim area contained two flat-plate devices, but was subsequently changed to a single large U-shaped flat-plate claim device capable of handling baggage from wide-body aircraft. The expansion, shown in Figure 4.63, adds two additional baggage claim carousels for a total of three. Bag carts are available to passengers without charge, but the passengers are not allowed to take the carts beyond the baggage recheck area. They must unload their carts before ascending escalators or elevators to the Boarding Level and taking the APM to the terminal. Once the expansion is completed baggage carts will be permitted beyond the recheck area.

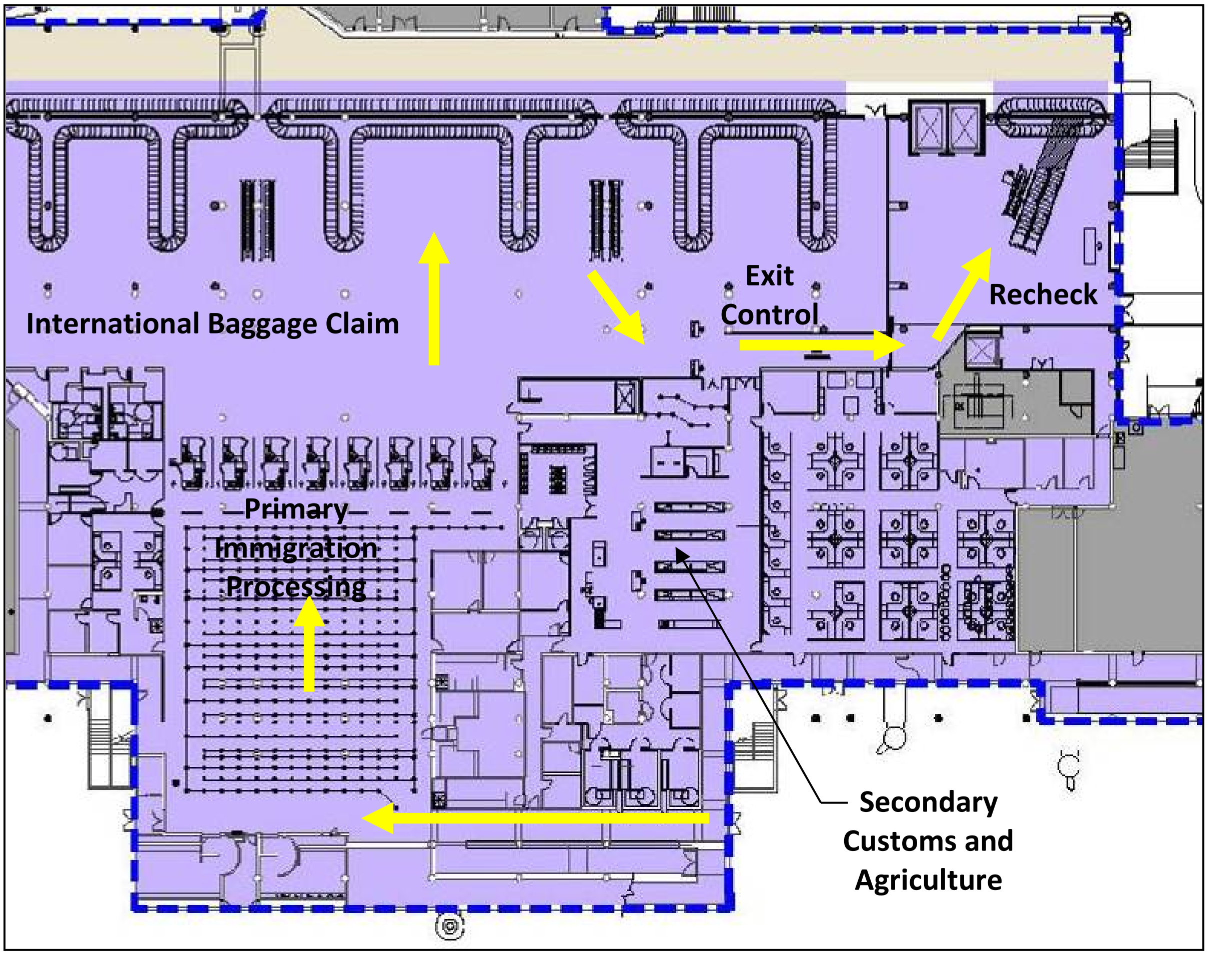
Six out of the fourteen gates on Airside F have ramps capable of accessing the CBP through the sterile corridor system on the ramp level. The accessible gates are 78, 83, 85, 87, 88, and 90.

Figure 4.62
Existing Airside F CBP Facility



Source: HNTB Corporation, July 2012

Figure 4.63
Future Airside F CBP Facility



Source: HNTB Corporation, July 2012

Planning and Performance Criteria

Based on data collected by Ricondo and Associates, Inc. and documented in *Airside F Customs Facility Improvements & Cost Estimate, dated October 2011*, the rate to process arriving international passengers through primary immigration is:

- US passport holders - 80 passengers per hour
- Foreign national passport holders - 45 passengers per hour

The exit control process is assumed to take roughly 7.5 seconds per passenger for an overall rate of eight passengers per minute.

The Customs and Border Protection area was evaluated using the following criteria:

- 95% of passengers should complete primary CBP processing in 15 minutes.

- 90% of peak hour passengers should complete CBP processing in 45 minutes or less (measured from flight arrival until a passenger exits the CBP facility, but does not include those passengers that undergo secondary baggage or secondary agriculture processing).
- IATA recommends an average distance between two individuals waiting in the same line (inter-person spacing) to be 2.6 to 3.0 feet at the inbound passport area.
- Passengers in queue at each of the CBP processing areas area should be provided a LOS of Service C or better at all times. The IATA LOS definition for international arriving passenger processing is shown in **Table 4.52**.

Table 4.52
CBP IATA Level of Service Standards (ft^2/pax)

Airport Area	A	B	C	D	E
Immigration Control	15.1	12.9	10.8	8.6	6.5
Baggage Claim	24.8	20.5	18.3	17.2	16.2
Exit Control	19.4	16.2	14.0	12.9	11.8
International Recheck	19.4	16.2	14.0	12.9	11.8

Source: IATA Airport Development Reference Manual, 9th edition, 2004

The International Baggage Claim within the CBP facility was evaluated using the following criteria:

- No passenger should wait in the international claim hall to claim their bags for more than 25 minutes.
- All flights should have the first bag from the flight present on the claim device in 18 minutes or less after flight arrival.
- All flights should have the last bag from the flight present on the claim device in 35 minutes or less after flight arrival.

Secondary Customs and Agriculture was not modeled.

Facility Requirements

CBP Primary Processing Hall – 2011 Flight Schedule

The performance of the CBP Primary Processing Hall with the existing 12 primary passport control positions is shown in **Table 4.53**. The passenger processing time is measured from arrival at primary passport control until clearing primary passport control.

Table 4.53
CBP Primary Processing Hall Wait Time Performance – 2011 Flight Schedule

Passenger Type	Number of Open Counters	Passenger Processing Times[1] (minutes)			Meets Criteria?
		Average	95%	Maximum	
Citizen/Resident	4	4.3	10	14.9	Yes
Foreign National	8	5.7	13.1	17.3	Yes
Combined	12	5.1	12.2	17.3	Yes

Note: [1] Includes waiting time in queues

Source: TransSolutions simulation modeling, July 2012

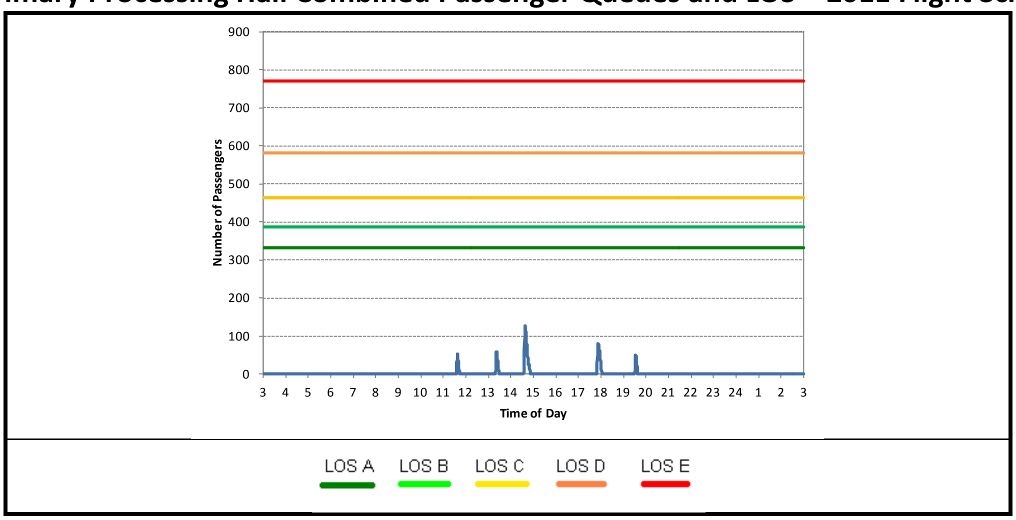
The number of passengers waiting in the CBP primary queues throughout a representative day is shown in **Table 4.54** and **Figure 4.64**. The LOS thresholds are based on the available queuing space for each area as shown in Table 4.49.

Table 4.54
CBP Primary Processing Hall Queuing Performance – 2011 Flight Schedule

Passenger Type	Number of Open Counters	Available Queuing Area (ft^2)	Maximum Queue (pax)	Queuing Area Per Passenger (ft^2)	LOS
Citizen/Resident	4	2,000	58	34.5	A
Foreign National	8	3,000	85	35.3	A
Combined	12	5,000	127	39.4	A

Source: TransSolutions simulation modeling, July 2012

Figure 4.64
CBP Primary Processing Hall Combined Passenger Queues and LOS – 2011 Flight Schedule



Source: TransSolutions simulation modeling, July 2012

As shown in the table and figure above, the CBP Primary Hall meets the performance criteria of providing LOS C or better at all times in 2011.

CBP Primary Processing Hall – 2031 Flight Schedule

The performance of the CBP Primary Processing Hall with the proposed 16 primary passport control positions is shown at the top of **Table 4.55**. The passenger processing time is measured from arrival to primary passport control until clearing primary passport control. The average time for 95% of passengers to process through primary immigration exceeds 15 minutes for foreign nationals and for all passengers combined, which does not meet the planning criteria. As shown at the bottom of Table 4.55, 12 primary inspection counters are required to process foreign nationals and a total of 18 counters are required to process all passengers to meet the planning criteria. The requirement for 18 combined counters is anticipated to occur near the end of the planning period (28.7 MAP), but is dependent on the number of new international entrants and their actual arrival times at TPA.

Table 4.55
CBP Primary Processing Hall Wait Time Performance – 2031 Flight Schedule

Passenger Type	Number of Open Counters	Passenger Processing Times[1] (minutes)			Meets Criteria?
		Average	95%	Maximum	
Citizen/Resident	6	3.5	12	18.9	Yes
Foreign National	10	5.6	18.7	26.8	No
Combined	16	4.8	16.3	26.8	No
Foreign National (Proposed)	12	4.4	14	22.4	Yes
Combined (Proposed)	18	4	13.2	22.4	Yes

Note: [1] Include waiting time in queues
Source: TransSolutions simulation modeling, July 2012

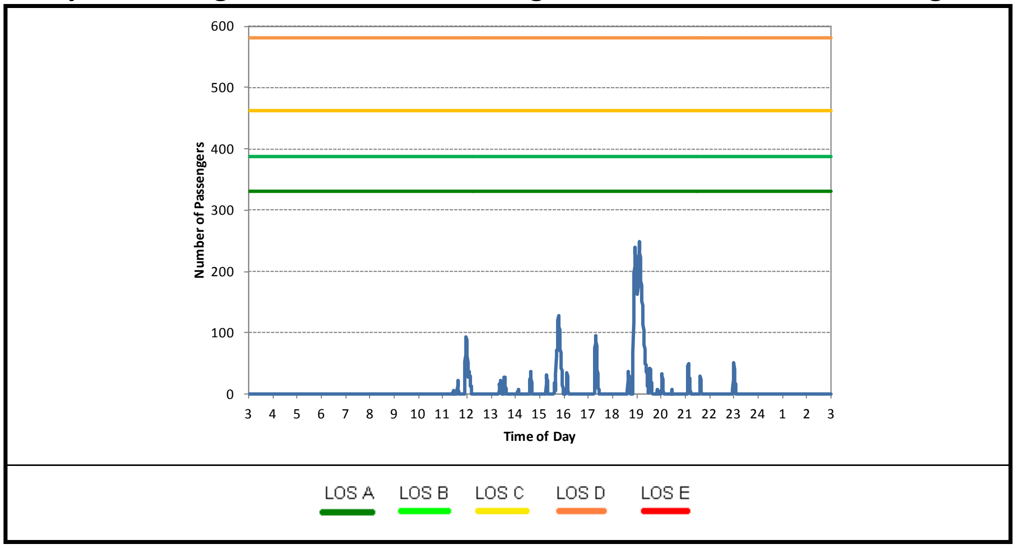
The number of passengers waiting in the CBP primary queues throughout a representative day is shown in **Figure 4.65**. The LOS thresholds are based on the available queuing space for each area as shown in **Table 4.56**.

Table 4.56
CBP Primary Processing Hall Queuing Performance – 2031 Flight Schedule

Passenger Type	Number of Open Counters	Available Queuing Area (ft^2)	Maximum Queue (pax)	Queuing Area Per Passenger (ft^2)	LOS
Citizen/Resident	6	2,000	102	15.7	A
Foreign National	10	3,000	168	15.3	A
Combined	16	5,000	249	15.8	A
Foreign National (Proposed)	12	3,000	154	19.5	A
Combined (Proposed)	18	5,000	238	21.0	A

Source: TransSolutions simulation modeling, July 2012

Figure 4.65
CBP Primary Processing Hall Combined Passenger Queues and LOS – 2031 Flight Schedule



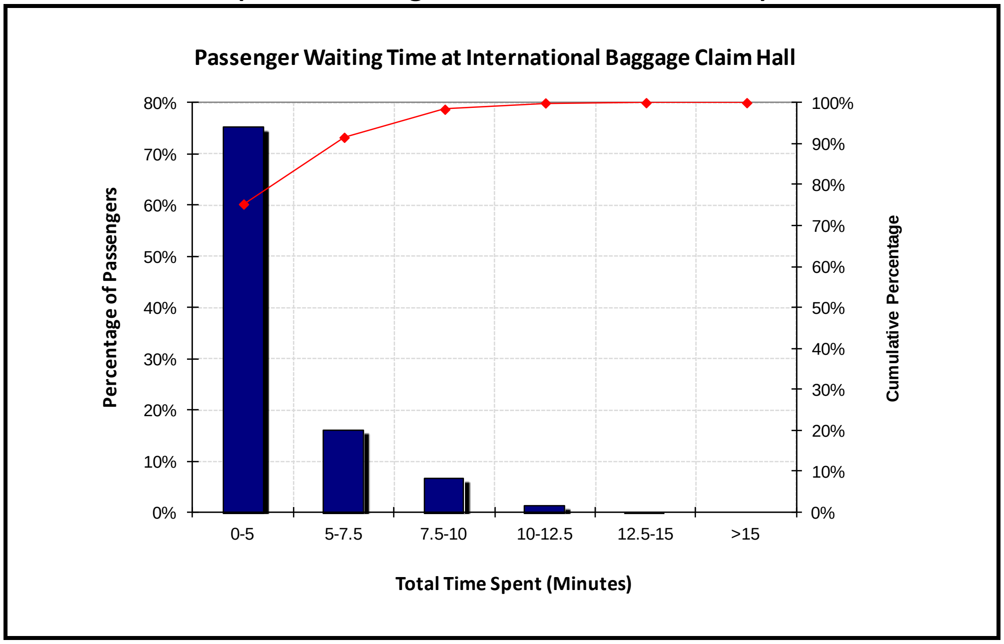
Source: TransSolutions simulation modeling, July 2012

As shown in the table and figure above, a CBP Primary Hall with 18 primary inspection counters meets the performance criteria of providing LOS C or better at all times throughout the planning period. The queue area available in the proposed plan meets the LOS requirements for 18 counters.

International Baggage Claim Hall – 2011 Flight Schedule

The distribution of times that passengers wait in the international bag claim hall is shown in **Figure 4.66**. As shown, 98.39% of passengers wait less than 10 minutes to claim their bags and 100% wait less than 15 minutes.

Figure 4.66
International Passenger Wait Time to Claim Bags – 2011 Flight Schedule
(from Passenger Arrival at Claim Device)



Source: TransSolutions simulation modeling, July 2012

The time it takes for bags to reach the claim devices and for passengers to retrieve bags from claim devices are shown in **Table 4.57**. Note that all times are relative to aircraft arrival time to the gate.

Table 4.57
International Bag Claim Device Delivery Performance – 2011 Flight Schedule

Statistics	Time (in minutes)[1]			
	Minimum	Average	95%	Maximum
Bags				
First Bag to Claim Device	8.2	10.7	13.3	14.2
Last Bag to Claim Device	12.1	16.0	19.4	20.6
Passengers				
First Passenger from Claim Device	9.3	11.5	13.8	14.6
Last Passenger from Claim Device	13.0	21.4	27.3	27.5

Note: [1] All times are relative to the arrival time of aircraft to the gate

Source: TransSolutions simulation modeling, July 2012

The 2011 performance of the international baggage claim hall is shown in **Table 4.58**.

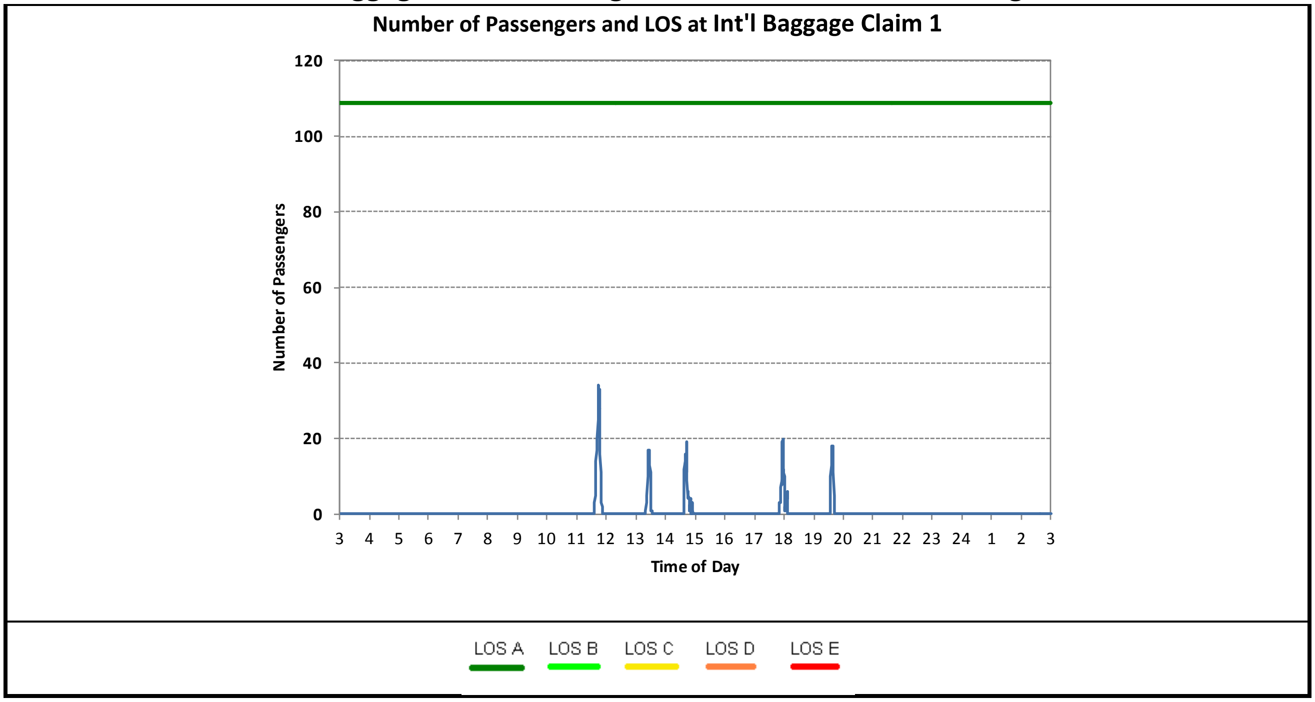
Table 4.58
International Baggage Claim Hall Wait Time Performance Summary – 2011 Flight Schedule

Baggage Claim Hall / Baggage Claim Number	Passenger Wait Times (minutes)		
	Average	90%	Maximum
Int'l Baggage Claim 1	3.3	7.1	13.0

Source: TransSolutions simulation modeling, July 2012

The number of passengers waiting at each claim device throughout a representative day is shown in **Figure 4.67**. The LOS thresholds are based on available queuing space for each area as shown in **Table 4.59**.

Figure 4.67
International Baggage Claim Passenger Queues and LOS – 2011 Flight Schedule



Source: TransSolutions simulation modeling, July 2012

Table 4.59
International Baggage Claim Hall Queuing Performance Summary – 2011 Flight Schedule

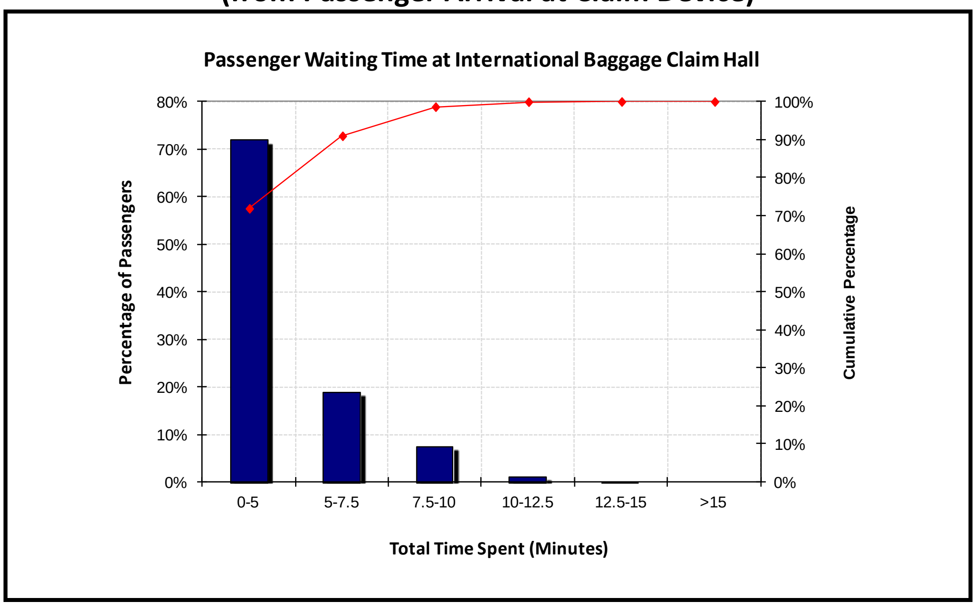
Baggage Claim Hall / Baggage Claim Number	Length (ft)	Available Queuing Area1 (ft2)	Maximum Queue (pax)	Queuing Area Per Passenger (ft2)	LOS
Int'l Baggage Claim 1	222	2,700	34	79.4	A
Note: [1] Assumed usable queuing depth of up to 11.5' around each device as recommended by IATA.					

Source: TransSolutions simulation modeling, July 2012

International Baggage Claim Hall – 2031 Flight Schedule

The distribution of times that passengers wait in the international bag claim hall is shown in **Figure 4.68**. As shown in the figure below, 98.64% of passengers wait less than 10 minutes to claim their bags and 100% wait less than 15 minutes.

Figure 4.68
International Passenger Wait Time to Claim Bags – 2031 Flight Schedule
(from Passenger Arrival at Claim Device)



Source: TransSolutions simulation modeling, July 2012

The time it takes for bags to reach the claim devices and for passengers to retrieve bags from claim devices is shown in **Table 4.60**. Note that all times are relative to aircraft arrival time at the gate.

Table 4.60
International Bag Claim Device Delivery Performance – 2031 Flight Schedule

Statistics	Time (in minutes)[1]			
	Minimum	Average	95%	Maximum
Bags				
First Bag to Claim Device	6.8	10.5	13.0	14.1
Last Bag to Claim Device	9.3	15.0	18.2	19.6
Passengers				
First Passenger from Claim Device	8.5	11.5	14.2	17.7
Last Passenger from Claim Device	10.0	18.3	32.9	36.1
Note: [1] All times are relative to the arrival time of aircraft to the gate				

Source: TransSolutions simulation modeling, July 2012

The 2031 performance of the international baggage claim hall is shown in **Table 4.61**.

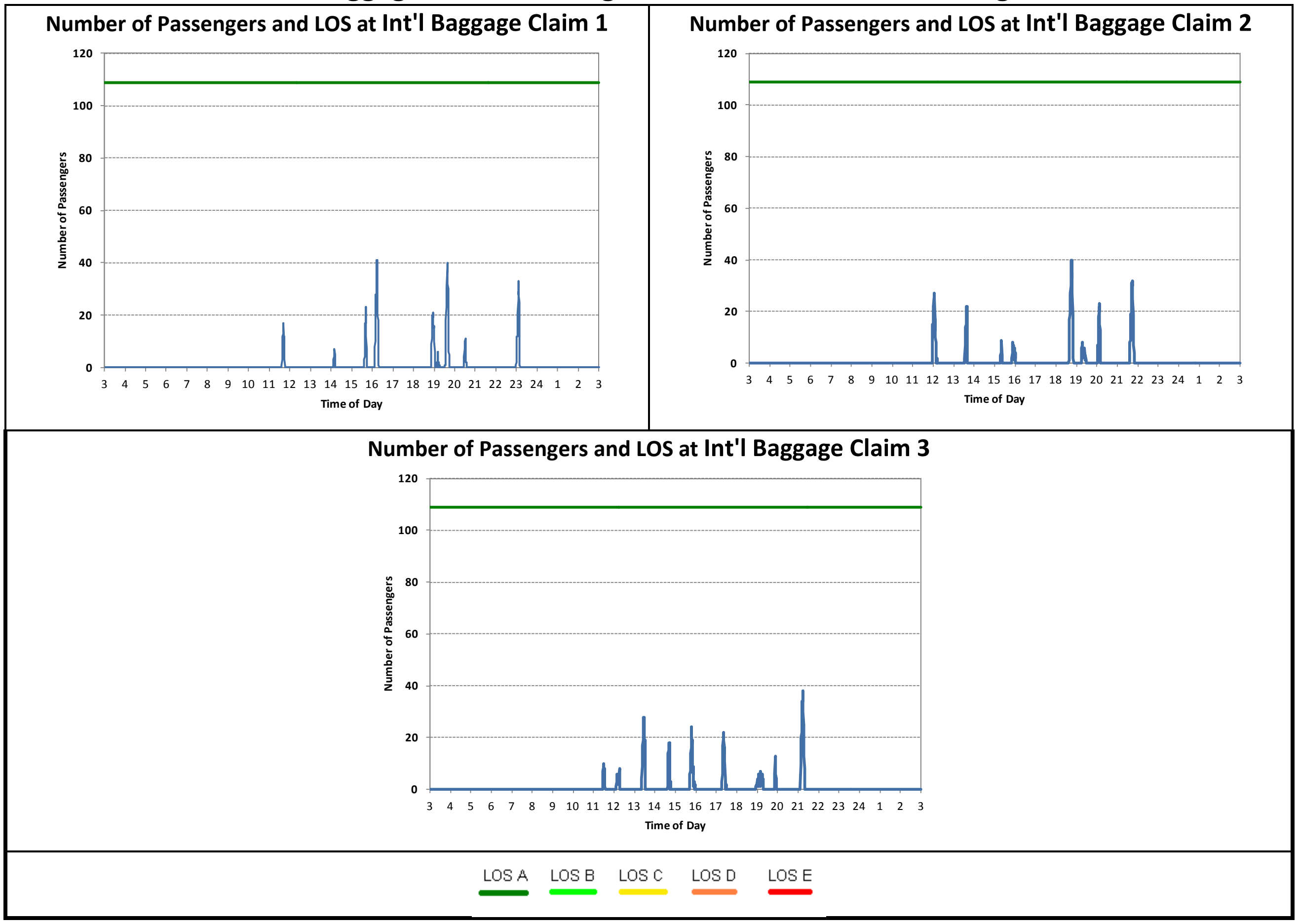
Table 4.61
International Baggage Claim Hall Wait Time Performance Summary – 2031 Flight Schedule

Baggage Claim Hall / Baggage Claim Number	Passenger Wait Times (minutes)		
	Average	90%	Maximum
Int'l Baggage Claim 1	4.0	7.7	11.6
Int'l Baggage Claim 2	3.5	7.5	12.8
Int'l Baggage Claim 3	3.2	6.7	12.9

Source: TransSolutions simulation modeling, July 2012

The number of passengers waiting at each claim device throughout a representative day is shown in **Figure 4.69**. The LOS thresholds are based on available queuing space for each area as shown in **Table 4.62**.

Figure 4.69
International Baggage Claim Passenger Queues and LOS – 2031 Flight Schedule



Source: TransSolutions simulation modeling, July 2012

Table 4.62
International Baggage Claim Hall Queuing Performance Summary – 2031 Flight Schedule

Baggage Claim Hall / Baggage Claim Number	Length (ft)	Available Queuing Area[1] (ft^2)	Maximum Queue (pax)	Queuing Area Per passenger(ft^2)	LOS
Int'l Baggage Claim 1	222	2,700	41	65.9	A
Int'l Baggage Claim 2	222	2,700	40	67.5	A
Int'l Baggage Claim 3	222	2,700	38	71.1	A

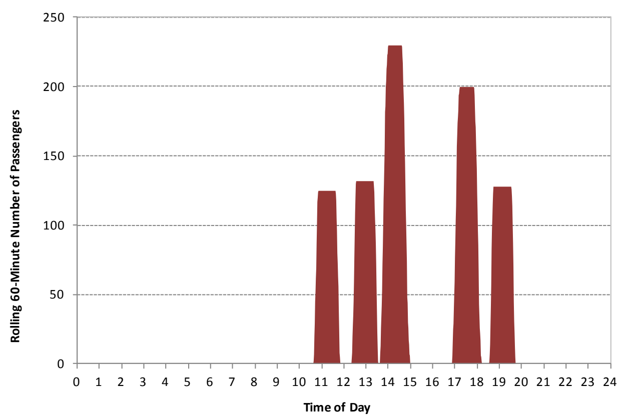
Note: [1] Assumed usable queuing depth of up to 11.5’ around each device as recommended by IATA.

Source: TransSolutions simulation modeling, July 2012

Exit Control – 2011 Flight Schedule

Figure 4.70 shows the rolling 60-minute passenger counts at exit control for the 2011 demand. The overall peak hour exit control demand is 230 passengers at 13:57 - 14:56.

Figure 4.70
Rolling 60-Minute Passenger Counts at Exit Control – 2011 Flight Schedule



Source: TransSolutions simulation modeling, July 2012

The performance of the exit control with a recommended two agents is shown **Table 4.63**.

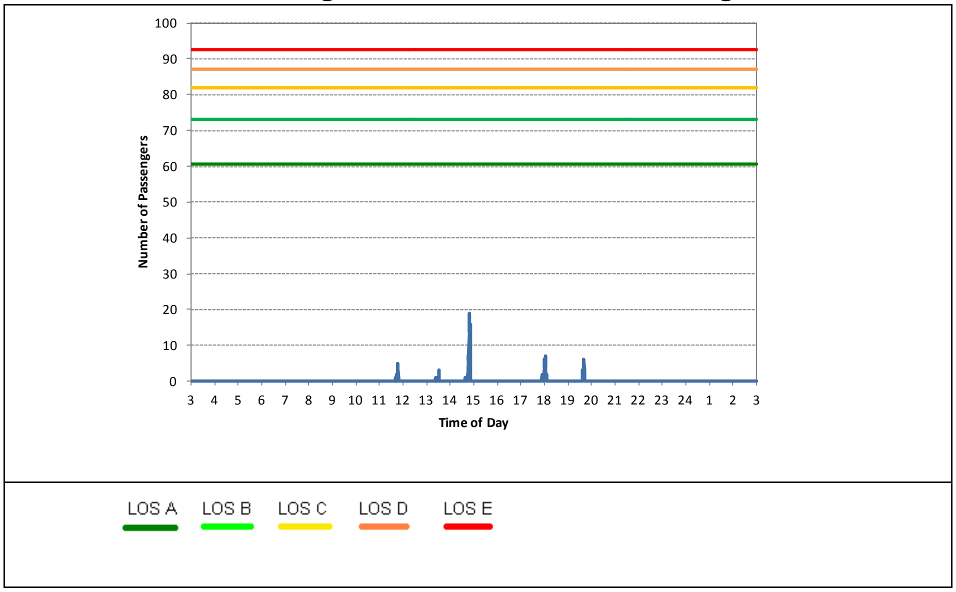
Table 4.63
Exit Control Performance Summary – 2011 Flight Schedule

Number of Open Counters	Passenger Processing Times[1] (minutes)			Meets Criteria?	Available Queuing Area (ft^2)	Maximum Queue (pax)	Queuing Area Per passenger (ft^2)	LOS
	Average	95%	Maximum					
2	0.1	0.6	1.9	Yes	1,500	19	78.9	A

Source: TransSolutions simulation modeling, July 2012

The number of passengers waiting in the exit control queues throughout a representative day is shown in **Figure 4.71**. The LOS thresholds are based on the available queuing space for each area as shown in Table 4.63.

Figure 4.71
Exit Control Passenger Queues and LOS – 2011 Flight Schedule

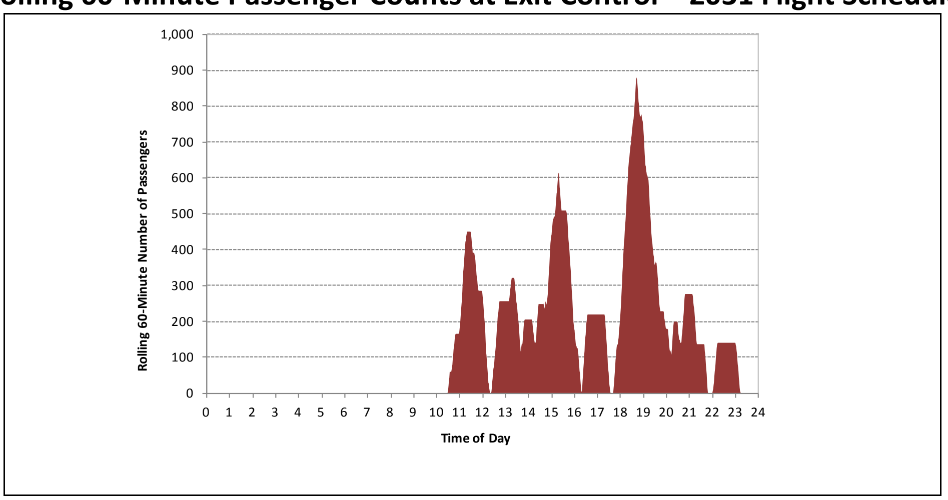


Source: TransSolutions simulation modeling, July 2012

Exit Control – 2031 Flight Schedule

Figure 4.72 shows the rolling 60-minute passenger counts at exit control for the 2031 demand. The overall peak hour exit control demand is 881 passengers at 18:40-19:39.

Figure 4.72
Rolling 60-Minute Passenger Counts at Exit Control – 2031 Flight Schedule



Source: TransSolutions simulation modeling, July 2012

The performance of the exit control with recommended three agents is shown in **Table 4.64**.

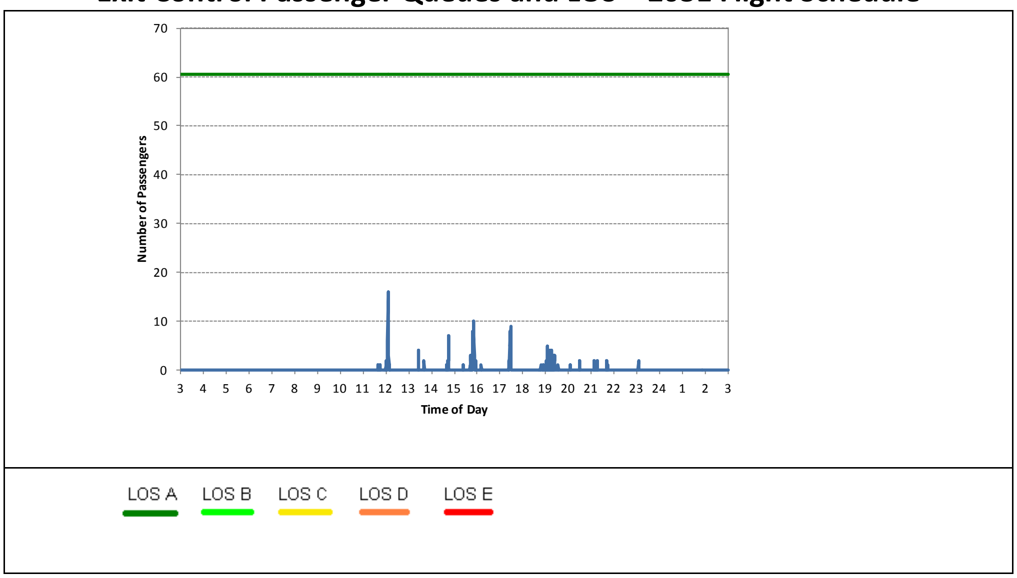
Table 4.64
Exit Control Performance Summary – 2031 Flight Schedule

Number of Open Counters	Passenger Processing Times[1] (minutes)			Available Queuing Area (ft^2)	Maximum Queue (pax)	Queuing Area Per Passenger (ft^2)	LOS
	Average	95%	Maximum				
3	0	0.2	1	1,500	16	93.8	A

Source: TransSolutions simulation modeling, July 2012

The number of passengers waiting in the exit control queues throughout a representative day is shown in **Figure 4.73**. The LOS thresholds are based on the available queuing space for each area as shown in Table 4.64

Figure 4.73
Exit Control Passenger Queues and LOS – 2031 Flight Schedule



Source: TransSolutions simulation modeling, July 2012

Time through CBP – 2011 Flight Schedule

Table 4.65 summarizes the total time through the CBP (excluding secondary processing) that passengers spend from flight arrival until the passenger clears the exit control assuming the use of 12 total CBP primary processors and 2 total CBP Exit Controls.

Table 4.65
Time Through CBP[1] - 2011 Flight Schedule

Passenger Type	Time Through CBP (minutes)		
	Average	90%	Maximum
Citizen/Resident	13.3	18.8	25.6
Foreign National	14.6	21.2	28.5
Combined	14.1	20.2	28.5

Note: [1] Measured from flight arrival until clearing exit control and does not include those passengers requiring secondary processing.
Source: TransSolutions simulation modeling, July 2012

As shown in the table above, 90% of all passengers complete the CBP processing in 20.2 minutes or less meeting the goal of 90% of all passengers completing CBP processing in 45 minutes or less.

Time through CBP – 2031 Flight Schedule

Table 4.66 summarizes the total time through CBP (excluding secondary processing) that passengers spend from flight arrival until the passenger clears the exit control assuming the use of 18 total CBP primary processors and 3 total CBP Exit Controls.

Table 4.66
Time Through CBP[1] - 2031 Flight Schedule

Passenger Type	Time Through CBP (minutes)		
	Average	90%	Maximum
Citizen/Resident	12.5	18.1	30.6
Foreign National	14.4	23.0	36.9
Combined	13.7	20.7	36.9

Note: [1]Measured from flight arrival until clearing exit control and does not include those passengers requiring secondary processing.
Source: TransSolutions simulation modeling, July 2012

As shown in the table above, 90% of all passengers complete the CBP processing in 20.7 minutes or less meeting the goal of 90% of all passengers completing CBP processing in 45 minutes or less.

The proposed improvements to the CBP facility at Airside F will satisfy passenger demand for primary queuing, baggage claim and exit lane capacity through 2031; all at LOS A. However, to meet the 2031 forecast flight schedule, two additional CBP primary passport control counters will be required for a total of 18 counters.

4.2.8.4 Commercial Program and Amenities

The Commercial Program and Amenities section refers to those public and support areas of the terminal allocated for the sale of merchandise and services, including but not limited to:

- Food and Beverage
- Bars
- News & Gift Stands
- Newspaper Sales Boxes
- Merchandise Stores
- Duty Free Shops
- Specialty Shops
- Bookstores
- Currency Exchanges
- ATMs
- Shoe Shine Stands

Commercial Program and Amenities also includes storage space, support space, food preparation areas, and staging areas used and occupied by the concession operators.

Existing Conditions

The majority of Concessions Areas are located on the Transfer Level and on the boarding level in each of the Airsides. The Transfer Level contains numerous merchandisers, two food courts, two stand-alone restaurants, a news & gifts area, a shoe-shine stand and a newly opened bar in the center of the concessions area. The Arcade leading to the hotel also contains several merchants. Each airside has several different concession areas containing multiple food and beverage options as well as several merchandise vendors. Airside E has a small Duty Free shop to support Canadian Flights. A larger Duty Free store is located on Airside F where the majority of international departures occur.

Planning and Performance Criteria

Space requirements were developed by Unison Consulting, Inc. through an iterative process, beginning with a preliminary quantitative analysis of space requirements, which is then refined as other elements of the concessions program are incorporated.

To help determine preliminary space requirements for TPA, a variety of data was used, including existing concession sales data and square footage information, comparative airport statistics, and enplanement projections.

Comparative Airport Statistics

A space utilization factor "SUF" is defined as the amount of space allocated to concessions for every 1,000 enplaned passengers. To help identify best practices in space planning, reviews of concession programs for large and medium hub airports were conducted and 24 comparable airports in terms of size and passenger characteristics were identified. The airports included in this list are primarily origination and destination domestic airports that enplane between 3.0 and 17.0 million passengers annually. The comparative airports were then sorted by sales per enplanement from the highest to the lowest within each primary concessions category (food and beverage and retail concessions). The "Top 25%" airports in terms of sales per enplanement in each category were used for benchmarking purposes to determine space requirements for food and beverage and retail concessions. Using the median of these Top 25% airports, the analysis indicates 6.57 square feet per thousand enplanements is needed for food and beverage (**Table 1** in **Appendix G**) and 5.08 square feet per thousand enplanements is required for retail concessions (**Table 2** in **Appendix G**).

Considering the small sample of origination and destination airports with duty free programs, the median of all nine comparable airports was used to determine that 4.52 square feet is required for every one thousand annual enplaned international passenger (**Table 3** in **Appendix G**).

Relative Main Terminal Landside Value Factors

Using existing sales per enplanement and area (square footage) for each Airside and the Main Terminal, the relative Main Terminal landside value factors for each major concession category were estimated. For example, as shown in **Table 4.67**, in FY 2011 food and beverage sales on Airside A were $4.42 per enplanement compared to $1.71 at Main Terminal food beverage concessions; that is, on average, Airside A enplaning passengers made only 28% of their food and beverage purchases in Main Terminal facilities. However, Main Terminal food and beverage concessions occupied 66% of the total food and beverage concession space to which Airside A passengers were exposed. Therefore, the Main Terminal landside value factor for food and beverage concessions relative to Airside A space is 0.42, equal to the ratio of the sales per enplanement share of 28% to the area share of 66%. Using the same process, the Main Terminal landside value factor of retail concessions relative to Airside A space is 0.39.

The same process is completed for each Airside. The landside value factor for Main Terminal concessions relative to Airside C is 0.38 for food and beverage and 0.42 for retail concessions (see Table 1A). For Airside E, **Table 4.68** indicates 0.41 for food and beverage and 0.43 for retail concessions. Last, for Airside F, the landside value factors are 0.41 for food and beverage and 0.38 for retail concessions.

Table 4.67
Main Terminal Landside Value Factor (Airsides A and C)

	Airside A				Airside C			
	Relative Landside Space Value				Relative Landside Space Value			
	Food & Beverage		Retail		Food & Beverage		Retail	
	Actual	Share	Actual	Share	Actual	Share	Actual	Share
FY11 Sales/EP								
Airside	$4.42	0.72	$2.03	0.67	$5.07	0.75	$1.90	0.65
Main Terminal	$1.71	0.28	$1.01	0.33	$1.71	0.25	$1.01	0.35
Total	**$6.13**		**$3.04**		**$6.78**		**$2.91**	
FY11 Area (sf)								
Airside	12,937	0.34	2,273	0.15	13,466	0.35	2,562	0.16
Main Terminal	25,415	0.66	12,988	0.85	25,415	0.65	12,988	0.84
Total	**38,352**		**15,261**		**38,881**		**15,550**	
Relative Landside Value								
Sales/EP Share		0.28		0.33		0.25		0.35
Area Share		0.66		0.85		0.65		0.84
Landside Value Factor		**0.42**		**0.39**		**0.38**		**0.42**

Table 4.68
Main Terminal Landside Value Factor (Airsides E and F)

	Airside E				Airside F			
	Relative Landside Space Value				Relative Landside Space Value			
	Food & Beverage		Retail		Food & Beverage		Retail	
	Actual	Share	Actual	Share	Actual	Share	Actual	Share
FY11 Sales/EP								
Airside	$4.16	0.71	$1.86	0.65	$4.26	0.71	$2.14	0.68
Main Terminal	$1.71	0.29	$1.01	0.35	$1.71	0.29	$1.01	0.32
Total	**$5.87**		**$2.87**		**$5.97**		**$3.15**	
FY11 Area (sf)								
Airside	10,219	0.29	2,961	0.19	10,778	0.30	2,406	0.16
Main Terminal	25,415	0.71	12,988	0.81	25,415	0.70	12,988	0.84
Total	**35,634**		**15,949**		**36,193**		**15,394**	
Relative Landside Value								
Sales/EP Share		0.29		0.35		0.29		0.32
Area Share		0.71		0.81		0.70		0.84
Landside Value Factor		**0.41**		**0.43**		**0.41**		**0.38**

Space Utilization Factor ("SUF")

Airside SUFs for food and beverage and retail concessions are calculated using these relative effective values of Main Terminal space and the developed SUFs discussed above (based on the median values for the Top 25% comparable airports). This is a three-step process: first, the gross Main Terminal SUFs are determined; then, relative Main Terminal SUFs calculated; and, last, airside SUFs is determined.

Relative SUFs – Food and Beverage and Retail Concessions

To determine the Main Terminal relative SUF, the Main Terminal gross SUF is first calculated using the Main Terminal concessions area divided by total enplanements (in thousands). This number is calculated for each concession category. For example, as shown in **Figures 4.74** and **4.75**, to determine the SUF for food and beverage, Main Terminal area (30,400 square feet) is divided by total enplanements in thousands (8,412), which equals 3.61 (Figure 1A, Step 1). The Main Terminal relative SUF is determined by multiplying the Main Terminal gross SUF by the relevant Main Terminal relative value for each airside area. As shown in Step 2, to determine the Main Terminal relative SUF for food and beverage for Airside A, the Main Terminal relative value (0.42) is multiplied by the gross Main Terminal SUF (3.61), which equals 1.52. Last, to determine the Airside A food and beverage SUF, the Main Terminal relative SUF (1.52) is subtracted from the developed food and beverage SUF (6.57), which equals 5.05. The same process is completed for Airside A retail concessions (Figure 1B).

Figure 4.74
Example Calculation of Main Terminal Relative SUF and Airside A SUF
(FY2011 Food & Beverage)

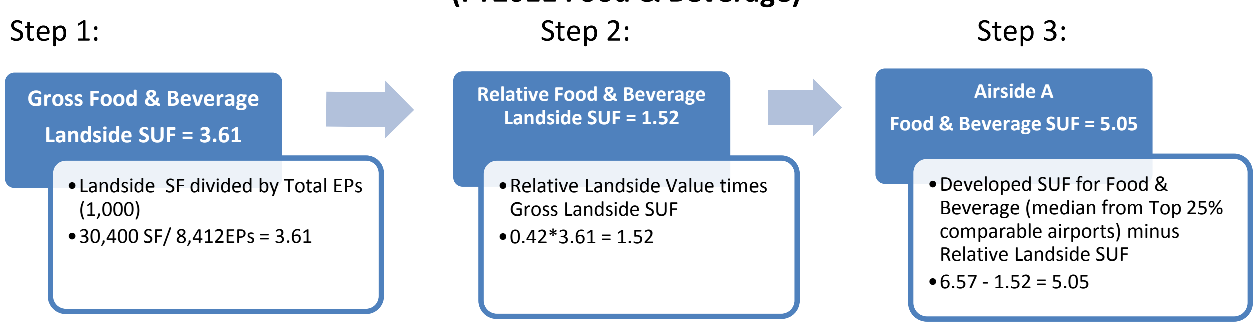
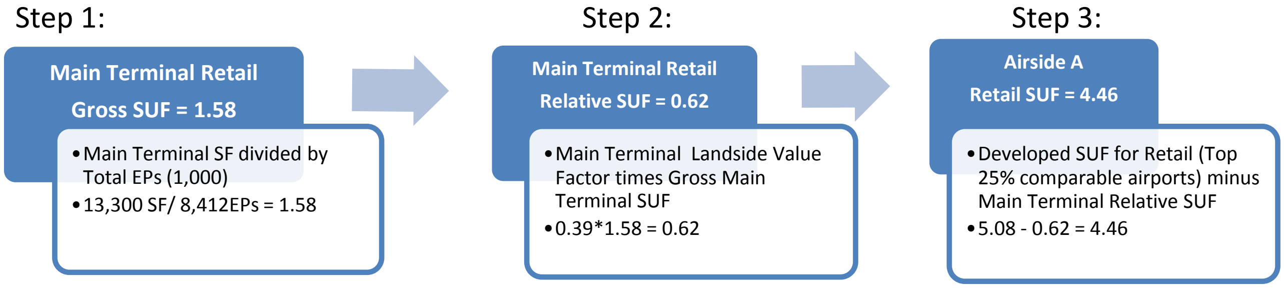


Figure 4.75
Example Calculation of Main Terminal Relative SUF and Airside A SUF (FY2011 Retail)



Duty Free SUF

Considering all duty free concession space is located airside and will continue as such for the new program, the developed duty free SUF is simply the median duty free SUF for comparable airports (4.52).

Facility Requirements

Food, Retail, and Duty Free Concession Space Requirements

Using projected enplanements for the airport and each airside provided by HNTB, Unison estimated space requirements for food and beverage, retail concessions, and duty free for each airside. Main Terminal space requirements remain fixed at its current size. The relative SUFs for each concession category is multiplied by projected airside enplanements (in thousands) to determine space requirements. For example, as shown in **Table 4.69**, projected enplanements for Airside A in 2016 are 1.901 million; thus, 9,900 square feet is required for food and beverage and 8,600 square feet for retail concessions. Based on projected enplanements in 2016 for Airside C, 20,400 square feet is required for food and beverage and 17,200 for retail concessions. For Airside E, 9,400 square feet is required for food and beverage and 8,100 for retail concessions. Considering projected international enplanements of 96,100 on Airside E, approximately 400 square feet of duty free space is required. Airside F space requirements for 2016 are as follows: 10,900 square feet for food and beverage, 9,400 square feet for retail concessions, and 1,700 square feet for duty free concessions. **Tables 4.70**, **4.71**, and **4.72** detail airside space requirements for 2021, 2026, and 2031, respectively.

Table 4.69
2016 Airside Space Requirements by Category

	Airside A	Airside C	Airside E	Airside F
Airside F&B Space Requirement				
Projected Airside Enplanements (000)	1,901.0	3,806.4	1,793.0	2,066.4
Airside Developed SUF (F&B)	5.2	5.4	5.3	5.3
Airside F&B Space Requirement (sq. ft.)[1]	**9,900**	**20,400**	**9,400**	**10,900**
Airside Retail Space Requirement				
Projected Airside Enplanements (000)	1,901.0	3,806.4	1,793.0	2,066.4
Airside Developed SUF (Retail)	4.6	4.5	4.5	4.6
Airside Retail Space Requirement (sq. ft.)[1]	**8,600**	**17,200**	**8,100**	**9,400**
Airside Duty Free Space Requirement				
Projected Airside Int'l Enplanements (000)	0.0	0.0	96.1	366.2
Airside Developed SUF (Duty Free)	4.5	4.5	4.5	4.5
Airside Duty Free Space Requirement (sq. ft.)[1]	**0**	**0**	**400**	**1,700**

Notes:
All years are fiscal years ending September.
1. Space Requirements rounded to nearest hundred square feet.

Table 4.70
2021 Airside Space Requirements by Category

	Airside A	Airside C	Airside E	Airside F
Airside F&B Space Requirement				
Projected Airside Enplanements (000)	2,104.1	4,313.2	2,084.7	2,443.7
Airside Developed SUF (F&B)	5.4	5.5	5.4	5.4
Airside F&B Space Requirement (sq. ft.)[1]	**11,400**	**23,800**	**11,300**	**13,300**
Airside Retail Space Requirement				
Projected Airside Enplanements (000)	2,104.1	4,313.2	2,084.7	2,443.7
Airside Developed SUF (Retail)	4.6	4.6	4.6	4.6
Airside Retail Space Requirement (sq. ft.)[1]	**9,700**	**19,800**	**9,500**	**11,300**
Airside Duty Free Space Requirement				
Projected Airside Int'l Enplanements (000)	0.0	0.0	118.9	501.9
Airside Developed SUF (Duty Free)	4.5	4.5	4.5	4.5
Airside Duty Free Space Requirement (sq. ft.)[1]	**0**	**0**	**500**	**2,300**

Notes:
All years are fiscal years ending September.
1. Space Requirements rounded to nearest hundred square feet.

Table 4.71
2026 Airside Space Requirements by Category

	Airside A	Airside C	Airside E	Airside F
Airside F&B Space Requirement				
Projected Airside Enplanements (000)	2,329.0	4,887.5	2,423.8	2,890.0
Airside Developed SUF (F&B)	5.6	5.7	5.6	5.6
Airside F&B Space Requirement (sq. ft.)[1]	**12,900**	**27,600**	**13,500**	**16,100**
Airside Retail Space Requirement				
Projected Airside Enplanements (000)	2,329.0	4,887.5	2,423.8	2,890.0
Airside Developed SUF (Retail)	4.7	4.6	4.6	4.6
Airside Retail Space Requirement (sq. ft.)[1]	**10,900**	**22,700**	**11,200**	**13,500**
Airside Duty Free Space Requirement				
Projected Airside Int'l Enplanements (000)	0.0	0.0	142.0	624.8
Airside Developed SUF (Duty Free)	4.5	4.5	4.5	4.5
Airside Duty Free Space Requirement (sq. ft.)[1]	**0**	**0**	**600**	**2,800**

Notes:
All years are fiscal years ending September.
1. Space Requirements rounded to nearest hundred square feet.

Table 4.72
2031 Airside Space Requirements by Category

	Airside A	Airside C	Airside E	Airside F
Airside F&B Space Requirement				
Projected Airside Enplanements (000)	2,577.9	5,538.2	2,818.2	3,417.7
Airside Developed SUF (F&B)	5.7	5.8	5.7	5.7
Airside F&B Space Requirement (sq. ft.)[1]	**14,600**	**31,900**	**16,100**	**19,500**
Airside Retail Space Requirement				
Projected Airside Enplanements (000)	2,577.9	5,538.2	2,818.2	3,417.7
Airside Developed SUF (Retail)	4.7	4.7	4.7	4.7
Airside Retail Space Requirement (sq. ft.)[1]	**12,200**	**26,000**	**13,200**	**16,200**
Airside Duty Free Space Requirement				
Projected Airside Int'l Enplanements (000)	0.0	0.0	159.0	730.3
Airside Developed SUF (Duty Free)	4.5	4.5	4.5	4.5
Airside Duty Free Space Requirement (sq. ft.)[1]	**0**	**0**	**700**	**3,300**

Notes:
All years are fiscal years ending September.
1. Space Requirements rounded to nearest hundred square feet.

Services Space Requirements

Although services such as foreign currency exchange, ATMs, business services, and shoe shine concessions do not necessarily generate significant revenues they are an important component to the overall concessions plan. Considering projected 2016 enplanements, 1,700 square feet of concession space should be allocated for Main Terminal and airside services as shown in **Table 4.73**. In 2021 and 2026, approximately 2,000 square feet is required for services and 2,300 square feet for 2031.

Support Space Requirements

Storage space requirements are estimated at 25% of the total revenue generating concession space requirements. Thus, approximately 35,300 square feet of storage space is required for 2016. Concessionaire office space requirements are estimated at 10% of the total revenue generating concession space requirements. For 2016, approximately 14,100 square feet of office space is required. As enplanements increase so do space requirements – support space requirements are estimated at 69,600 square feet for projected 2031 enplanements of approximately 14.4 million.

Total Space Requirements

Table 4.74 indicates that in total, approximately 141,200 square feet of concession space is required for 2016 considering projected enplanements of 9.6 million. For 2021, 158,500 square feet is required; 177,400 for 2026; and 199,700 for 2031.

Table 4.73
Space Requirements by Category and Location

	Existing Space[1]	Space Requirements				
		2011	2016	2021	2026	2031
Food & Beverage						
Airside A	13,407	9,600	9,900	11,400	12,900	14,600
Airside C	17,847	15,100	20,400	23,800	27,600	31,900
Airside E	9,352	9,500	9,400	11,300	13,500	16,100
Airside F	11,228	8,900	10,900	13,300	16,100	19,500
Main Terminal	30,401	30,400	30,400	30,400	30,400	30,400
Subtotal	82,235	73,500	81,000	90,200	100,500	112,500
Retail						
Airside A	2,623	8,500	8,600	9,700	10,900	12,200
Airside C	2,923	12,800	17,100	19,700	22,600	26,000
Airside E	2,961	8,200	8,000	9,500	11,200	13,200
Airside F	2,406	7,800	9,400	11,300	13,500	16,200
Main Terminal	13,253	13,300	13,300	13,300	13,300	13,300
Subtotal	24,166	50,600	56,400	63,500	71,500	80,900
Duty Free						
Airside E	621	300	400	500	600	700
Airside F	740	600	1,700	2,300	2,800	3,300
Subtotal	1,361	900	2,100	2,800	3,400	4,000
Services						
Airside A	0	100	100	200	200	200
Airside C	0	200	300	400	400	500
Airside E	0	200	200	300	300	400
Airside F	47	200	300	300	300	400
Main Terminal	799	800	800	800	800	800
Subtotal	846	1,500	1,700	2,000	2,000	2,300
Subtotal Revenue/Sales Space	108,608	126,500	141,200	158,500	177,400	199,700
Support Spaces						
Storage Space[2]	16,504	31,600	35,300	39,600	44,400	49,900
Office Space[3]	4,726	12,700	14,100	15,900	17,700	20,000
Subtotal	21,230	44,300	49,400	55,500	62,100	69,900
Total Concessions Space	**129,838**	**170,800**	**190,600**	**214,000**	**239,500**	**269,600**

Notes:
1. Existing Space as of 7/31/2012.
2. Storage Space equals 25% of total Revenue/Sales Space.
3. Office Space equals 10% of total Revenue/Sales Space.

Table 4.74
Summary of Space Requirements

	Existing Space	2016	2021	2026	2031
Airside A	16,030	18,600	21,300	24,000	27,000
Airside C	20,770	37,800	43,900	50,600	58,400
Airside E	12,934	18,000	21,600	25,600	30,400
Airside F	14,421	22,300	27,200	32,700	39,400
Main Terminal	44,453	44,500	44,500	44,500	44,500
Total Revenue/Sales Space	**108,608**	**141,200**	**158,500**	**177,400**	**199,700**
Projected Enplanements (000)		*9,567*	*10,946*	*12,530*	*14,352*

Source: Projected Enplanements provided by HNTB (May 9, 2012)

4.2.8.5 HCAA Offices and Support Spaces

Existing Conditions

The Hillsborough County Aviation Authority has offices and support spaces on several levels of the terminal and on the ramp and boarding levels at each airside. HCAA has a board room and executive offices located on the south side of the Transfer Level. There is a new network operations center (NOC) located at the east end of the Ticketing Level. The two-story HCAA administrative building located across the Red Curb from the Main Terminal houses HCAA staff, police, security badging offices and maintenance shops. Rooms on each airside are used for storage of supplies and cleaning equipment.

Planning and Performance Criteria

Future facility requirements for HCAA office space were discussed with HCAA Planning and Development senior staff, who report that HCAA administrative office space was nearing capacity in late 2011. It was determined that growth of HCAA office space will be based on adding one additional office and two new cubicles with associated circulation space every 5 years throughout the planning period. This equates to approximately 550 sf of new office space.

Facility Requirements

Additional space requirements of 550 sf every 5 years are programmed to support Aviation Authority growth at HCAA.

4.2.8.6 Loading Docks

Existing Conditions

Loading docks and trash compactor areas that are located under each of the airsides and at the service building are included in this category.

Planning and Performance Criteria

HCAA Planning and Development staff report that existing loading dock facilities are properly sized for the foreseeable future.

Facility Requirements

No additional loading dock area is proposed.

4.2.8.7 Unused/Unfinished Areas

Existing Conditions

Un-leased, unfinished or unoccupied areas identified during the inventory process are placed in this category.

Planning and Performance Criteria

Unused/unfinished areas are existing surplus spaces that may be converted into functional areas once a use is identified in the future. Such areas are not planned and no future requirement for these spaces is projected.

Facility Requirements

None.

4.2.8.8 Concessionaire Offices

Existing Conditions

Concessionaire offices were identified on the Mezzanine Level of Airside E.

Planning and Performance Criteria

As noted in Section 4.2.8.4, concessionaire office space requirements are estimated at 10% of the total revenue generating concession space requirements.

Facility Requirements

There was an estimated shortfall of 6,800 sf of concessionaire office space in 2011, growing to a 14,100 sf shortfall by 2016. The larger office requirements support anticipated multiple concessionaires serving the airport under future concessions contracts.

4.2.8.9 United Services Organization (USO)

Existing Conditions

The airport has constructed a new 1,400 sf USO facility on the Ticketing Level behind the British Airways ticket counters. This new space is included in the inventory of existing facilities.

Planning and Performance Criteria

HCAA senior staff anticipates the USO facility is adequately sized for the Master Plan period.

Facility Requirements

No additional USO space is projected through the planning period.

4.2.8.10 Public Restrooms

Existing Conditions

Public restrooms are located on each level of the Main Terminal and on Airside levels that are accessible to passengers. Most restroom cores have been updated to contain unisex special assistance restrooms near the larger men's and women's restrooms. This category also includes area for janitor closets adjacent to restroom cores.

Planning and Performance Criteria

Airport public restrooms are typically not adequately sized when using building or plumbing codes as the sole guidance; even those codes designated for "Transportation Facilities". HNTB recommends the following industry proven planning factors to calculate airport restroom requirements:

- 4 sf per peak hour passenger for secure-side restrooms (Airsides)
- 2 sf per peak hour passenger for non-secure side restrooms (Terminal area)

Facility Requirements

Restroom area requirements are calculated in **Table 4.75**.

Table 4.75
Restroom Requirements

Location	Existing Area (sf)	Peak Hr Pax		Area Req't (sf)	
		2011	2031	2011	2031
A	6,132	546	739	2,184	2,956
C	8,219	876	1,624	3,504	6,496
E	5,693	602	886	2,408	3,544
F	3,629	539	928	2,156	3,712
Terminal	17,146	4,450	7,434	8,900	14,868
Total	**40,819**			**19,152**	**31,576**

Assumptions: 4 sf/pk hr pax secure side
2 sf/pk hr pax non-secure side

Source: HNTB Analysis, July 2012

The existing restrooms at Airsides A, C, and E and in the terminal appear to be adequately sized to serve demand through the planning horizon. Airside F restrooms are slightly undersized for the forecasted peak passenger period in 2031 (deficiency = 83 sf). The average space in a restroom per fixture is 55 sf. Therefore, this shortfall equates to approximately 1 ½ fixtures. The restrooms at Airside F will begin approaching LOS C by 2031, but should not exceed that acceptable threshold.

4.2.9 Areas Dependent on Building Configuration

Some building areas are highly dependent on the terminal's configuration and difficult to define during the programming phase. Therefore, a percentage of the total building is determined for mechanical, electrical, plumbing (MEP) areas and information technology (IT) services, circulation spaces, common tug drives, and miscellaneous space. The percentages of building area these existing areas occupy are used to determine future requirements. During the inventory analysis, each area is studied to determine if surpluses or deficiencies exist and these findings are applied as future space requirements are developed.

4.2.9.1 Mechanical, Electrical, Plumbing (MEP) and Information Technology (IT) Areas

Existing Conditions

The areas designated for utilities and building services include non-public areas allocated for the operation and maintenance of the terminal facilities. Facilities supporting these services include mechanical and electrical rooms, telephone and communication equipment rooms, horizontal and vertical rights-of-way for distribution of mechanical, electrical, and communication systems, storage areas, APM maintenance areas and trade workshops. The majority of these facilities are located on the ramp level of the Airsides and at Level 1 of the Administrative Office Building. MEP and IT areas occupy 10.1% of the total existing building area.

Planning and Performance Criteria

Discussions with HCAA Maintenance staff determined the existing space dedicated to MEP and IT areas is reasonably sized, particularly at the newer airsides. HNTB's work at similarly sized airport terminals has typically found MEP and IT areas occupy between 9.5% and 10.5% of the total building area.

Facility Requirements

MEP and IT area requirements are assumed to occupy 10% of the overall terminal area.

4.2.9.2 Circulation

Existing Conditions

Circulation areas include public and non-public circulation areas, and vertical circulation (stairs, escalators, and elevators). The Baggage Claim Level has a 40-foot wide public circulation area on the Red and Blue sides, except near elevators and escalators where the width is reduced to 30 feet. The Ticketing Level has public circulation area between each ticket counter with cross circulation paths at the ends of the ticket counters. There are four banks of six elevators and four escalator banks connecting the Baggage Claim, Ticketing and Transfer Levels. The elevator banks also serve the short-term parking decks above the Main Terminal Building. Eight escalators allow passengers to connect from the Ticketing Level to the Transfer Level. Eight Escalators connect the Transfer Level to the Baggage Claim Level and two escalators run from the Transfer Level to the Ticketing Level. Passengers on the Baggage Claim Level can use two sets of escalators and two sets of stairs on each side to access the Ticketing Level.

The Transfer Level accommodates a large amount of circulation space situated between concessions, along the arcade leading to the Marriott Hotel, around the vertical circulation cores and encompassing the Automated Guideway Transit System (AGTS) shuttle stations. Circulation space includes public seating areas and meeter-greeter waiting areas near the AGTS station exits. Each AGTS station has three platforms that serve two shuttle car units. Outbound passengers board on the center platform and inbound passengers exit the shuttles from the outer platforms.

Each airside has circulation space associated with the APM station, corridors off of which holdrooms are situated, vertical circulation between levels, and back-of-house corridors connecting offices, mechanical rooms, storage areas, and loading docks.

Existing circulation areas occupy approximately 24.9% of the total passenger terminal complex.

Planning and Performance Criteria

The Transfer Level circulation areas between the escalator cores and the APM stations were a specific area of concern identified by HCAA early in the planning process. During 2007, prior to the economic downturn, these areas were becoming increasingly congested. There are four primary types of people occupying these spaces: 1) originating passengers going to the APM stations, 2) well-wishers escorting their passengers to the APM stations, 3) deplaning passengers going from the APM stations to the vertical circulation cores (to baggage claim, curbs, or parking), and 4) meeter/greeters waiting for their passenger to exit the APM station. The following assumptions were used to evaluate the performance of the passenger transfer area:

- All Arriving and Departing Passengers pass through the Transfer Level of the Terminal Building.
- All Departing Passengers take elevators or escalators up from Ticketing Level.
- All Arriving Passengers take escalators or elevators up or down depending on whether they are going to the Baggage Claim Level or parking.
- Meeter/greeters and well-wishers wait for or send off passengers at an area located between the escalators and the APM stations.
- Two ID check personnel are available for each airside except for Terminal C under 2031 flight demand which will utilize four ID check personnel.
- The ID check rate is assumed to be 8.6 seconds per passenger group.
- Well-wishers are assumed to be 10% of enplaning passengers. Meeter/Greeters are assumed to be 6.3% of all deplaning passengers, according to the airport's 2010 passenger survey.

- It is assumed that 10% of passengers use elevators and 90% of passengers use escalators to transfer.
- Departing passengers and well-wishers are assumed to spend 5 – 10 minutes in the area before passengers join the ID check queues if their scheduled departure time is at least 50 minutes away.
- Departing passengers and well-wishers are assumed to spend no additional time in the waiting area before passengers join the ID check queues if their scheduled departure time is less than 50 minutes away.

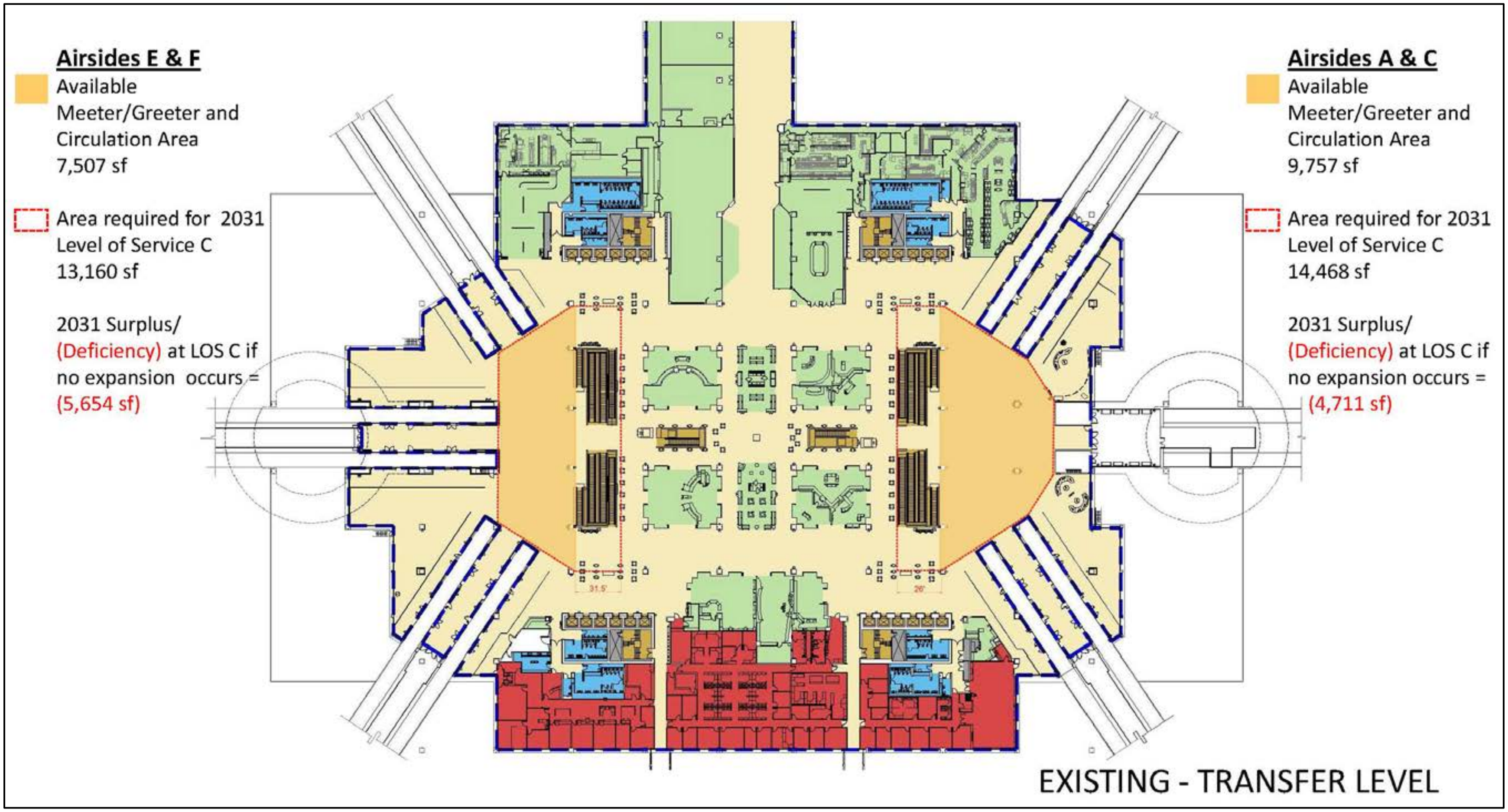
The Passenger Transfer Area was evaluated using the following criteria:

- Passenger queuing area at ID check point prior to boarding shuttles should provide a LOS C or better at all times. This is defined by IATA as 10.8 ft^2 of personal space per passenger. The IATA LOS definition for SSCP utilized for ID check area is shown in **Table 4.76**.
- The meeter/greeters and well-wishers standing and seating area between the escalators and the APM stations should provide a LOS C or better at all times. This is defined by IATA as 20.5 ft^2 of personal space per passenger. The IATA LOS definition for waiting/circulating area is shown in Table 4.68.
- The circulation path between the escalators and the APM stations should provide a LOS C or better at all times.

Figure 4.76 shows the existing Transfer Level and available meeter/greeter waiting and circulation areas. The 2031 requirement for waiting and circulation areas determined by simulation modeling is illustrated by red dashed lines, which extend over the escalator cores on both sides of the terminal. It is not practical to relocate the escalator cores to create additional space for these waiting areas. Therefore, other solutions to provide additional space must be explored.

One of the challenges inherent to the APM station configuration is the need for meeter/greeters to positions themselves such that they can see both exits of the APM station so they don't miss the arrival of their passenger(s). This, coupled with the center platform entrance to the station, creates a mix of passengers coming and going along with their meeter/greeters and well-wishers all trying to occupy or pass through the same space. Ideally, departing passengers and their well-wishers are segregated from arriving passengers and their meeter/greeters. Additionally, well defined waiting areas help to provide clear circulation paths to and from the station.

Figure 4.76
Existing Transfer Level – Available Meeter/Greeter and Well-Wisher Areas



Source: HNTB Corporation, September 2012.

Table 4.76
IATA Level of Service Standards (ft^2/pax)

Airport Area	A	B	C	D	E
SSCP/ID Check	15.1	12.9	10.8	8.6	6.5
Wait/Circulate	29.1	24.8	20.5	16.1	10.8

Source: IATA Airport Development Reference Manual, 9th edition, 2004

Facility Requirements

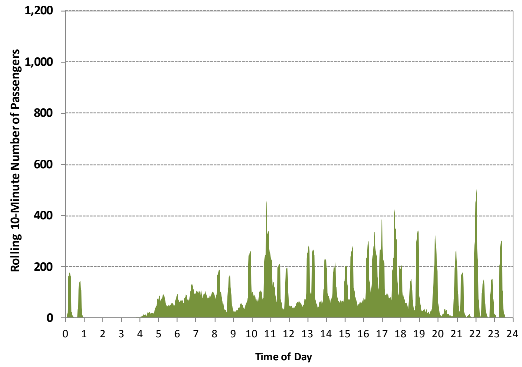
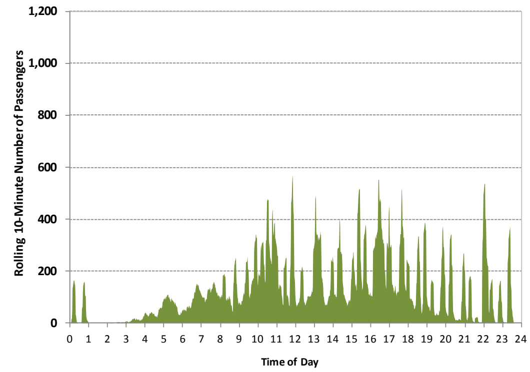
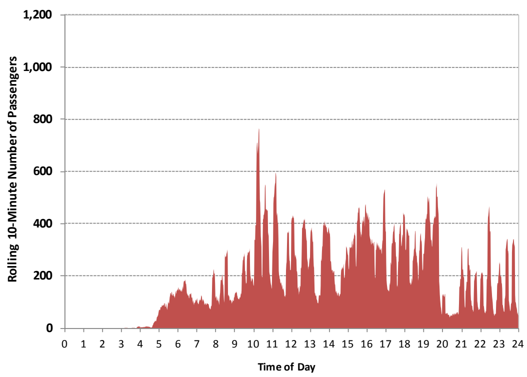
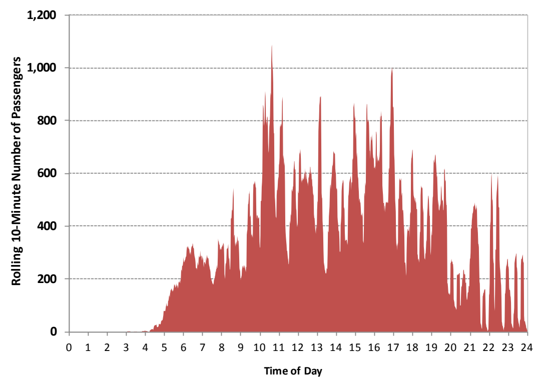
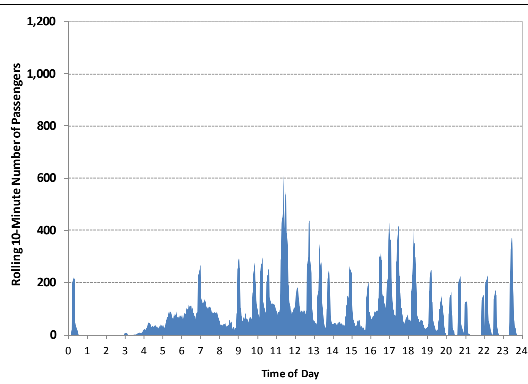
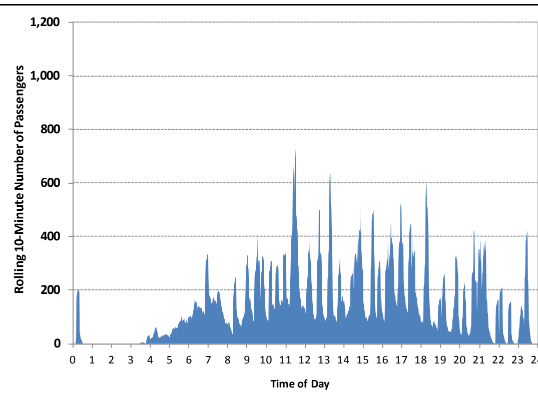
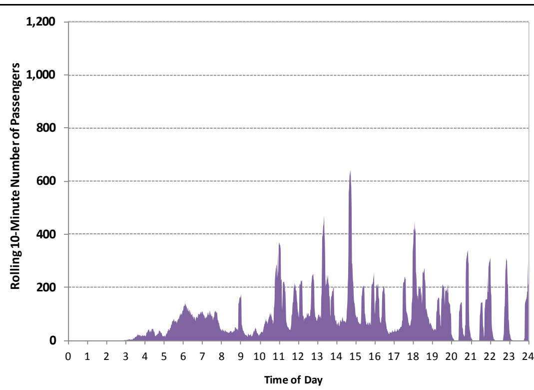
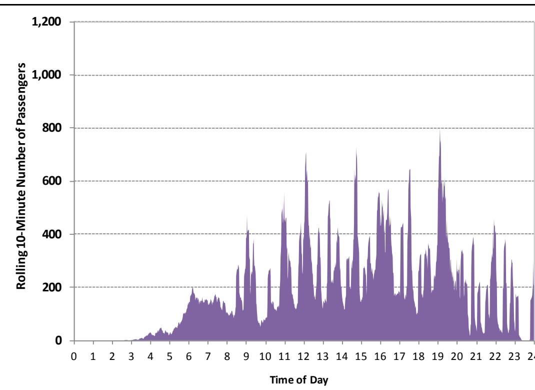
Assuming all flights are on schedule, the peak 10-minute combining Departing Passengers and Arriving Passenger counts at Transfer level escalators for airside A, C, E and F of the 2011 and 2031 flight schedules are shown in **Table 4.77** and **Figure 4.77**.

Table 4.77
Peak Hour Passenger Counts at Transfer Level

Location	2011 Schedule		2031 Schedule	
	Rolling 10-Minute Peak Time	Rolling 10-Minute Number of Passengers	Rolling 10-Minute Peak Time	Rolling 10-Minute Number of Passengers
Airside A	22:05 - 23:04	505	11:52 - 12:51	566
Airside C	10:17 - 11:16	765	10:38 - 11:37	1,088
Airside E	11:23 - 12:22	610	11:31 - 12:30	730
Airside F	14:44 - 15:43	642	19:05 - 20:04	799

Source: TransSolutions simulation modeling, July 2012

Figure 4.77
Rolling-10 Minute Numbers of Passengers

<table>
<tr><th>Airside</th><th>2011 Flight Schedule</th><th>2031 Flight Schedule</th></tr>
<tr><td>A</td><td>
</td><td>
</td></tr>
<tr><td>C</td><td>
</td><td>
</td></tr>
<tr><td>E</td><td>
</td><td>
</td></tr>
<tr><td>F</td><td>
</td><td>
</td></tr>
</table>

Source: TransSolutions simulation modeling, July 2012

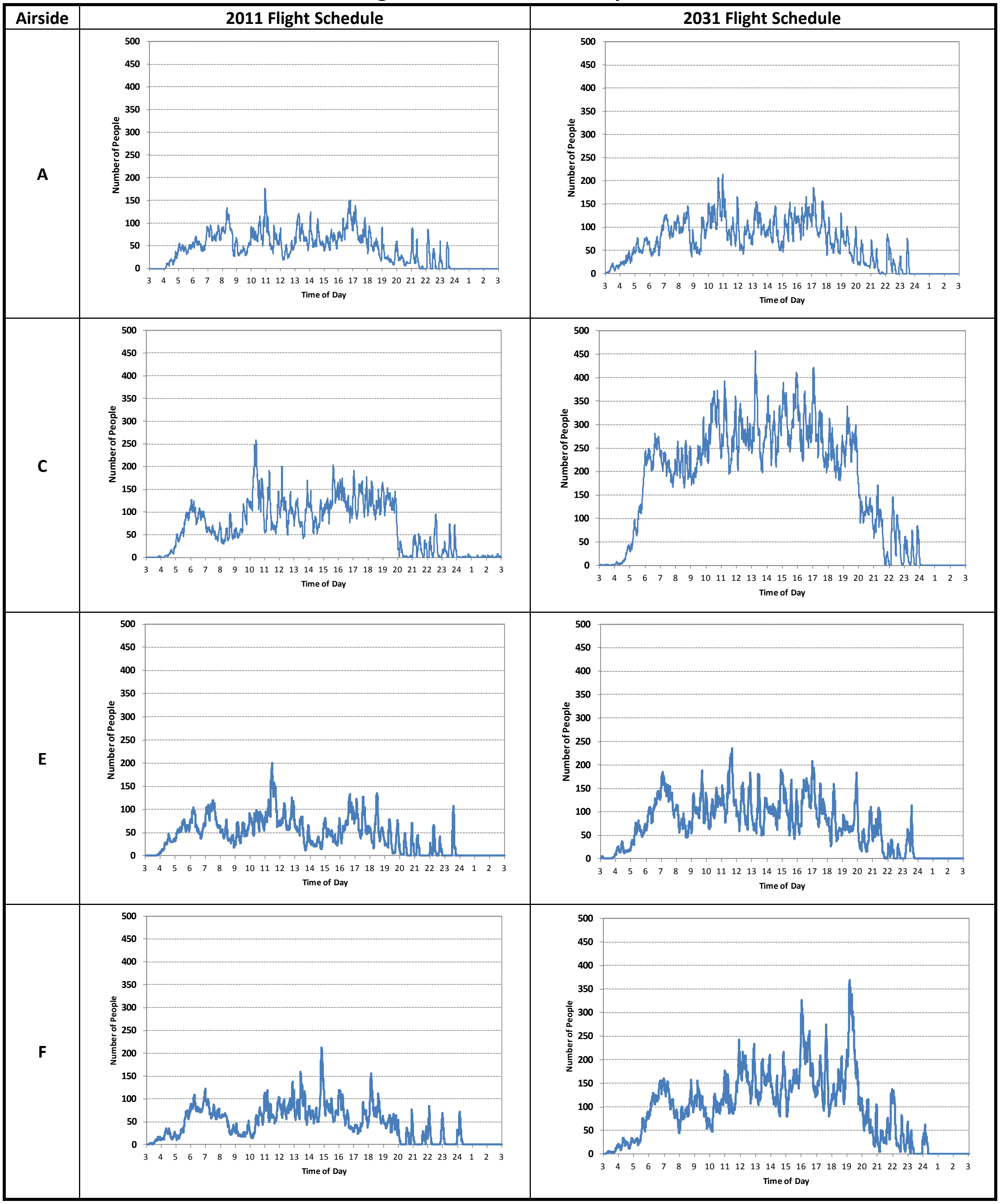
The maximum number of passengers and visitors occupying the waiting areas and the required space to provide LOS C for each airside APM station at the 2011 and 2031 demand levels are shown in **Table 4.78** and **Figure 4.78**.

Table 4.78
Waiting Area Occupancies

Waiting Area Airside	2011 Flight Schedule		2031 Flight Schedule	
	Maximum Occupancy (people)	Area Required to provide LOS C (ft2)	Maximum Occupancy (people)	Area Required to provide LOS C (ft2)
Airside A	176	3,608	215	4,408
Airside C	259	5,310	457	9,369
Airside E	201	4,121	235	4,818
Airside F	213	4,367	369	7,565

Source: TransSolutions simulation modeling, July 2012

Figure 4.78
Waiting Area Number of Occupancies



Source: TransSolutions simulation modeling, July 2012

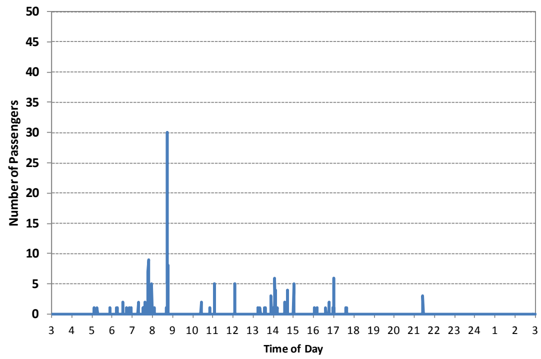
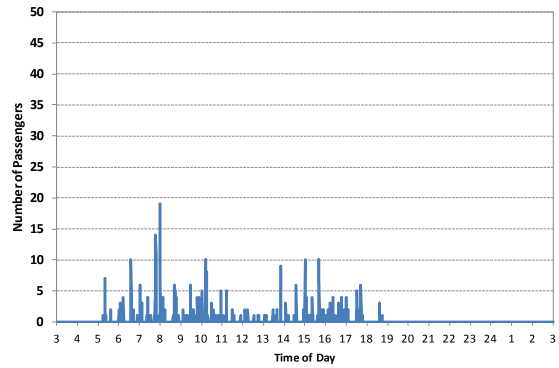
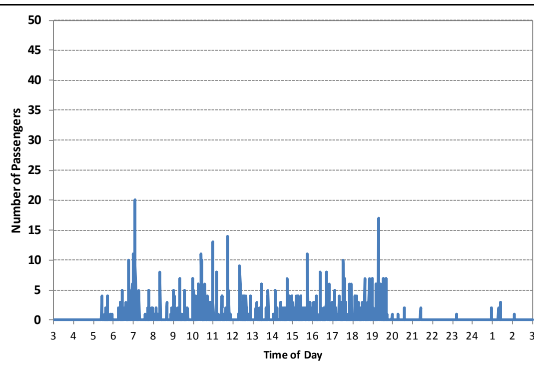
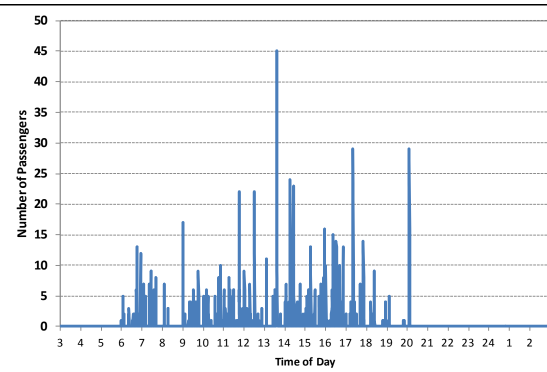
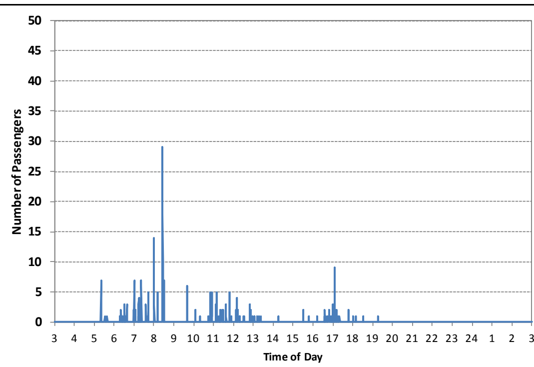
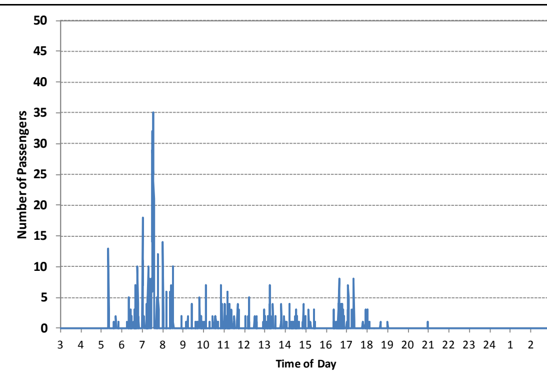
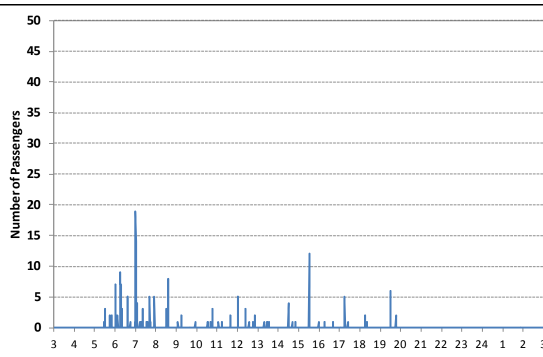
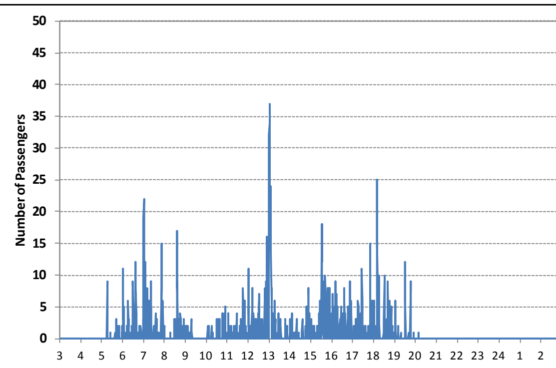
The maximum number of passengers queuing at ID check throughout the day for the 2011 and 2031 demand levels, and the required space to provide LOS C at the queuing areas for each airside are shown in **Table 4.79** and **Figure 4.79**.

Table 4.79
ID Check Queuing Area Maximum Queue and Required Space for LOS C

Queuing Area Airside	2011 Flight Schedule		2031 Flight Schedule	
	Maximum Queue (pax)	Queuing Area Required to provide LOS C (ft2)	Maximum Queue (pax)	Queuing Area Required to provide LOS C (ft2)
Airside A	30	324	19	205
Airside C	20	216	45	486
Airside E	29	313	35	378
Airside F	19	205	37	400

Source: TransSolutions simulation modeling, July 2012

Figure 4.79
ID Check Queuing Area Numbers of Passengers

Airside	2011 Flight Schedule	2031 Flight Schedule
A		
C		
E		
F		

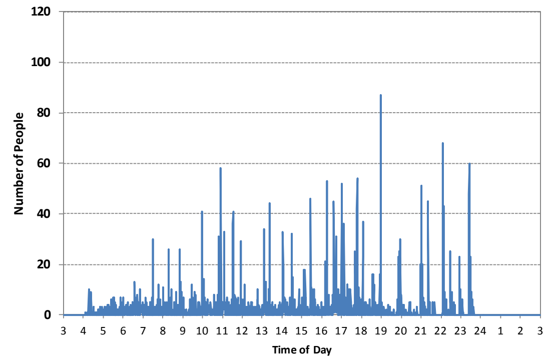
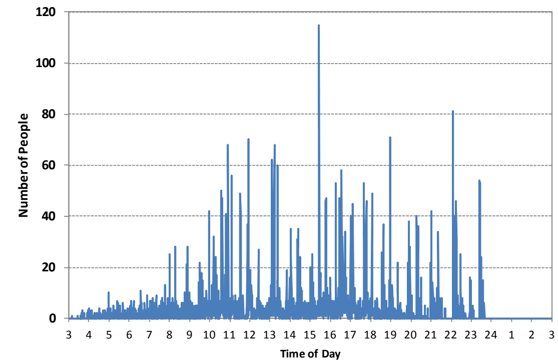
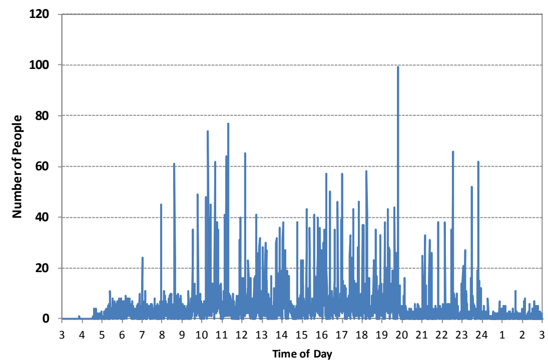
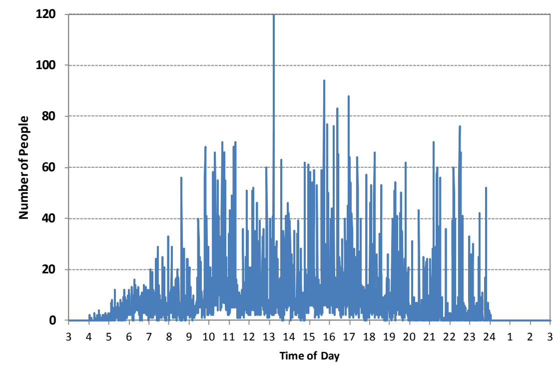
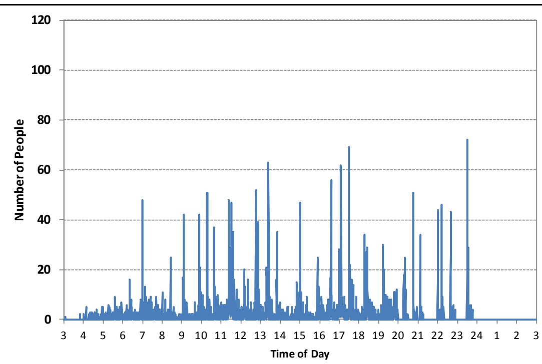
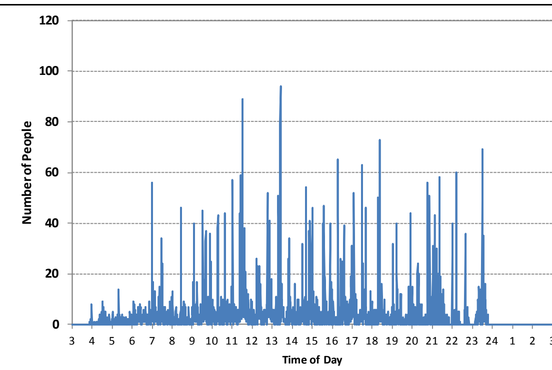
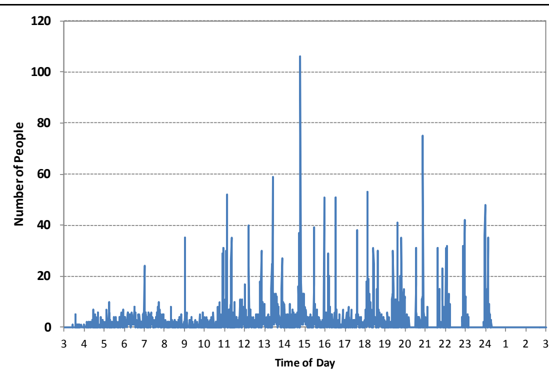
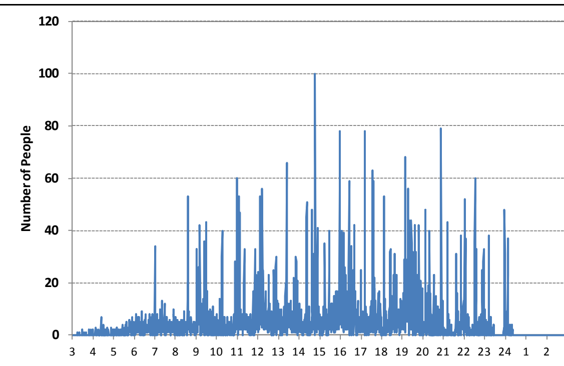
The maximum number of passengers and visitors in the circulation areas between the elevators, escalators, waiting areas and entrance/exit of APM shuttles throughout the day for the 2011 and 2031 demand levels for each airside are shown in **Table 4.80** and **Figure 4.80**.

Table 4.80
Maximum Number of People in Circulation Path

Airside Destination	2011 Flight Schedule	2031 Flight Schedule
	Maximum Number of People	Maximum Number of People
Airside A	87	115
Airside C	99	120
Airside E	72	94
Airside F	106	100

Source: TransSolutions simulation modeling, July 2012.

Figure 4.80
Circulation Path Number of People

Airside	2011 Flight Schedule	2031 Flight Schedule
A		
C		
E		
F		

Source: TransSolutions simulation modeling, July 2012

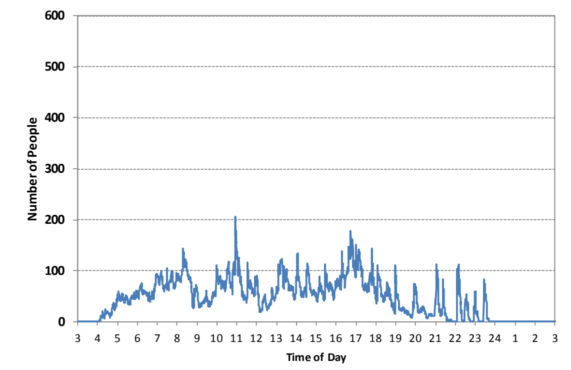
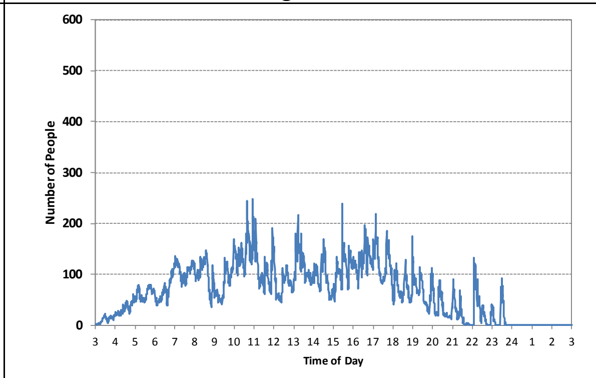
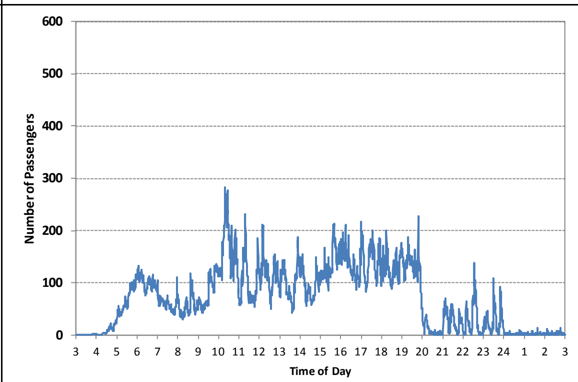
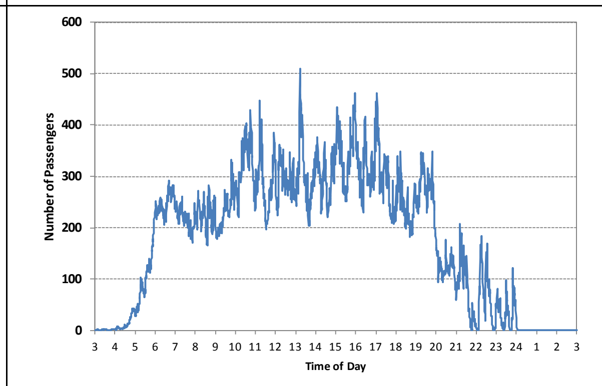
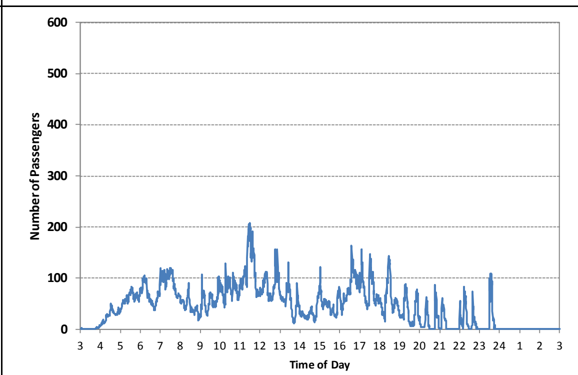
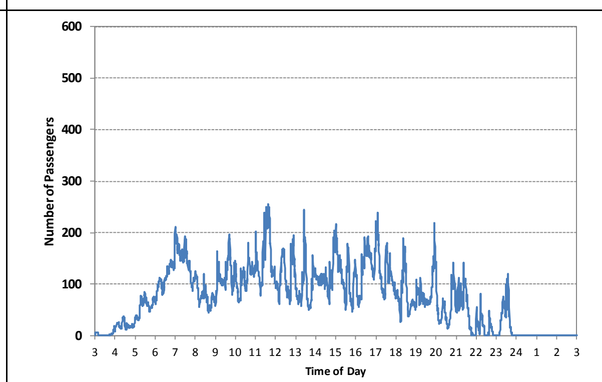
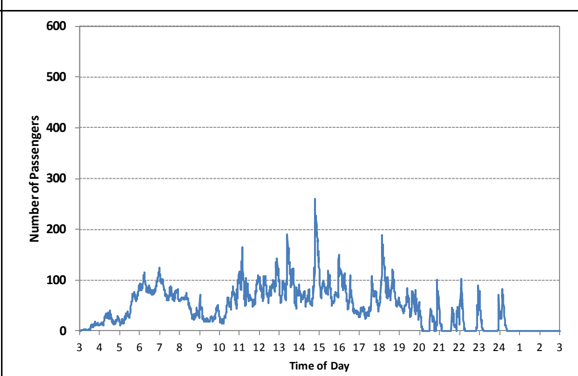
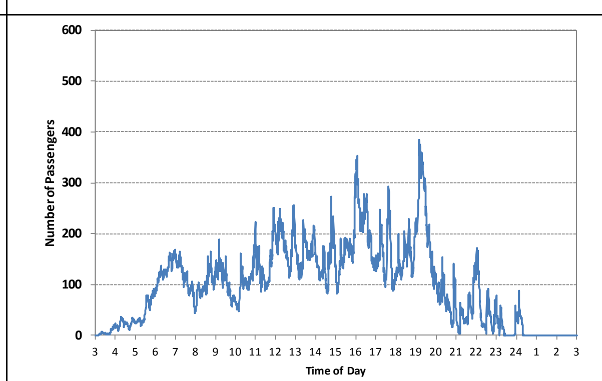
The overall number of passengers and visitors in circulation areas, waiting areas and ID check queues throughout the day for the 2011 and 2031 demand levels are shown in **Table 4.81** and **Figure 4.81**.

Table 4.81
Overall Maximum Occupancies at Transfer Areas

Airside Destination	2011 Flight Schedule	2031 Flight Schedule
	Maximum Occupancy (People)	Maximum Occupancy (People)
Airside A	206	247
Airside C	282	509
Airside E	208	256
Airside F	260	385

Source: TransSolutions simulation modeling, July 2012

Figure 4.81
Overall Occupancies at Transfer Areas

Airside	2011 Flight Schedule	2031 Flight Schedule
A		
C		
E		
F		

Source: TransSolutions simulation modeling, July 2012

4.2.9.3 Tug Drives

Existing Conditions

In the Main Terminal Building, common-use parallel east-west tug drives are primarily used by tugs pulling baggage carts delivering bags to baggage claim and for taking oversize bags to the Airsides. At the Airsides and Airside Sort Buildings, tug drives allow baggage cart circulation to and from cart staging areas located around baggage make-up carousels and sort piers. There is also an open-air driveway running beneath Airside A that is classified as a Tug Drive area. Tug drives occupy approximately 6.9% of the total passenger terminal complex.

Planning and Performance Criteria

Observations and discussions with HAS staff determined the existing tug drives are adequately sized and configured for the existing operation.

Facility Requirements

Future tug drive area requirements are based on 6.9% of the total passenger terminal complex area requirements.

4.2.9.4 Miscellaneous Space

Existing Conditions

Miscellaneous space includes interstitial space, wall cavities, and other unoccupied spaces, including structural columns that are found when conducting area take-offs. These spaces are subtracted from another category because they generally cannot be occupied by passengers or other functional purposes. Approximately 4.5% of the total building complex is classified as Miscellaneous Space.

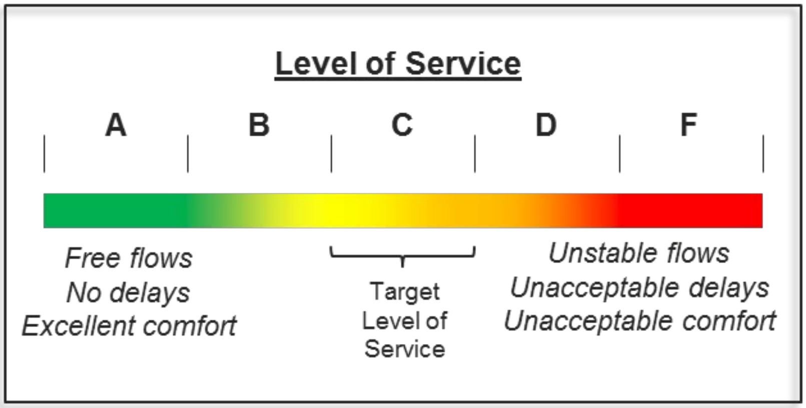
Facility Requirements

The estimated area occupied by these miscellaneous spaces is calculated at 4.5% of the total passenger terminal area requirements.

4.2.10 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 4.82**. Typically, terminal elements are planned to LOS C. **Figures 4.83 – 4.87** 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 28.7 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, particularly the deficiencies, described in Section 4.2 of this document.

Figure 4.82
Stoplight Chart Level of Service Key



Source: HNTB Corporation, December 2012

Figure 4.83
Stoplight Chart - Main Terminal

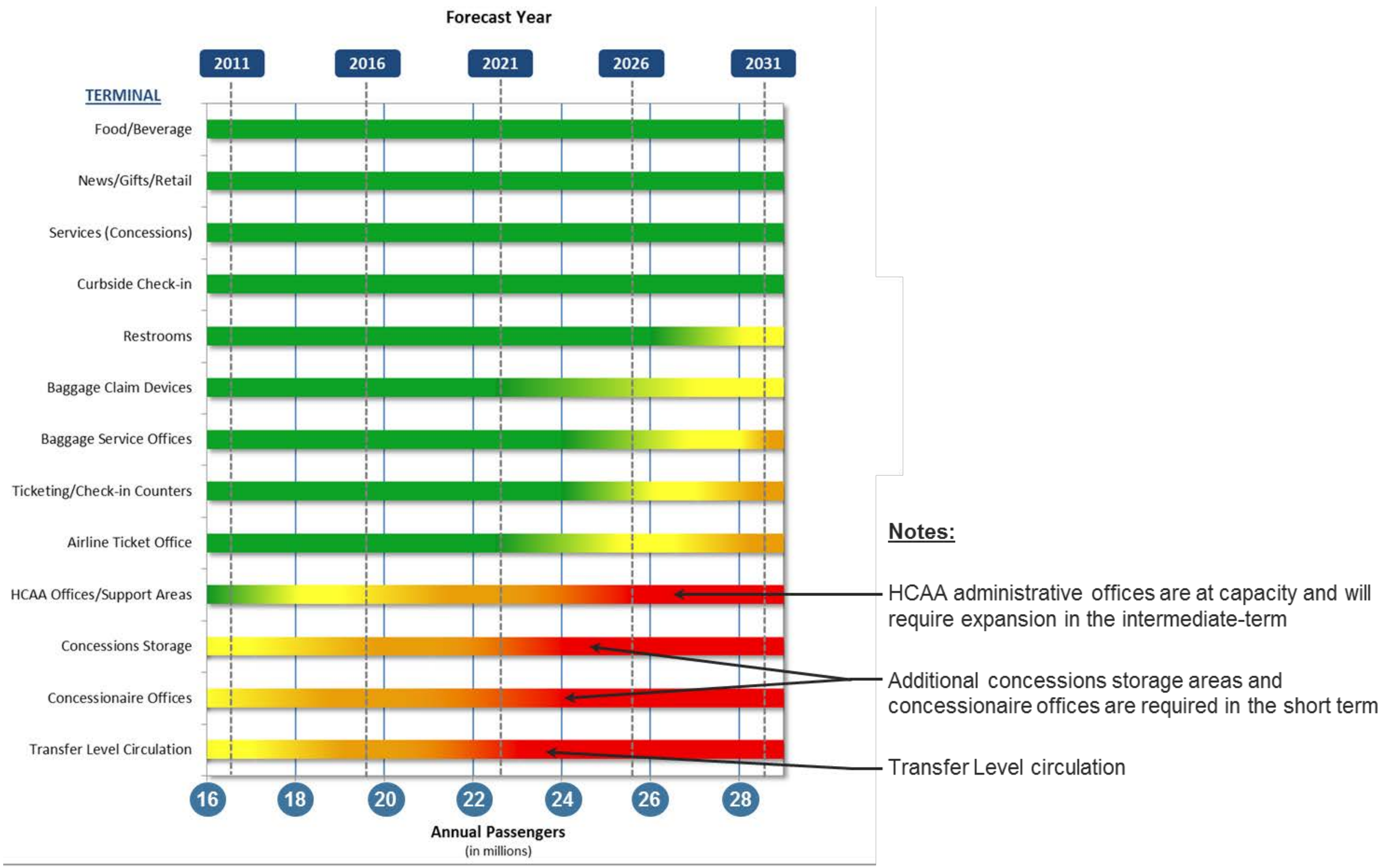
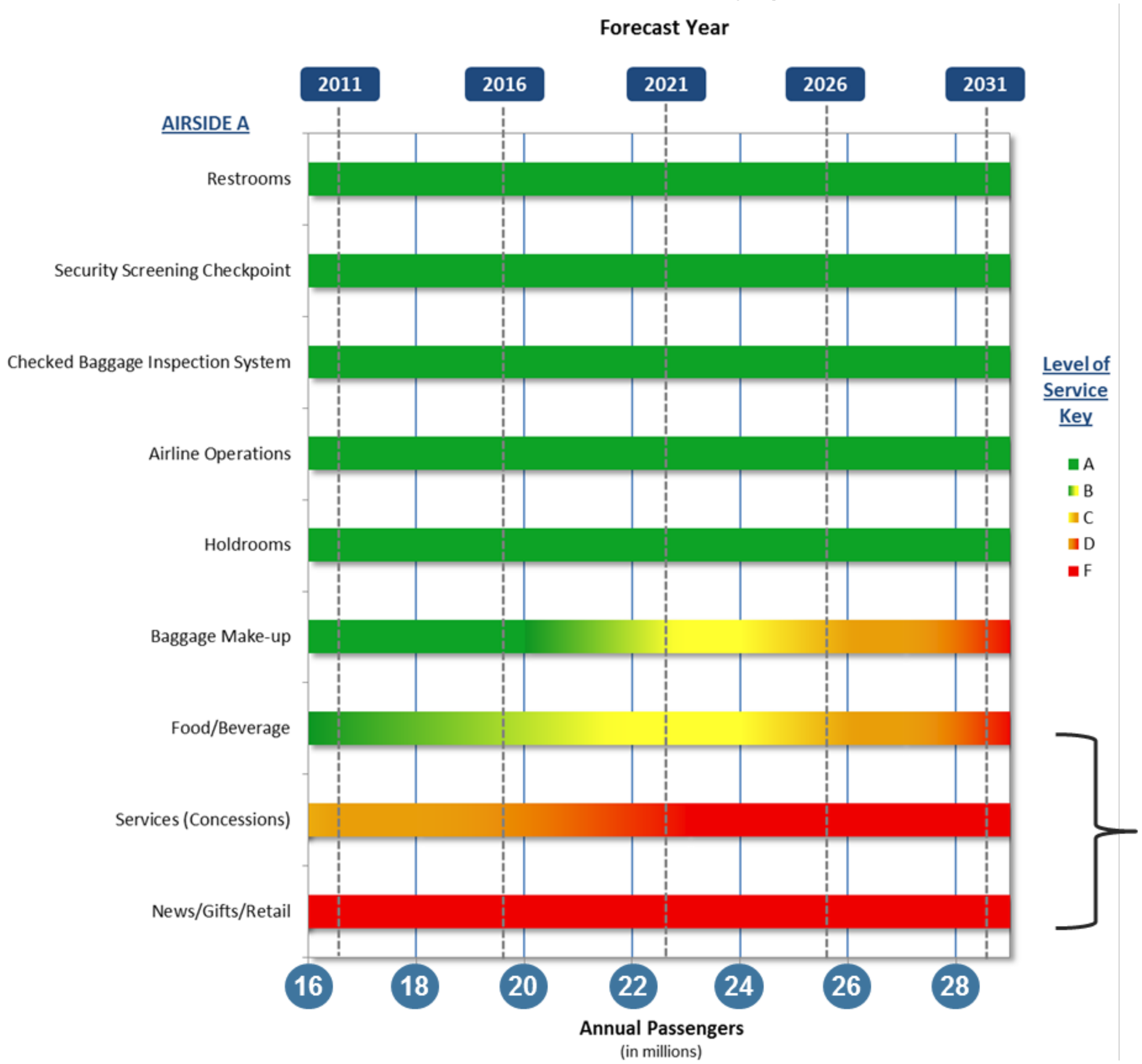


Figure 4.84
Stoplight Chart – Airside A



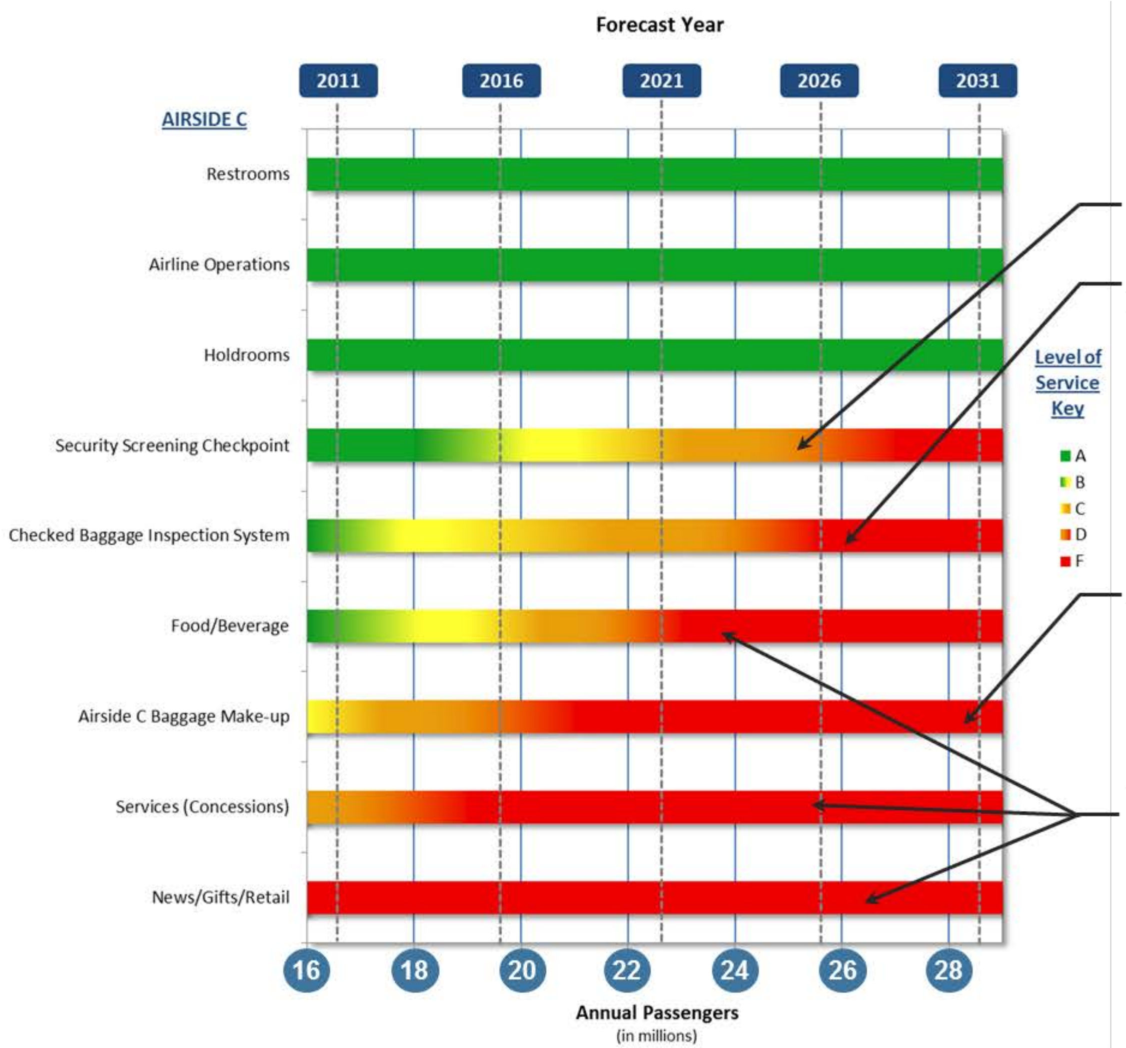
Notes:

Airside A concessions should be expanded:

2031 Deficiencies:

- Food & Beverage – 1,200 sf
- Services - 200 sf
- News/Gifts/Retail - 9,600 sf
- TOTAL 11,000 sf

Figure 4.85
Stoplight Chart – Airside C



Notes:

Security checkpoint grows from 8 to 12 lanes

Airside C baggage screening requires modifications to accommodate anticipated demand

Airside C baggage make-up area was nearing capacity in 2011 and is projected to require a carousel supporting 21 additional cart positions

Airside C concessions should be expanded

2031 Deficiencies:

- Food & Beverage – 14,000 sf
- Services - 500 sf
- News/Gifts/Retail - 23,100 sf
- TOTAL 37,600 sf

Figure 4.86
Stoplight Chart – Airside E

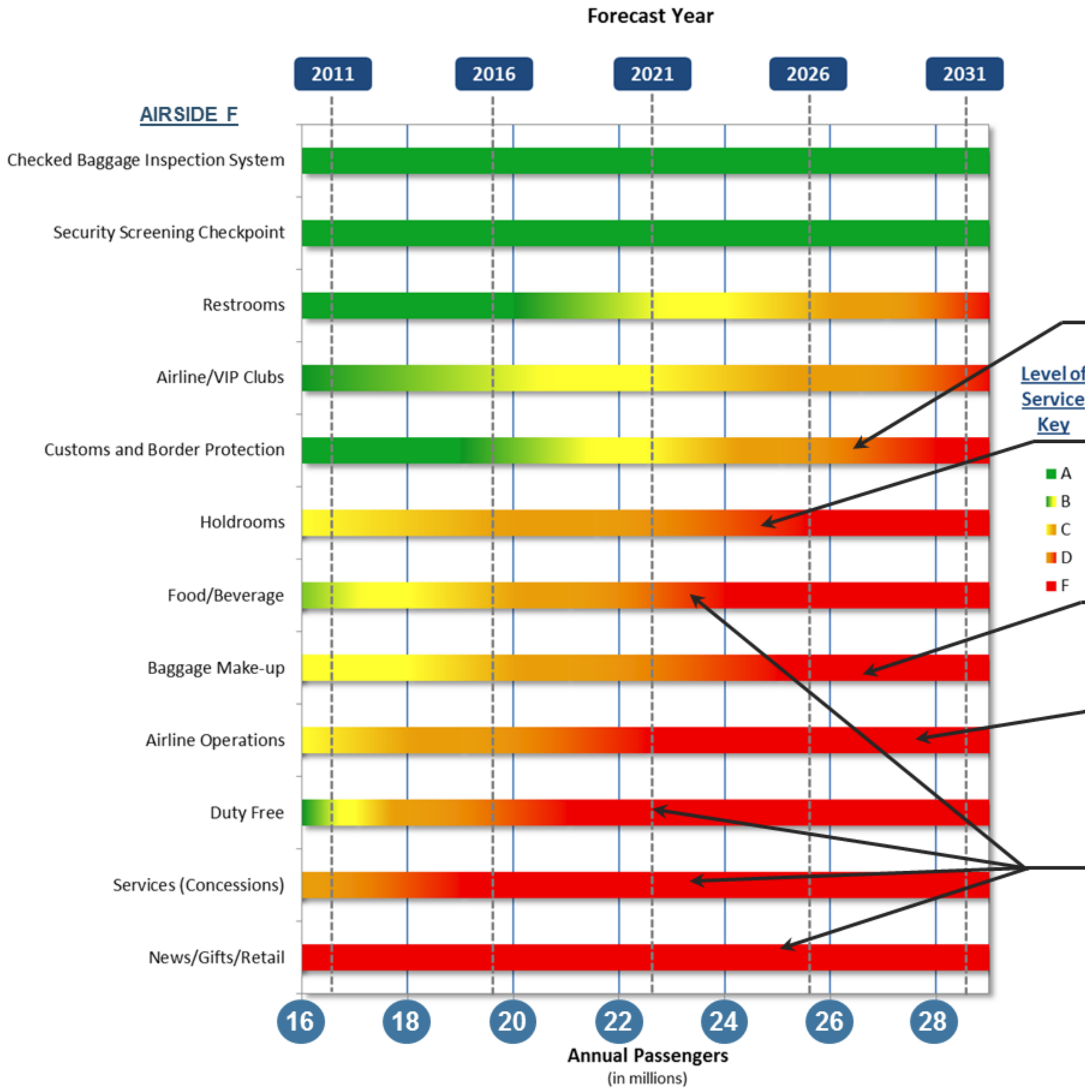
Notes:

Airside E concessions should be expanded

2031 Deficiencies:

• Food & Beverage –	1,200 sf
• Services -	200 sf
• News/Gifts/Retail -	9,600 sf
• Duty Free -	700 sf
• TOTAL	11,700 sf

Figure 4.87
Stoplight Chart – Airside F



Notes:

Customs and Border Protection reaches capacity

An additional 4,600 sf of holdroom area is required

Airside F baggage make-up area is at capacity, unless carousels are shared by international carriers

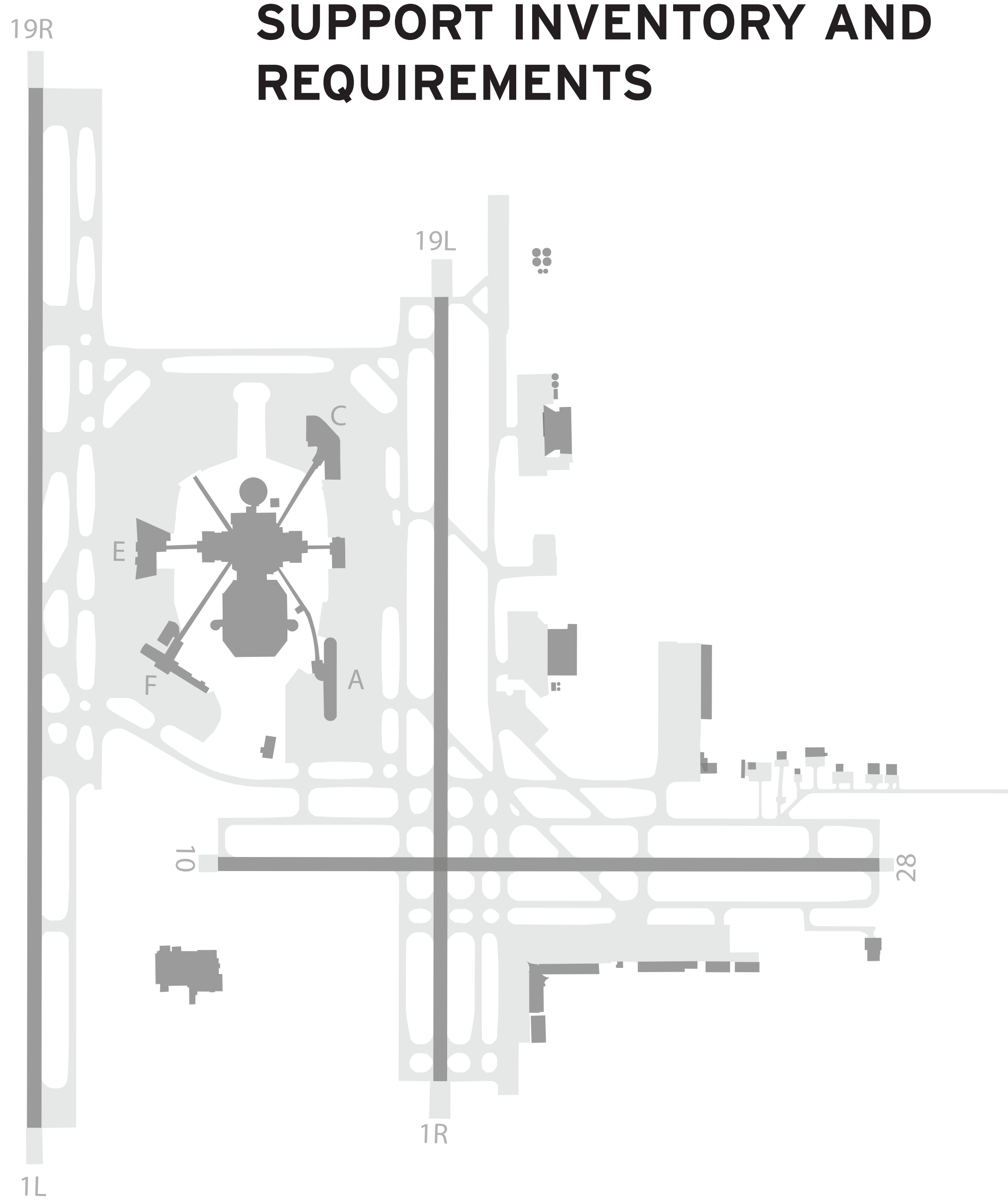
No available airline operations space for new entrants

Airside F concessions should be expanded

2031 Deficiencies:

- Food & Beverage – 8,300 sf
- Duty Free - 2,550 sf
- Services - 400 sf
- News/Gifts/Retail - 13,800 sf
- TOTAL 25,050 sf

LANDSIDE TERMINAL SUPPORT INVENTORY AND REQUIREMENTS



4.3 Landside Terminal Support Inventory and Requirements

4.3.1 Inventory of Existing Facilities

This section describes the existing landside terminal support facilities at TPA. Included among these elements are the following:

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

One of the major components of the landside access system at TPA is the on-airport circulating roadway, known as the George J. Bean Parkway (Bean Parkway). The Bean Parkway serves as the interface between the regional highway system, the terminal area and its related primary destinations — the terminal area curbside system, public and employee parking facilities, and the on-airport rental car facilities.

4.3.1.1 Regional Access

Regional access to TPA is provided by the interstate highway system, a toll road, and major north-south and east-west arterial roadways. The most significant facilities are I-275 from the west and south, SR 60 (Memorial Highway and Courtney Campbell Causeway) from the south and west, Memorial Highway/Veterans Expressway (SR 589) from the west and north, Dale Mabry Highway from the north and south, Spruce Street/Boy Scout Blvd from the east, and Hillsborough Avenue from the east and west. With the exception of Dale Mabry Highway and Hillsborough Avenue, the above roadways are connected to the George J. Bean Parkway, the main entrance to the airport. Hillsborough Avenue provides access to the air cargo complex and employee parking on the north side of the airport via Hoover Blvd. Cargo Road, which is on the east side of the airport, provides access to airport maintenance, the fuel farm, and airline maintenance bases.

- **Veterans Expressway (SR 589)** — This north-south expressway generally forms the western boundary of the airport and provides regional access to northern Hillsborough, Pasco, Hernando and Citrus Counties. The Veterans Expressway is a four-lane, limited access toll facility that is part of Florida's Turnpike System. The Turnpike Authority has plans to widen Veterans Expressway as well as to provide All Electronic Tolling (ATC).
- **Memorial Highway/SR 60** — This north-south highway segment along the southwest corner of the airport boundary provides a link between the Courtney Campbell Causeway and I-275, south of the airport. Memorial Highway serves southern Tampa and also provides access from St. Petersburg as well as southern and eastern Hillsborough County. The Florida Department of Transportation (FDOT) recently reconstructed this section of Memorial Highway/SR 60 to include two new 3-level

directional interchanges with the Bean Parkway and Spruce Street, and the Courtney Campbell Causeway/Veterans Expressway as part of the Tampa Airport Interchanges Project (or LINKS Project).

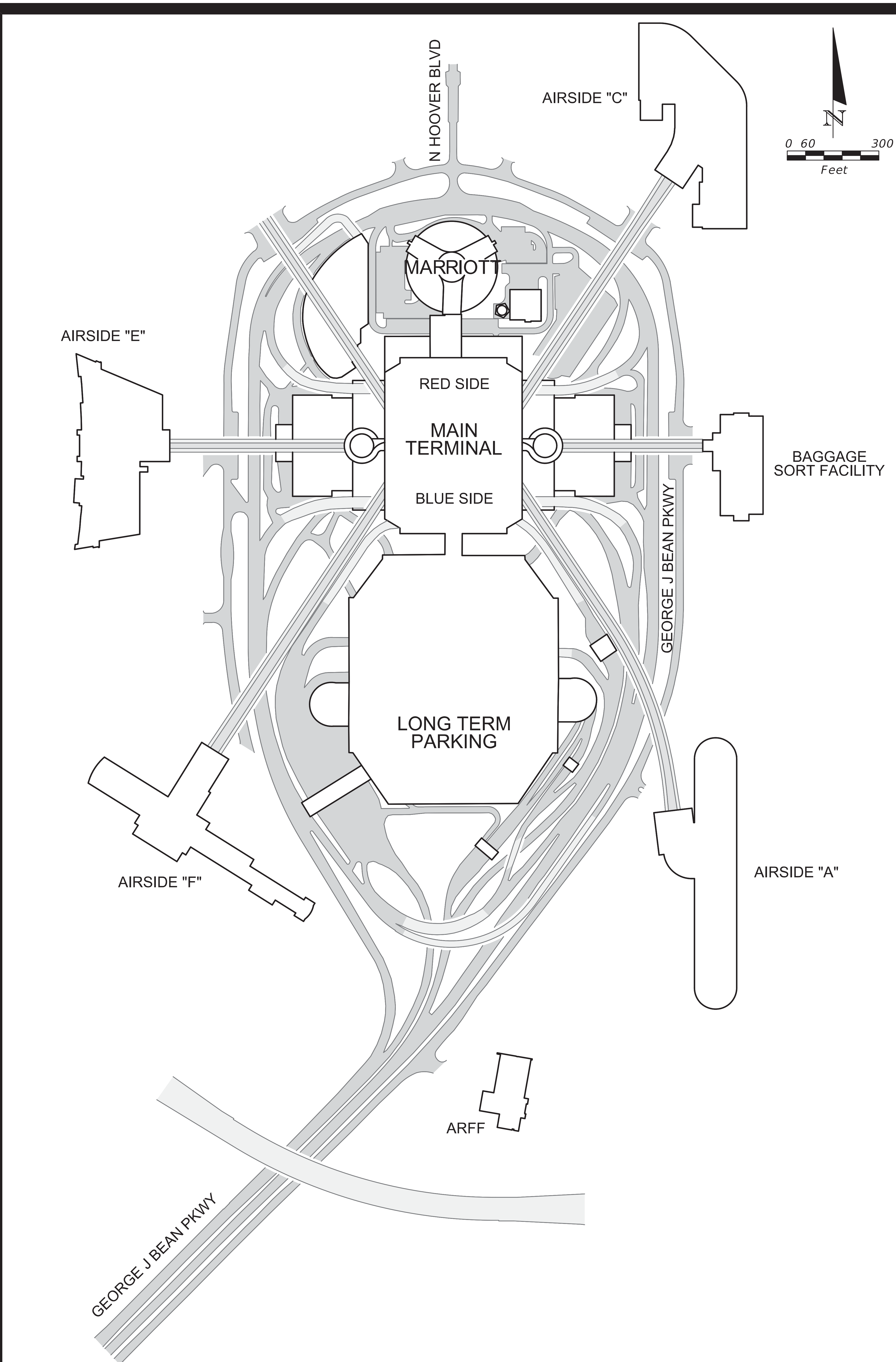
- **Spruce Street/Boy Scout Blvd** — This east-west roadway segment generally forms the southern boundary of the Airport and provides access from the western side of the City of Tampa. The Spruce Street interchange with Memorial Highway provides access to George J. Bean Parkway and serves as the gateway to the airport terminal area facilities, including the service areas (e.g., Post Office) located in the southern part of the airfield via the at-grade signalized intersection at O'Brien Street.
- **Interstate-275** — This interstate freeway (mostly 8 lane sections) provides regional access south and west of the airport and extends into downtown Tampa. I-275 provides direct access to the middle and southern portions of densely populated Pinellas County to the west of Hillsborough County via the eight-lane Howard Franklin Bridge. Interstate 275 also extends south into Manatee County via the Sunshine Skyway Bridge toll facility.
- **Courtney Campbell Causeway**—This east-west four-lane divided expressway intersects with Memorial Highway and provides access from the middle portion of Pinellas County to the west of the airport.
- **Hillsborough Avenue**—This east-west roadway generally forms the northern boundary of TPA. Hillsborough Avenue is generally a six-lane divided arterial that provides access to the northern portions of Pinellas County and areas west of the airport. Hillsborough Avenue also provides local area access to Tampa and the area immediately east of the airport. Employee parking access is provided via an at-grade signalized intersection with Hoover Blvd.
- **Dale Mabry Highway**—This north-south arterial roadway, located on the east side of the Airport and the Drew Park area, provides local access to Tampa and areas of Hillsborough County north and south of the airport.

4.3.1.2 On-Airport Circulation

The Bean Parkway is a four-lane divided roadway that serves as the primary entrance to the airport. The 1.25-mile Bean Parkway extends from the Spruce Street Interchange and provides circulation around the Landside Terminal Building. The Bean Parkway also provides access to the Post Office, the Economy Parking facilities, and the rental car service and support areas via a grade- separated interchange.

The existing terminal area roadway system is depicted on **Figure 4.88**. As shown, the Bean Parkway forms a circumferential circulation system that provides access to the Landside Terminal Building curbsides, terminal area parking (Long Term and Short Term garages), rental car facilities on the lower levels of the Long Term Garage and in the Red side rental car garage, and the airport hotel. The Bean Parkway is comprised of a minimum of two lanes, but widens to three or four lanes in roadway sections that accommodate lane merge or diverge areas. A public service road system (with controlled access points to the secure airside) is provided parallel with the Bean Parkway and provides a direct service road connection with the South Support Area.

Signing and decision-making along the Bean Parkway is straightforward. Drivers inbound to the terminal area generally have three primary decision points defined by left-side exits from the Parkway. The first decision point is the exit to parking and rental car returns. Drivers that remain on the Parkway destined for the terminal curbsides will then decide between either the Blue (south) side of the Landside Building or the Red (north) side of the building. Throughout this roadway system, a driver currently has sufficient time to determine the message on a sign (many of which are overhead), understand and react to it, and to maneuver the vehicle into the proper lane for his/her destination.



HNTB

One Tampa City Center
201 North Franklin St., Suite 550
Tampa, Florida 33602

Tel (813) 402-4150
Fax (813) 402-4245

EXISTING TERMINAL AREA ROADWAY

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
05/31/2012

FIGURE
4.88

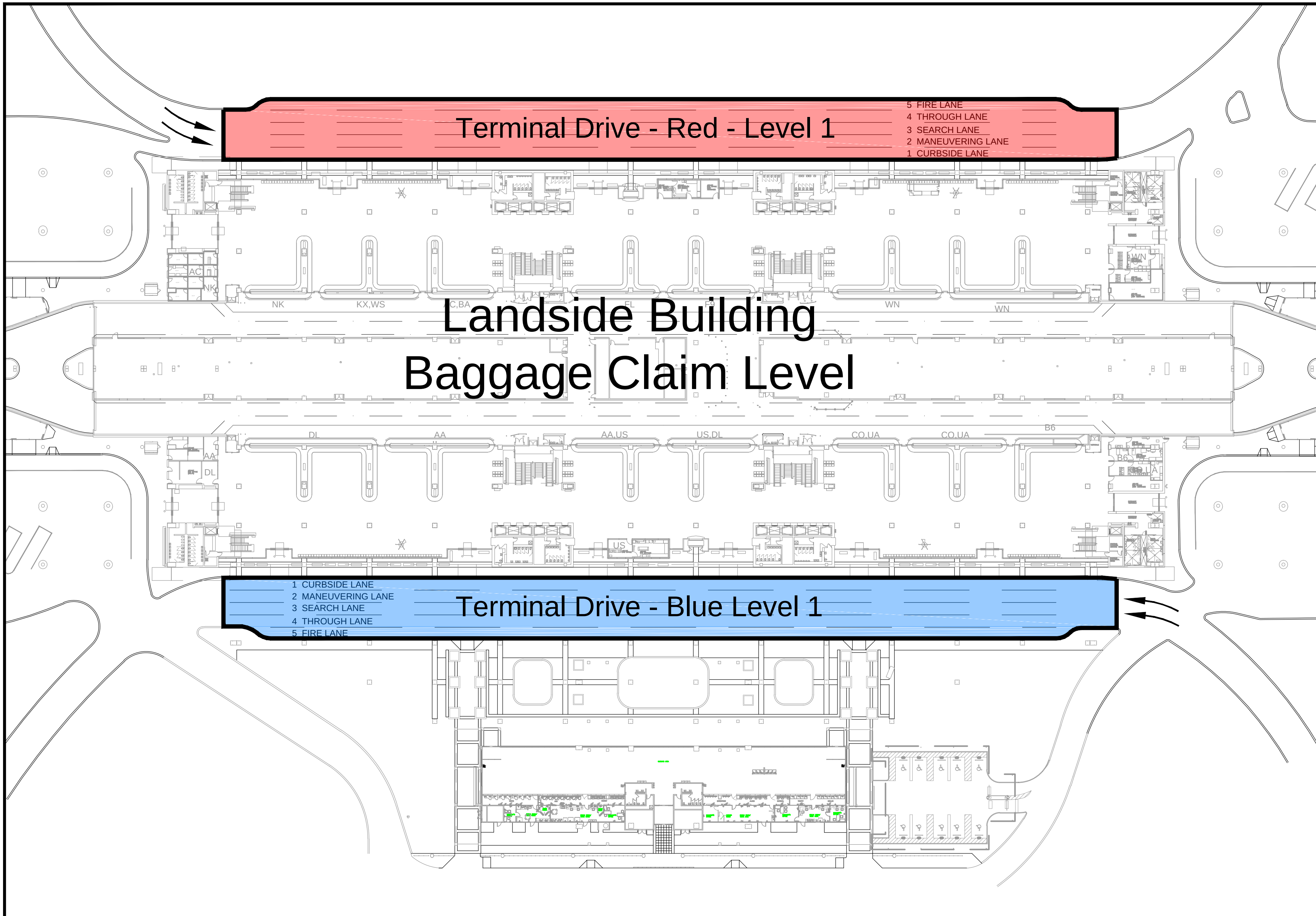
4.3.1.3 Landside Terminal Building Curbsides

The Landside Terminal Building is functionally divided into two zones, serving the north and south sides of the building, with each zone accommodating a different set of airlines. The Blue zone is located on the south side of the Landside Terminal Building and the Red zone is located on the north side. Roadway access is provided to both sides of the building via a two-level, linear curbside system. The upper level curbside is generally used for passenger drop-off (departing passengers). The lower level curbside is used for passenger pickup (arriving passengers). In addition, commercial vehicle access is accommodated on the east and west ends of the Landside Terminal Building in surface parking areas known as “quad lots.” Parking decks directly above the quad lots, known as “quad decks,” are currently used to accommodate taxi staging, shared ride shuttle staging, and Aviation Authority parking.

The lower level curbside roadways and quad lots are depicted on **Figure 4.89**. The lower (arrivals) level curbside is designated for passenger pickup by private automobiles and limousines. As shown, the curbsides serving the Blue and Red zones of the Landside Terminal Building are similar with both providing approximately 650 feet of building frontage. The curbside roadway provides four travel lanes and a dedicated fire lane. During peak periods, the lower level curbside roadways on both sides of the building experience significant levels of congestion. This includes frequent double/triple parking along the full length of the Landside Terminal Building with queues that can extend onto the Bean Parkway. Section 4.3.2 provides an analysis of the current operations of all the terminal curb roadways.

The upper level curbside roadways and quad decks are depicted on **Figure 4.90**. The upper (departures) level curbside is the designated area for passenger drop-off for all vehicle types with the exception of charter buses, which are assigned to the cross-over drives (see below). The curbsides on both sides of the Landside Terminal Building are similar with both providing approximately 560 feet of building frontage. Similar to the lower level curbside, the upper level curbside roadway provides four travel lanes and a fire lane. Unlike the lower curbside roadways, the departures curbs do not experience congestion or delay, due to significantly lower dwell times (the time a vehicle dwells or stops to service its passengers).

The Red and Blue upper level curbsides are connected by cross-over drives on the east and west sides of the Landside Terminal Building. These connections allow certain commercial vehicles to drop-off passengers on both sides of the Landside Terminal Building without having to return to the Bean Parkway to access the other side of the building. The cross-over drives also provide for charter bus drop-off and some valet drop off as well, on the Blue side, east crossover, from 5:30 a.m. to 5:30 p.m.



N

Scale: 1" = 100'

HNTB

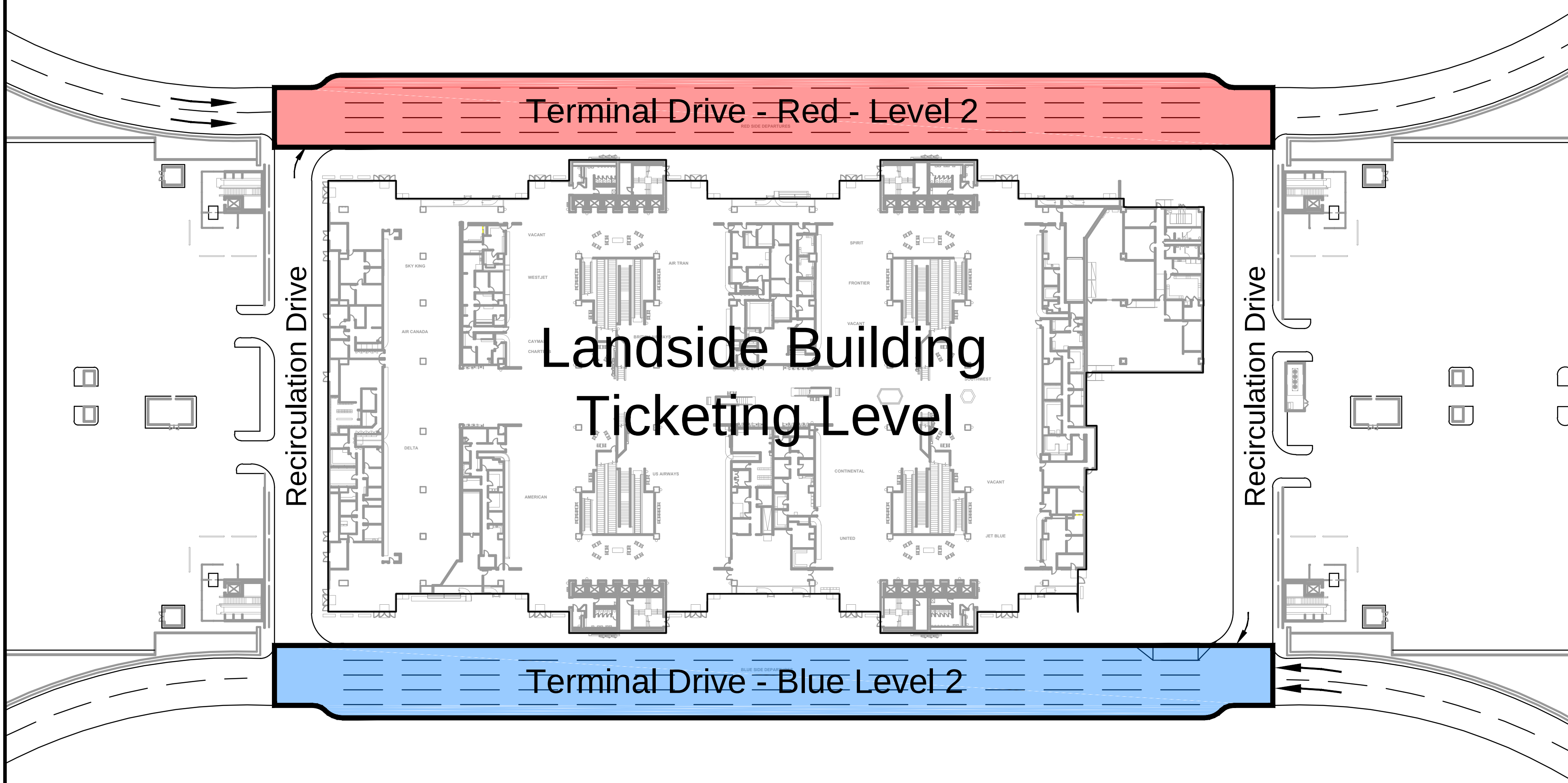
2900 SOUTH QUINCY STREET,
SUITE 200
ARLINGTON, VIRGINIA 22206
PH (703) 824-5100
FAX (703) 671-6210

Existing Lower Level Curbsides

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
Jul 02, 2013

FIGURE:
4.89



Scale: 1" = 100'

HNTB

2900 SOUTH QUINCY STREET,
SUITE 200
ARLINGTON, VIRGINIA 22206
PH (703) 824-5100
FAX (703) 671-6210

Existing Upper Level Curbsides

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
Jul 02, 2013

FIGURE:
4.90

P:_Projects\57785 - Tampa MP\00-CADD\HNTB_Team_Dwg_files\Terminal Curbs and Quad Decks.dwg Upper Level Jul 02, 2013 - 8:49am

4.3.2 Roadway and Curbside Operations Analysis

A roadway and curbside traffic analysis was completed for the airport roadway system in its current conditions and for 2031 conditions (28.7 MAP). This section describes the data collection effort undertaken to establish the existing conditions and the methodology used to analyze the roadway traffic conditions.

4.3.2.1 Traffic Data Collection

The following is a summary of the on-airport surface transportation data collected at TPA during December 2011, in support of the Master Plan Update. This data collection summary includes the inventory data for on-airport roadways and terminal curb roadways.

The on-airport surface transportation data summarized in this report were collected in two major categories: roadway traffic counts and terminal curbside counts. The roadway traffic counts include the automated traffic recorder counts (tube counts) along on-airport roadways. The automated traffic recorder counts were conducted with mechanical traffic counters that record one-way and/or two-way traffic volumes at each location by 15-minute intervals over the period of the data collection effort. A preliminary seven-day traffic count was conducted from December 2, 2011 to December 8, 2011 to determine the inbound and outbound peaking throughout the week. The preliminary roadway traffic count was supplemented with terminal parking volume data at the short and long term parking entrances and the terminal parking exit plaza. These data were averaged over the seven days to determine an average daily volume. Traffic data have been included in **Appendix H**.

The overall peaking characteristics of the Bean Parkway can be summarized with the counts that were taken at the major entry and exit locations of the airport along Bean Parkway just north of the taxiway bridge. **Table 4.82** presents the preliminary daily volume comparisons for the seven-day traffic count.

Table 4.82
24-Hour Traffic Counts Daily Peaking
(December 2, 2011 – December 8, 2011)

Day of the Week	Inbound Volume (NB)	Outbound Volume (SB)
Sunday	26,143	23,749
Monday	28,681 (1)	24,303
Tuesday	25,654	22,080
Wednesday	26,671	23,044
Thursday	27,111	26,197 (2)
Friday	27,034	26,023
Saturday	22,036	20,572

Note: (1) Peak inbound daily volume occurs on Monday.
(2) Peak outbound daily volume occurs on Thursday.

It is interesting to note that for each day during this period, the traffic inbound to the airport exceeded the traffic outbound from the airport. This is common in the days prior to the busy holiday travel season, when Tampa area residents come to the airport and park while they are gone on holiday travel.

Figure 4.91 and **Figure 4.92** present graphs of the hourly volumes by time of day for the inbound and outbound airport traffic, respectively. In general, the airport entry and exit volumes begin to peak in the morning at approximately 8:00 a.m. The volumes remain relatively constant through late morning and early afternoon until approximately 6:00 p.m. The highest activity occurs during the late morning at approximately 10:00 a.m. Based on the traffic counts, the peak entry hour is 10:00 a.m. to 11:00 a.m. and the peak exit hour is 11:00 a.m. to 12:00 p.m.

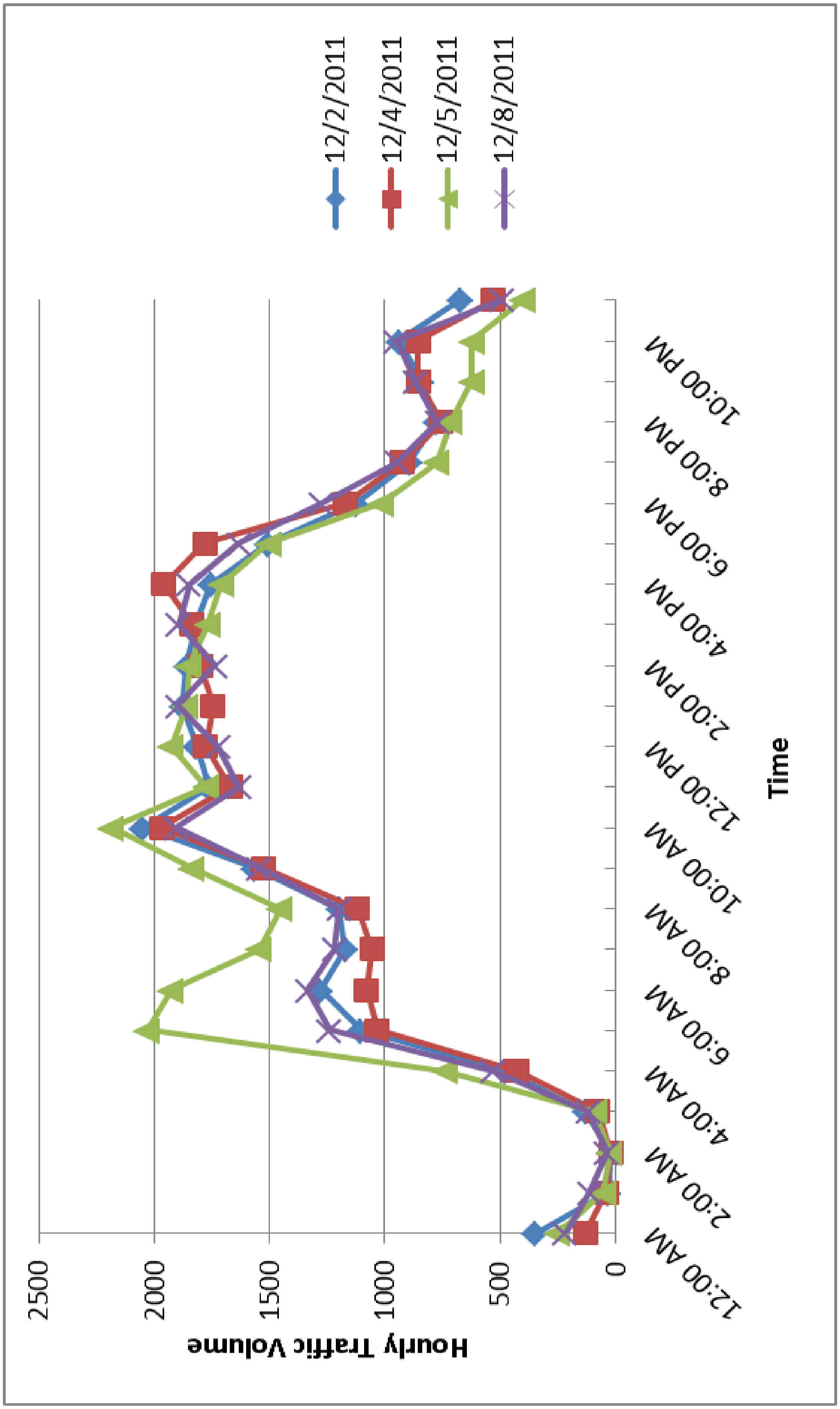


Figure 4.91 – Hourly Peaks for Entering Traffic on Bean Parkway

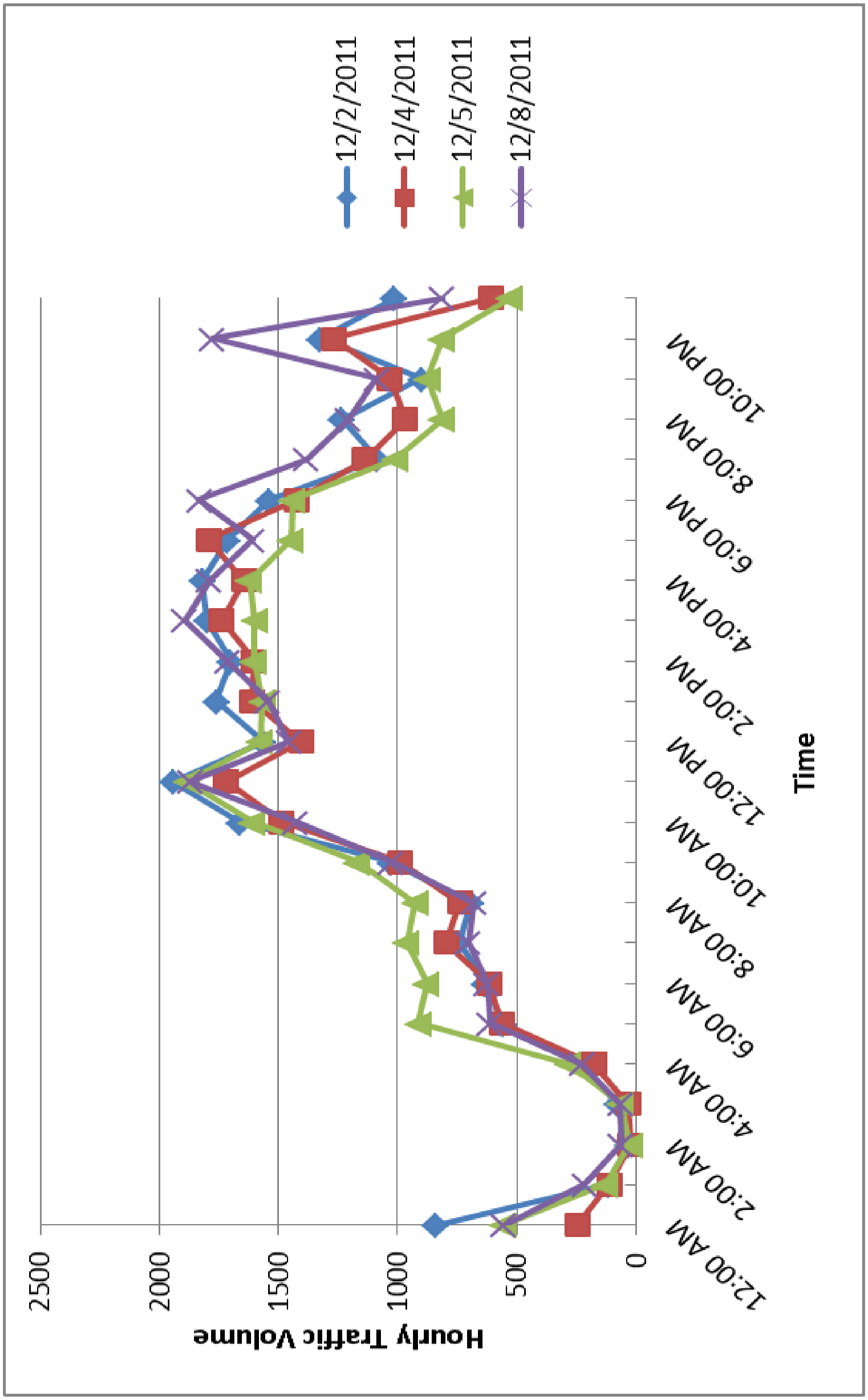
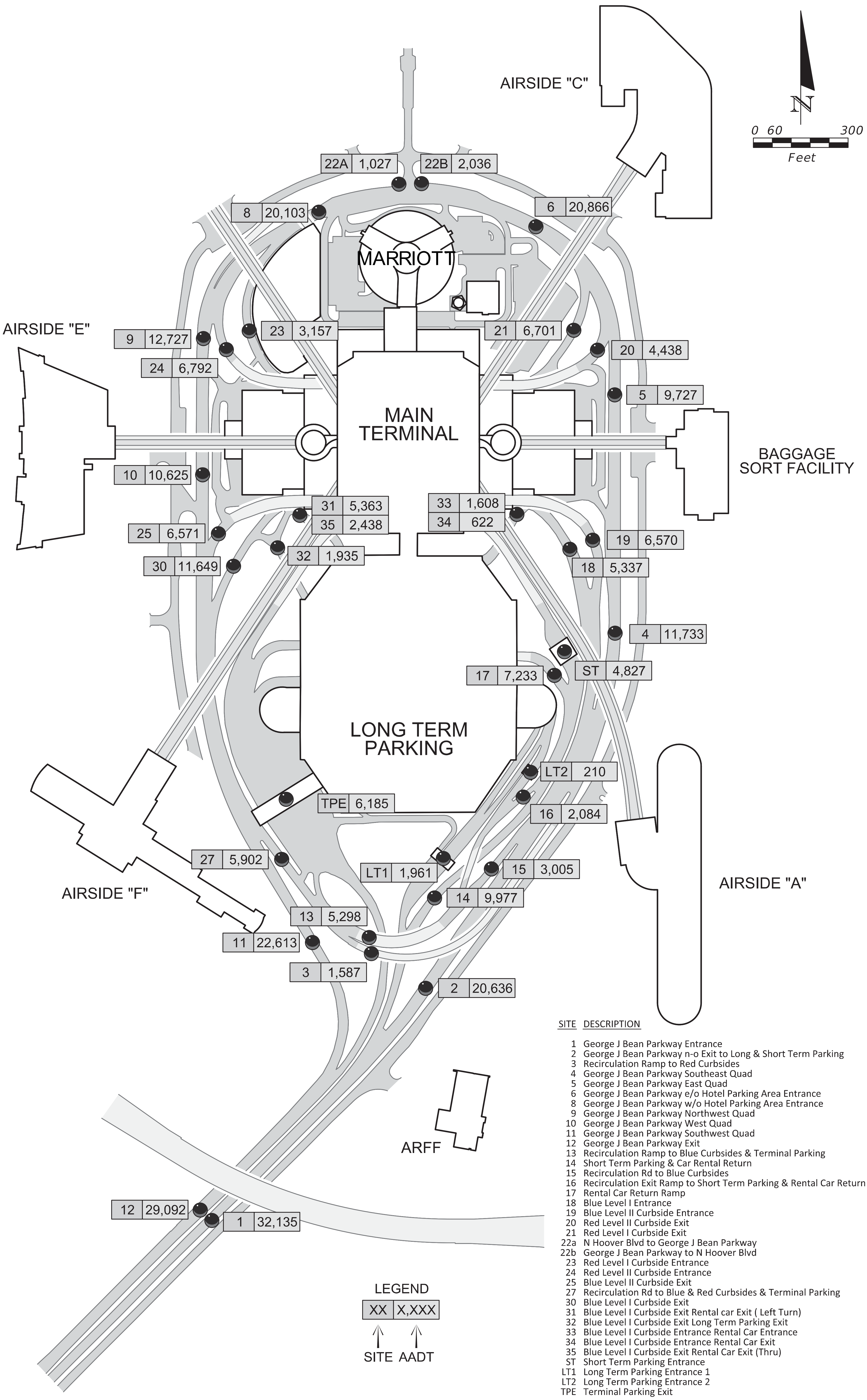


Figure 4.92 – Hourly Peaks for Exiting Traffic on Bean Parkway

After the average daily volumes were determined, a peak month factor of 1.227 was used to equate the average daily peak month volume. This factor was developed based on the number of enplaned and deplaned passengers in December versus the peak month of March. A schematic map of the count locations and average daily peak month volumes is presented in **Figure 4.93**.

Table 4.83 provides the average daily peak month volumes and peak hour of the average daily peak month volumes for each roadway link based on seven-day traffic counts.



HNTB

One Tampa City Center
201 North Franklin St., Suite 550
Tampa, Florida 33602

Tel (813) 402-4150
Fax (813) 402-4245

EXISTING TERMINAL AREA ROADWAY
AVERAGE DAILY PEAK MONTH VOLUMES

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
05/31/2012

FIGURE
4.93

Table 4.83
Traffic Volumes by Location

Site Location	Average Daily Peak Month (ADPM) Volume	Peak Hour ADPM Volume
George J Bean Parkway Entrance	32135	2410
George J Bean Parkway n-o Exit to Long & Short Term Parking	20636	1527
Recirculation Ramp to Red Curbsides	1587	121
George J Bean Parkway Southeast Quad	11733	798
George J Bean Parkway East Quad	9727	710
George J Bean Parkway e/o Hotel Parking Area Entrance	20866	1523
George J Bean Parkway w/o Hotel Parking Area Entrance	20103	1447
George J Bean Parkway Northwest Quad	12727	955
George J Bean Parkway West Quad	10625	818
George J Bean Parkway Southwest Quad	22613	1764
George J Bean Parkway Exit	29092	2182
Recirculation Ramp to Blue Curbsides & Terminal Parking	5298	424
Short Term Parking & Car Rental Return	9977	808
Recirculation Rd to Blue Curbsides	3005	282
Recirculation Exit Ramp to Short Term Parking & Rental Car Return	2084	171
Rental Car Return Ramp	7233	658
Blue Level I Entrance	5337	448
Blue Level II Curbside Entrance	6570	683
Red Level II Curbside Exit	4438	417
Red Level I Curbside Exit	6701	509
N Hoover Blvd to George J Bean Parkway	1027	58
George J Bean Parkway to N Hoover Blvd	2036	116
Red Level I Curbside Entrance	3157	275
Red Level II Curbside Entrance	6792	577
Blue Level II Curbside Exit	6571	565
Blue Level I Curbside Exit	11649	792
Recirculation Rd to Blue & Red Curbsides & Terminal Parking	5902	478
Blue Level I Curbside Exit Rental car Exit (Left Turn)	5363	451
Blue Level I Curbside Exit Long Term Parking Exit	1935	163
Blue Level I Curbside Entrance Rental Car Entrance	1608	146
Blue Level I Curbside Entrance Rental Car Exit	622	55
Blue Level I Curbside Exit Rental Car Exit (Thru)	2438	217
Short Term Parking Entrance	4827	395
Long Term Parking Entrance 1	1961	282
Long Term Parking Entrance 2	210	19
Terminal Parking Exit	6185	516

Source: HNTB

4.3.2.2 Curb Roadway Data

In addition to the traffic volumes collected as described above, data were collected on the characteristics of behaviors and activity on the terminal curb roadways. Significant data were collected on dwell times, which were necessary to support the analysis of the capacity and performance (or level of service) of the terminal curbsides. Additional data useful to the understanding of curb operations were collected, including vehicle occupancies (passengers discharged or boarding into stopped vehicles), lane occupancies and densities (number of vehicles stopped in a lane at a fixed time, percent of lane occupied by stopped vehicles), and lane utilization (percent of traffic stopping in each lane). While the dwell times were gathered in sufficient numbers to be statistically useful, the additional data should be considered more anecdotal than statistically significant. The statistically valid data are presented and described below.

Mean (average) dwell times by vehicle classification and curbside location are shown in **Table 4.84**. Also shown are the maximum dwell times for privately owned vehicles (POVs) for the four curbsides. Most of these dwell times are within the norms of the industry. Two sets of high dwell times stand out. The first is the high dwell times for taxis in two of the quad courts. We attribute these values to early dispatching of taxis from the staging area. No adverse impacts of the long taxi dwell times were observed.

The second set of high dwell times is for private vehicles on the arrivals curbs. While Tampa experiences private vehicle dwell times within the common range of major hub airports on its departures curbs, the dwell times for private vehicles on the arrivals curbs are extraordinarily high, and exceed any experienced by the planning team since the events of September 11, 2001.

Table 4.84
Dwell Times, Terminal Curbsides

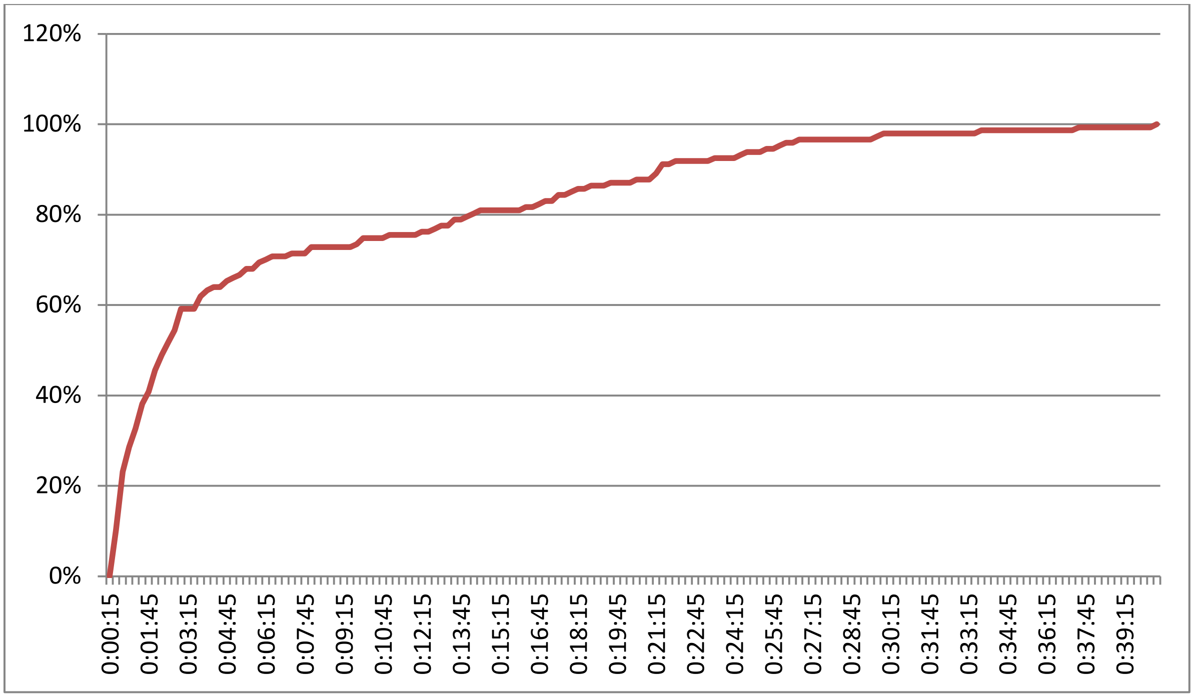
Side	Vehicle Classification	Mean Dwell Time (min:sec)				Max POV Dwell Time (min:sec)
		Departures	Arrivals	East Quad	West Quad	
Blue	POV	1:41	4:47	--	--	40:15
	Taxi	1:04	--	24:59	1:36	
	Limo	1:33	15:15	--	1:01	
	Parking Shuttle	0:54	--	1:09	1:10	
	Hotel Shuttle	1:33	--	0:53	1:12	
	Shared Ride Van	1:23	--	2:20	2:10	
	Rental Car Shuttle	0:50	--	0:46	0:55	
	Bus	--	--	--	--	
Red	POV	1:14	7:19	--	--	32:45
	Taxi	1:24	--	1:59	11:42	
	Limo	1:35	0:50	--	--	
	Parking Shuttle	1:17	--	0:34	0:34	
	Hotel Shuttle	1:00	--	0:55	0:55	
	Shared Ride Van	1:00	--	2:27	2:27	
	Rental Car Shuttle	2:00	--	2:00	0:50	
	Bus	1:30	--	--	--	

Source: HNTB data collected December 2011

By policy, the operations staff on the arrivals curbs permit drivers to dwell indefinitely while waiting for passengers as long as the curb is uncongested. Lane 1 (nearest the curb) essentially fills in the peak hours with waiting vehicles, and subsequent arrivals need to use Lanes 2 and 3. When congestion becomes apparent, then the operations staff moves the waiting vehicles along, encouraging them to go to the Short-term Parking Garage (where the first hour is free), or to the Cell Phone Lot. Based on our observations, however, by the time long-time dwelling vehicles are encouraged to move, they are blocked by vehicles loading in Lanes 2 and 3, and there is a significant queue waiting just to enter the curb roadway. As is the common experience in roadway blockages, for each minute of blockage by a congested curb location, it takes 10 minutes for the blockage to ease. Thus, unless the operations staff moves prior to the formation of a congestion blockage, the queue remains for some time until the peak demand has passed. Queues were observed lasting 45 minutes or more, and were longer than 500 feet, long enough to impede vehicle movements to other portions of the terminal roadway system.

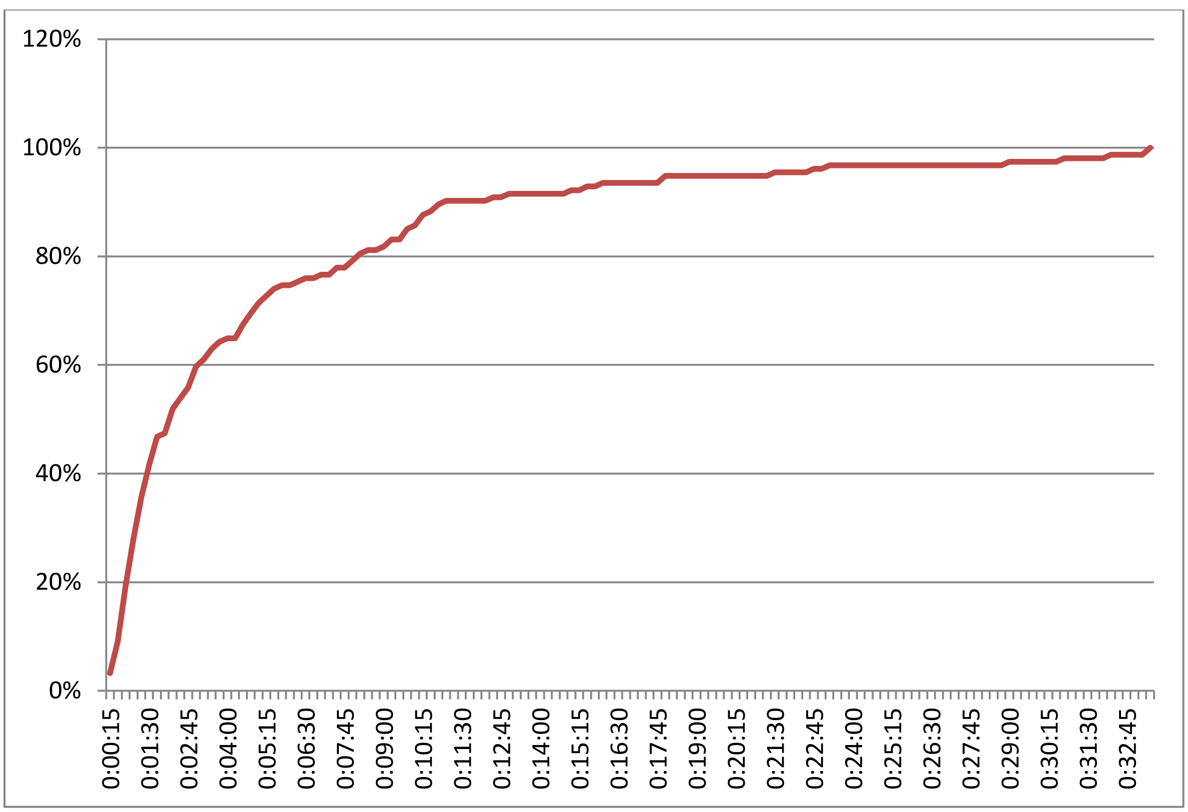
Figure 4.94 and **Figure 4.95** present the cumulative dwell time distributions for the two arrivals curbs. National norms are for average POV arrivals curbs dwell times in the range of 2:00 – 4:00 minutes, with 2:30 being typical. Tampa's averages are well above those norms, with the mean dwell times 90 percent higher than national mean times on the Blue side, and 190 percent higher on the Red side. The cumulative distributions show why. On the Red side, 35 percent of POVs dwell longer than the upper limit of the national normal range (4:00); on the Blue side, the value is 37 percent. With maximum dwell times in the 30 – 40 minute range, a small number of vehicles, dwelling for very long times, consume significant portions of the curb's capacity. One POV dwelling 40 minutes consumes the capacity that otherwise would be used by 16 private vehicles.

Figure 4.94 - Dwell Time Distribution, Blue Side



Source: HNTB data collected December 2011

Figure 4.95 - Dwell Time Distribution, Red Side



Source: HNTB data collected December 2011

4.3.2.3 Circulation Roadway Operations Analysis

In order to analyze the future operating conditions along the airport roadway system, the calculated volume for each roadway link is compared to the capacity of the roadway at that particular location. The capacities of the roadway segments are determined from the type of roadway and the number of travel lanes. Based on the *Airport Cooperative Research Program, Report 40* [1]*,* the theoretical capacity of airport access and circulation roadways are calculated assuming that (1) heavy trucks and buses represent less than 5% of the traffic volume on the access roadways, (2) courtesy vehicles and minibuses represent about 10% of the traffic volume on access roadways, and (3) a high proportion of drivers who are infrequent users of, and are, therefore, unfamiliar with, the airport roadways. **Table 4.85** and **Table 4.86** show the estimated level of service thresholds based on a free-flow speed of 35 mph and 45 mph, respectively. Free-flow speeds are estimated based on the posted speed along the roadway. Entering the airport, speeds are posted at 50 mph. This posted speed is then reduced to 45 mph approximately where the Bean Parkway intersects Airport Access Road in the South Development Area. The speed is then reduced once more to 35 mph where the Bean Parkway intersects with Taxiway J. The 35 mph posted speed is maintained along the circulating roadway and the reverse occurs with the posted speeds increasing outbound on the Bean Parkway.

Table 4.85
Level of Service on Airport Access and Circulating Roadways
(35 mph Free-Flow Speed)

Criteria	Level of Service				
	A	B	C	D	E
Minimum Speed (mph)	35.0	35.0	34.0	34.0	33.0
Maximum Volume/Capacity Ratio	0.26	0.42	0.61	0.80	1.00
Maximum Flow (vehicle/hour/lane)	330	540	790	1,030	1,290

Source: Transportation Research Board, Airport Cooperative Research Program, Report 40, 2010 [1].

Table 4.86
Level of Service on Airport Access and Circulating Roadways
(45 mph Free-Flow Speed)

Criteria	Level of Service				
	A	B	C	D	E
Minimum Speed (mph)	45.0	45.0	45.0	44.4	42.2
Maximum Volume/Capacity Ratio	0.26	0.43	0.62	0.82	1.00
Maximum Flow (vehicle/hour/lane)	400	650	940	1,250	1,530

Source: Transportation Research Board, Airport Cooperative Research Program, Report 40, 2010 [1].

Existing operations along the Bean Parkway were analyzed by dividing the roadway into seven basic segments and determining the current level of service using the peak hour peak month volumes along the segments. The results of the roadway lane capacity analyses are depicted in **Table 4.87**.

Table 4.87
Bean Parkway Segment Level of Service

Roadway Segments	Number of Lanes	Free-Flow Speed (mph)	Peak Hour Peak Month Volume	Level of Service
Airport Entrance to Taxiway J	3	45	2410	C
Taxiway J to Parking Off-Ramp	3	35	2410	D
Parking Off-Ramp to Recirculating Roadway On-Ramp	3	35	1527	B
Recirculating Roadway On-Ramp to Red Curbside On-Ramp	3	35	798	A
Red Curbside On-Ramp to Hoover Blvd	4	35	1523	B
Red Curbside Off-Ramp to Blue Curbside On-Ramp	2	35	955	B
Recirculating Roadway Off-Ramp to Terminal Parking On-Ramp	2	35	1764	D
Terminal Parking On-Ramp to Taxiway J	3	35	2182	C
Terminal Parking On-Ramp to Airport Exit	3	45	2182	C

The estimated existing LOS along the Bean Parkway varies from LOS A to D. LOS is a qualitative measure of roadway traffic operations. Six levels of service are defined in the *Highway Capacity Manual*, from LOS A to F with LOS A representing the best level of service and LOS F representing the worst level of service. At airport terminal roadways the level of service standard is considered to be LOS C[1]. Therefore, some of the roadway segments along the Bean Parkway are currently operating below acceptable levels of service.

To better assess future roadway needs along the Bean Parkway, a growth rate was applied to current volumes to determine the peak hour, peak month volumes for the years 2016, 2021, 2026, and 2031. The growth rate was based on achieving 28.7 MAP in 2031. Volumes were developed for two scenarios. The first scenario involves leaving all rental car facilities within the terminal area as currently exists. The second scenario involves relocating these rental car facilities to the South Development Area. The resulting peak hour, peak month volumes and LOS for each of these scenarios are summarized in **Tables 4.88** through **4.91**.

As can be seen there is a significant difference in LOS between the existing configuration and with a CONRAC being located in the South Development area. As such, the benefit of relocating the rental car functions and associated traffic outside of the terminal area is evident. This is discussed further in the next section which also identifies requirements to accommodate long-term demand on the roadway network.

[1] Leigh Fisher. *Airport Cooperative Research Program (ACRP), Report 40*. Washington, DC, USA: Transportation Research Board, 2010.

Table 4.88
Bean Parkway Terminal Segment Level of Service (2016)

Roadway Segments	Number of Lanes	Existing		CONRAC	
		Peak Hour Peak Month Volume	Level of Service	Peak Hour Peak Month Volume	Level of Service
Airport Entrance to Taxiway J	3	2830	D	2114	C
Taxiway J to Parking Off-Ramp	3	2830	D	2114	C
Parking Off-Ramp to Recirculating Roadway On-Ramp	3	1793	C	1715	C
Recirculating Roadway On-Ramp to Red Curbside On-Ramp	3	937	A	953	A
Red Curbside On-Ramp to Hoover Blvd	4	1789	B	1823	B
Red Curbside Off-Ramp to Blue Curbside On-Ramp	2	1121	C	920	B
Recirculating Roadway Off-Ramp to Terminal Parking On-Ramp	2	2071	E	1182	C
Terminal Parking On-Ramp to Taxiway J	3	2562	D	1708	C
Terminal Parking On-Ramp to Airport Exit	3	2562	C	1708	B

Table 4.89
Bean Parkway Terminal Segment Level of Service (2021)

Roadway Segments	Number of Lanes	Existing		CONRAC	
		Peak Hour Peak Month Volume	Level of Service	Peak Hour Peak Month Volume	Level of Service
Airport Entrance to Taxiway J	3	3296	D	2462	C
Taxiway J to Parking Off-Ramp	3	3296	E	2462	D
Parking Off-Ramp to Recirculating Roadway On-Ramp	3	2088	C	1997	C
Recirculating Roadway On-Ramp to Red Curbside On-Ramp	3	1091	B	1109	B
Red Curbside On-Ramp to Hoover Blvd	4	2083	B	2122	B
Red Curbside Off-Ramp to Blue Curbside On-Ramp	2	1305	C	1071	B
Recirculating Roadway Off-Ramp to Terminal Parking On-Ramp	2	2412	E	1377	C
Terminal Parking On-Ramp to Taxiway J	3	2983	D	1988	C
Terminal Parking On-Ramp to Airport Exit	3	2983	D	1988	C

Table 4.90
Bean Parkway Terminal Segment Level of Service (2026)

Roadway Segments	Number of Lanes	Existing		CONRAC	
		Peak Hour Peak Month Volume	Level of Service	Peak Hour Peak Month Volume	Level of Service
Airport Entrance to Taxiway J	3	3716	D	2776	C
Taxiway J to Parking Off-Ramp	3	3716	E	2776	D
Parking Off-Ramp to Recirculating Roadway On-Ramp	3	2354	C	2252	C
Recirculating Roadway On-Ramp to Red Curbside On-Ramp	3	1230	B	1251	B
Red Curbside On-Ramp to Hoover Blvd	4	2348	C	2393	C
Red Curbside Off-Ramp to Blue Curbside On-Ramp	2	1472	C	1208	C
Recirculating Roadway Off-Ramp to Terminal Parking On-Ramp	2	2719	F	1552	C
Terminal Parking On-Ramp to Taxiway J	3	3364	E	2242	C
Terminal Parking On-Ramp to Airport Exit	3	3364	D	2242	C

Table 4.91
Bean Parkway Terminal Segment Level of Service (2031)

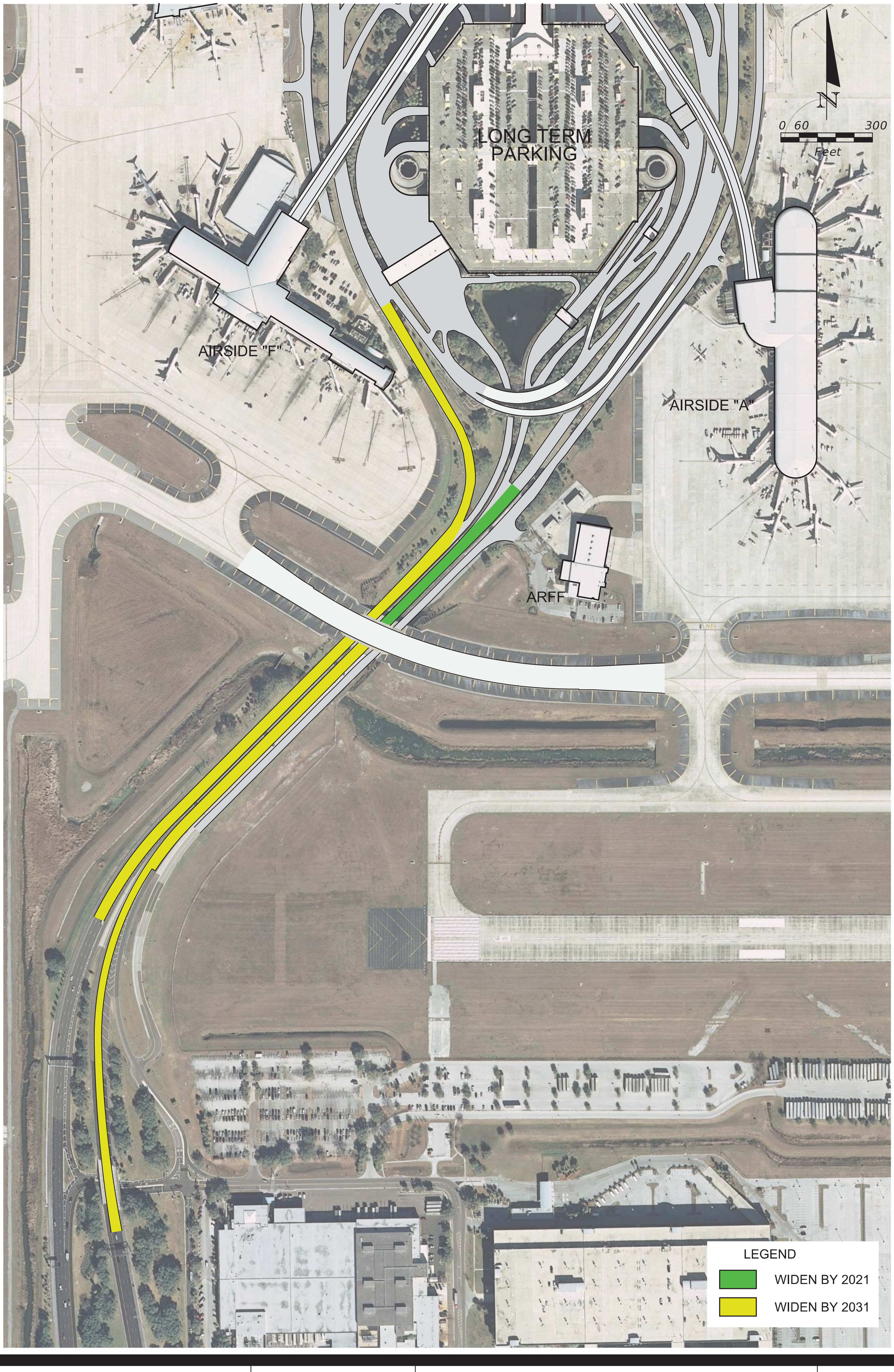
Roadway Segments	Number of Lanes	Existing		CONRAC	
		Peak Hour Peak Month Volume	Level of Service	Peak Hour Peak Month Volume	Level of Service
Airport Entrance to Taxiway J	3	4136	E	3090	D
Taxiway J to Parking Off-Ramp	3	4136	F	3090	D
Parking Off-Ramp to Recirculating Roadway On-Ramp	3	2621	D	2507	D
Recirculating Roadway On-Ramp to Red Curbside On-Ramp	3	1369	B	1392	B
Red Curbside On-Ramp to Hoover Blvd	4	2614	C	2663	C
Red Curbside Off-Ramp to Blue Curbside On-Ramp	2	1638	D	1345	C
Recirculating Roadway Off-Ramp to Terminal Parking On-Ramp	2	3027	F	1728	D
Terminal Parking On-Ramp to Taxiway J	3	3744	E	2495	D
Terminal Parking On-Ramp to Airport Exit	3	3744	D	2495	C

4.3.2.4 Level of Service Summary and Facility Requirements

The estimated LOS along the Bean Parkway in 2031 (28.7 MAP) vary from LOS B to D, assuming the rental car facilities are relocated to the South Development Area. Therefore, some of the roadway segments along the Bean Parkway would be operating below acceptable levels of service and would require widening. The widening improvements needed along Bean Parkway are summarized as follows and are depicted in **Figure 4.96**.

- 2021 (22.9 MAP) Improvements
    - Widen northbound Bean Parkway from Taxiway J to parking off-ramp from 3 to 4 lanes.
- 2031 (28.7 MAP) Improvements
    - Widen northbound Bean Parkway from South Development Area return to terminal on-ramp to Taxiway J from 3 to 4 lanes.
    - Widen northbound Bean Parkway from parking off-ramp to recirculating road on-ramp from 3 to 4 lanes.
    - Widen southbound Bean Parkway from recirculating road off-ramp to terminal parking on-ramp from 2 to 3 lanes.
    - Widen southbound Bean Parkway from terminal parking on-ramp to South Development Area off-ramp from 3 to 4 lanes.

These improvements will improve the operations along Bean Parkway and will improve levels of service to C or better.



HNTB

One Tampa City Center
201 North Franklin St., Suite 550
Tampa, Florida 33602

Tel (813) 402-4150
Fax (813) 402-4245

PROPOSED TERMINAL AREA
ROADWAY IMPROVEMENTS

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
05/31/2012

FIGURE
4.96

4.3.2.5 Curb Roadway Operations Analysis

The curbs were analyzed using a spreadsheet-based tool which looks to find the equilibrium between the capacities of a curb roadway to fulfill two functions:

- to move vehicles to, along, and from the curb: this is the "through" capacity. It is analyzed using standard techniques related to per-lane volumes derived from the *2010 Highway Capacity Manual.*
- to provide for stopped vehicles to serve their passengers, either for drop off or for pick up: this is the "service" capacity. It is analyzed using the space-time analysis similar to how one would analyze the demand for parking spaces in a lot.

The methodology determines the balanced capacity (the equilibrium between service and through capacity) and calculates the ratio of demand (volume) to capacity, or V/C. Based upon years of observation and analysis, a terminal curb roadway begins to fail at V/C > 0.70, which becomes the targeted maximum V/C to achieve a tolerable level of service.

The inputs to the curb analysis included:

- Vehicle volume by vehicle classification (or mode), including POVs, taxis, limousines, parking shuttles, hotel shuttles, shared ride van, rental car shuttles, and bus. Volumes were used as factored from the December counts to the peak hour of the average day, peak month of passenger activity, which is when it is assumed that curb activity also peaks.
- Dwell times by vehicle classification (for departures and for arrivals), derived from those presented in **Table 4.84**. The values used are shown in **Table 4.92**.
- Vehicle lengths (in feet), more accurately described as the area along a curb or in a lane which a stopped vehicle would utilize to serve its passenger(s), including some space to unload/load luggage. The values used are shown in **Table 4.92**.

Table 4.92
Data Used in Curb Analysis

Mode	Vehicle Length (ft.)	Dwell Times (min.)			
		Blue Departures	Red Departures	Blue Arrivals	Red Arrivals
POV	25	1.67	1.25	4.75	7.20
Taxi	25	1.00	1.50	1.75	1.75
Limousine	25	1.50	1.50	2.00	1.00
Parking Shuttle	35	1.00	1.25	1.00	1.00
Hotel Shuttle	35	1.50	1.00	1.00	1.00
Shared-ride Van	25	1.50	1.00	2.50	2.50
Rental Car Shuttle	35	0.75	2.00	1.00	1.00
Bus	50	1.00	1.50	--	--

Source: HNTB observation and judgment. Note that Arrivals data includes quad courts.

Key inputs and the results of the curb capacity and level of service analysis are presented in **Table 4.93**. The analysis scenario was for the peak hour of each curb facility for the average day of the peak month of passenger activity in 2011, which is when the terminal curb roadways and quad lots are assumed to be busiest. The effective length of each curb is the actual length less any crosswalks (on the curb roadways), or less an adjustment for the quad lots for the inside of the curve where vehicles cannot pull parallel to load. The target V/C is 0.70, the upper threshold that represents the maximum above which level of service deteriorates rapidly with increasing V/C.

Table 4.93
Results of Curb Analysis

Location	Effective Length	Est. Total Volume	Balanced Capacity	Estimated V/C	Comments
Blue Departures	500’	683	1086	0.68	Modest impact of pedestrian crossings
Red Departures	560’	577	1242	0.47	--
Blue Arrivals	590’	455	660	0.90	Significant queuing and loss of capacity due to long dwell times
Red Arrivals	590’	320	464	0.82	Significant loss of capacity due to long dwell times
Blue SE Quad	180’	74	288	0.26	--
Blue SW Quad	180’	61	269	0.23	--
Red NE Quad	180’	103	289	0.36	--
Red NW Quad	180’	85	291	0.29	--

Source: HNTB analysis

The results in **Table 4.93** reflect what is regularly observed at Tampa International. The quad courts and the departures curb operate well, with little congestion and delay, even in busier times. The arrivals curbs, however, are operating with significant congestion, delay, and queuing on the inbound roadways in the peak hours. The level of service, described in traffic engineering terms (where letter grades from A = excellent to F = failure are used), would be that the departures curbs are at Level of Service E, which is an unstable state subject to congestion and delay which results in queuing.

The source of the problems on the arrivals curbs is the long dwell times permitted. There are few issues with permitting longer dwell times when demand (vehicle volumes) are low, in the off-peak hours. But when passenger activity increases, dwell times of the length observed greatly reduces the availability of spaces to stop to pick up passengers. As a result, customer service suffers, as drivers are caught in a queue and have a hard time finding, entering, and leaving a spot to stop and pick up a passenger, even with the help of the curb operations staff. Only a small set of customers in the peak hours get to enjoy the long dwell times. They occupy Lane 1 and Lane 2 early in the peak, and are still there 10, 15, or even 30 – 40 minutes later. Their presence denies subsequent arrivals a quality experience, so the many suffer due to the lack of movement of the few.

The curb analysis for the arrivals curbs was run a second time, with the POV dwell times set to national norms (2.5 minutes) in which drivers can only stop to actively load passengers. With these shorter dwell times, the capacity of the Blue arrivals curb would increase more than 50 percent, and the Red arrivals curb capacity would more than double. As a result, the V/C for the Blue side would be approximately 0.60 and for the Red side, 0.40, both excellent levels of service. Given that Tampa International provides 60 minutes free parking and a cell phone lot, an active reduction in dwell times would preserve the long-term capacity of the terminal curbs without sacrificing customer service.

4.3.3 Parking Inventory

Tampa International Airport provides parking in the terminal area for the traveling public and employees. Additional parking for the public and employees is provided in the South Development Area. In addition, many of the individual cargo and airline support operators located along the perimeter of the airport provide on-site parking for their employees. In some cases, limited employee parking is provided at the airside buildings. The main parking facilities are described below and are shown in **Figure 4.97.**

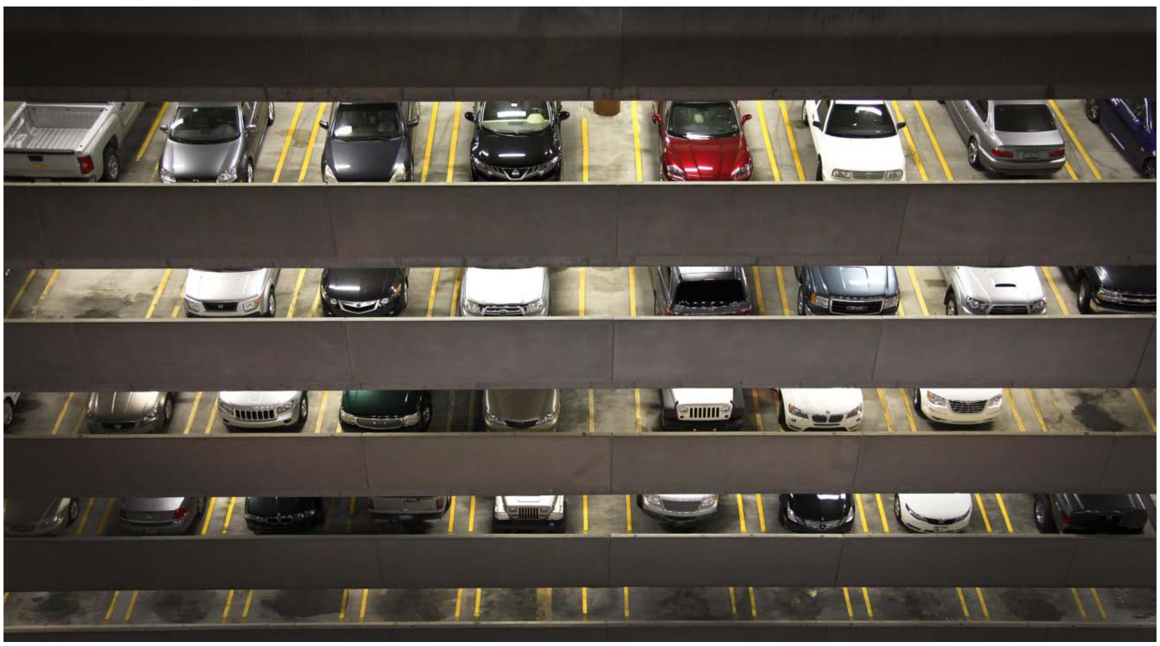
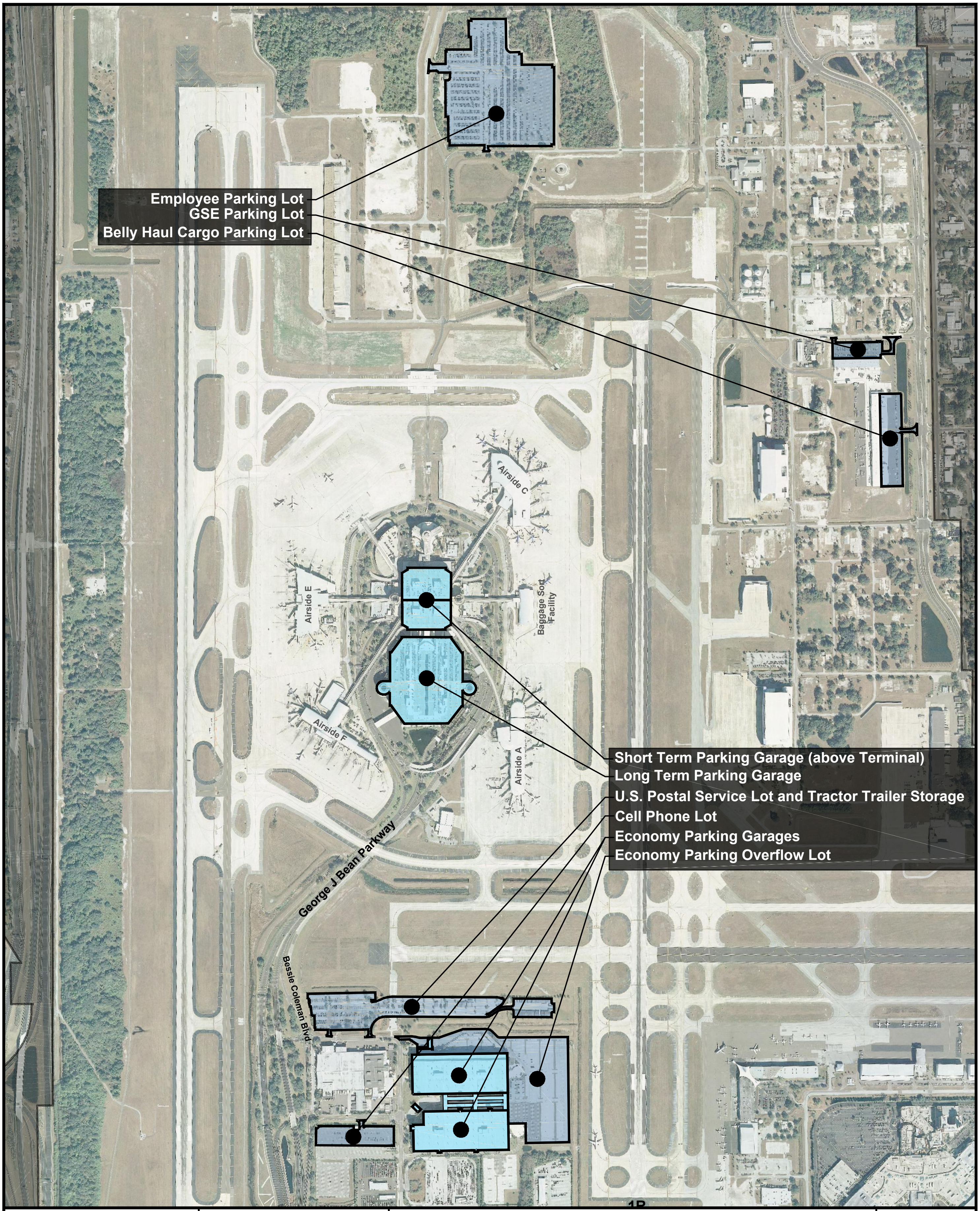


Photo: Long-Term Garage levels
Source: HNTB Corporation.

4.3.3.1 Public Parking

The airport provides a variety of parking for the air traveler: valet, short-term, long-term, economy, and a Cell Phone Waiting Lot. In addition, there is off-airport parking provided by private companies. The first three options are all located at, above or adjacent to the Landside Terminal Building, while the remainder are located remotely in the South Development Area or nearby, but outside the airport boundaries.



0' 600' 1,200'
SCALE: 1" = 1,200'

HNTB

Airport Parking Facilities

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
Jun 28, 2013

Figure:
4.97

P:_Projects\57785 – Tampa MP\00-CADD\HNTB_Team_Dwg_files\Parking Facilities.dwg Airport Parking Jun 28, 2013 – 1:22pm

4.3.3.2 Terminal Parking

In September 2011, 3,542 spaces were provided in the Short-Term Parking Garage, which is located directly above the Landside Terminal Building. The garage has vertical clearance for vehicles up to 6 feet 8 inches. Pedestrian access from its nine levels is provided by elevator to all public levels of the terminal.

Photo: Short-Term Garage over the Main Terminal Facility with the Long-Term Garage shown photo left.
Source: HNTB Corporation.

Valet service is also available, with drop off of the vehicle on the departure level of the Blue curb during normal daytime hours, and drop off available 24/7 on Level 5 of the Short-Term Parking Garage. Valet storage and pick up are also on Level 5 of the Short-Term Parking Garage.

The Long-Term Parking Garage, located directly south of the Landside Terminal Building, provides an additional 6,854 spaces, with vertical clearances for vehicles up to 7 feet 10 inches. Pedestrian walkways to the terminal are located on Level 2 and a monorail to the terminal is available at Level 5 of the garage.

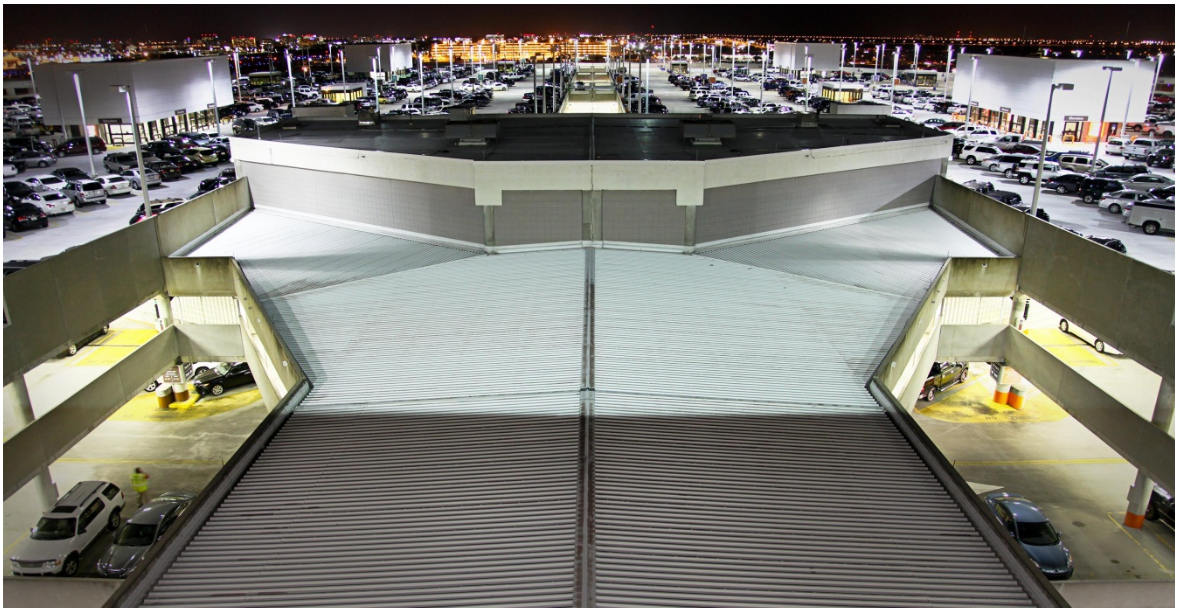


Photo: Perspective from Short-Term Garage deck looking over top level of the Long-Term Garage.
Source: HNTB Corporation.

The entrance to both garages is via a series of 13 entry lanes in three plazas—two for long-term and one for short-term. Each of the plazas has one lane dedicated to SunPass customers; the balance of the lanes have machines which issue tickets. Both garages use helical ramps for primary vertical circulation, although the Short-Term Parking Garage is accessed initially by a straight ramp up to its first level. The garages are served by a common exit plaza which includes 16 lanes, two of which are reserved for SunPass customers. HCAA typically operates two of the non-SunPass lanes with cashiers, though that number can vary depending on demand. All of the non-SunPass lanes are equipped with electronic ticket readers, and accept a variety of credit cards.

The current parking rate for the Short-Term Garage is free for the first hour and \$4 from the 61st minute to the 80th minute, and \$1 per each additional 20 minutes, with a maximum of \$20 per day. Parking rates in the Long-Term Garage are similar to the short-term, with a \$15 per day maximum. The policy of first-hour free is a major draw for customers who otherwise would use the terminal curb roadways to service passengers.

In September 2011, there were 10,396 total passenger parking spaces in the terminal area. The two garages provide a combined total of 138 handicapped spaces. **Table 4.94** provides the breakdown of the on-airport supply of public parking.

Table 4.94
Public Parking Space Counts

Garage Terminal Parking	Regular Spaces	Disabled Spaces	Valet Spaces	Totals
Short Term	3,344	48	150	3,542
Long Term	6,764	90	-	6,854
subtotal	10,108	138	150	10,396
Economy Parking				
Economy (Phase I)	5,411	120	-	5,531
Economy (Phase II)	5,562	66	-	5,628
Economy (Surface Lots)	1,402	10	-	1,412
subtotal	12,375	196	-	12,571
Grand Total	**22,483**	**334**	**150**	**22,967**

Source: HCAA, September 2011

October is the peak month for all parking activity except for the Economy Parking garages and lots, which peak in July. The terminal garages attract two types of customers. The first is the "hourly" (short-duration) customer who is parking for a few hours and is not flying. These customers are well-wishers or meeter-greeters, or have some business purpose at the terminal, e.g., retrieving delayed luggage, or dealing with customer service or ticket agents. Eighty-seven percent of the transactions in the Short-Tem Parking Garage are of less than six hours duration. For the other garages, the short-duration customers make up only 13 percent (in the Long-Term Garage) or less than five percent (in Economy Parking).

The second type of parking customer is the "daily" (long-duration) customer who is flying and leaves their vehicle for a day trip or overnight. The minimum duration for a day trip is approximately eight hours, but day trippers' duration of parking is usually more like 12 – 18 hours. On the whole, though, passengers leave their cars for longer than just day trips. Parking duration data by facility are shown on **Table 4.95** for the peak months of 2011.

The transaction data for the average day of the peak parking month(s) (ADPM) in **Table 4.95** show an average of 417 tickets were issued for the "hourly" type of customers and 585 tickets were issued for the "daily" type of customers in the Short-Term Parking Garage. In the Long-Term Parking Garage, an average of 1,529 tickets was issued.

Table 4.95
2011 Public Parking Supply, Activity, and Characteristics

Garage	Peak Month	Supply (Spaces)	ADPM Transactions	Average Duration	ADPM Occupancy
Short Term (Hourly)	October	3,392	417	54 mins.	68.9%
Short Term (Daily)	October		585	2.5 days	
Valet	October	150	48	2.9 days	92.7%
Long Term	October	6,854	1,529	3.5 days	93.2%
Economy	July	12,571	823	5.2 days	37.8%

Source: HCAA revenue control system data and HNTB analysis

4.3.3.3 Remote Parking

Economy Parking is provided on-airport by two garages and an adjoining surface lot with a total of 12,571 spaces. Vertical clearance in the garages is 8 feet. Airport shuttles run 24 hours a day with typical service frequencies of every 7 to 10 minutes. The shuttles travel through the center of the two economy garages on the ground floor and pick up and drop off at two locations within each garage. At the terminal building they drop off at the departures curbs on both sides, and pick up at the quad lots on arrivals level of the Blue and Red sides.

The current parking rate for the Economy Parking Garage and lot is $1 per each 20 minutes, with a maximum of $9 per day.

Photo: View of the Economy Garages from the USPS facility on the west side of Airport Service Road.
Source: HNTB Corporation.

Most of the time, the Phase II Garage is not open, as it is not usually needed except at peak times, typically around holidays. A significant reason for this idle garage at the airport is the growth in the past ten years of the off-airport private parking industry. Approximately 3,750 off-airport passenger parking spaces are provided by at least five private companies. Some of these are national chains, or are affiliated with national parking marketing firms. These locations have taken advantage of the slow development climate in the region to generate revenue from land which otherwise has a better and higher use once the economy perks up. Others are off-airport rental car operations or hotels which have extra space in their lots and are already operating shuttle buses, so the addition of parking becomes an easy source of additional revenue. Collectively, the private sector has siphoned off a significant portion of the Economy Parking market due to their low cost structure, low rates, marketing, and additional services. The peak month for activity at off-airport parking facilities is December.

The Cell Phone Waiting Lot is located just south of the Post Office. It provides 350 parking spaces, plus there is access to an overflow lot that can accommodate an additional 388 parking spaces. The Cell Phone Waiting Lot presents drivers with the opportunity to wait in a convenient yet uncongested location until their party arrives and can be picked up on the arrivals curbs, which at peak times are significantly congested. Unfortunately, while its location is well suited for customers who know about its location in advance of coming to the airport, and can head their upon arriving, it is a fairly long way from the terminal for those who are less familiar with the airport. Anecdotally, these less familiar drivers are hesitant to seek it out if they come to the arrivals curb and their party is not there. Thus, they tend to sit on the curb for as long as permitted, and then they typically recirculate, further congesting the curbs.

4.3.3.4 Employee Parking

The HCAA provides a total of 3,209 parking spaces dedicated to airport employees. These spaces are in several lots located throughout the airport.

The main employee lot is located north of the terminal building and is accessed via Hoover Blvd off of Hillsborough Avenue. This lot contains 2,470 parking spaces. A shuttle transports employees to the terminal complex.

Each airside building also provides limited employee parking. Airside A has 42 spaces, Airside C has 44 spaces, Airside E has 43 spaces, and Airside F has 70 spaces.

An additional 84 parking spaces are available adjacent to the Airport Service Building. The Cargo Complex is served by a lot that has approximately 125 spaces.

4.3.3.5 Rental Car Parking

Eight rental car companies (Avis/Budget, Dollar/Thrifty, Enterprise/Alamo/National and Hertz) provide ready cars and rental returns at the terminal complex. Rental cars occupy the lower two levels of the Long-Term Parking Garage, with service facilities and ready cars on the lowest level, and returns on the second level. As well, ready cars are found on the Red side in the rental car garage, west of the Marriott Hotel. As noted in the sections regarding rental cars, these facilities are heavily used and are near or at capacity.

In the terminal area, rental cars compete with public parking demand for space in the garages. Stated otherwise, rental car spaces could be converted to use as public parking. The estimated number of public parking spaces which could be provided if the rental car function were not present at the terminal complex includes 2,414 spaces in the Long-Term Parking Garage and 635 spaces in the Red side Rental Car Garage.

4.3.4 Public Parking Requirements

Public parking is provided in garages in the terminal complex (short-term, valet, and long-term), and in garages and surface lots in the South Development Area (economy garage, economy overflow lot, and cell-phone waiting lot). As well, off-airport providers have attracted some parkers away from the on-airport opportunities by taking advantage of certain economies (i.e., generating revenues from land to be developed to higher economic uses later, or selling empty spaces in hotel and off-airport rental car lots, and using the same shuttle system). To estimate the future requirements for public parking, it was necessary to define the targeted audience to be served, and the peaking condition during which such provision would be made. The HCAA staff provided the following guidance:

- It is the HCAA's intent to provide parking for all customers in order to position themselves to attract back customers who have chosen off-airport parking.
- It is the HCAA's intent to provide the physical facilities which meet the needs of their customers with targeted levels of service under all but the peak-of-the-peak condition.

Public parking requirements were therefore estimated based upon parking demand for the average weekday of the peak month (AWDPM). This procedure was validated for the base year (2011) by determining the number of hours and percentage of time that the requirement would not have met needs. Validation is discussed later in this section.

Key to the understanding of parking requirements is the definition of acceptable levels of service. It is common in the airport parking industry and in aviation planning to define an adequate level of service by the ease of finding a space in a nearly full facility during the peak hours of demand. The ease of finding a space is defined by a term called "search factor", which is (1 – percent of spaces available in the peak hour). To provide good levels of service at Tampa International, search factors were defined as follows:

- For very short-term parkers (those parking for just an hour or so in the short-term garage), the search factor was set at 0.85, meaning that they would have an acceptable ease of finding a space if the facility were sized to provide 15 percent of its spaces to be empty during the peak hours of demand.
- For parkers in the short-term and long-term garage who park for one to several days, and for those economy garage parkers who typically park for several days, the search factor was set at 0.90. The difference in the search factor reflects the difference in sensitivity to time between the very short-term parkers who will be there only an hour or so, versus the rest who will be there for a matter of days.
- No search factor was used for valet parking because the user does not search for a space.

4.3.4.1 Methodology and Data Sources

The parking requirements for the traveling public were estimated using a growth factor approach. This approach starts with a determination of the number of parking spaces required during the historical peak month of the base year (2011) as evidenced by data from the parking revenue control system. This requirement is then factored to grow in proportion to the estimated future growth in originating passengers. Key assumptions in this procedure include:

- Airport access behavior will be constant over time. A review of the past 20 or more years of evidence at large hub airports in North America confirm this to be true unless either:
  - a substantial change has been made in the relative availability, price, or convenience of one of the modes, **or**
  - parking is constrained by lack of facilities.

Neither of these factors has been true or is expected to be true at Tampa International Airport.

- The total parking requirement is the sum of the requirements for each type of parking when they peak:
  - October is the peak month of demand for all on-airport parking except for Economy Parking.
  - July is the peak month of demand for Economy Parking.

- o December is the peak month of demand for off-airport parking.

The HCAA staff provided the revenue control system data from 2011 that was used in the parking requirements analysis:

- The MGA reports were used as the basis for transaction data, with a transaction being a single parking stay by a vehicle.
- Duration Summary Reports were the basis for the percentage distribution of transactions by duration, and for the calculation of average duration.

These latter reports do not include SunPass data, as the parking transactions which use SunPass for payment flow through a different reporting process. Absent any data to the contrary, this analysis assumed that the duration distribution of SunPass users mimicked the distribution of non-SunPass users.

The parkers in the Short-Term Parking Garage (STPG), other than valet parking customers, are of two distinct types, the nature of which can be segregated out from the aggregate transaction and duration data for that facility. This analysis differentiated between very short-term parkers (referred to as “hourly”), and longer term parkers (referred to as “daily”). The parking data from the Duration Summary Reports for STPG users were isolated and their transactions were analyzed separately. The overall peaking of the demand for this garage was defined by the transaction data, but this information needed to be segregated between the two service types. A review of the transaction data and the airline gated flight schedule led to the assumption that the peak hour for “hourly” demand represented 15 percent of the daily demand for “hourly” parking in the STPG. This assumption proved reliable during the validation effort (see below).

Key data used in the parking analysis are shown in **Table 4.96.**

Table 4.96
Inputs to the Estimate of Public Parking Requirements

Public Parking Element	Peak Month	2011 Supply	2011 Transactions	2011 Average Duration
Short-term				
Hourly	October		640	54 minutes
Daily	October		597	2.5 days
Total		3392	n/a	n/a
Valet	October	150	48	2.9 days
Long-Term	October	6854	1642	3.5 days
Remote				
Economy (airport)	July	12571	823	5.2 days
Off-Airport	December	3750	n/a	n/a
Total		16321	823	
GRAND TOTAL		**26717**	**n/a**	**n/a**

Source: HNTB analysis

The duration column makes it clear why it is necessary to break out the hourly parkers from the rest of the STPG users. The average duration of the stay for these users falls within the 60 minute grace period that the HCAA established as a customer courtesy as well as a means to offload demand from the busy arrivals curbs. The challenge in the Short-Term Parking Garage is that with significant numbers of parkers staying on average 2.5 days, the spaces available for hourly users are relatively few, and scattered throughout the nine levels of this facility. This makes it hard to find a space, and it cuts down on those willing to chance running over the 60 minute grace period and having to pay the first $4 increment in the 61 – 80 minute parking duration window. By not designating specific spaces for hourly parkers, the benefit of curb relief from the grace period is dampened, and all parkers of durations of just an hour or two are inconvenienced by a long search for an available space during peak hours.

4.3.4.2 Public Parking Requirements

The requirements for public parking are shown in **Table 4.97**. They indicate that, with a reallocation of the use of the STPG, it should remain adequate for true short-term parking plus valet parking through 2031.

Table 4.97
Public Parking Requirements

Public Parking Element	Current Supply	Public Parking Requirements				
		2011	2016	2021	2026	2031
Short-term						
Hourly	n/a	677	721	780	833	889
Daily	n/a	1657	1871	2163	2425	2692
Total	3392	2335	2593	2943	3258	3581
Valet	150	139	157	182	204	226
Long-Term	6854	6386	7211	8333	9345	10372
Remote						
Economy (airport)	12571	4753	5366	6202	6955	7719
Off-Airport	3750	2900	3274	3784	4243	4710
Total	16321	7653	8641	9986	11198	12428
GRAND TOTAL	**26717**	**16513**	**18602**	**21444**	**24005**	**26607**

Source: HNTB analysis

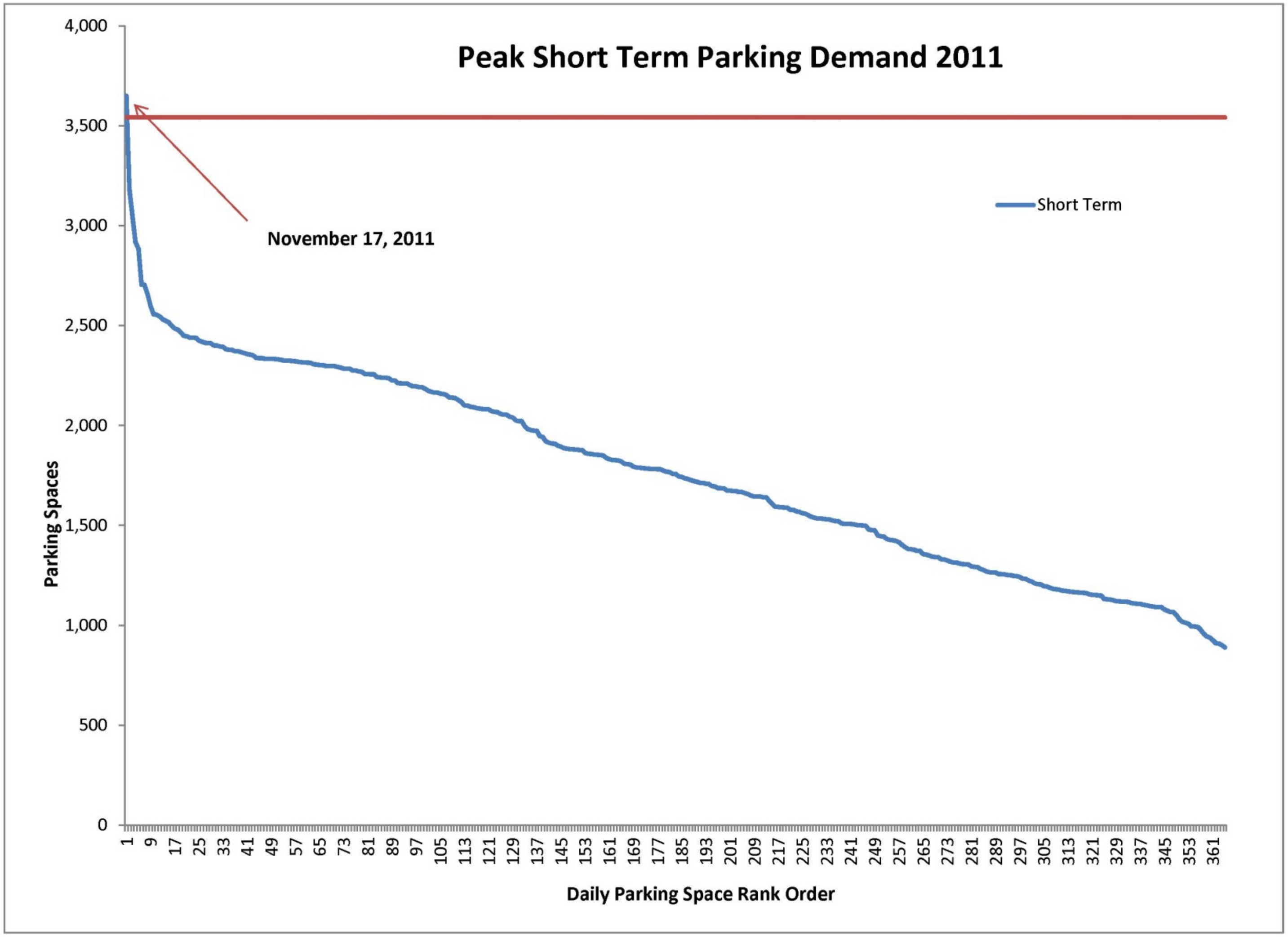
Table 4.97 also reveals a requirement for additional terminal-proximate long-term parking. More is required as early as 2016, with 3,500 additional spaces needed by 2031. The alternatives for providing this additional long-term parking are discussed later in this section.

The Economy parking facilities are adequate to meet the needs through 2031. This includes the capacity to attract back the current customers of the off-airport parking options. The alternatives discussion below shares some ideas on how to do that.

4.3.4.3 Seasonality and Validation of the Estimate

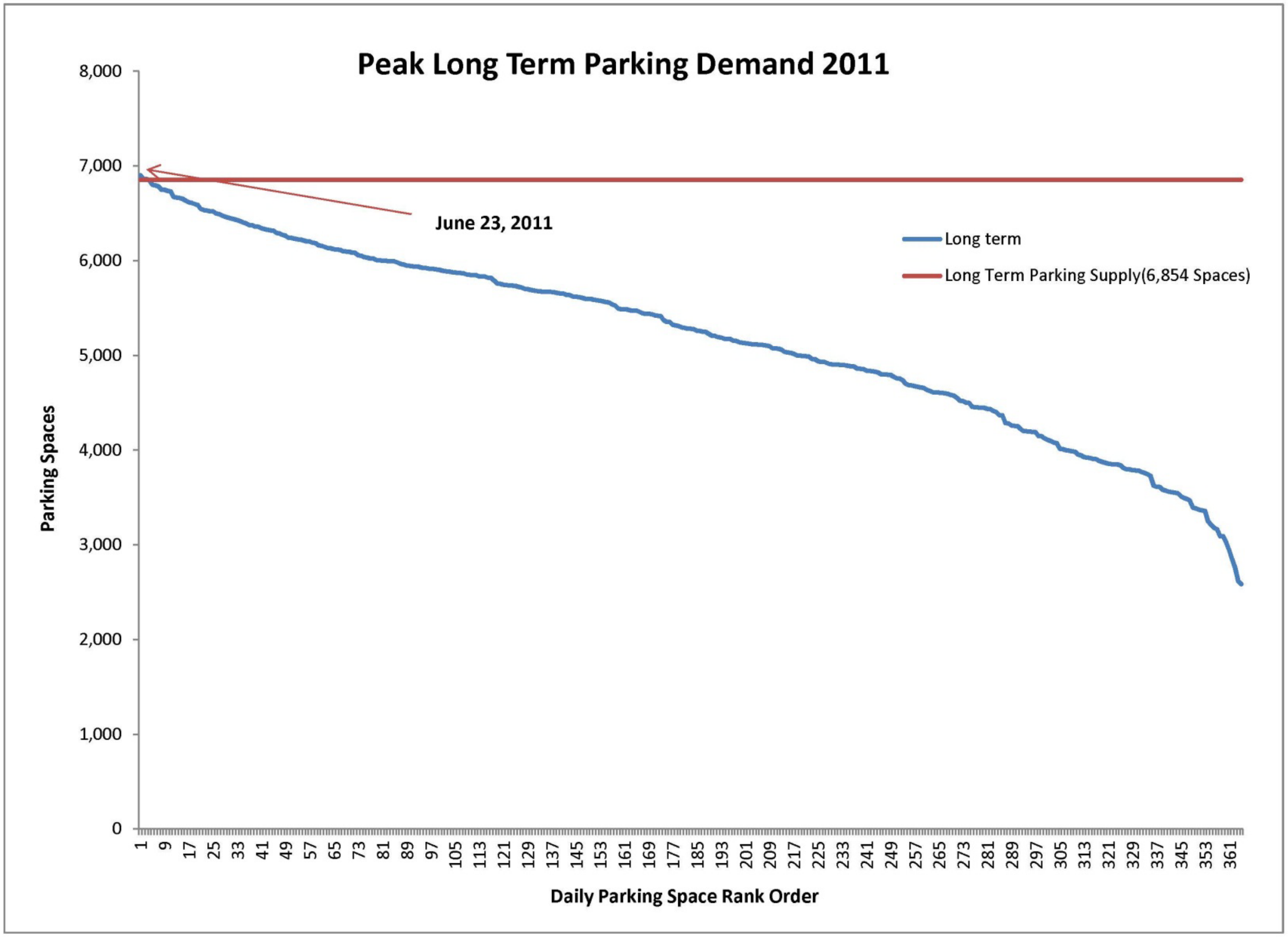
To address the HCAA goal to meet parking requirements in all but the very peak of the peaks (the busiest holiday times), and even then to give their staff flexibility in managing parking resources to the customers' satisfaction, the planning team analyzed the seasonality of the parking demand relative to the requirements**. Figures 4.98 – 4.102** show the peak demand for all the days of 2011. Each figure also shows the available spaces for the parking type(s) of interest. These data were distilled to show how the very peak of peak demands in 2011 compared to the estimate of 2011 requirements.

Figure 4.98



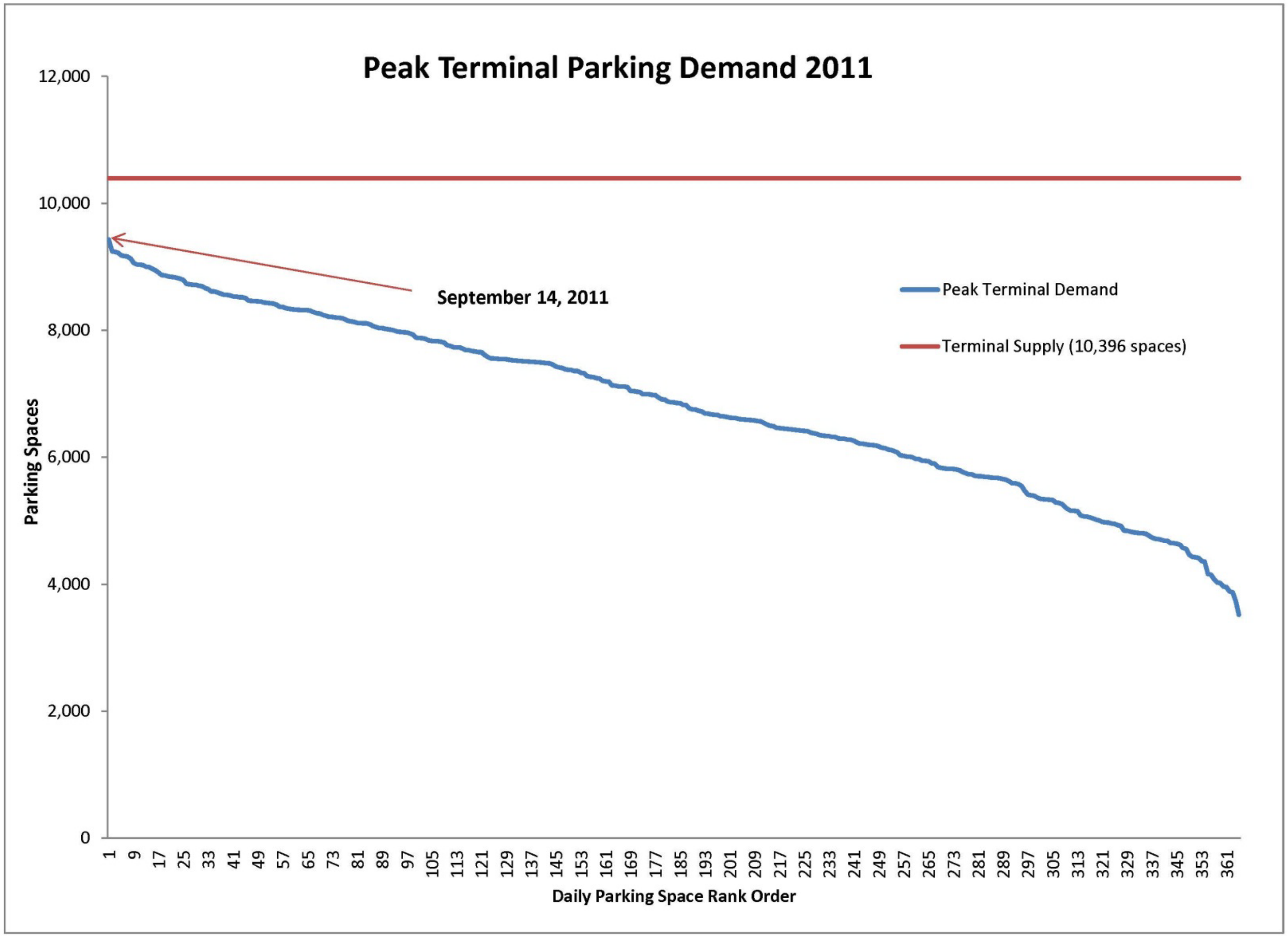
Source: HNTB analysis

Figure 4.99



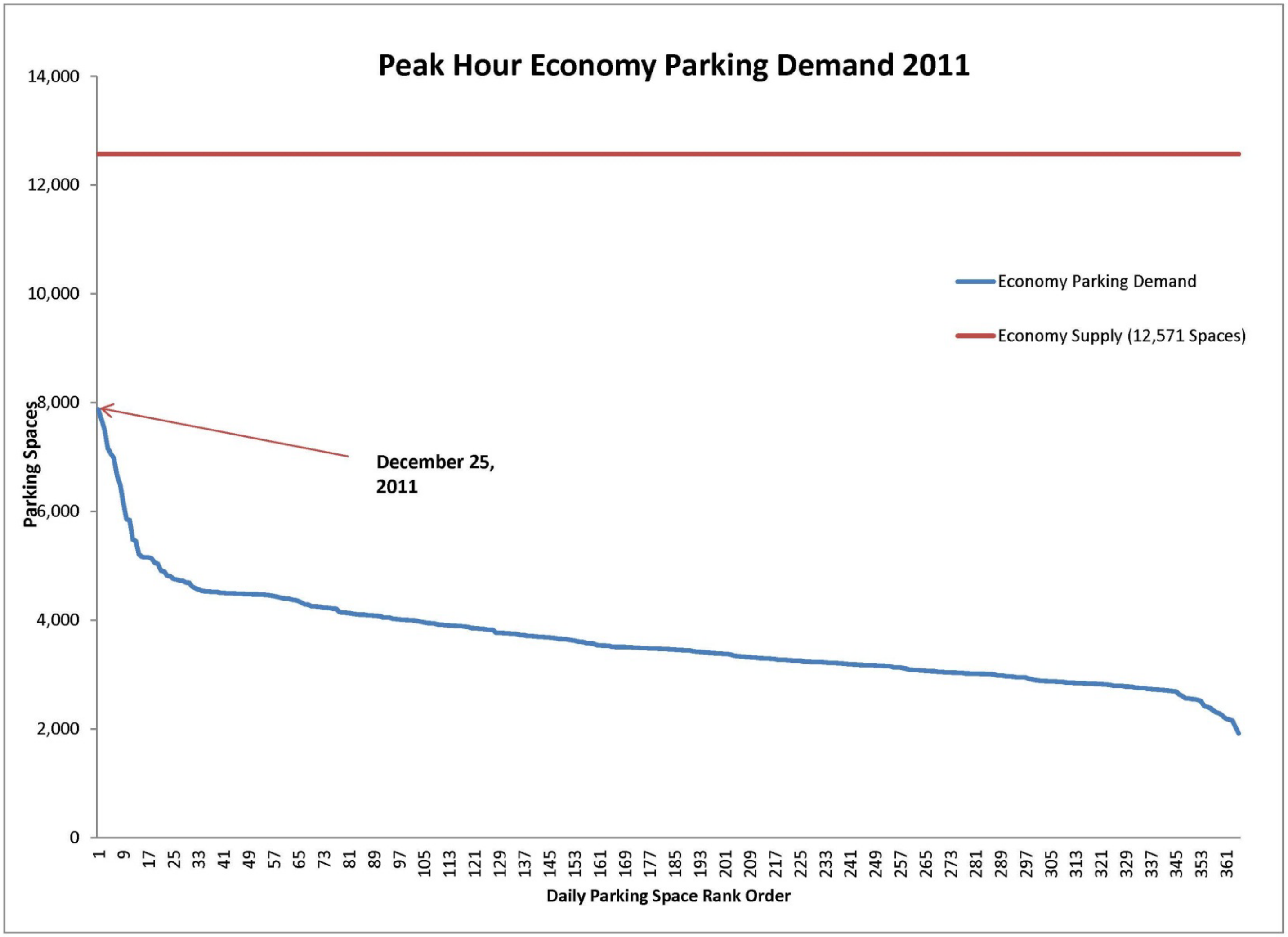
Source: HNTB analysis

Figure 4.100



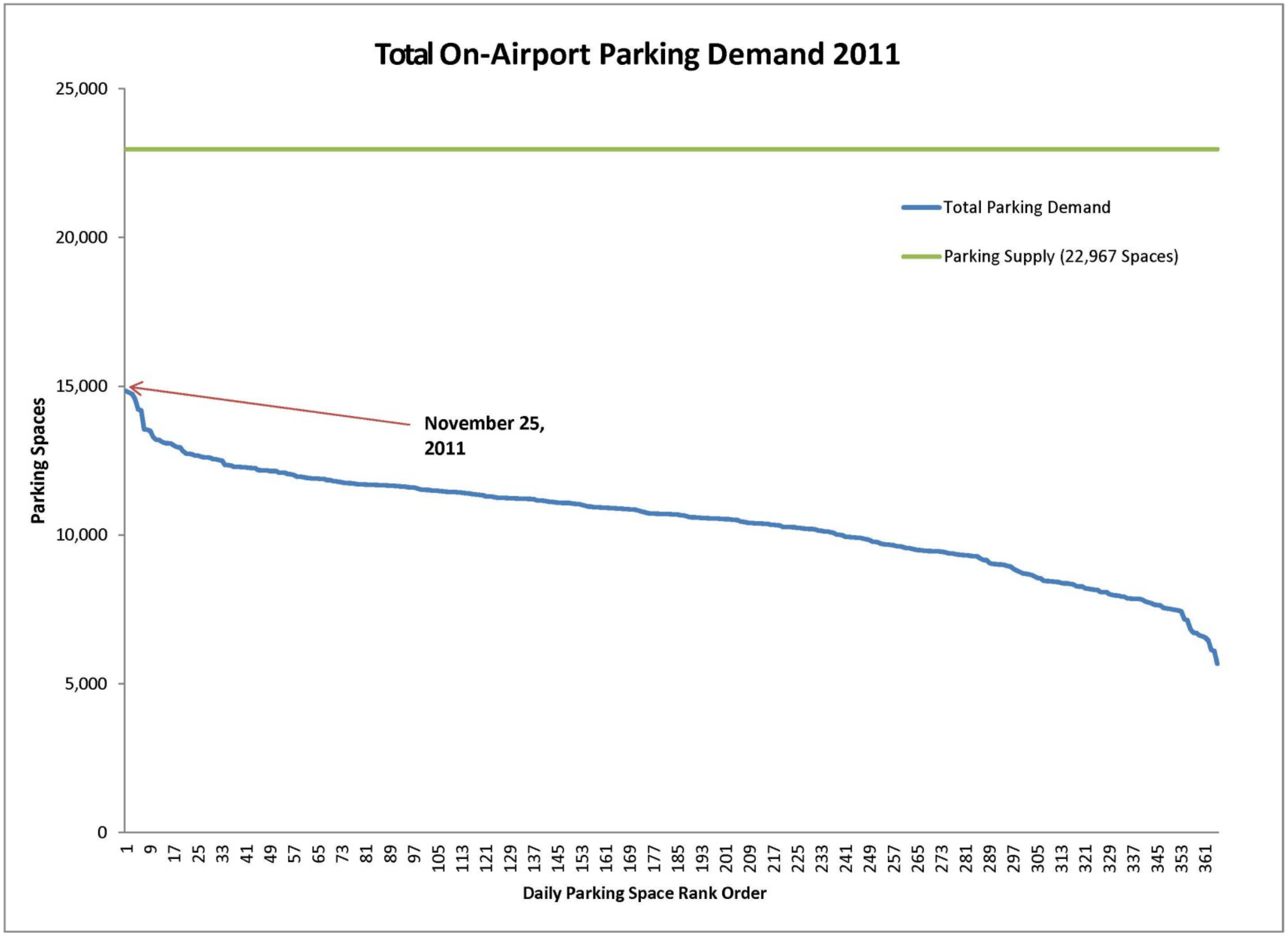
Source: HNTB analysis

Figure 4.101



Source: HNTB analysis

Figure 4.102



Source: HNTB analysis

Table 4.98 provides the summary comparison of peaks with estimated requirements. The greatest variability is in the demand for short-term parking, which truly picks up at holiday times when there are increased numbers of family visitors to the region, and the personal service of parking and greeting visitors is highest. Even so, the estimated 2011 short-term parking requirements would have provided for all the short-term needs in 2011 with the exception of 45 days when, for perhaps two hours in the peak, demand would have exceeded the requirements. Thus, that requirement meets 99 percent of all demand hours of the year. For long term, and economy, the estimated requirements would have met a slightly higher percentage of demand.

Table 4.98 also shows how much the requirements would need to be increased in order to fully meet demand in each hour of the year. Rather than the estimated requirement of 16,374 spaces, the space count in 2011 would have had to be increased 12.5% (2,054 spaces) to a total requirement of 18,428 spaces. This value includes providing for the people who in 2011 parked off airport. By the out year of our forecast requirements, 2031, a policy of never turning away anyone wishing to park on airport would result in the overall parking supply needing to increase from the estimated requirement of 26,607 to approximately 30,000 spaces. The pros and cons of this approach, and the alternatives to providing so many spaces, are included in the discussion of the next section.

A key observation of parking demand at Tampa is that the several parking locations/types do not have the same pattern of peaking. The variable peaking times work to the operational advantage of the parking staff at TPA, as it enables them to pro-actively manage their space count in real time, and guide customers to alternative parking when a particular preferred location is full. Improved signing and information (some of which is in the works, some of which makes sense when new facilities are designed and built) will make these daily operational decisions easier on staff and especially easier on users.

Table 4.98
Seasonality Analysis

Parking Type	Estimated 2011 Requirement	Peak 2011 Demand	Add'l Spaces Required to Meet 100% Demand	Estimated Hrs in Yr > Requirement	Estimated % Hours of Year when Requirement Meets Demand
Short-Term	2335	3650	1315	90	99.0
Long-Term	6386	6902	516	72	99.2
Terminal Subtotal	8721	NA	1831	52	99.4
Economy	7653	7876	223	4	100.0
GRAND TOTAL	**16374**	**NA**	**2054**	**-**	**-**

Source: HNTB analysis. Note: Hours in year > requirement (column 5) assumes two hours duration for each day with a peak hour in the MGA report listed as exceeding the estimated required number of spaces.

4.3.5 Employee Parking Operations and Requirements

The focus of this section is to develop employee parking space requirements to accommodate the forecast demand at TPA over the course of the planning period (2011 through 2031). The inventory of employee parking spaces, current peak occupancy, and estimated future requirements are presented in **Table 4.99.**

Table 4.99
Employee Parking Requirements

Parking Lot	Spaces	Permits	2012		2016	2021	2026	2031
			Peak Occupancy	Peak Demand	Peak Requirements			
Lot 1 (Main Lot)	2470	5395	83%	2050	2235	2456	2712	2969
Lot 2 (Airside A)*	42	53	100%	42	-	-	-	-
Lot 3 (Airside C)*	44	52	100%	44	-	-	-	-
Lot 5 (Airside E)*	43	49	100%	43	-	-	-	-
Lot 6 (Airside F)*	75	68	90%	68	-	-	-	-
Lot 14 (Cargo Lot)*	125	188	100%	125	-	-	-	-
Level 7 Red Side RAC	75	59	80%	60	65	72	79	87
Total	**2874**	**5864**		**2432**	**2300**	**2528**	**2791**	**3056**

Note: *Additional spaces required are included in the Peak Requirements for Lot 1 and the Level 7 Red Side lot.
Source: HNTB analysis.

Based on information provided by the Authority, it is estimated that on average, the existing facilities listed in the table are 85 percent occupied during a typical peak day, which equates to a total demand of approximately 2,400 spaces out of 2,874 spaces available. As can be seen through the occupancy rates, a number of the airside employee lots and the cargo lot are at capacity currently. It is assumed that future employee space requirements will increase in proportion to the average growth in annual passenger enplanements and annual aircraft operations. With a capacity of 2,470 spaces the main employee parking lot would need additional capacity after 2021. Similar to the main employee lot, the red-side RAC (Level 7) would need additional capacity after 2021. As shown, it is estimated that the existing supply will be surpassed at the 23.2 MAP activity level. The resulting aggregate space requirement for Airport employee parking will reach approximately 3,100 spaces (rounded up) by 2031.

Based on the forecasted demand levels it is clearly anticipated that a moderate amount of additional employee parking spaces will need to be furnished within the duration of the planning period. Opportunities to accommodate this demand will be discussed in Section 5, Alternatives analysis.

4.3.6 Airport Rental Car Facilities Inventory and Facility Requirements

The focus of this section is to provide an updated inventory of the existing rental car facilities at TPA and to develop associated facility requirements to accommodate the forecast demand at TPA over the course of the planning period (2011 through 2031). Existing conditions information was generated from various sources including a review of previous studies and drawings, including the 2005 AMPU and specifically the rental car memorandum dated September 30, 2011 in the AMPU; interviews with Airport staff and Airport tenants; and from a series of site visits. At the direction of the Hillsborough County Aviation Authority (HCAA), the focus of the inventory effort has been on the identification of changes that have occurred since the completion of the last master planning effort. Where changes have not occurred, the intent is to reference back to the previous master plan existing conditions data.

Facility requirements were developed by taking the aviation demand projections presented in Section 2 and performing a demand/capacity analysis. While the facility needs are discussed in this chapter, specific alternative methods of meeting these requirements are evaluated in Section 5, Alternatives analysis.

4.3.6.1 Existing Rental Car Configuration

The existing rental car operation at TPA has facilities conveniently located within walking distance of the main terminal building. There are rental car counters on both the Blue Side and the Red Side of the Main Terminal. The reason for duplicate counters on a single level is primarily for customer service as passengers cannot easily move between the red and blue sides on the baggage level. Passengers must take an escalator from the baggage level up to the ticketing level and then a second escalator or stairs back down to move between red and blue sides.

For passengers arriving on the Blue Side, the rental car counters can be accessed via the bag claim level of the Main Terminal. Passengers seeking rental cars must then cross the lower level curbside roadway to the south past the outside lane to access the rental car customer service building, which is adjacent to the Long-Term Parking Garage. The rental car counters are located at this facility. From the counters, passengers are directed to proceed behind the customer service building which leads to the rental car ready area on the ground-level of the long-term garage. It should be noted that passengers proceeding to their rented vehicle space must first walk to a second customer service station in the garage to pick up the vehicle key from an attendant. This is known as a “keys-out” mode of operating. From this point the customer proceeds to their vehicle. Exiting the garage requires no transit through a secure exit gate as is typical at many facilities.

For passengers arriving on the Red Side, the rental car counters can be accessed via the bag claim level of the Main Terminal. Passengers seeking rental cars on this side must then cross the lower level curbside roadway to the north northwest past the outside lane to access the rental car customer service building. From this location the customer then must walk to the adjacent red side garage to pick up their vehicle.

Shuttles for off-airport rental car companies provide pick-up service at the ends of the terminal building. Following signs for ground transportation will bring passengers to these areas.

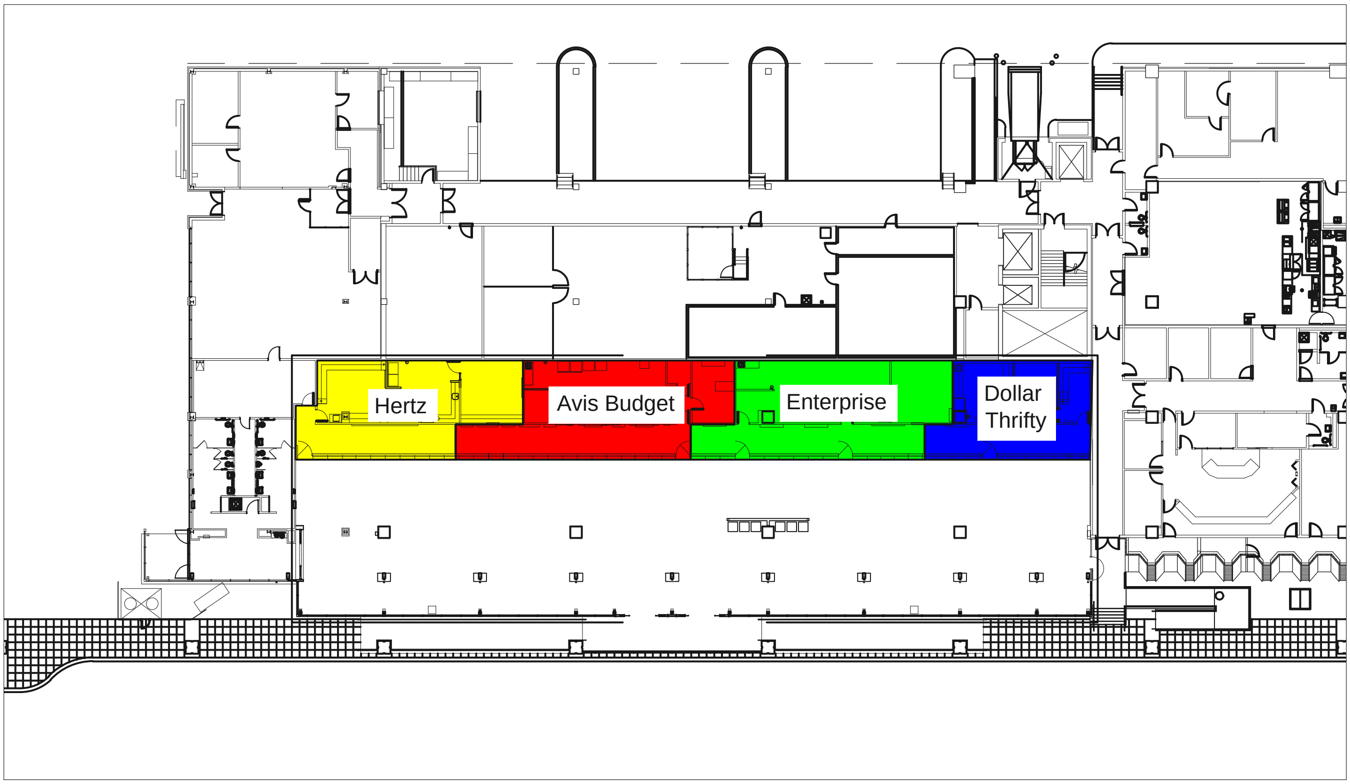
The previous sections outline the general process a passenger must go through to pick up their rental car. To return a vehicle at the Airport, passengers driving on the airport roadway network must follow signs to the Rental Car Return Area which is located on the second level of the Long-Term Garage on the Blue Side. The vehicle return lanes are oriented in a south to north configuration with separate return areas for each respective rental car operator. Rental car operators process the receipt of vehicles on this level prior to being run through the rental car QTA which is located on the lower level.

Counters

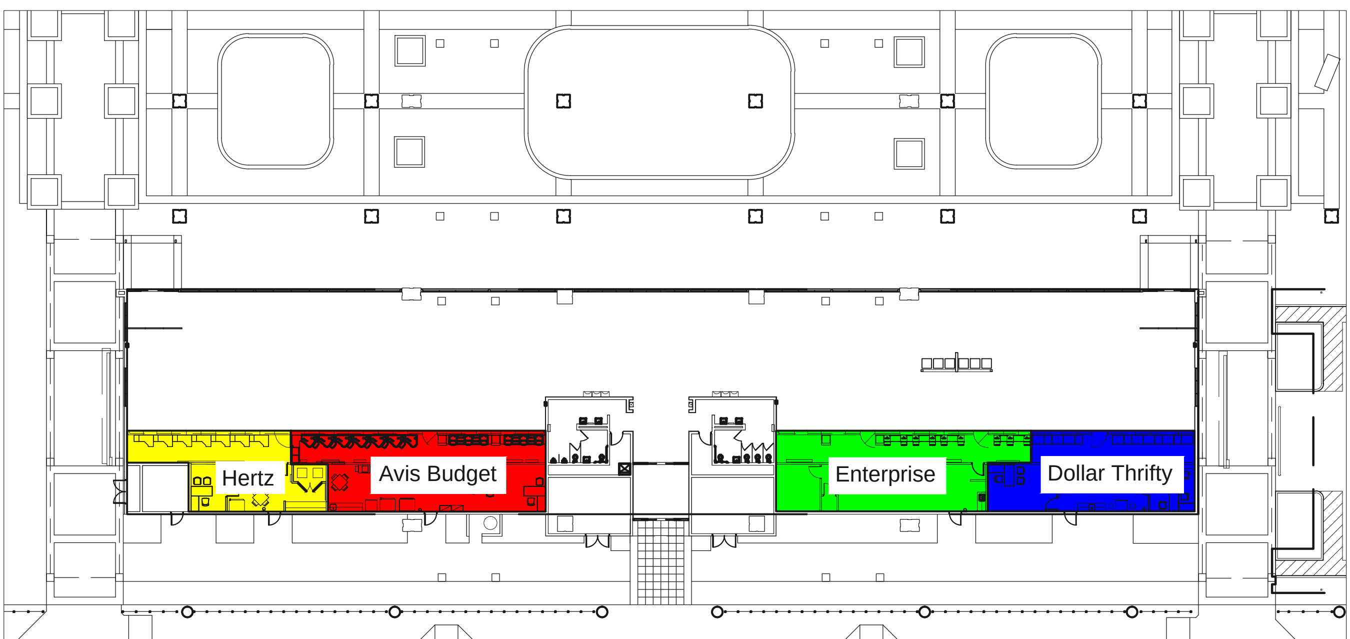
There are 60 counter positions on the Blue Side and 56 counter positions on the Red Side. The rental car concessionaires all have duplicate counters on the Blue and the Red side, however there configurations vary between the two locations. **Table 4.100** summarizes the existing counter allocations and **Figure 4.103** shows the existing customer counter areas and back office spaces.

Table 4.100
Counter Allocation

Rental Company	Blue Counters	Blue Area (sf)	Red Counters	Red Area (sf)
Avis Budget	18	1,274	16	1,493
Dollar Thrifty	12	1,039	10	1,014
Enterprise Alamo National	18	1,247	18	1,521
Hertz	12	799	12	1,321
Total	**60**	**4,359**	**56**	**5,349**



RED SIDE RAC OFFICES AND COUNTERS



BLUE SIDE RAC OFFICES AND COUNTERS

0' 25' 50'
SCALE: 1" = 50'

HNTB

Existing Rental Car Counters and Back Office Space

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
Apr 18, 2013

Figure:
4.103

P:_Projects\57785 - Tampa MP\00-CADD\HNTB_Team_Dwg_files\Rental Car Facilities.dwg counters-office space Apr 18, 2013 - 1:46pm

Rental Parking Spaces

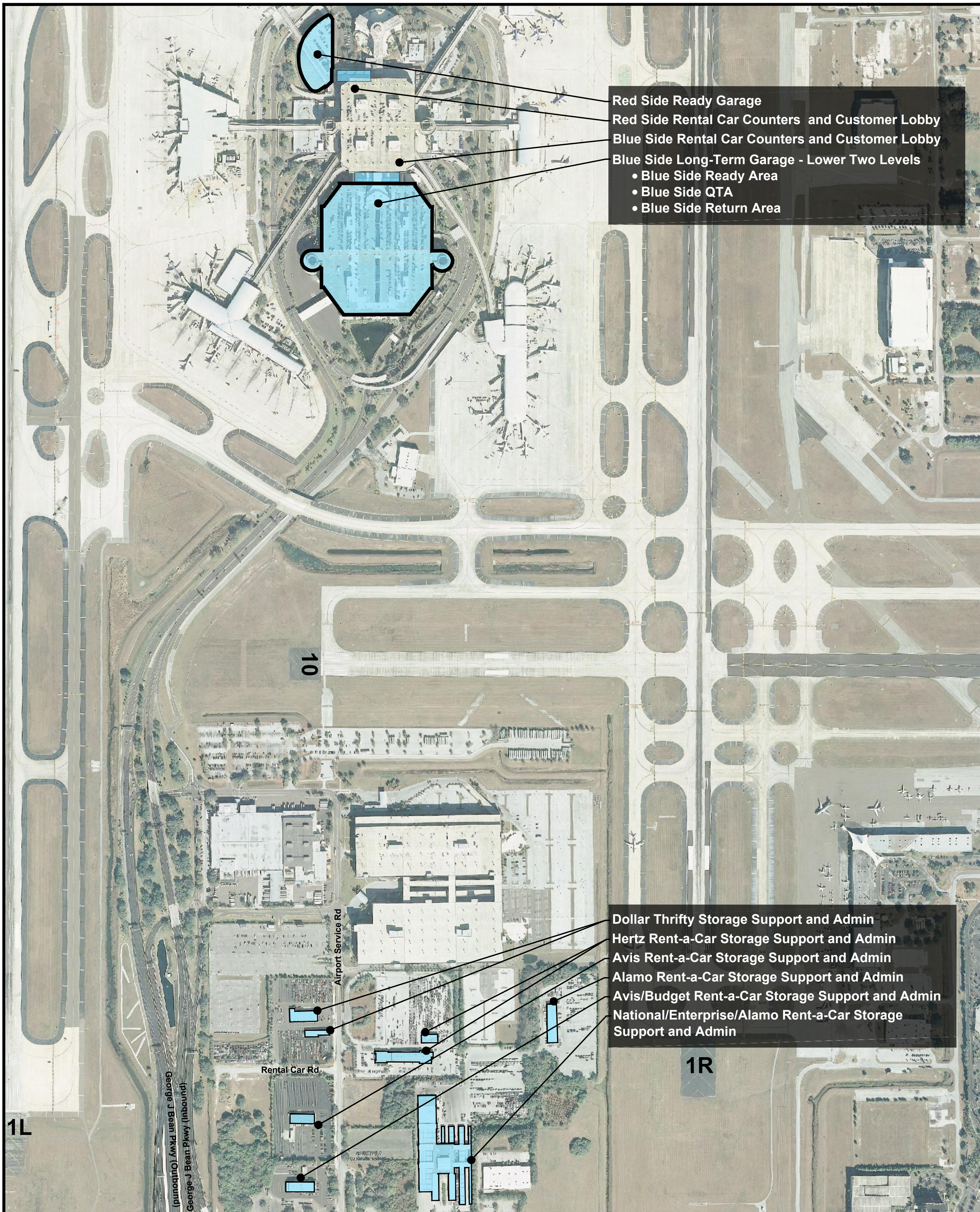
Rental car parking spaces are divided among several areas on both the blue and red sides. **Table 4.101** summarizes the rental car parking space allocations for the blue and red sides. The Blue Side contains 671 dedicated rental car parking spaces all located in the north half of the ground floor. The Red Side garage has 6 levels containing 635 dedicated rental car parking spaces. **Figure 4.104** shows an overview of the locations of rental car facilities at TPA. The terminal area houses the main rental car parking and service facilities; the Red Side Ready Garage, Blue Side Ready Area, Blue Side QTA, and the Blue Side Return Area. **Figure 4.105** represents the ready stalls on the blue side as well as the QTA.

Table 4.101
Parking Space Allocation

Rental Company	Return Space	Blue Ready	Red Ready	Total
Avis Budget	565	210	190	965
Dollar Thrifty	383	125	127	635
Enterprise Alamo National	571	210	191	972
Hertz	411	126	127	664
Total	**1,930**	**671**	**635**	**3,236**

Source: TranSystems Analysis

Returned cars are brought to the second level of the Blue Side garage that has a nose to tail total capacity of approximately 1,930 vehicles. **Figure 4.106** represents the allocation of the blue side return. The QTA (fueling, wash and service facilities) are located in the southern half of the ground level of the Long-Term Garage on the Blue Side. There are currently 148 fueling positions and 13 wash bays. There is stacking space adjacent to the fueling area where cars are stored prior to being serviced. The fueling islands also include facilities for vacuuming and cleaning the insides of the cars and checking and filling the fluid levels. Once the cars have been serviced, they are returned to a ready stall or put in remote storage which is located in the South Development Area.



0' 400' 800'

SCALE: 1" = 800'

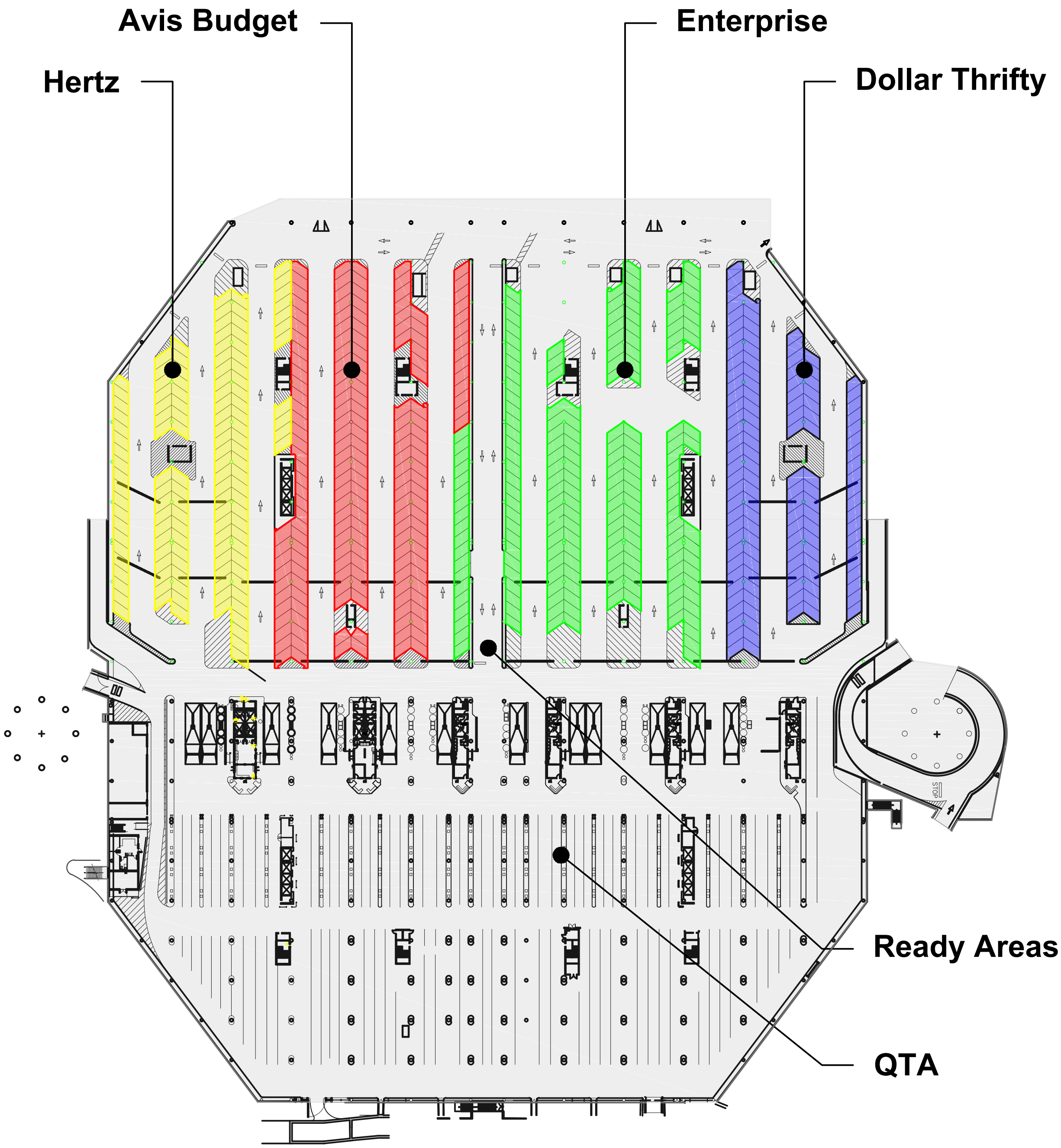
HNTB

Rental Car Facilities

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

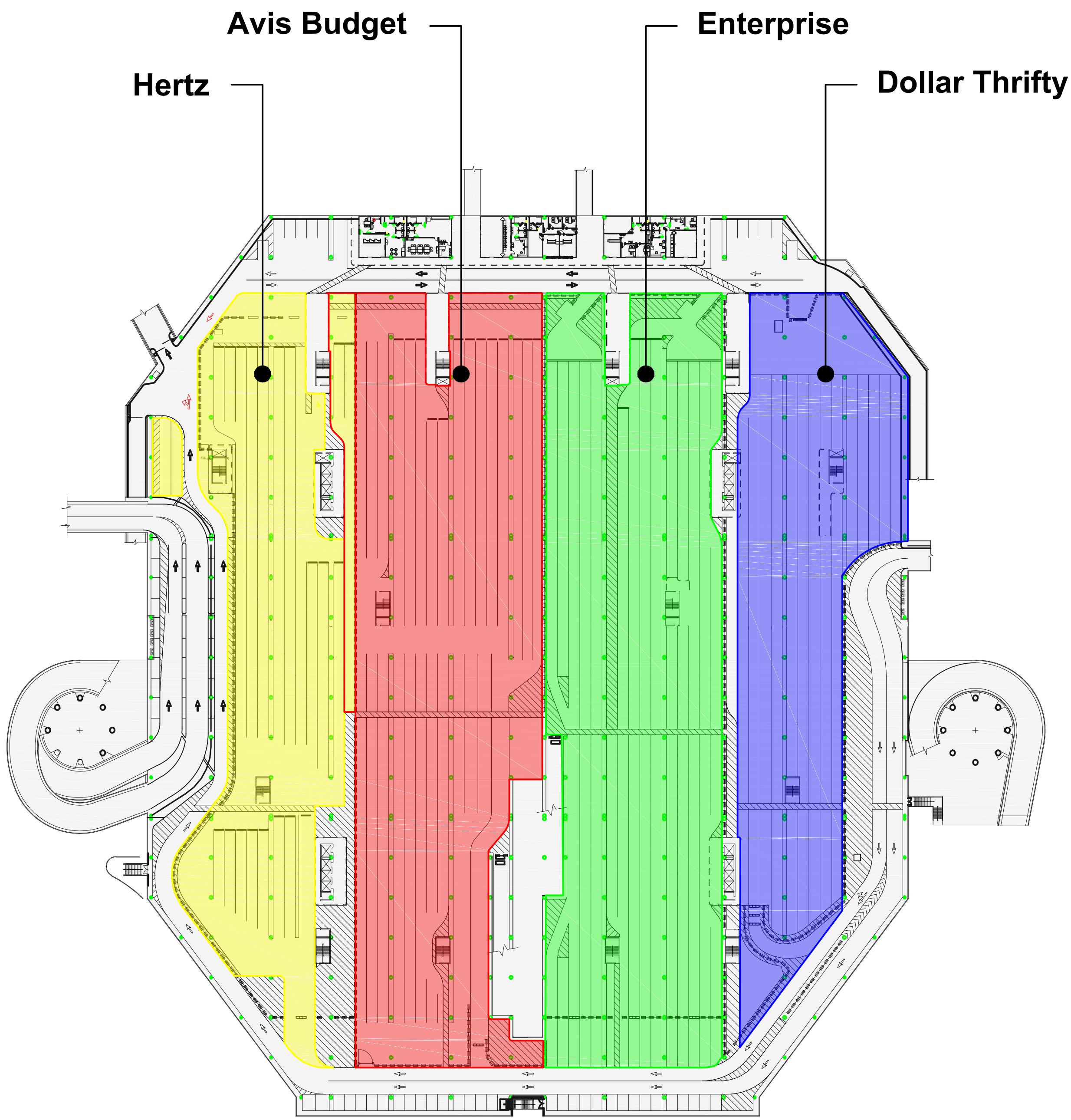
DATE:
Apr 23, 2013

Figure:
4.104



C:\Temp\AcPublish_2292\Rental Car Facilities.dwg Ready and QTA Area Apr 25, 2013 – 10:49am

0' 75' 150' SCALE: 1" = 150'	HNTB	Existing Blue Side Ready and QTA Areas	DATE: Apr 25, 2013
		TAMPA INTERNATIONAL AIRPORT TAMPA, FLORIDA	Figure: 4.105



C:\Temp\AcPublish_1172\Rental Car Facilities.dwg Return Area May 07, 2013 - 4:32pm

0' 75' 150'
SCALE: 1" = 150'

HNTB

Existing Blue Side Return Area

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
May 07, 2013

Figure:
4.106

Rental Car Support Areas

The South Development Area houses the majority of rental car support functions for all the rental car companies. See **Table 4.102** for a breakdown of the each company, the amount of land they occupy, the number of fuel positions and wash bays. Additionally, all the companies have maintenance bays, administrative space and storage space in the South Development Area. It should be noted that these quantities represent existing leased facilities, and do not include additional land that the rental car companies lease during peak storage times.

Table 4.102
South Development Area Allocation

Rental Company	Land (acres)	Fuel Positions	Wash Bays
Avis Budget	14.8	16	2
Dollar Thrifty	6.4	9	2
Enterprise Alamo National	22.5	18	3
Hertz	11.7	8	1
Total	**55.4**	**51**	**8**

Source: TranSystems Analysis

Rental Car Transaction Data

The Rental Car Memorandum in the previous Master Plan based its analysis of the capacity of the existing facility on the peak rental day activity combined with the peak return day activity. These two peaks do not occur on the same day. This kind of analysis is appropriate in a rental car facility such as TPA where the rental and return areas are separated from each other. In order to understand the Tampa market and how it might take advantage of the ability to locate rental and return spaces next to each and flex the use of the space based on the demands of each particular day, the rental car consultant gathered information on the return transactions simultaneous with the peak rental activity. In late 2011, the rental car consultant prepared a questionnaire for the rental car companies that was distributed by the airport to rental car staff and returned and compiled in early 2012. The results of this survey, in combination with interviews, is the basis for the information presented below.

4.3.6.2 Market Conditions

In March of 2012, TranSystems toured the TPA rental car operations, visiting with each of the 4 major brand families and observed the ongoing operations. The survey and site visit allowed the project team to make the following observations:

- The Tampa rental car market is characterized by high flat peaks on an annual basis and during the peak season on a weekly and daily basis.
- The peak season begins with the Thanksgiving holiday and continues through the weekend after Easter with a drop during the first three weeks of January.
- Peak season activity is twice as high as off peak season activity.
- During peak season, weekly activity is high Monday through Saturday.

- During the peak season, daily activity is high from 9 am through 6 pm.
- The high flat peak activity level compounds the stress associated with rental car activity at TPA because there is very little opportunity to either prepare for or recover from the peak.
- It is not unusual for a customer to spend over one hour in line waiting to get to the rental car counter during a peak period.
- It is not unusual for rental car companies to run out of cars and either transfer rental car contracts to a competitor or put customers up in a hotel so the rental car company can get the customer a car the next day.

4.3.6.3 Customer Service

Customer service at a rental car center has many different aspects. Following is a discussion of several of those facets as they apply at Tampa.

- **Wait Times.** While we have not done a customer service survey, direct observation of operations during a typical peak day suggests frequent long waits currently in the ready area and up to 90-minute waits for some customers in the customer counter areas. The high flat daily and weekly peak of activity during the peak season, stretching roughly from Thanksgiving through Easter, suggests that long customer waits are common during current operations and should be expected to get worse.
- **Safety.** Currently on the Blue side, pedestrians must cross the path of the exiting customer vehicles on their way to their ready cars. The path of returning pedestrian customers crosses the path of the service drivers taking the returned cars to the QTA. On the red side, there are numerous occasions where pedestrian must cross the path of service drivers and customers in vehicles on their way to their ready cars. Some of these crossings are blind corners such are what happens on Red level 1 when pedestrians leave the elevator area and cross the service path as the pedestrians walk north toward the cars. The potential for a pedestrian/car accident is much higher in Tampa than in many other rental car locations.
- **Walking Distance.** One of the industry standards is to keep the walking distance from the counter to the rental cars and from the returned cars to the terminal within no more than 350’. Most of the ready stalls on both the blue and the red side fall within the 350’ walking distance. On the return however, the back of the return area is over 800’ from the terminal. Fortunately for the rental car customers, these remote areas are seldom used for returning cars. During peak return periods, customer walking distance far exceeds the target 350’.
- **Wrong Side**. Tampa has the challenge that comes when a customer arrives at the side opposite from where their car is. While this does not account for a large number of customers, it is very inconvenient for the ones who experience it.
- **Service Offerings.** Many of the rental car service offerings that customers expect and would like to take advantage of are not available in Tampa. Most of the Blue and Red side is not secure. As a result, the opportunity for the customers to have their keys and contracts waiting for them in the car, saving them time and an interaction at a customer

booth, is generally not available. The "choose any car in this category" service is also largely not available.

- **Cost.** There is additional cost to the rental contract generated because of the highly inefficient rental car operation. Tampa is one of the most expensive locations for rental car operations in the country. The extra cost is passed on to the customer.

4.3.6.4 Operational Efficiency

Rental car operations are very repetitive and very labor intensive. Unlike parking, where a car may sit in the same stall for days, each rental car stall is used over and over many times each day. The churn associated with rental cars makes efficient operations extremely important. The following is a discussion of several aspects of operations at Tampa:

- Two-sided facility. The two-sided operation on the Red Side and the Blue Side, lack of security, and split between rental and return areas creates extensive duplication of customer touch points at Tampa.
- Tight and odd shaped space. The constricted QTA area makes for very slow turn-around and frequently results in excessive damage to the vehicles. The fuel islands are too close together and the pumps are not far enough apart. One of the brand families budgets $500,000 to $800,000 per year to pay for damage caused by their own drivers moving the cars in and around the QTA area.
- Excessive space. The return area on the Blue side Level 2 is much larger than can be fully utilized.
- Flexibility. The rental and return areas are not next to each other. If they were next to each other, the rental area could cross into the return area during peak rental times and conversely during peak return times. The adjacency of the two areas would also help with the supervision of staff. The lack of flexibility in the physical space means rental car operations can only compensate for peak times through the addition of staff.
- Seasonal fleet size changes. The large in-fleet and out-fleet levels create serious shortages of bulk car storage.
- Roadway congestion. The highly congested roadway system in the terminal area creates serious bottlenecks in the movement of cars from one side to the other and cars from the terminal area to the south side storage and service facilities.

4.3.6.5 Interviews with Current Rental Car Operations Staff

As part of the inventory process, meetings were held with rental car operations staff to conduct a tour of existing facilities, document key elements, and to discuss the nature of their operations and state of affairs. Emphasis was placed on identifying any existing issues, capacity shortfalls, and discussing long-term requirements. The following operators were interviewed:

- Enterprise Holdings
- Dollar Thrifty Automotive Group. Inc.
- Avis Budget Group
- Hertz

4.3.6.6 Issues and Shortfalls Identified

The following is a compilation of the comments from the rental car representatives:

- The current configuration is generally not secure. Some cars have the keys left in them and are very vulnerable to theft. Most of the vehicles do not have the keys in them, which requires customers to stop at the counters or booth to get the keys. This is a low level of customer service as well as an expensive operational model.
- Generally speaking, none of the operators wants to bus the customers to a distant rental car center.
- All of the companies stated they had insufficient dirty car storage.
- All of the companies stated they were unable to provide typical customer service offerings because of the non-secure condition at Tampa.
- Hertz was unable to bring Advantage onto the airport because there is insufficient space.
- The fuel and wash area is very tight. For some companies, up to 50% of the washing and fueling activities happen in the South Development Area because the in-garage facilities are so constrained.
- The peak period runs from President's Day to the week after Easter.
- The peak storage demand occurs the week after Easter as the rental car companies wait for an opportunity to send the cars north.
- The peak period fleet is twice the size of the summer time fleet.

4.3.6.7 Rental Car Requirements

The focus of this section is to define the facility requirements for providing a full-service Consolidated Rental Car Facility (CONRAC) at TPA. Notable in the presentation of these requirements is that they have been developed specifically for the application of developing a CONRAC facility in the South Development Area and not the existing terminal area where the facilities are currently located. This is notable because facility requirements developed for a "retrofit situation" would be markedly different than those developed for an optimized facility in an unconstrained or much less constrained location. That is the case at TPA, specifically in the existing terminal area, which currently houses rental car facilities in a functionally constrained location. The assumption moving forward is that rental car facilities will be relocated out of the terminal area in exchange for more close-in public parking capacity. The following sections on facility requirements are based on that fundamental assumption.

A secondary assumption is that the facility requirements presented represent "minimum requirements" for the planning of the CONRAC. The goal being to assess sizing requirements that will serve as a starting point for the planning of not only the CONRAC but other terminal support functions. As such, additional facilities may be desired by rental car operators. This will not be discussed in this section, but Section 5 Alternatives Analysis.

Facility Requirements Planning Methodology

The On-Airport Rental Car companies were surveyed in late 2011 and asked to provide their individual peak rental week transaction data. The questionnaire requested peak week hourly transactions including regular counter rentals, premium service rentals and car returns at the same hour. This peak week transaction data was then compiled as a total for the Industry and became the basis for sizing the proposed facility. In addition to the transaction data, the survey requested program needs for adjacent supporting administrative, service, maintenance and storage facilities. Established rental car industry metrics were applied to the transaction data and a proposed program for the various facility components was created for the forecast year of 2031. This included customer service lobby with rental counter area, rental stalls, return stalls and storage stalls within a multi-story consolidated facility with supporting fueling and wash areas (QTAs).

Consolidated Facility (CONRAC) Functional Components

The design goal of the rental car facility planning that was completed for this AMPU is to provide customers and rental car companies with a consolidated facility that will accommodate all vehicles required for the industry's peak rental day at TPA. The main functional components to be considered in this analysis are as follows:

- Customer Service Lobby
- Consolidated Facility Rental Stalls / Return Stalls / Vehicle Storage
- Quick Turnaround Area (Fueling / Wash / Light Maintenance)
- Adjacent Individual Service Sites

All vehicles required to meet the forecast peak rental day are to be within the structured garage area with minimal off-site movement of vehicles required. All spaces within a typical large-scale facility are available to be used in a flexible way during the course of the rental day and week. Structural bays can be used interchangeably for rentals, returns and storage depending on the particular need. A full rental space unit of measure is used to size the facility with a conversion factor applied to return spaces and storage spaces as they require less area. Therefore the full rental space equivalent does not equate to the potential total vehicle count within the facility.

Customer Service Lobby

The survey data showed that approximately seventy (70) percent of the rental transactions at TPA are traditional regular counter rentals requiring direct contact with a rental representative. Thirty (30) percent are premium rental transactions allowing for bypass of the traditional lobby. Premium customers are able to go directly to their individual company rental car and proceed to the exit where they are checked out at a security booth. The typical rental counter transaction time was approximately seven (7) customers per hour per position. Using this metric, a total of ninety (90) counter positions are required for the forecast year of 2031. The rental car industry is in transition with individual premium programs and many companies now offer "Choice" programs. No metric for premium service was developed due to the variation in present and future programs.

Rental Stalls / Return Stalls / Storage Stalls

Rental Stalls

The quantity of rental stalls is determined by the peak hour capacity metric. Peak rental hour demand is projected to be 760 vehicles per hour in 2031. The recommendation is to use the 2.0 metric resulting in 1520 full rental stalls for vehicle rentals. The applied 2.0 metric factor is an accepted industry standard for determining the inventory requirements for the peak rental hour. This factor doubles the amount of ready vehicles in fixed rental stalls to account for variations in customer traffic, flight delays and other unknown factors.

Return Stalls

The number of return stalls is determined by the number of vehicles being returned at the same peak rental hour. The industry range is typically to provide 1.5 to 2.0 hours of capacity to meet peak hour return demand during the peak rental hour. 500 return vehicles per hour are projected for 2031. Using the recommended 1.5 metric this equals 750 vehicles. With a conversion factor of 0.7 this equates to a requirement of 530 full rental stalls for vehicle returns. This accounts for variations in return car flow to provide additional space. Return stalls require less space than rental stalls which are the standard measure of size. The conversion factor of 0.7 equates that space to a full rental stall.

Storage Stalls

On a peak rental day, additional vehicles must be stored in inventory since the number of rentals exceeds the number of vehicles being returned and available for rental. The number of storage stalls is determined by the vehicle deficit of total rentals minus the total number of returns. Not all returning vehicles are available for rental so a reduction factor is applied to the returns. There is a projected deficit of 2080 vehicles on the peak rental day. With a reduction factor of 10% and a conversion factor of 0.6 this equates 1250 full rental stalls for vehicle storage. Storage stalls require less space than rental stalls which are the standard measure of size. The conversion factor of 0.6 equates a storage stall to a full rental stall.

Total Full Stall Requirement

3,180 full rental stalls meet the requirement of the on-airport rental car companies surveyed. In order to accommodate existing off-airport operators and potential future entrants an additional seven (7) percent or 220 full stalls are recommended. This equates to a recommended 3400 full rental stall program. Based on industry standard vehicle storage practices, which require significantly less space than a “full stall” the actual count within the structured facility during the peak hour is approximately 4500 vehicles.

Quick Turnaround Area (QTA)

A key component of a CONRAC facility is a co-located QTA facility that will allow the efficient throughput of vehicles from the return process to their final CONRAC destination in the ready spaces. The QTA will house a host of critical functions that primarily include fueling, washing (car wash and vacuuming) and light maintenance. Requirements for each of these major functions are as follows.

Fueling Positions

The quantity of fueling positions (nozzles) is determined by the number of vehicles being returned during the peak rental hour. Typically, those vehicles must be fueled and washed and made available as a rental vehicle as quickly as possible. As noted previously, there is a vehicle deficit on peak rental days making utilization of the returning vehicles critical to an efficient and cost effective operation. Returns at the peak rental hour are projected to be 500 vehicles per hour in 2031. The recommendation is to use a fueling metric between 4.0 and 5.0 vehicles per hour per fueling position. This results in a recommended number of 112 fueling positions.

Wash Bays

The quantity of wash bays is also determined by the number of vehicles being returned during the peak rental hour. A wash bay can typically wash 30 or more vehicles per hour. 18 to 20 wash bays are recommended depending on ultimate facility configuration.

Light Maintenance Bays

To minimize vehicle movements to off-site facilities for required maintenance the recommendation is to provide for light-duty maintenance bays within the QTA. There is no specific metric for this requirement and the actual number will vary depending on the ultimate facility design. The recommendation is to provide approximately 20 to 24 light maintenance bays.

Adjacent Service Sites

A portion of the proposed site for the Consolidated Rental Car facility is presently leased and occupied by existing on-airport rental car companies. These sites will have to be replaced and additional leased sites created for supporting administrative, service, maintenance facilities and overflow vehicle storage areas. Approximately 40 to 45 acres adjacent to the structured CONRAC will be available for sub-division and development by individual rental car companies. The final requirements and individual programs for the individual companies must be developed for these areas.

CONRAC Facility Requirements Summary

The previous sections present a brief outline of the requirements identified for each of the main functional components. The requirements identified represent “minimum requirements” for the planning of the CONRAC. During the process of developing facility requirements there were differing perspectives on what would meet the long-term needs of the rental car companies. The rental car operators indicated a desire to develop a larger facility that could accommodate longer peak periods. With that in mind, the goal of this section is to set a baseline set of requirements using professional judgment and industry precedent. The proposed alternative may depart from this baseline to meet the desires of rental car operators at TPA.

For a summary of the baseline requirements see **Table 4.103** below. This summary provides the general requirements provided, but translates the quantities into square footages which will be applied in assessing the potential siting of the CONRAC facility. It should be noted that there are a variety of ways to accommodate the requirements identified for the future CONRAC facility. These will be explored in Section 5 Alternatives Analysis.

Table 4.103
Rental Car CONRAC Facility Requirements Summary

RAC Programmatic Elements	2011 Present	2031 Proposed	Square Footage (2031)
Customer Service Center			
Transaction Counter Positions*	104	90	11,000 SF
Back Office Areas			6,000 SF
Common Lobby Area			8,000 SF
Building Core Areas			5,000 SF
Customer Service Center: **Total**			**30,000 SF**
Vehicle Rental and Return Areas			
Rental Stalls	1330	1520	460,000 SF
Return Stalls	1195	750 / 530*	160,000 SF
Storage Stalls	0	2080 / 1250*	400,000 SF
Circulation	NA	Factor 25%	280,000 SF
Rental / Return: Total	2525		**1,300,000 SF**
Quick Turnaround Facilities			
Fuel Positions	140	112	35,000 SF
Wash Bays	13	18	30,000 SF
Queuing / Storage	479	450	100,000 SF
Light Maintenance Bays		24	20,000 SF
Administrative Areas			35,000 SF
Circulation		Factor 30%	80,000 SF
QTA: Total			**300,000 SF**

Note: *Rental and return stall numbers shown #/# represent optimized rental spaces vs. full size space numbers.

Source: TranSystems Analysis

4.3.7 Commercial Ground Transportation Facilities

Tampa International Airport is served by a variety of commercial ground transportation options, including taxi, limousine, shared ride van, charter bus, HART regional transit bus, intercity airport bus, and courtesy shuttles for on- and off-airport parking, hotels, and off-airport rental car operators. In addition to the Bean Parkway and the landside terminal circulation roads, these modes utilize facilities at the landside terminal and/or in the South Development Area for staging, passenger drop-off, and passenger pick up. The HCAA has developed detailed operating regulations for each mode which informs drivers of the locations for their operations and the paths to follow between locations.

At the landside terminal, most commercial ground transportation providers drop off originating passengers at the departures curb on the Red and Blue sides. If the vehicle is a multi-party carrier and has passengers for airlines on both sides of the terminal, their movements are facilitated by the cross-over drives, which connect the downstream end of each upper curb with the upstream end of the other upper curb. The cross-over drives are also used for drop-offs by charter buses. The HART regional bus stops only on the Red side arrivals curb, and the Red Coach bus service that connects TPA with Tallahassee and Miami picks up and drops off on the Red quad lot 2.

Connecting drives are provided at the terminal's corners for movements by certain commercial vehicle (CV) drivers between the upper and lower levels. At baggage claim, various CVs pick up terminating passengers at the four quad lots. There are connecting drives on the east and west sides which enable drivers to pick up from the several quad lots without having to drive across the busy arrivals curb roadways. The quad lots have a curvilinear curb for pickups by taxis, courtesy shuttles, and shared ride vans. The center of each quad lot accommodates several waiting vehicles, and is used by Red Coach, charter buses, and short-term staging for Super Shuttle shared ride vans.

In the South Terminal Support Development Area, there is a staging area for several of the ground transportation providers. The two franchised taxi companies share a linear taxi queue approximately 460 feet long, with approximately 20 of each company's cabs queued up on either side of the roadway. Adjacent to this queue is a paved lot approximately 28,000 SF in area. It is used for taxi staging (typically around the perimeter), and for staging of charter buses and shared-ride vans. The lot as currently configured can accommodate approximately 50 additional taxis, and up to 10 buses or vans, depending on how carefully the vehicles are queued and parked. The lot is not specifically configured for a staging area, and thus is inefficiently utilized. At times, the lot is packed, which can be a source of friction among the drivers.

The CV staging area and taxi queue is served by two small restrooms, a picnic area, and food truck service.

The standard for airports similar to Tampa International is to provide an hour's worth of commercial vehicles in the staging area. For current demand levels, this would equate to the volumes and areas shown in Table 4.103x. The table also shows the requirements for the planning horizon level of activity. Note that the space requirements for the break area, restrooms, and food service are in addition to the parking areas in **Table 4.104**.

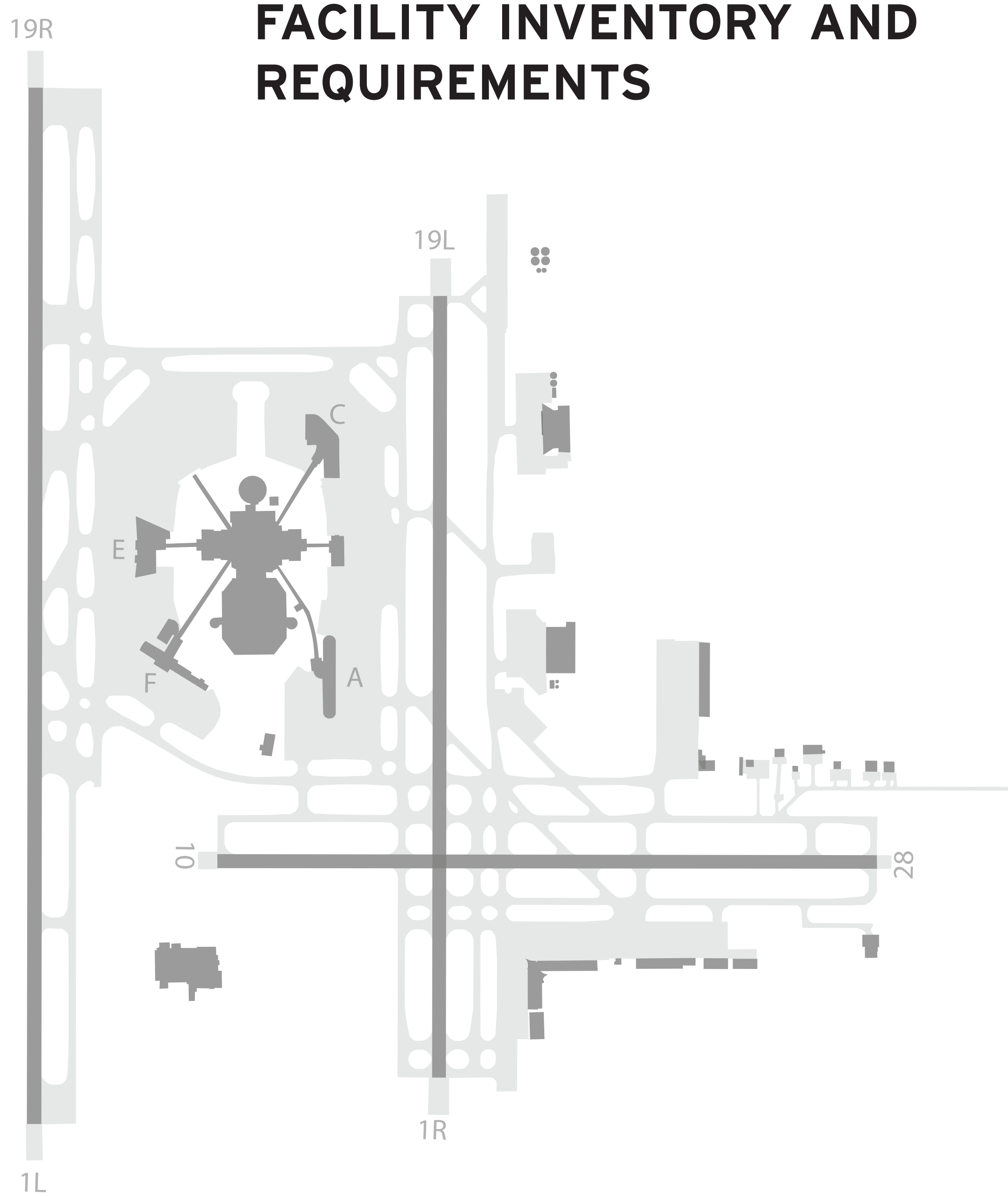
Table 4.104
Commercial Vehicle Staging Facility Requirements

	Existing (2011)			Future (2031)		
Mode	Peak Hour Demand	SF per space	SF for Mode	Peak Hour Demand	SF per space	SF for Mode
Taxi	80	280	22400	140	280	39200
Shared ride vans	22	420	9240	37	420	15540
Charter buses	10	630	6300	18	630	11340
TOTAL			**37940**			**66080**

Source: field counts and HNTB analysis. Note: SF/space includes 40% premium for circulation.

Based on the requirements, the current facility is just barely adequate to meet needs. It will need to be expanded and reorganized in order to provide operators and the HCAA with an efficient facility in support of high quality customer service.

AIRPORT SUPPORT FACILITY INVENTORY AND REQUIREMENTS



4.4 Airport Support Facility Inventory and Facility Requirements

The focus of this section is to update the inventory of the existing airport support facilities at TPA and provide the projected facility requirements in one place. This will combine what are typically two separate sections into one for the convenience of the reader. The Airport Support facilities that are assessed consist of the following:

- Air Cargo Facilities (Airline Belly Haul and Dedicated Air Freight)
- Aircraft Maintenance/Maintenance Repair and Overhaul (MRO) Facilities
- Ground Service Equipment (GSE) Storage and Maintenance Facilities
- Airport Maintenance, Equipment Storage and Maintenance Warehouse
- RON Parking
- Airport Rescue and Fire Fighting (ARFF) Facilities
- Airport Fuel Farm
- Airport Surveillance Radar (ASR)
- Compressed Natural Gas (CNG) Fuel Facility
- Airport Security and Police (K9 Training Facility and Range)
- Ground Run-Up Enclosure
- General Aviation Facilities
- Fixed Base Operator (FBO) Facilities

Existing conditions information was generated from various sources including a review of previous studies, the 2005 Airport Master Plan Update (AMPU); review of as-built and other facility drawings; interviews with Airport staff and Airport tenants; and from a series of site visits. The site visits and interviews were conducted during airport visits that occurred from December 2011 through March 2012. These were supplemented on an as needed basis with follow-up site visits. At the direction of the HCAA, the focus of the inventory effort has been on the identification of changes that have occurred since the completion of the last master planning effort. Where changes have not occurred, the intent is to refer back to the previous master plan existing conditions data.

The majority of the airport support facilities at TPA, with the exception of the ARFF and RON area, are located on the east side of the airport in the area generally referred to as the Eastside Aviation Development Area. In the case of the Fixed Base Operators (FBO), the facilities are located on the east side of the airport south of the alignment of Runway 10-28. **Figure 4.107** presents an updated (2012) graphic of the airport and delineates the location of the support uses noted above.

0' 1,000' 2,000'
SCALE: 1" = 2,000'

HNTB

EXISTING AIRPORT SUPPORT FACILITIES

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
Jun 06, 2012

Figure:
4.107

C:\Temp\AcPublish_4780\TPA_Support Facility Figure_Rev1.dwg 1 – Support Facilities Jun 06, 2012 – 10:03am

4.4.1 Air Cargo Facilities Inventory

There are two primary active air cargo facilities and a third smaller facility at TPA, all of which are situated in the Eastside Aviation Development Area. These consist of the new airport Belly Cargo Building that opened in 2010, the FedEx Cargo Building which currently accounts for the vast majority of dedicated air cargo at the airport, and the Flight Express hangar located to the southeast of the FedEx facility and directly east of the Global Aviation facility. The most significant change among cargo facilities since the completion of the 2005 AMPU is the closure of a former air cargo facility that was located along the east side of Runway 1L-19R and north of the cross-field taxiway B. The activities formerly conducted in this building were subsequently relocated to the new Belly Cargo Building east of 1R-19L. Air cargo facilities as they exist today are summarized as follows:

4.4.1.1 Belly Haul Air Cargo Building

Airline belly cargo is handled through a new multi-tenant Belly Cargo Building located in the Eastside Aviation Development Area fronting on Air Cargo Road and to the south of West Cayuga Street. The Belly Cargo Building was built after the completion of the 2005 AMPU and opened for operation in 2010. The new Belly Cargo Building was constructed as a replacement for the former Air Cargo Building located to the north of the terminal complex. Access to the Belly Cargo Building from the terminal is provided via a secure 25' wide bi-directional roadway that extends northward from the terminal beneath crossfield Taxiway B then turns to the east and proceeds through a tunnel beneath the Runway Safety Area on the north end of Runway 1R-19L. To provide access to the building, Westshore Blvd. was truncated approximately 400 feet south of West Cayuga Blvd. While the primary use of the facility is for belly haul cargo operations, a portion of the building is also currently utilized by Global Aviation for aircraft parts storage supplementing the space they have in the primary facility located at the southern end of the Eastside Aviation Development Area. The Belly Cargo Building is approximately 86 feet deep by 875 feet in length and is situated along a north/south orientation. The building is currently divided into nine main units and is occupied as described in the listing below (listed north to south):

- Southwest Airlines provisioning (Unit No. 1900);
- Southwest Airlines belly cargo (Unit No. 1800);
- Global Aviation holdings/World Airways/North American Airlines (Unit No. 1700);
- Air General (Unit No. 1600);
- Continental/United Cargo (Unit No. 1500);
- SMT Technical Management & Logistics (Unit No. 1400);
- Unit Number 1300 (appears to be unoccupied as of March 2012;
- U.S. Customs and Border Protection (Unit No. 1200); and
- Freight Forwarder Office Space Unit accommodating multiple tenants (Unit No. 1100).

With the exception of the freight forwarder unit and U.S. Customs and Border Protection, each unit has both warehouse space as well as associated administrative/office space. The freight forwarders unit and U.S. Customs and Border Protection unit are comprised solely of administrative office space. These two units are located on the southern end of the building with access to the landside via a single or a double entrance/exit door. Essentially every cargo tenant has a combination of airside and landside truck docks and or truck ramps which range in size with 7-foot, 10-foot, and 15-foot-wide roll-up doors. A summary of docks/roll-up doors for each tenant is included in **Table 4.105**.

Southwest Airlines also currently houses its aircraft provisioning operation in the northernmost unit (Unit 1900) in the Belly Cargo Building. The operation is facilitated by a covered elevated loading dock structure on the north end of the building oriented perpendicularly to the building. This loading dock is situated at the cargo building floor elevation and approximately 3 feet above the adjacent ground/truck staging level. The elevated dock allows for direct access from the building and loading platform into the backs of aircraft provisioning trucks. Ten truck loading positions are provided at this loading area and access into the building is afforded by a single roll-up door on the north end of the Belly Cargo Building.

On the west, secure side, of the Belly Cargo Building is a paved vehicle operational area. This area provides maneuvering and equipment storage space behind the entire length of both the Belly Cargo Building and the separate Ground Service Equipment (GSE) building that is located to the immediate north of the Belly Cargo Building. This paved area is approximately 175,000 SF in size and links to the secure service roadway accessing the terminal area at its northwestern corner.

Photo: The east side (landside) of the HCAA Belly Haul Cargo Building. Source: HNTB Corporation

Given the fact that the building is essentially new, respondents noted the facility as being in excellent condition and right-sized for the current operations. No major issues were noted with the configuration or sizing of facilities. It was indicated that any modifications needed by tenants would likely be related to revising the internal configuration or the installation of specific equipment such as refrigeration units to address a specific equipment related requirement.

A summary of the Belly Cargo Building by tenant, and primary building and apron square footage takeoffs are delineated in **Table 4.105**. The configuration of the belly cargo site and its relationship to other airport facilities and functional areas is presented in **Figure 4.107**.

Photo: North-end of Belly Cargo Building. Southwest provisioning docks (10). Source: HNTB Corporation

Table 4.105
Cargo Facility Summary

Facility	Warehouse Space (SF)	Building Admin (SF)	Total Building (SF)	Apron Area (SF)	Aircraft Positions	Landside Ramps/ Docks	Airside Bays/ Docks	Automobile Parking	Acreage
Air Cargo									
FedEx Building (SF includes L1 and L2)	66,000	42,000	108,000	400,000	3 (2)	31	12	175	19.5
Flight Express	-	-	6,500	42,000	14	-	-	12	2.48
Air Cargo Building (Belly Haul Cargo Building)	56,805	18,775	75,580	175,000	N/A, Tug access only	27	24	160 (1)	10.1
- Freight Forwarders	-	2,715	2,715			-	-	See bldg total	-
- U.S. Customs and Border Protection	-	3,900	3,900			-	-	See bldg total	-
- Unoccupied Unit	3,900	-	3,900			-	1	See bldg total	-
- SMT Technical Management & Logistics LLC	4,450	750	5,200			1	1	See bldg total	-
- Continental Cargo	5,490	2,310	7,800			4	2	See bldg total	-
- Air General Cargo	15,570	2,600	18,170			16	7	See bldg total	-
- Global Aviation Holdings (World Air/North Amer. Air.)	10,700	2,280	12,980					See bldg total	-
- Southwest Cargo	7,780	1,350	9,130			4	2	See bldg total	-
- Southwest Provisioning	8,915	2,870	11,785			2	11	See bldg total	-

Note: (1) Additional unmarked spaces against the building are not counted.
(2) Parking positions in the vicinity of the FEDEX facility are common use and shared by FEDEX and Global Aviation

Source: HCAA Documentation

4.4.1.2 FedEx Cargo Facility

The FedEx Cargo Building is located to the west/northwest of the intersection of Tampa Bay Blvd and North Lauber Way/Air Cargo Road, south of West Ohio Avenue and approximately 2,750 feet east of the mid-point of Runway 1R-19L. The FedEx facility was constructed in 2005 by HCAA to FedEx specifications and is currently leased and operated by FedEx Corporation. See **Figure 4.107** for a graphical depiction of the airport and the location of the FedEx facility.

Photo: Airside portion (western façade) of the FedEx cargo facility. Source: HNTB Corporation

Per the existing lease documents, the FedEx leasehold encompasses an approximately 10.1 acre area (Source: HCAA Leasehold drawing). This area includes the FedEx building and the surface truck loading and parking lots to the north, east and south of the building. Warehouse, processing and administrative functions are housed in a single 108,000 SF building. The footprint of the facility is approximately 115 feet deep by 750 feet long and is sited in a north/south orientation. The southern end of the building houses the administrative space, which occupies a two-level space totaling approximately 34,000 SF. The majority of the northern end of the building is a single-level warehouse/processing space. Inbound cargo is offloaded and processed through the warehouse/processing area before being re-loaded onto trucks and distributed to regional service centers for delivery to customers.

On the west side of the facility is a common-use aircraft parking apron with space immediately behind the FedEx building to accommodate three ADG IV-sized aircraft (wingspans up to 171 feet). Based on the past seven years of operational data, FedEx operations at TPA have historically been conducted using a mix of aircraft types that have included DC-10-10/30, MD11, A300, A310, and 727-200 aircraft, with operations by the 727-200 occurring predominantly during the December Christmas peak. During the remainder of the year activity has been almost exclusively associated with wide-body aircraft. The apron, including the access taxilane, is approximately 400,000 SF (44,000 SY) and is constructed of concrete. This area is not included in the FedEx lease area and is used in common with Global Aviation Holdings. Since the completion of the 2005 AMPU there has been the addition of 55,000 SF (6130 SY) of concrete apron filling in a formerly unpaved area between the common-use apron adjacent to FedEx and the apron adjacent to Global Aviation to the south. This additional pavement allows the potential for two additional ADG-IV sized aircraft parking positions bringing the total parking capacity of the common-use apron to seven ADG-IV sized positions.

The FedEx facility accesses the airfield via a 75 foot-wide taxilane that intersects the eastern terminus of Taxiway J and Taxiway N, both of which parallel the north side of Runway 10-28. For a summary of the facility, its primary building and apron square footage please refer to **Table 4.105**.

4.4.1.3 Flight Express

Flight Express is an on-demand air carrier providing expedited air and ground transportation for time-critical cargo/package deliveries. The operator focuses on providing services to banking and financial institutions, publishing, payroll processing, and life sciences industries. Flight Express currently operates in 26 states with Tampa being one of their 11 operational bases. The Tampa facility is also one of four Flight Express bases that provides aircraft maintenance support for their fleet. Flight Express currently operates a system-wide fleet comprised of over 100 Cessna 210 and Beechcraft Baron 58 aircraft.

The flight express facility is located on a 2.48 acre parcel at the south end of the Eastside Aviation Development Area, immediately east of Global Aviation and south of the intersection of West Tampa Bay Blvd and North Lauber Way/Air Cargo Road. Flight Express accesses the airfield via a short 30-foot wide connector taxiway that crosses the airport perimeter roadway and intersects with Taxiway N approximately 1,200 feet from Taxiway N’s eastern terminus. Current facilities are comprised of a small (6,432 SF) conventional hangar and an asphalt aircraft parking apron that is approximately 42,000 SF (4,666 SY) in size. The hangar opens on the south side to a small concrete parking pad while aircraft parking is generally located to the east side of the hangar and site. Along the west side of the site and immediately south of the vehicle parking area is an above ground 100LL tank and fueling system for Flight Express. The standalone tank has an estimated capacity of 10,000 gallons and is mounted on a concrete slab with curbing. The tank is accessible via airside ramp access or a landside access drive that extends along the west side of the facility.

For a summary of the facility, primary building and apron square footage please refer to **Table 4.105**. For the location of the facility and its relation to other facilities and functional areas on the airport see **Figure 4.107**.

Photo: Southeast side of the Flight Express facility. Source: HNTB Corporation

4.4.1.4 North Cargo Building

As previously noted, belly cargo facilities were previously located north of the Main Terminal Complex along the east side of Runway 1L-19R. This area, which includes the North Cargo Building, was identified in the previous planning effort as the site for the development of the North terminal complex to meet the projected level of demand that was then occurring at TPA. The development of the north terminal complex was put on hold as a result of the major impact the 2007 economic recession had on aviation activity nationally, in Florida and in the Tampa Bay market. The HCAA had taken steps including the relocation of belly haul cargo from the north area to the Eastside Aviation Development Area as an initial step in facilitating the ability to develop terminal facilities north of the crossfield taxiway system. Since 2010, the former North Cargo Building has remained generally unoccupied and access to the airfield has been removed through the demolition of the taxilanes that formerly connected the cargo area ramp to Taxiways V and W. The North Cargo Building is no longer required to meet cargo demand, however the building has been considered for temporary use to meet the needs of potential aviation related businesses relocating to TPA. See **Figure 4.107** for the location of the North Cargo Building.

4.4.2 Air Cargo Facility Requirements

The preceding discussion provided the delineation of the cargo facilities that as of 2012 are in operation at Tampa International Airport. This inventory provides the basis, when compared against the forecast of future demand as set forth in the Aviation Activity Forecasts, for developing the assessment of future facility needs. The sections that follow describe the methodology and assumptions used to estimate the cargo facility requirements for the Airport, including cargo building space and apron area for all-cargo and belly-cargo.

4.4.2.1 Cargo Building Requirements

The measurement used to define building requirements for air cargo facilities is the building utilization rate. Building utilization rates are expressed as annual tons of cargo per square foot of facility. **Table 4.106** summarizes cargo facility requirements for both all-cargo and belly cargo.

All-Cargo

All-Cargo operations at TPA are carried out from two facilities on the Airport, the FedEx facility and the Flight Express building. Combined, these facilities represent a total of 72,500 SF of warehouse space (administrative and office space are not included in calculations). The greater majority of cargo tonnage is transported in the larger facility by Fedex, who not only transport their own packages but are contracted to transport mail for the U.S. Postal Service. Flight Express operates in a smaller facility with more focused deliveries at a much greater frequency than a larger operator like FedEx.

Based on 2011 activity levels, the two facilities are cumulatively operating at an estimated building utilization ratio of 1.06 tons per square foot. This is reflective of well utilized facilities that could operate at higher levels of activity. For all-cargo type activity (including integrated cargo carriers like FedEx) the industry standard building utilization ratio is 1.5 tons/sf.

By 2031 forecast activity levels, the all-cargo facilities will be operating marginally above their estimated optimal capacity at 1.54 tons per square foot (calculated to be 103 percent of estimated capacity). This calculation is based on the industry standard building utilization ratio of 1.5 tons/sf. See **Table 4.106** for a summary of cargo facility requirements.

In summary, it can be stated that the all-cargo facilities meet forecast cargo tonnage capacity for the majority of the planning period. Approaching 2031, the end of the planning period, and working under optimal building utilization levels (1.5 tons/sf), all-cargo activity will theoretically justify the construction of additional processing space.

While the existing storage capacity of the facility is forecast to marginally exceed capacity, overall no immediate expansion of the existing all-cargo facilities are needed. It is however good planning to preserve an area for expansion to accommodate planning horizon activity levels and to accommodate unanticipated growth during the planning period. The addition of a single cargo handler alone would justify the need for an additional facility. To prepare for this and maintain maximum flexibility for the range of scenarios that may arise, adequate space should be reserved for the expansion.

Options for accommodating additional cargo capacity will be explored in **Section 5** Alternatives Analysis.

Belly Cargo

The existing belly haul cargo facility opened for operation in 2010. The new facility is in excellent condition and based on information provided during the stakeholder interviews, it was notionally mentioned that the facility is right-sized for the current operations. No major issues were noted with the configuration or sizing of facilities. It was indicated that any modifications needed by tenants would likely be related to revising the internal configuration or the installation of specific equipment such as refrigeration units to address a specific equipment related requirement.

While eight of nine units are occupied by tenants, it should be noted that some of the tenants utilize the space for functions other than belly cargo support. Based on the forecasts of belly cargo tonnage for years 2016, 2021, and 2031, it can be concluded that the existing Belly Cargo Building is more than adequate for forecasted levels of activity within the planning horizon.

Based on 2011 activity levels, the facility is operating at a building utilization ratio of 0.34 tons per square foot. This is reflective of a lightly utilized facility. By 2031 forecast activity levels, the facility will be operating at an estimated 54 percent of capacity assuming an industry standard building utilization ratio of 1.0 tons/sf. See **Table 4.106** for a summary of cargo facility requirements.

In summary, no additional belly cargo facilities are required at the forecast activity levels within the planning period.

Table 4.106
Cargo Building Requirements

Type of Cargo	2011	2011	Target Facility Utilization Rates (Tons/SF)	2016	2021	2031
	Existing SF (2)	TPSF		Net SF Req.	Net SF Req.	Net SF Req.
All-Cargo (1)	72,500	1.06	1.5	(15,096.97)	(9,962.55)	**2,194.87**
Belly Cargo	56,805	0.34	1.0	(33,451.04)	(31,188.32)	(26,204.85)

Note: (1) Includes FedEx and Flight Express
(2) Square footage quantities includes warehouse space only.

Source: HCAA Records, HNTB Analysis

4.4.2.2 Apron Requirements

FedEx Apron

FedEx Cargo apron requirements were determined by estimating the number of required aircraft parking positions by aircraft grouping. Based on a review of all-cargo activity during December 2011 (the typical peak month), the average number of aircraft on the cargo ramp was approximately 4.0 aircraft per operating day which is consistent with FedEx reported activity during peak activity periods. This assumes operating primarily 4.5-days/week (Tuesday through Friday, with a half day on Sat). Based on the forecast, FedEx will require an estimated 6.0 parking positions sized for ADG-IV aircraft by 2031.

Based on the existing ramp layout, which has a combined seven marked ADG-IV positions, the size of the common-use ramp is adequate to meet forecast levels of demand for all-cargo activity which requires an estimated 6.0 positions. The only potential capacity shortage could stem from the fact that Global Aviation often parks one or two aircraft on the apron in front of their building. This condition would typically not be an issue during off-peak activity periods; however, reserving additional common-use apron is advisable for long-term accommodation of additional cargo facilities.

Options for accommodating additional cargo capacity will be explored in **Section 5** Alternatives Analysis.

Belly Cargo Apron Requirements

The Belly Cargo Building apron does not have direct flightline access for aircraft, but is served by a vehicle access road. The capacity of the belly cargo ramp is typically based on airline operational considerations and policies that are highly variable. Representing these considerations with planning factors can be difficult. Notionally, however, the building is rather lightly utilized throughout the planning period and it can be assumed that the apron is as well.

Based on the forecast of aviation activity the belly cargo apron appears to have excess capacity for the forecast activity levels.

4.4.3 Aircraft Maintenance and MRO Facility Inventory

In years past, there were two primary commercial transport aircraft maintenance facilities at TPA. These consisted of a maintenance hangar constructed in 1982 and operated by Delta Airlines, and a second maintenance hangar constructed in 1992 and operated by US Airways. Both maintenance hangers are located north of Runway 10-28 and along the east side of Runway 1R-19L. As a part of cost saving programs implemented by both carriers in the wake of the 2001 recession and the 9-11 attacks, both carriers ceased providing any significant aircraft maintenance services at TPA. This left both facilities unoccupied until 2008 when PEMCO World Aviation Services began providing Maintenance, Repair, and Overhaul (MRO) services at TPA.

PEMCO is a MRO service provider for wide and narrow body aircraft and regional jets. Capabilities and services provided across their facilities include development and manufacture of aircraft cargo systems, cargo modifications, aircraft parts and support, scheduled and unscheduled maintenance, engineering services, repairs, precision components, avionics, and aircraft interior modifications. At the two TPA facilities, PEMCO primarily provides aircraft interior servicing and heavy airframe repair (no composites). Services do not include heavy engine maintenance activities. Similar services are provided in both the “North” and “South” hangar. See **Figure 4.107** for the locations of both hangars.

4.4.3.1 North Hangar

The north hangar (T-2) is used for providing the full range of MRO services provided by PEMCO at their Tampa facility, namely, aircraft interior servicing and heavy airframe repair. The hangar is located on the east side of the airfield approximately 1,100 feet east of the Runway 19L aiming point markings, which are approximately 1,020 feet from the runway threshold.

The northern PEMCO operation is housed in a hangar with supporting office, shop, storage and warehouse space that has a footprint of approximately 125,000 SF. The actual hangar floor area totals an estimated 105,770 square feet while the office/shop areas occupy space at the rear or east side of the building and along the sides of the hangar floor. These areas are encompassed within a two level portion of the building.

The facility is sited in a north/south orientation with the hangar door opening on the west side. The six-panel clear span door width and hangar space is approximately 400 feet in width. It is able to accommodate up to two wide-body aircraft or a combination of wide and narrow body aircraft and/or regional jets (potentially up to three) while still having adequate space for scaffolding and the necessary structures required as a part of typical aircraft maintenance operations. The apron adjacent to the hangar is approximately 1,050 feet wide by 300 feet deep, and including apron on the sides of the facility, totals approximately 380,000 SF. The apron features blast fencing on the northern and southern edges with airside/landside apron access points along both ends of the building. The apron is connected to the airfield via a stub taxilane that intersects with Taxiway E.

On the southeastern side of the hangar are five roll-up doors and a single standard personnel door for shipping and receiving with a vehicle maneuvering area in front of the doors. On the northern side of the hangar is an employee parking lot with approximately 220 spaces. Between the parking lot and apron are a large storage shed that is approximately 4,400 SF (40 feet wide by 110 feet long) and two large cylindrical Aqueous Film Forming Foam (AFFF) holding tanks. The AFFF holding tanks are approximately 60 foot in diameter and 25 feet above ground and estimated to have a capacity of 40,000 gallons each. Typical for maintenance hangars, these tanks hold the “high-expansion” foam type that is capable of an expansion ratio over 200, which is suitable for large enclosed spaces where quick filling of space is needed to address fire suppression requirements.

See **Table 4.107** for a summary of the facility, its primary building and apron square footage takeoffs, and other characteristics.

Photo: PEMCO MRO facility (Red Hangar). Source: HNTB Corporation

4.4.3.2 South Hangar

The south hangar (T-1) is also occupied by PEMCO and like the north hangar, is used for providing light MRO services, namely, aircraft interior servicing and heavy airframe repair. The hangar is located on the east side of the airfield approximately 1,100 feet east of the mid-point of Runway 1R-19L

The facility, including the aircraft maintenance area, shops, storage, warehouse and administrative office functions are housed in a hangar having a footprint of 148,000 SF. An estimated 89,850 SF is devoted to aircraft hangar purposes while the remainder is utilized for activities supporting the primary use including the accommodation of the headquarter offices of PEMCO World Aviation Services. The facility is sited in a north/south orientation with the hangar door opening on the west side of the facility. The eight-panel clear-span track door opening and hangar space is approximately 430 feet in width by 200 feet deep and is able to accommodate up to a combination of three wide and narrow body aircraft and/or regional jets while still having adequate space for scaffolding and the necessary structures around the aircraft to support the maintenance and servicing.

The apron adjacent to the hangar is an irregular shaped trapezoid, the rectangular portion of which is approximately 720 feet wide by 440 feet deep. Including apron on the sides of the facility brings the total footprint to approximately 350,000 SF. The apron features blast fencing on the northern edge and southeastern corner. The apron is connected to the airfield via a stub taxilane that intersects with Taxiway E. An airside/landside apron access point is on the south side of the hangar adjacent to a small 2,200 SF storage building, the AFFF tanks, and a medium-sized 5,200 SF (55 feet wide by 95 feet long) warehouse. The AFFF holding tanks are approximately 40 foot in diameter and 30 feet above ground and are estimated to have a capacity of 20,000 gallons each. On the southern edge of the hangar, just north of the AFFF tanks and warehouse, are six roll-up doors and four standard doors for shipping and receiving with a narrow vehicle maneuvering area in front of the doors. Additionally, there is a sheltered shipping/receiving dock on the southeast corner of the building, likely for handling large, heavy pallet shipments. It should be noted that the single facility entrance on the south end of the building that provides airside access appears to be constrained in size with little maneuvering and vehicle storage space. Parking for employees is provided on the northern side of the hangar with approximately 230 spaces in two similarly sized lots. During interviews, PEMCO noted a need for additional administrative space to accommodate ongoing shifting of their operations to their Tampa location as well as a need for additional vehicle parking and a future desire for expanded or additional maintenance hangar space.

See **Table 4.107** for a summary of the facility, its primary building and apron square footage takeoffs etc.

Table 4.107
MRO Facility Summary

Facility	Acreage	Total Building SF (Footprint)	Hangar Space (SF)	Warehouse, Shop & Admin (SF)	Apron Area (SF)	Vehicle Parking
North Hangar (PEMCO) T-2	TBD	125,000	105,770	-	380,000	220
South Hangar (PEMCO) T-1	TBD	148,000	89,850	58,150	350,000	230

Photo: PEMCO MRO facility (Blue Hangar). Source: HNTB Corporation

4.4.3.3 Global Aviation

Global Aviation occupies a stand-alone facility to the immediate south of the FedEx Cargo Building along with additional space in the Belly Cargo Building and the building shown below. This facility is located on the east side of the airfield immediately south of the FedEx Cargo Building, approximately 2,700 feet east of the mid-point of Runway 1R-19L, and approximately 960 feet north of the crosswind Runway 10-28. The building was previously utilized as an air cargo processing facility by Emory Express/Menlo Worldwide who ceased operations at TPA shortly after their purchase by UPS in 2004. Global Aviation Holdings, through its subsidiaries, World Airways and North American Airlines, provides “customized air transportation” services. They are one of the largest commercial providers of charter air transport (Certified as a Part 121 carrier) for the U.S. Military, and also provide commercial global passenger and cargo transport services using a fleet of over 30 aircraft, which include B747-400F, MD11 and MD-11F, DC-10-30, B767-300, and B757-200 aircraft. Global Aviation Holdings is headquartered in the Atlanta metropolitan area and uses their Tampa facility to support the operations of World Airways and North American Airways by providing the following services:

- Clean and service their fleet of aircraft,
- Store parts necessary to maintain their fleet, and
- Serve as a world dispatch facility

The building is approximately 27,500 SF in size accommodating both an office and administrative area of approximately 6,300 SF on the north, and a warehouse facility with rolling doors and truck docks on three sides to the south. On the west side of the building complex is a common-use aircraft parking apron that is shared with FedEx. The western side of the building has two 10-foot wide roll-up doors that access the apron from the portion of the building that is generally used as an aircraft parts warehouse for the fleet of aircraft operated by World and North American Airways. The apron directly in front of the Global Aviation building is marked to accommodate two ADG IV-sized aircraft (wingspans up to 171 feet).

Additionally, portions of the apron near the building and along the apron's southern end are typically used for equipment storage; including items such as cargo containers, trolleys for pallets/containers, and ground service equipment. Including the taxilane, the apron immediately adjacent to the Global leasehold is approximately 175,000 SF (19,440 SY) and is constructed of concrete panels. Due to its common use, the apron area is not included in the Global Aviation lease area. As previously discussed, a 55,000 SF (6130 SY) expansion of concrete apron between the common-use apron adjacent FedEx to the north and the apron adjacent to Global Aviation to the south was recently completed. This additional pavement allows the potential for two additional ADG-IV sized aircraft parking positions bringing the total parking capacity of the common-use apron to seven ADG-IV sized positions. Both FedEx and Global noted that at times the ramp can become crowded and this can result in Global parking/positioning aircraft on the RON apron in the northwest portion of the Terminal area.

The warehouse component of the facility and notably the northern/eastern/southern sides are surrounded by approximately 41 loading and tractor trailer parking positions, 18 of which mate to docks on the building as a result of the building's former use as an air cargo processing center. Twelve of these docks are on the south side of the building, most of which appear to currently be unused. A tour of the facility indicated that a number of these docks had been blocked by parts inventory shelving in the warehouse portion of the Global facility. There are six additional loading docks located along the north side of the warehouse portion of the building, several of which are frequently used in the day to day activities of Global Aviation. Beyond the positions surrounding the building is a horseshoe shaped vehicle maneuvering area. The perimeter outside of the maneuvering area is marked for the storage of trailers/containers with approximately 42 available positions for a standard eight foot wide by (up to) 48 foot long semi-trailer. This appears to be a holdover from the previous use of the building, as much of this area is routinely unoccupied. In addition to the trailer storage there are approximately 60 automobile parking positions provided in a lot to the north of the facility.

A summary of the facility, and primary building and apron square footage for the main Global Aviation facility are contained in **Table 4.105**. It is important to remember that Global also maintains space in the airport Belly Cargo Building which they use for parts warehousing. For the location of both Global Aviation facilities, their relation to one another and other functions on the airport see **Figure 4.107**.

Photo: West side (airside) of the Global Aviation facility. Source: HNTB Corporation

4.4.4 Aircraft Maintenance and MRO Facility Requirements

Facilities and hangar space provided by MROs are largely based on business decisions and market conditions that hinge on the domestic and international MRO marketplace.

4.4.4.1 PEMCO Requirements

Based on information provided during the initial stakeholder interviews with PEMCO, the existing MRO facilities were reported as being generally adequate for the current operations, but noted a need for several minor improvements to facility configuration or sizing of facilities, as follows:

- A minor administrative/office area expansion is planned on the north side of the south MRO hangar. A small bump out will be constructed in place of a short row of parking adjacent the building.

In addition to the item mentioned above, no specific demand or timeframe has been identified for additional facilities. However, a desire was indicated for the construction of a third and fourth MRO hangar between the two existing hangars north and east of the noise run-up enclosure. Options for accommodating these additional elements will be explored in **Section 5,** the Alternatives Chapter.

4.4.4.2 Global Aviation Requirements

Based on information provided during the initial stakeholder interviews with Global Aviation, the existing facilities, although not designed specifically for Global's operation, were reported as being generally adequate for the current operations. The only shortfall in available facilities is the occasional need for additional aircraft parking positions on the common-use ramp adjacent the main facility, next to FedEx. Peak activity periods during December when FedEx peaks, may push peak day ramp occupancy and occasionally require Global to park aircraft on the RON apron on the northwest side of the terminal facilities. RON facilities were found to have adequate capacity throughout the planning period and should have adequate capacity to accommodate an occasional aircraft from Global. Additional capacity is also available on the overflow ramp adjacent to Runway 1R. However, it is not able to accommodate aircraft larger than an ADG-III aircraft or aircraft with a fuselage length longer than 110 feet, which is the limiting dimension for aircraft parked on that apron.

4.4.5 Ground Service Equipment Storage and Maintenance Facility Inventory

The Ground Service Equipment (GSE) building is a multiple-tenant facility located along the south side of West Cayuga Street, west of Air Cargo Road and to the immediate north/northwest of the airport Belly Cargo Building. The facility is used for servicing and storage of GSE equipment by both airlines and third party providers of aircraft servicing. The GSE building was built by the HCAA and opened in the spring of 2010.

The GSE building is approximately 90 feet deep by 420 feet long and is sited along an east/west orientation. The building is located behind and northeast of the north MRO hangar, east of North Westshore Blvd., and is connected to the airside via a 25-foot wide bi-directional airfield access/tug drive. With the GSE building co-located with the Belly Cargo Building, the two facilities share the secure access road which passes through both facilities' aprons. This access road interrupts North Westshore Blvd. which terminates on both sides of the tug road with cul-de-sacs and fencing to separate airside from landside. As of April 2012, the building is divided into seven main units and occupied by the following tenants:

- Delta GSE
- Evergreen Aviation
- American GSE/Cabin Services
- Southwest GSE
- ASIG Operations
- US Airways GSE
- ASIG Equipment Maintenance

All tenants share a landside parking lot located along the north side of the building that provides a total of approximately 113 spaces. The concrete airside apron on the south side of the building (see photo below) is approximately 440 feet long by 150 feet deep (66,000 SF). This includes the 25-foot wide bi-directional airside access road/tug lane that connects this facility and the belly haul cargo to the airfield and terminal complex. As can be seen in the photo below, the airside apron is primarily used for storing and staging equipment, service vehicles, and typical transport vehicles.

A summary of the facility, its tenants, and primary building and apron square footage takeoffs are contained in **Table 4.108**. For the location of the facility and its relation to other functions on the airport see **Figure 4.107**

Photo: Airside apron behind the GSE building. Source: HNTB Corporation

4.4.6 Ground Service Equipment Storage and Maintenance Facilities Requirements

The existing GSE storage and maintenance facility opened for operation in 2010. The facility is essentially new and in excellent condition. Based on information provided during the stakeholder interviews, the building was reported as being right-sized for the current operations and no major issues were noted with its configuration, sizing, or number of docks provided.

The only shortfall identified was that a small amount of additional outdoor GSE storage space is required. The area required is approximately a 50 foot by 50 foot concrete area. Options for accommodating this additional storage area will be explored in **Section 5** Alternatives Analysis.

While the facility was determined to be generally adequate to meet future needs for GSE maintenance demand, it remains prudent to ensure that area be reserved to accommodate expansion capability should an unforeseen need arise. To this end, the area between the entrance drive to the Air Cargo Building and the east end of the GSE building should be kept clear to allow for a limited eastern extension of the building. Additional, a Mexican Food manufacturing facility to the due west of the GSE building was in the process of being acquired at the time of the 2012 AMPU. Once acquired the facilities on this site were scheduled for removal and the site was to be cleared. It is recommended that some or all of this property be retained for airport support facility development, which should reserve area for the long term expansion of the GSE facility.

Table 4.108
GSE Facility Summary

Facility	Warehouse Space (SF)	Building Admin (SF)	Total Building (SF)	Leased Area (SF)	Apron Area (SF)	Aircraft Positions	Landside Ramps/ Docks	Airside Bays/ Docks	Automobile Parking
GSE Building	**TBD**	**TBD**	**36,000**		**66,000**	**N/A**	**9**	**10**	**113**
- Delta GSE	6,362	1,375	7,737	7,737	See Total	Tug only			See Total
- Evergreen Aviation	3,700	1,420	5,120	5,120	See Total	Tug only			See Total
- American GSE/Cabin Services	2,200	360	2,560	2,560	See Total	Tug only			See Total
- Southwest GSE	5,570	830	6,400	6,400	See Total	Tug only			See Total
- ASIG Operations	-	3,840	3,840	3,840	See Total	Tug only			See Total
- US Airways GSE	3,989	930	4,919	4,919	See Total	Tug only			See Total
- ASIG Equipment Maintenance	3,347	1,830	5,177	5,177	See Total	Tug only			See Total

Note: Leased area per HCAA lease documents. Building and Warehouse areas are quantified from design drawing and are approximate and do not include internal and external walls.

4.4.7 Airport Maintenance, Equipment Storage and Airport Central Warehouse Inventory

Airport maintenance activities are located in two separate facility centers on the Airport, adjacent to the terminal building in the Airport Service Building, and on the northeast side of the airport in the Maintenance Shops and Airport Central Warehouse facility. These facilities cumulatively house all 206 dedicated maintenance staff. For purposes of this section, the focus will be on those facilities located outside of the terminal complex. Uses in the terminal area are addressed as a part of the terminal area planning efforts.

4.4.7.1 Airside Maintenance Shops

The airport maintenance complex is located in the northern portion of the Eastside Aviation Development Area along the west side of N. Westshore Blvd at the intersection with West South Avenue. To the immediate west of the maintenance complex is the Airport Operations Area (AOA) that encompasses area off the north end of Runway 1R-19L, including the Runway Protection Zone (RPZ). See **Figure 4.108** for a close-up of the maintenance facilities in relation to adjacent airport facilities. The uses situated in the maintenance complex include equipment and vehicle (storage?), maintenance shops, maintenance vehicle and grounds keeping equipment storage facilities, vehicle fueling station, office and other administrative space for maintenance managers and staff, two small greenhouse facilities and the maintenance warehouse. This campus of facilities is situated approximately 750 feet north of the main airport fuel farm and south of the Airport Police and Security facilities. This campus houses the 60 staff and equipment associated with the following functions:

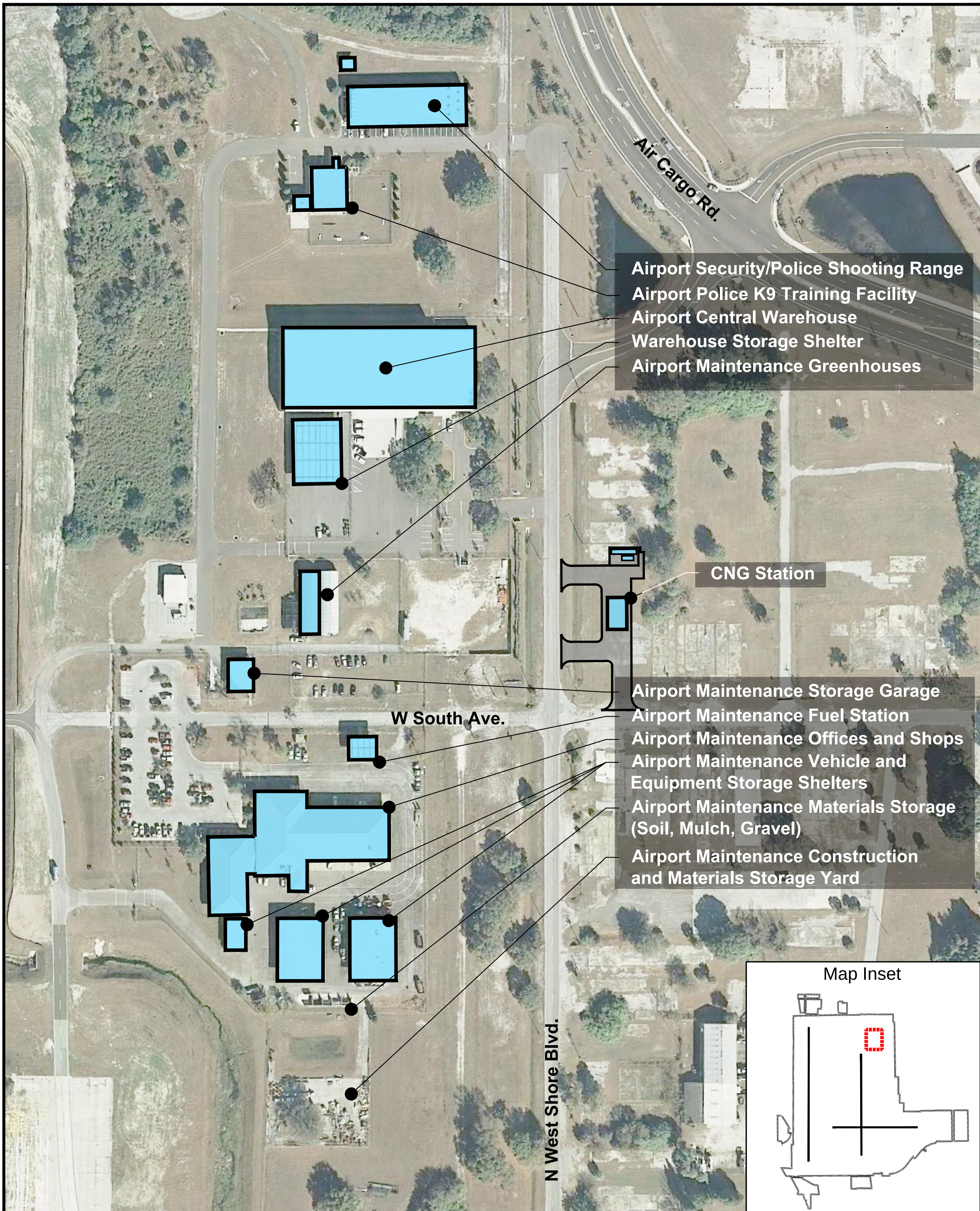
- Landscaping
- Projects
- Airfield Maintenance
- Warehouse

These functions are supported by five main structures as listed in **Table 4.109** below.

Table 4.109
Airport Maintenance Buildings

Building	Area (SF)
Maintenance Offices and Shops	30,200
Light Maintenance Equipment storage Shelter	1,500
Vehicle Storage 1	7,000
Vehicle Storage 2	7,000
Airport Central Warehouse	38,750
Total Airport Maintenance	**84,450**

Source: HCAA Records, HNTB Analysis



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

HNTB

MAINTENANCE FACILITIES

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
Apr 23, 2013

Figure:
4.108

C:\Temp\AcPublish_6368\TPA_Support Facility Figure_Rev2.dwg 4 – Maintenance Facilities Apr 23, 2013 – 12:40pm

All facilities appear to be in good operating condition; however, airport staff indicated that fleet maintenance and landscaping spaces are slightly undersized. This is evident by the number of vehicles stored outside the perimeter of the vehicle storage shelters and on the outer perimeter of the airside maintenance campus. Maintenance staff noted that additional covered storage, similar to the covered storage facilities south of the administrative office facility, is desired for airport maintenance vehicles to minimize the impact of the elements on equipment, reduce vehicle maintenance costs and extend the useful life of equipment. The maintenance area site appears to have the flexibility to accommodate additional covered storage; however, these facilities should be situated to the south or south/southeast of current covered storage units as a major stormwater drainage channel borders the site to the west. Disturbing the drainage channel would be cost prohibitive and likely trigger environmental requirements.

A landside access point to the maintenance office facility and shop facility is provided at the terminus of W. South Avenue, which ends at an 85 space employee parking lot that is separated from general public access by a gated perimeter fence.

The maintenance administrative office facility is sited in an east/west orientation and houses a variety of facilities including administrative space, locker rooms, break room, shops, three bays with roll-up doors on the east end of the facility, and four large drive through vehicle maintenance bays with roll-up doors. The drive through maintenance bays are complete with vehicle lifts and work benches for typical equipment maintenance activities. The depth of the bays are approximately 70 feet and each is capable of accommodating two vehicles lengthwise. On either end of the vehicle bays outside the building is a vehicle maneuvering lane that provides access to both sides of the facility. To the north of the office area is a self-serve fueling station that contains a single above ground dual cell tank containing both diesel and gasoline fuel types. Two separate pump stations are provided at either ends of the tank. In between both pumps are fueling controls and an access control keypad. The facility is covered with a 45 foot long by 35 foot wide sun shelter.

Photo: Tampa Airport Maintenance and Equipment Storage Campus. Source: HNTB Corporation

To the south of the maintenance facility are two vehicle and equipment storage structures. They are both approximately 100 feet long by 75 feet wide and are sited along a north/south axis. These are unconditioned CMU constructed buildings/weather shelters. The easternmost structure contains a small-equipment cage (weed whackers and fuel storage) on the north end of the shelter, enclosed storage/shops in the center, and an open ended vehicle wash bay on the south end of the facility. The western storage facility has open bays on the east and west sides and is used only for vehicle and larger equipment storage.

Photo: Tampa Airport Maintenance Equipment Storage Shelter. Source: HNTB Corporation

On the south side of the vehicle storage shelters are five three-sided materials storage containers, which store mulch, gravel, pea stone, sand, and loam. Directly south of the materials storage containers and maintenance campus is a small stormwater basin (approximately 100 feet long by 75 feet wide) and construction materials storage yard. The paved storage yard is approximately 160 feet long by 100 feet wide and contains rolls of chain-link fencing, fence posts, pallets of masonry, old airfield signs, taxiway edge lighting, generators, trailers, etc. When considering expansion of the maintenance facilities, these two areas should be considered as possible sites for expansion.

To the west of the two vehicle storage facilities is the light maintenance equipment storage cover, which is approximately 50 feet long by 30 feet wide. The facility is used for storing light landscaping equipment with wall mounted racks and is also marked for vehicle parking. The facility is closed on all sides except the eastern side which faces a drive lane.

Airfield access from the maintenance complex is provided by way of a single two-way service road that extends southward from the site intersecting the northern end of the Taxiway E alignment, and the northern east/west airport service road.

North of the maintenance campus across extended West South Avenue are two adjoined greenhouse units, which support the landscaping functions of the maintenance department. Combined, the greenhouse is 60 feet wide by 100 feet long.

4.4.7.2 Airside Maintenance Vehicles

Airfield maintenance has approximately 39 vehicles stored on the Airport maintenance campus. Airport landscaping has approximately 30 vehicles and 41 small engine maintenance tools (i.e. backpack blowers, line trimmers, chain saws etc.).

4.4.8 Airport Maintenance Equipment Storage Requirements

Unlike some of the other functions at the airport (terminal, curbside, aircraft gates) whose sizing and requirements are driven by levels of activity, identifying facility requirements for maintenance facilities is primarily based on input from the end users. Factors that drive space for maintenance facilities are often based on equipment needs, staffing levels, material storage and necessity for indoor or outdoor vehicle storage. During the inventory of existing facilities, maintenance staff indicated the following needs:

1. More sheltered cover in the fleet maintenance, projects, and landscaping facilities. Many vehicles are parked outside and exposed to the elements.
2. An approximate doubling of covered storage (“overhang space”)

They also noted that fleet maintenance bays are working well, but are a little cramped.
Overall it was evident that additional covered vehicle storage is required to meet both an immediate need and the long-term requirements of airport maintenance within the current airport maintenance complex on the northeast side of the airfield.

An inventory of the existing equipment was provided, which indicates the number of vehicles that are currently stored under cover and those that are stored outside. Approximately 75 percent of existing equipment/vehicles (based on the total equipment inventory and number of vehicles) are being stored under cover with 25 percent being stored outside and subject to the elements. It is evident that the vehicles being stored outside are generally the larger more cumbersome vehicles, which in terms of square footage requirements represent approximately 60 percent of the entire fleet.

Providing covered storage for vehicles currently stored outside will effectively extend their useful life by shielding them and stored materials from sunlight, radiant heat, moisture (salinated), contaminants, hurricanes and extreme weather events. With the extension of vehicle useful life there are (mid and long-term) tangible benefits as a result of reductions in vehicle maintenance, reductions in staff labor to maintain vehicles, and reductions in the cyclical turnover of vehicles. Additionally, as stated in Grant Assurances and AC 150/5220-18, airport sponsors are required to adequately shelter and maintain equipment purchased with FAA funds to maximize the useful life of the equipment.

Table 4.110 below shows the square footage of the existing vehicle storage facilities, which totals an estimated 15,580 SF and in the following row shows the additional area requirements needed to notionally meet the needs as identified by maintenance staff. For planning purposes it is estimated that approximately 18,400 SF of vehicle storage shelter and shop space is required as well as adequate vehicle access and circulation. This would bring the total storage space provided to approximately 34,000 SF (rounded up).

The facility requirements in Table 4.109 will accommodate all the vehicles identified as needing covered storage by maintenance staff in the inventory, and also meets the general request to approximately double the amount of covered vehicle storage. This would provide additional space beyond what is necessary to simply put all maintenance vehicles under cover and thereby allow for the addition of shop space to the fleet maintenance bays.

Table 4.110
Maintenance Facility Requirements

Scenarios	Area Requirement (SF)	Total
Existing Vehicle Storage (with 75% Vehicles Under Cover)	n/a	15,580
Future - All vehicles Under Cover Plus 25 Percent	18,395	33,975

4.4.9 Airport Central Warehouse Inventory

The Airport Central Warehouse is an airside facility located approximately 600 feet north of the main Airside Maintenance Campus on the northeast side of the airport. This facility was constructed since the last master plan. The warehouse is operated by the purchasing department for receiving, storing and distributing typical supplies and consumables needed to support daily operations of the airport. The facility is comprised of an office area of approximately 8,125 SF and an attached warehouse of approximately 30,625 SF for a total facility size of approximately 38,750 square feet. The facility is constructed of warehouse-typical metal panel walls. Landside access to the facility can be gained via N. West Shore Blvd through a tracked gate on the south side of the facility. Several small parking clusters for employees are located adjacent to the building and south of the building access road providing a total of approximately 17 parking spaces. Situated along the south side of the warehouse building are a vehicle maneuvering area and four shipping receiving docks. This area also contains ten additional parking spaces. The location of the central warehouse facility and its relation to other functions on the airport are shown in **Figure 4.108**.

4.4.10 Airport Central Warehouse Requirements

The central warehouse is in excellent condition based on information provided during the interviews with airport maintenance. No specific new facilities or needs were identified for improvements to the facility. Adequate space is available in the vicinity of the facility for expansion should additional space be required.

4.4.11 Remain Overnight Parking Inventory

The primary Remain Over Night (RON) parking apron is located on the northwest side of the terminal facility in the area formerly occupied by the Airside D facility. This area can be seen on **Figure 4.107**. The apron on the northwest side of the terminal provides up to 12 RON parking positions. There are seven narrow-body positions and five positions which can accommodate wide-body aircraft.

Seven additional RON aircraft positions are located adjacent to the Airside A baggage sort facility located between Airside A and Airside C. The positions are located around the eastern perimeter of the facility and are currently marked to accommodate ADG-III aircraft such as the B737 series and Airbus A320.

Photo: RON Apron. Source: HNTB Corporation

4.4.12 Remain Overnight Parking Requirements

A gated flight schedule was prepared as part of the forecast of aviation activity in **Section 2**. Using the gated flight schedule, RON parking requirements for average day peak month (March) were able to be established for the base year (2011) and the planning horizon year (2031). The analysis identified overnight flights that were parked at gates during night hours and overnight flights that are currently designated as “tow-on” and “tow-off” flights. The “tow-on” and “tow-off” flights were assessed to identify whether they could be reassigned to RON at available common-use gates compatible with the design group of each aircraft identified to RON. Gates identified as having airline gate restrictions were considered to be unavailable.

Based on the capacity of common-use gates, RON flights were assigned to gates that were available and any additional RON flights were assigned to remote RON parking positions in either the Airside D positions or the positions adjacent the Airside A baggage sort facility.

Table 4.111 summarizes the existing remote RON capacity and the 2011 and 2031 average day peak month position requirements. As shown in the table below, during average day peak month conditions with the existing number of gates and remote RON positions there is excess RON capacity in 2011 with ten additional positions available. In 2031, an estimated deficit of one position was noted. Given the marginal need for a single position it is recommended that RON requirements continue to be monitored. In the case that a single additional position is required aircraft can be parked on the overflow ramp just east of runway end 1R and Taxiway E. It should be noted that no ADG-IV positions were projected in the gated flight schedule. However, there are five alternate positions in the Terminal D area should demand or fleet mix change.

4.4.12.1 Other Considerations

Requirements for RON should be revisited in the case that; the Airside D area is redeveloped to accommodate a Future International Terminal expansion; major airline agreements are revised that could affect the number of common-use gates available; or that unforeseen changes in activity occur.

Alternative RON locations will be explored in **Section 5** Alternatives Analysis.

Table 4.111
Projected RON Demand

Year	ADG-II	ADG-III	ADG-IV	Projected RON Demand	Total RON Positions Available	Remaining Positions (Additional Required)
2011	2	10	0	12	19	7 (0)
2031	2	18	0	20	19	0 (1)

Note: (1) Based on Average day peak month (March)
(2) Gates identified as having airline gate restrictions were considered to be unavailable
(3) Unoccupied common-use gates were considered as being available for RON parking

4.4.13 Airport Rescue & Fire Fighting Facility Inventory

Prior to 2006 TPA had two Airport Rescue and Fire Fighting (ARFF) facilities, one on the east side of the airport just south of the southern PEMCO hangar and the other on the west side of Runway 1L-19R approximately 4,340 feet north of the Runway 1L threshold. A new ARFF facility was opened in 2006 replacing the two separate facilities into a single consolidated state-of-the-art mid-field facility. The facility is located airside in a triangular tract of land adjacent to the southwest corner of the aircraft ramp serving Airside A. The facility is essentially bordered by Taxiway J to the south, the Airside A ramp to the east and George J Bean Parkway to the west. In relation to primary airfield circulation routes, the station is just north of the intersection of Taxiways L and J with Taxiway J providing access to both of the parallel runways as well as the crosswind runway alignment. The position of the midfield ARFF station meets the response time requirements of the FAA to be at the mid-point of the furthest runway within three minutes. Additionally, with its location within the Main Terminal Complex, direct access is also afforded to the landside complex and all of the airside concourses without having to cross an active runway. See **Figure 4.107** for the location of the ARFF facility on the airfield.

The facility houses all ARFF personnel and response equipment. The facility is an irregular polygon, approximately 240 feet wide by 100 to 150 feet deep comprising approximately 26,000 square feet. There are five separate drive-through bays with large roll-up doors that house a fleet of Oshkosh ARFF response vehicles. The northernmost bay houses an additional emergency response vehicle that dispatches firefighters to the terminals, parking garages, and other locations on the airport campus whenever a fire response is required. The middle bay on the west elevation houses an Advanced Life Support vehicle that is staffed full-time with two state certified paramedics. The centralized facility effectively consolidates equipment, staff, housing, training facilities, and reduces redundancy in infrastructure requirements. Cross training personnel is easily facilitated due to the centralized facility.

The response vehicle bays occupy approximately 40 percent (10,000 SF) of the facility footprint, while the remaining 60 percent (16,000 SF) is comprised of gear storage, response stations, administrative space, rest rooms and showers, communications, training facilities, fitness functions, (14) dorm rooms, recreational areas, kitchen, laundry, locker rooms along with supporting mechanical and storage spaces.

Photo: Consolidated ARFF facility. Source: HNTB Corporation

4.4.13.1 ARFF Training Facility

On the north side of the airport approximately 1,400 feet north and 650 feet west of Runway 1R-19L is an ARFF training facility. Please refer to **Figure 4.107** for the location of the facility. The training facility is designed to realistically replicate an aircraft accident fire environment for fire-fighting and rescue training and to also provide for the containment of training substances.

The current ARFF training facility is a large circular area consisting of a replicated fuselage cross section (aircraft mock-up), encircled by a 120-foot diameter "burn area" made up of crushed stone and a 12 foot-wide circular concrete apron around the burn area. Beyond the burn area and concrete apron is a large vehicle maneuvering area that is clear out to 150 feet from the center of the circle (300 foot diameter). Outside of that area are the typical support systems, which are sheltered behind a protective burn wall. The support systems consist of a control center, fuel and water storage tanks, and a fuel/water separator. The existing ARFF training facility, although weathered, is reported as being adequate for continued use within the planning period.


Photo: ARFF Aircraft Mock-up. Source: HNTB Corporation

Airport management has, however, identified a near-term need to initiate improvements to the current ARFF training facility. Further, the HCAA expressed a desire to identify a potential replacement site on the airport for the current ARFF training area. The ARFF training area would have to be relocated at the time, admittedly well into the future, that development of the north terminal commences in order to provide updated state-of-the-art ARFF training facilities on the Airport. The intent is to provide a facility that will allow staff (local and visiting) to train on aircraft up to Airport ARFF Index E, which includes aircraft with fuselages of 200 feet or greater (i.e. A380, B747). If the existing facility is to be relocated or if it is determined that a facility upgrade is needed, the facility requirements outlined in the following section should be considered.

Alternative configurations will be explored in **Section 5 - Alternatives Analysis**.

4.4.13.2 ARFF Training Facility Requirements

The following section summarizes the general requirements for each component of an ARFF training facility and the overall facility siting, describing the recommended sizing and the spatial relationship between them. Meeting these requirements will aid in the proper selection and design of a new ARFF training facility.

Design standards for ARFF training facilities are provided in FAA Advisory Circular (AC) 150/5220-17A, *Design Standards for Aircraft Rescue and Fire Fighting Training Facilities*, dated September 30, 2010. The document outlines the appropriate standards for the siting and construction of a new ARFF training facility. This guidance was current at the time of the Master Plan Update, but should be revisited in detail upon advancement in future training facility development.

The main components of an ARFF training facility, which must be designed according to specific criteria, include: the burn area, vehicle maneuvering area, aircraft mock-up, control station and support systems, to include fuel, water and/or electricity.

Burn Area

The burn area is the main structure where live fire drills are conducted. The burn area recreates aircraft accident fire scenarios for ARFF personnel training purposes. The design of the burn area is typically a function of the size of aircraft serving the airport. Typically, sizing of a fixed burn area structure is governed by the Airport ARFF Index Method, based on the dimensions of the largest aircraft operating at the airport. As discussed above, TPA is categorized as an ARFF Index E. Based on AC 150/5220-17A, the FAA recommends Index E airports to provide a circular burn area diameter of 152 feet.

Additionally, the Empirical Area Simulator Method can be used to size a burn area structure. This method is generally used for smaller training facilities for airports where space is limited, and is ideal for design of mobile training facilities. This method was developed based on the use of computer systems to control the fuel fires. Computer systems allow better control of the fire-extinguishing rate as opposed to free burning fossil fuel, and therefore result in a smaller total fire area requirement. This method requires a circular burn area structure of at least 125 feet in diameter for airports categorized as ARFF Index C through E.

Based on these two methods, the burn area structure at TPA should be between 125 to 152 feet in diameter. The new ARFF facility will most likely be controlled by computer systems, which requires a 125 foot diameter. However, it is practical to plan for the more conservative case. Planning for the more critical diameter of 152 feet is considered appropriate for TPA. This also allows for the provision of unforeseen events such as changes in FAA requirements or the introduction of new larger aircraft.

Vehicle Maneuvering Area

The vehicle maneuvering area surrounds the burn area structure. This area must be large enough to allow for the operation of ARFF vehicles and for the appropriate distribution of personnel for aircraft fire training exercises. The vehicle maneuvering area is typically constructed of concrete, crushed stone or gravel, and must be capable of handling fully loaded ARFF vehicles during training operations. The surface must be sloped according to AC 150/5220-17A requirements in order to reduce the runoff load on the drainage system.

Dimensions of the vehicle maneuvering area must be designed to accommodate turret discharge and vehicle mobility. The area must be large enough to accommodate full turret discharge range in both dispersed and stream patterns during operations. As indicated in AC 150/5220-17A, "the area must accommodate the ARFF vehicle turning radius, backup requirements, and, with the longest vehicle parked perpendicular to the burn area structure, allow the passing of other ARFF vehicles." Based on commonly used ARFF vehicles, the turning radius of the largest vehicle (Oshkosh Striker 4500) is 135 feet. Therefore, a 135-foot wide area is adequate to accommodate the turning radius of a large majority of ARFF vehicles and to allow for room behind the trucks for additional vehicle movement.

A paved access road will be required if the ARFF training facility will be directly connected to an aircraft operational area, for at least the first 500 feet from the edge of the operational area. This paved area helps to prevent tracking of foreign object debris (FOD) which may damage aircraft movement areas. Additionally, all-weather access to the ARFF training facility must be provided.

Aircraft Mock-up

The aircraft mock-up is located within the burn area. The mock-up represents the typical aircraft serving the airport and is able to provide a range of aircraft fire scenarios for training purposes. ARFF training facilities may have one or two aircraft mockups. When two mockups are used, one is located within the burn area to simulate major fuel spills. The second, typically referred to as the Special Aircraft Fire Trainer (SAFT), is used to simulate smaller fire scenarios, such as wheel fire, cabin flashover or gallery fire.

The aircraft mockup placed in the burn area should be orientated with its axis directed towards the control station and the prevailing winds. The FAA recommends that an ARFF Index C through E aircraft mockup be at least 75 feet long, with a fuselage diameter of at least 10 feet for round sections and at least seven feet wide by seven feet high for rectangular sections. The wing span must be at least 30 feet and a tail section with an engine pod must be installed.

The FAA does not provide specific sizing requirements for a SAFT, but indicates that it may be portable/mobile.

Control Station

The control station is where the aircraft fire simulations are configured and controlled. The control station must provide complete unrestricted views of the burn area structure for monitoring exercises and must be at least 150 feet upwind with respect to the prevailing winds from the burn area. The size of the control center can vary greatly depending on the airport's requirements and constraints. Typically, space is provided in the control center for firefighters not engaged in the exercises to rest. It may also include rooms for instruction and/or protection for support equipment such as fuel/water tanks.

Siting

A variety of factors affect the siting of an ARFF training facility at an airport, including: location of utilities, neighboring land uses, obstruction of ATCT line of sight, and airport operations and restricted areas.

Utilities

Utilities, including electricity, water and sanitary sewer, are needed to support the training facility. It is recommended that electricity and water utilities be available within 900 feet of the training facility, and access to a sanitary sewer be within 300 feet. The network of available utilities at TPA is complex, and therefore, should not be a constraint in the siting of the ARFF training facility.

Neighboring Land Uses

The ARFF training facility must be greater than 1,000 feet from residential areas and 300 feet from other airport buildings and public parking lots. Noise, light emissions and exposure to flames associated with training exercises are a major concern for adjacent buildings and communities. For this reason, an ideal location would limit impacts to residential areas and would provide a safety buffer between the training facility and any adjacent structures.

Line of Sight

The ARFF training facility must be sited in a location where smoke and thermal plume will not interfere with aircraft operations or with the ATCT's line of sight to the aircraft movement area. It must also be located where the aircraft mockup and facility buildings will not interfere with navigational aids. For these reasons, the siting of the training facility must take into account the location of the ATCT, the tower cab height and runway uses.

Operations and Restricted Areas

The ARFF training facility must be located outside of all restricted areas, as provided in AC 150/5300-13A, *Airport Design*, and must remain clear of the Airport operations areas, Part 77 imaginary surfaces, and runway and taxiway object free areas, RPZs etc. Airport operation areas include all runways, taxiways and aprons. It is also important that the movement of fire trucks going to and from the facility remain clear of the airport operation areas.

4.4.13.3 ARFF Certification Requirements

The Airport ARFF facility and equipment are provided in accordance with meeting Part 139 certification requirements. As part of the Airport's certification requirements under Title 14 of the Code of Federal Regulations, Part 139, the Airport must be able to meet certain ARFF requirements. These requirements are determined by the Index designation of an airport. Per Part 139.315, Index determination is based on the following:

- The Index is determined by a combination of

  (1) The length of air carrier aircraft and

  (2) Average daily departures of air carrier aircraft.

For the purpose of Index determination, air carrier aircraft lengths are grouped as follows:

- Index A includes aircraft less than 90 feet in length.
- Index B includes aircraft at least 90 feet but less than 126 feet in length.
- Index C includes aircraft at least 126 feet but less than 159 feet in length.
- Index D includes aircraft at least 159 feet but less than 200 feet in length.
- Index E includes aircraft at least 200 feet in length.

If there are five or more average daily departures of air carrier aircraft in a single Index group serving the airport, the longest aircraft with an average of five or more daily departures determines the Index required for the airport. When there are fewer than five average daily departures of the longest air carrier aircraft serving the airport, the Index required for the airport will be the next lower Index group than the Index group prescribed for the longest aircraft. Tampa International Airport is categorized as an Index E[2] facility by the FAA. To be certified as meeting Index E the following minimum equipment requirements must be provided.

A minimum of three ARFF vehicles are required. One vehicle must carry either 500 pounds of sodium-based dry chemical, halon 1211, or clean agent; or 450 pounds of potassium-based dry chemical and water with a commensurate quantity of Aqueous Film Forming Foam (AFFF) to total 100 gallons for simultaneous dry chemical and AFFF application. Two other vehicles must carry an amount of water and a commensurate quantity of AFFF so the total quantity of water for foam production carried by all three vehicles is at least 6,000 gallons.

Each aircraft rescue and firefighting vehicle used to comply with Index E requirements with a capacity of at least 500 gallons of water for foam production must be equipped with a turret. Vehicle turret discharge capacity must be as follows:

- Each vehicle with a minimum-rated vehicle water tank capacity of at least 500 gallons, but less than 2,000 gallons, must have a turret discharge rate of at least 500 gallons per minute, but not more than 1,000 gallons per minute.
- Each vehicle with a minimum-rated vehicle water tank capacity of at least 2,000 gallons must have a turret discharge rate of at least 600 gallons per minute, but not more than 1,200 gallons per minute.

Each aircraft rescue and firefighting vehicle that is required to carry dry chemical, halon 1211, or clean agent for compliance with the Index E requirements must also meet one of the following minimum discharge rates for the equipment installed:

- Dry chemical, halon 1211, or clean agent through a hand line—5 pounds per second.
- Dry chemical, halon 1211, or clean agent through a turret—16 pounds per second.

In addition to the quantity of water required, each vehicle required to carry AFFF must carry AFFF in an appropriate amount to mix with twice the water required to be carried by the vehicle.

The airport operator must demonstrate that an ARFF vehicle can reach the midpoint of any runway within three minutes of an alarm and begin applying an extinguishing agent. Also, two additional ARFF vehicles must be able to respond to the same location within four minutes of the alarm for secondary response. ARFF response times specified by Part 139 are for certification purposes only, as observed by an FAA examiner during a simulated emergency response typically referred to as a “certification run.” As previously indicated the current ARFF station location conforms to the above noted requirements.

---

[2] AirNav.com, FAA Information Effective through May 31, 2012.

4.4.14 ARFF Facility Requirements

The existing ARFF facility, which was built in 2006, is reported to be in excellent condition and is designed in accordance with the immediate and future needs of ARFF support at the airport. Additionally, the facility location meets critical ARFF response requirements. No additional facilities are required within the planning horizon of this project (2031). However, the requirements of the facility and ARFF response requirements should be revisited if major changes to the airport runway system are planned following the completion of this AMPU.

As noted earlier, Airport management has identified a near-term need to initiate improvements to the current ARFF training facility and expressed a desire to identify a potential replacement site on the airport for the current ARFF training area. Alternative configurations will be explored in **Section 5** Alternatives Analysis.

4.4.15 Fuel Farm Inventory

The existing fuel farm is located approximately 1,000 feet east of the threshold of Runway 19L, south of the airport maintenance facilities and along the west side of West Shore Blvd. The facility consists of a total of six fuel storage tanks totaling approximately 3.5 million gallons of Jet A storage capacity on a 2.68 acre (117,000 SF) parcel (Source: HCAA Leasehold drawing, 2009). The tanks are clustered throughout the 300-foot long by 260-foot wide fenced area with the supply manifold spanning the southern extent of the site. The parcel is generally delineated by the fence that encloses the fuel farm, but the leasehold appears to extend approximately 140 feet to the north. This area is a flat undeveloped grass surface. **Table 4.112** provides a tabular summary of the tanks and their capacities and **Figure 4.107** depicts the location of the facility. The storage capacity provides for approximately six days of fuel reserve. Based on input from the operator and the airline consortium that oversees the facility, this capacity is sufficient to meet the anticipated level of demand.

The fuel farm is operated by ASIG. Fuel is supplied to the tank farm via an 8-inch feed from the Port of Tampa. On-airport, the fuel farm pumps fuel 15 hours a day from 5am to 8pm over a network of 6-inch feeder lines. The operating hours have been adjusted to reflect a depressed level of demand over the past several years compared to pre-recession historic fuel pumping operations.

Despite the system being over forty years old, the fuel farm operator indicated that the system is very well maintained, performs well, and has no particular issues that hinder the continued operation of the facility. Long-term, it was mentioned that additional pumping capacity may be required, but not tank capacity. The operator indicated an annual threshold of 180 to 200 million gallons per year would need to be met before needing any additional capacity. In the near-term, the operator indicated a need for several facility upgrades/improvements that were already underway at the time of the facility inventory. These included; replacing the pump motors and pumps, replacing the main electrical breakers, and expanding the existing control building, which is currently undersized. The operator of the fuel farm indicated that ample space within the existing parcel existed for these improvements as well as the accommodation of ample additional tank capacity should that need ever arise.

Table 4.112
Fuel Farm Storage Capacity

# Tanks	Fuel Type	Individual Tank Capacities (Gallons)	Total (Gallons)
2	Jet A	1,050,000	2,100,000
2	Jet A	630,000	1,260,000
2	Jet A	63,000	126,000
		Total Fuel Farm Capacity	**3,486,000**

Photo: Fuel Farm from the landside perspective. Source: HNTB Corporation

4.4.16 Fuel Farm Facility Requirements

Over the past five years, Jet A fuel consumption has averaged approximately 140 million gallons per year. The peak year over the last five years was in 2007 at approximately 160 million gallons. This level of flowage then declined to a low of 124 million gallons in 2009. In 2011, the last full calendar year of available data, fuel flowage totaled 138,086,454 gallons, had a monthly average of 11.5 million gallons and had an average daily flowage rate of 383,573 gallons. In discussions with ASIG, the fuel farm operator, it was noted that over the past 20 years the demand for fuel has been tempered by the introduction of newer and more fuel efficient aircraft that commenced in the early 1990's and continues today.

Based on information provided during the stakeholder interviews, it was notionally mentioned that the existing fuel farm has excess storage capacity to serve today's activity levels and has capacity to meet long term capacity requirements. ASIG staff identified a threshold of between 180 to 200 million gallons per year before an expansion to fuel storage capacity would be needed to maintain the current 6 days of storage capacity that is presently maintained.

The growth in fuel demand at TPA will be influenced by two somewhat offsetting factors. The first factor is associated with the fact that airlines are increasingly focused on implementing fuel conservation procedures to reduce fuel consumption which in turn reduces operational costs. Additionally, the air carriers continue to invest in new aircraft models that provide increased fuel efficiency over the older aircraft in their fleets. These new aircraft are incorporating new engine technologies such as the CFM LEAP family of engines which will provide a 15% reduction in fuel consumption or the Pratt and Whitney Geared Turbo Fan with a 16% reduction in fuel consumption. The new more efficient engines will power the Airbus A320 NEO and the Boeing 737-MAX, new versions of two of the most popular narrow body aircraft in the commercial fleet. The net impact of new engine and aircraft technology will be an increase in fuel efficiency and act to temper the rate of growth in overall consumption.

The second factor that could offset some of the impact associated with new more efficient technology is the anticipated growth in international activity into and out of TPA with a corresponding increase in the average stage length or distance flown by aircraft serving international destinations.

In defining future fuel storage requirements is the maintenance of an adequate fuel reserve in the event that fuel deliveries to the fuel farm were to be interrupted. In the case of TPA this could result due to the need to conduct improvements or repairs to the fuel line that serves the current fuel farm. For planning purposes a reserve capacity based on a six-day fuel reserve supply has been defined consistent with current practice. At existing operational levels (for Passenger and Cargo departures) the fuel farm at TPA has more than adequate storage for six days of reserve with the ability to easily pump more fuel from their sole source provider via an 8-inch feed from the Port of Tampa. **Table 4.113** summarizes the 2011 fuel flowage based on the data provided from ASIG and further breaks down average month, average day, 6-day fuel reserve requirements and percent of capacity. Additionally the major planning horizon years are shown representing 5, 10, and 20-year anticipated fuel requirements.

Table 4.113
Fuel Storage Requirements

Metric	2011	2016	2021	2031
Year Total	138,086,454	152,767,760	170,515,697	211,615,452
Average Month	11,507,205	12,730,647	14,209,641	17,634,621
Average Day	383,573	424,355	473,655	587,821
6-day requirement (per avg day)	2,301,441	2,546,129	2,841,928	3,526,924
% Capacity at 6-day Reserve	66%	73%	82%	101%

As can be seen in **Table 4.113**, fuel flowage is projected to marginally exceed the available six-day reserve capacity of the fuel farm by the 2031 planning horizon requiring approximately 3.526 million gallons for the typical reserve period. This equates to exceeding existing capacity by approximately 40,000 gallons.

While the projected storage requirement of the facility is forecast to marginally exceed capacity by 2031, no immediate expansion of the existing fuel farm storage tanks is needed. Notionally it is good planning to reserve an area for expansion to accommodate planning horizon activity levels and for phasing in the case that a tank or tanks are in need of replacement.

Space should be reserved for the expansion of a 105 foot by 215 foot area. This would equate to providing an area of approximately a 22,500 SF (0.5 Acres). Definition of the most viable location for a long-term expansion of the fuel farm storage capacity will be explored in **Section 5** Alternatives Analysis.

4.4.17 Airport Surveillance Radar (ASR)

The existing ASR is located on the western edge of the Airport approximately 1,100 feet west of the Runway 1L-19R centerline and 200 feet south of the Runway 19R threshold. At the time of the inventory a new replacement ASR was constructed on the far east side of the Airport approximately 2,500 feet east and in-line with the Runway 19L threshold. The facility abuts Air Cargo Rd, W Cayuga St, and W Curtis St.

The new ASR tower is reported to be 150 feet tall AGL (194 feet AMSL) including the lightning rods affixed atop the structure. The top of the array is 144 feet tall AGL (188 feet AMSL) with the base of the array at 126 feet AGL (170 feet AMSL). The ASR site is approximately 300 feet wide by 200 feet deep with a small parking area, a card activated access gate and black perimeter fencing. The new ASR will adequately serve the airport over the entire planning horizon.

See the photo following this text and **Figure 4.107** for the location of the ASR.

Photo: New ASR tower and equipment. Source: HNTB Corporation

4.4.18 Compressed Natural Gas Fuel Facility

A compressed natural gas (CNG) refueling station was recently constructed on the northeast side of the Airport. The facility is located northeast of the intersection of N West Shore Blvd. and W South Ave across from the Airport maintenance warehouse. The facility occupies a footprint that is approximately 250 feet by 250 feet including driveway entrances, two dual-sided pumps, a 45 foot by 30 foot elevated shelter, vehicle circulation area, and a concrete walled area that contains the aboveground CNG tanks and supporting equipment.

See the following photo and Figure 4.108 for a graphical depiction of the airport and the location of the CNG station.

Photo: Compressed Natural Gas Station. Source: HNTB Corporation

4.4.19 Airport Security and Police

Airport Police operate out of a number of facilities across the airport. The following is a summary of those facilities and the functions they support.

4.4.19.1 Police K-9 and Training Facility

The Airport Police Canine and Training Facility is located on the northeast corner of the Airport. Please refer to **Figure 4.108** for the location of the facility. The 3,600 square-foot facility houses the Airport Police Canine Unit and is used train canines at the Airport. The current unit is composed of four Transportation Security Administration (TSA) certified explosive detection K-9 teams. Additional training space is available for other police department training activities. The facility was opened in January 2005 and provides the following functional areas:

- Reception area with public restrooms
- Administrative offices
- Locker/shower area
- Training and break room with classroom accommodations for up to 24 officers
- Six dog runs with split indoor/outdoor kennels
- Grooming area with washing and drying appliances
- Kennel service area
- Outdoor exercise training area (8,400 sq. ft.) accessible from covered drop-off canopy
- Baggage storage room
- Four vehicle parking spaces in front of the facility

The facility is reported to serve the needs of the Airport Police very well with adequate space to meet their current and anticipated facility and operational needs.

Photo: Tampa Airport Police, K9 Facility. Source: HNTB Corporation

Photo: Tampa Airport Police, K9 Facility. Source: HNTB Corporation

4.4.19.2 Shooting Range

The police have an 11,500 square foot firing range that is situated just north of the Canine Training Facility. The firing range is a standalone building that is open on the west end. The open side provides fenced-in access to firing positions. The facility is flanked with a single row of 20 parking spaces along the south side of the building. Airport Police reported the facility to be adequate for their needs throughout the planning period.

4.4.19.3 Police Facility Requirements

The police K9 facility and shooting range appear to be in excellent condition based on information provided during the interviews with Airport Police. No specific facilities or needs were identified for improvements to the existing facilities, however some portions of the facilities may need to be renovated or replaced during the planning period as the facility ages. Staff did however identify the need to accommodate additional facilities on or adjacent to the existing facilities. Adequate space is available for expansion should additional space be required. An additional discussion of long-term Airport Police facility needs is located in Section 5 – Alternatives Analysis.

4.4.20 Ground Run-Up Enclosure Inventory

The ground run-up enclosure (GRE) is situated between the North and South MRO hangars and is located approximately 960 feet east of Runway 1R-19L and 430 feet east of Taxiway E. The facility has a separate taxilane that provides direct access to the south-facing facility which is comprised of a large ramp and the ground run-up enclosure structure itself. Please refer to **Figure 4.108** for the location of the facility

The run-up enclosure is a 43 foot tall three-sided structure that is clad with acoustical absorbent panels to absorb, dissipate and effectively reduce the noise impacts of aircraft engine ground run-ups. It is used to conduct routine engine maintenance tests during maintenance and repair which requires the operation of engines at high power for extended periods of time. Typically this would generate continuous elevated noise levels, but is minimized by the use of the enclosure. In fact, as part of the Informal runway use program the facility is recommended by HCAA to be used for all testing activity for all aircraft sizes.

The facility has an interior dimension of approximately 260 feet by 260 feet and is sized to accommodate a full range of aircraft up to and including ADG-V with adequate wingtip clearance provided on each side. In meetings with representatives of PEMCO, it was noted that the location of the facility is well suited to supporting their MRO activities. Shown in the photo below is a KC-135 Stratotanker which was temporarily based at the airport during runway construction at nearby MacDill Air Force Base parked inside the run-up enclosure. A KC-135 has a wingspan of 130 foot 10 inches.

The enclosure is outfitted with elevated lighting for night-time use and a wind direction indicator and wind velocity monitor to provide needed information on airflow and ensure ideal engine operating conditions.

4.4.21 Ground Run-Up Enclosure Requirements

The ground run-up enclosure is reported as being in excellent condition based on information provided from the Airport Noise Office. No specific facility improvements or needs were identified for the facility. However, some portions of the facilities may need to receive minor maintenance or replacement during the planning period as the facility ages. For example, at the time of the inventory, the computer was being serviced (rebooted) by the manufacturer.

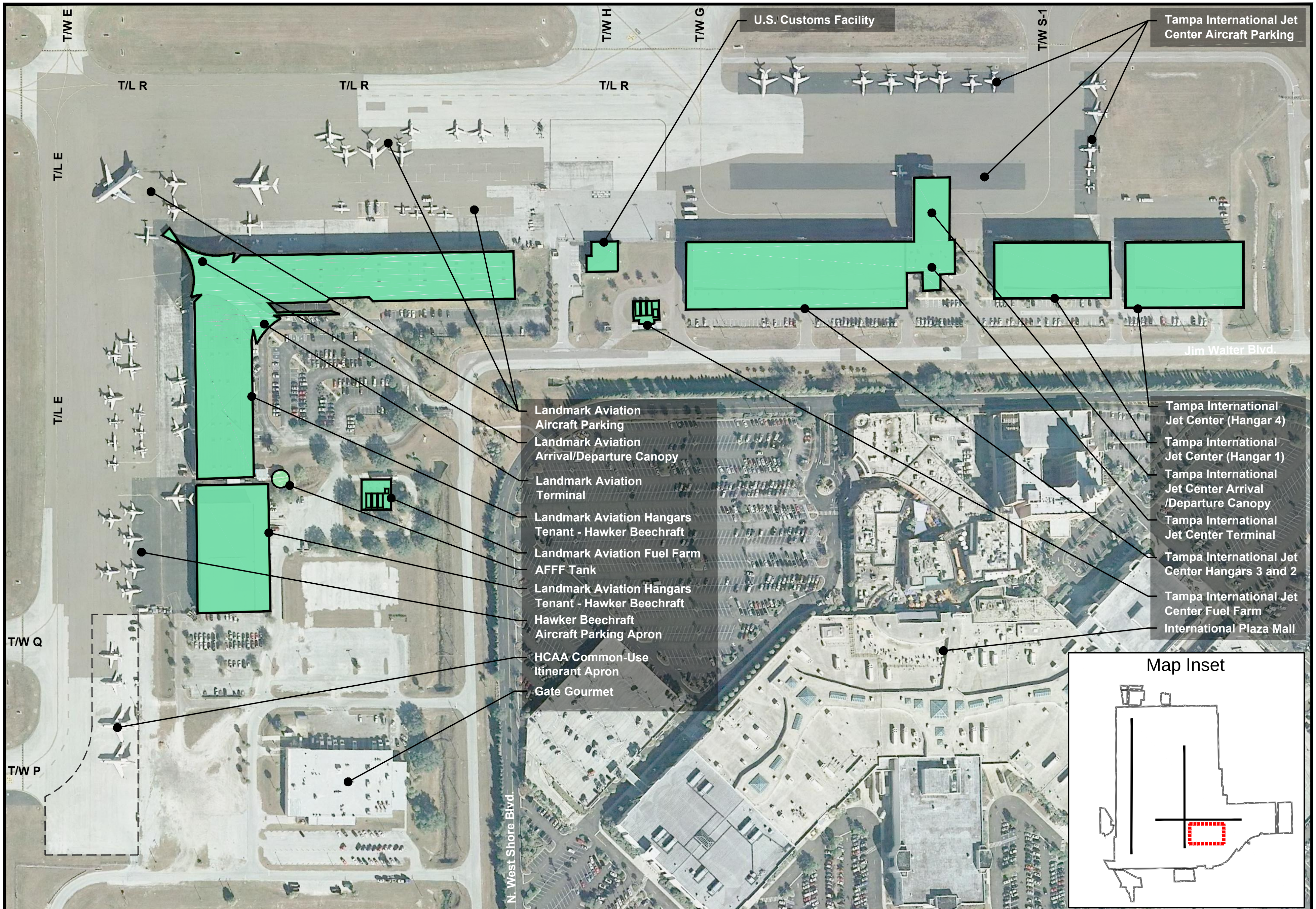
Photo: Aircraft run-up facility with a visiting KC-135 Stratotanker performing some engine testing. Source: HNTB Corporation

4.4.22 General Aviation Facilities

This section updates the inventory of existing General Aviation (GA) facilities at TPA to provide a basis for determining the adequacy of facilities to meet demand generated by the projected future levels of activity. GA facilities that are being assessed consist of the following:

- General Aviation Customs and Border Patrol Facilities
- Fixed Base Operator (FBO) Facilities,
    - Landmark Aviation
    - Tampa International Jet Center
- Corporate Tenant Facilities

GA facilities are concentrated in the southeast quadrant of the Airport, with most of the private corporate or governmental agency hangars along the north side of Runway 10-28 and the Fixed Base Operators (FBO) south of Runway 10-28 and east of Runway 1R-19L. Please refer to **Figure 4.109** for the locations of the following facilities.



0' 300' 600'
SCALE: 1" = 600'

HNTB

2900 SOUTH QUINCY STREET,
SUITE 200
ARLINGTON, VIRGINIA 22206
PH (703) 824-5100
FAX (703) 671-6210

FBO FACILITIES

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
Jun 06, 2012

FIGURE:
4.109

4.4.22.1 Customs and Border Patrol Facilities

Since the 2005 AMPU was completed, a new U.S. Customs and Border Protection (U.S.CBP) facility was constructed southeast of the intersection of Runways 10-28 and 1R-19L, and in between the Landmark Aviation and Tampa International Jet Center facilities. The facility is approximately 57 feet wide by 52 feet long. Based on design drawings held on-file with HCAA, the building is comprised of approximately 2,855 SF of conditioned space and is located on a 1.5 acre parcel. The primary functions in the facility are passenger waiting areas, passenger processing space, U.S. CBP administrative space and processing area.

There is a small apron in front of the facility dedicated for the U.S. CBP, which is delineated by red pavement striping and marked “US Customs and Border Protection No Trespassing”. The area is approximately 295 feet wide by 110 feet deep, and based on the delineated line, the area totals approximately 31,000 SF.

The facility is primarily utilized by international flights arriving to either of the two FBOs on the airport; Landmark Aviation and Tampa International Jet Center. The facility is intended for processing small numbers of passengers and their cargo. According to information collected from the FBOs, the facility is reported as being limited to processing a maximum number of 15 to 18 passengers. Larger flights must utilize the Main Terminal Complex.

Photo: U.S. Customs and Border Protection facility. Source: HNTB Corporation

4.4.22.2 FBO Facilities

There are two full service Fixed Based Operators at TPA; Landmark Aviation and Tampa International Jet Center (TIJC). Combined, both FBOs provide a total of approximately 250,000 SF of aircraft storage space and roughly 890,000 SF of aircraft parking and movement apron (total area includes circulation area). See **Table 4.114** for a FBO facility summary, including estimated building square footage. **Figure 4.109** depicts the location of the FBO facilities.

Table 4.114
FBO Facility Summary

Facility	Occupied By	Acreage	Total Building SF	Warehouse / Hangar Space (SF)	Building Admin (SF)	Apron Area (SF)	Aircraft Positions	Automobile Parking
Landmark Aviation	Landmark and Tenants	17.8	**161,925**	**120,725**	**41,200**	530,000	Variable	305
Terminal (Estimated)	Landmark Aviation	-	10,000		10,000			
East Hangar	Landmark Aviation Based Aircraft	-	57,950	57,950				
South Hangar	Hawker Beechcraft	-	46,125	31,525	14,600			
South Hangar (Separate)	Hawker Beechcraft	-	47,850	31,250	16,600			
Tampa International Jet Ctr (TIJC)	TIJC	21.04	**151,200**	**107,800**	**43,400**	362,000	Variable	280
Terminal (two levels, L1 10K, L2 4K)	TIJC	-	14,000		14,000			
West Hangar (Hangars 2 and 3)	TIJC and Tenants	-	73,500	53,900	19,600			
East Hangar (Hangar #1)	Southern Air Systems Maintenance	-	31,850	26,950	4,900			
Easternmost Hangar (Hangar #4)	TIJC and Tenants	-	31,850	26,950	4,900			

4.4.22.3 Landmark Aviation

Landmark Aviation is located southeast of the intersection of Runways 10-28 and 1R-19L on a17.88 acre leasehold. The facility is in an L-shaped configuration with hangar and apron extending both to the south and the east. Landmark Aviation recently acquired the facility and has been operating at this location since October 2011. The TPA Landmark operation is part of a network of 45 FBO locations nationwide. Landmark is a full-service FBO providing a complete range of aeronautical services including fueling, aircraft hangar space leasing, tie-down and parking, aircraft rental, aircraft maintenance. They additionally provide auxiliary services to pilots, flight crews and passengers, including; ground transport, communication access, waiting areas, flight planning, small conference facilities, catering, and air taxi.

Photo: Landmark Aviation arrival/departure canopy and landside/airside access drive (on left).
Source: HNTB Corporation

The Hawker Beechcraft Corporation operates a turbo-prop and business jet maintenance operation located within the limits of the south wing of the Landmark complex. Their operation also includes an additional stand-alone hangar that is located immediately south of the main Landmark facility.

Terminal Area

In the center of the Landmark facility, where the east and south hangar wings intersect, is a large tensioned fabric canopy that provides cover for customers coming and going from the airside of the facility into the FBO lobby/terminal component of the operation. At the time of the inventory (May 2012), the terminal portion of the facility was under renovation, and was not able to be accessed. The central portion of the facility will contain a large reception lobby, office space, pilot lounges, conference rooms, crew rest and recreation areas and various administrative uses and office spaces. From the landside, there is a curbside drop/off and pick up area as well as a vehicle access gate that allows customer vehicles to be brought airside for convenient and secure pick up/ drop off on the apron or in a hangar. The airside canopy spans approximately 125 feet from the chamfered façade of the building on the corner to the concrete anchor at the outer edge of the canopy. The shelter can accommodate a range of corporate aircraft.

Photo: Under the Landmark Aviation arrival/departure canopy. Source: HNTB Corporation

Hangars

There are three main hangar sections associated within the Landmark Aviation complex. To the east of the canopy structure is a six bay hangar approximately 630 feet in length by 110 feet in depth. The doors are made of synthetic fabric roll-up material and span nearly the entire width of each bay. This hangar provides aircraft storage space for all Landmark Aviation customers that have aircraft based at the airport. At the time of the inventory it was noted that a potential office expansion is planned along a portion of the southern side of this hangar facility to provide additional office/administrative space to new tenants. The expansion would fit between the southern building façade and the existing parking lot in front of the hangar facility extending east of the Landmark FBO terminal and airside canopy.

South of the FBO terminal area and airside canopy is a connected four-bay hangar and an additional standalone two bay hangar. These hangers are leased to Hawker Beechcraft Corporation. Hawker Beechcraft provides a full range of turbo-prop and business jet maintenance and overhaul services for their line of aircraft models. The four-bay hangar is approximately 410 long by 110 feet deep. The northernmost two bays provide avionics maintenance and repair services. The two bays to the south are used primarily for servicing the line of Hawker Beechcraft general aviation turbo-prop aircraft; notably the Beechcraft King Air series. The eastern back side of this building has a single level space for parts and other storage, a shop space, administrative space and an employee break room that is approximately 300 feet long and 20 feet deep. The southernmost stand-alone two bay hangar is approximately 255 feet long by 125 feet deep and is used for corporate jet maintenance and overhaul activities. See **Table 4.114** for a summary of estimated building square footage.

Photo: Landmark Aviation east hangar and Hawker 850XP parked on the apron. Source: HNTB Corporation

Aircraft Parking Apron

The aircraft parking apron is located along the frontage of the entire L-shaped facility from the face of the hangar out to the edge of Taxiway R and Taxiway E (to the fixed or moveable object line which is clearly delineated by red striping on the pavement). Aircraft are parked right up to this line. See **Table 4.114** for a summary of estimated apron square footage.

The apron area is flexibly used based on the size and types of aircraft needing to be parked at any given time. There are an estimated 21 available tie-downs for small single and twin engine piston aircraft, in addition to anchored cables elsewhere on the ramp that can be used for a variety of aircraft types and sizes. Aircraft are parked and stored on the apron as they arrive. The existing pavement was identified as being in good condition. However, the limited depth of the existing aircraft parking apron is a concern due to increasing activity by larger general aviation and other aircraft. It should be noted that the adjacent Taxiway R and Taxiway D occasionally need to be closed to allow the FBO to accommodate larger aircraft that may seek services at the FBO. Landmark currently accommodates professional sports teams that fly into Tampa during their respective seasons, including professional hockey, baseball and to a lesser extent, professional football teams. Additionally, the FBO has a military fueling contract that draws a diverse array of military aircraft to their facility ranging from rotorcraft to large military and air refueling transport aircraft. When these operations occur, considerable shifting of smaller based and itinerant aircraft has to occur. This includes the occasional utilization of the itinerant ramp south of, and outside of their leasehold. The frequency of operations by larger aircraft at Landmark has increased and is anticipated to continue into the future.

Landmark Aviation Fuel Facility

The fuel farm is consolidated on the landside of the Landmark facilities in a horseshoe shaped complex. The complex contains four fenced-in fuel tanks that are mounted over a fuel spill containment basin. The facility has direct landside access for fuel deliveries and is easily accessed by mobile refueling trucks that operate on the airside. Due to changes in demand, consideration is being given to reducing the storage capacity for Avgas by shifting the existing 20,000 gallon Avgas tank over to accommodating Jet A. This potential change would meet demand for Jet A and not adversely impact the ability to meet the demand for Avgas at Landmark. **Table 4.115** summarizes the fuel storage capacity at Landmark Aviation by fuel type.

Table 4.115
Landmark Aviation Fuel Storage Capacity

Fuel Type	Number of Tanks	Individual Tank Capacity (Gallons)	Total Capacity
Jet A	2	20,000	40,000
Avgas	1	20,000	20,000
Avgas	1	2,000	2,000
Total	**4**		**62,000**

Photo: Landmark Aviation fuel farm. Source: HNTB Corporation

Landside

Landside access to the Landmark facility is provided off of Spruce Street by way of N West Shore Blvd. A large Landmark Aviation sign island is located at the entrance, which effectively identifies the facility and separates inbound and outbound traffic flows to/from the facility. The access lane directs inbound traffic to the pick-up/drop-off area at the entrance of the facility which is located at the inside corner of the L-shaped facility. The automobile parking follows the facility's L-shaped configuration with four consecutive rows of parking, which total approximately 196 parking spaces adjacent to the Landmark Terminal Complex and the main hangar bays extending to the east. An additional 16 spaces are located to the south, adjacent to the Hawker Beechcraft shipping/receiving docks and 93 spaces are located at the southern end of the stand-along Hawker Beechcraft hangar. This brings the total count to approximately 305 vehicle parking spaces.

4.4.22.4 Tampa International Jet Center

The Tampa International Jet Center (TIJC) is located south of Runway 10-28 and parallel to Taxiway S. The complex is oriented along an east/west alignment that parallels Runway 10-28 and includes a large elevated canopy that extends to the north out over a portion of the associated TIJC apron area. The facilities were constructed and opened for operation in October 2004. TIJC is a full-service FBO providing a complete range of aeronautical services to the general aviation industry, including fueling, hangar storage of aircraft, tie-down and parking, line service, and aircraft maintenance. Additionally, TIJC provides an array of auxiliary services to pilots, flight crews and passengers, including ground transport/rental cars, restroom facilities, flight planning areas, communication access, waiting areas, conference facilities, catering, and air taxi.

Terminal Area

The airside entrance to the facility is by way of an entrance located beneath the large arrival /departure canopy that extends outward from the main TIJC Terminal. The canopy is approximately 150 feet long by 83 feet wide, equating to a covered area of 12,500 SF and has a 40-foot tail height clearance. The canopy provides a covered area for customers entering or leaving the FBO terminal from the TIJC aircraft apron. The canopy is designed to withstand winds up to 200 mph and is sized to accommodate a wide range of aircraft, including a single ADG-III business jet or two medium-sized (ADG-II) corporate jets side by side.

Photo: Tampa International Jet Center terminal canopy and hangars 1, 2, and 4. Source: HNTB Corporation

TIJC has a 14,000 SF two-level FBO terminal area that includes a large reception lobby, seating areas, office space, canteen, pilot lounges, conference rooms and administrative spaces. The facility is attached to the eastern end of the large two-bay hangar. Access from the landside into the TIJC terminal facility is provided via a canopied curbside drop/off and pick up area.

Photo: Tampa International Jet Center terminal entrance and parking. Source: HNTB Corporation

Hangars

The TIJC facility includes three main hangars consisting of one large two-bay structure and two large stand-alone single bay structures. Attached to, and to the west of the TIJC terminal facility, is a large two-bay aircraft storage hangar 490 feet long by 110 feet deep (each bay is 245 feet long by 110 feet deep) with track doors opening onto the FBO parking apron. This facility, identified as Hangars 2 and 3, was built in 2004 at the same time as the TIJC corporate terminal. Attached on the landside (southern side) of the building is a 490 foot long by 20 foot deep administrative and office space occupied by tenants with aircraft housed in the hangar or by entities providing support services. Primo's Catering (a subsidiary of Air Chef) is located at the western end of the office area and provides on-site catering for aircraft owners and operators. Extending off the front of this administrative and office space structure is a canopy that extends over surface parking spaces to provide covered parking for employees and customers. Combined Hangars 2 and 3 encompass a footprint of approximately 73,500 SF of combined hangar and support space, excluding the area beneath the landside vehicle covered parking canopy.

Photo: Tampa International Jet Center hangars 2 and 3. Source: HNTB Corporation

East of the TIJC terminal building is an additional standalone hangar referenced as Hangar 1. Hangar 1 is 245 feet long by 110 feet deep with an additional 245 foot long by 20 foot deep administrative and office space section located along the southern side of the structure. This facility was also built in 2004 during the same construction period as the terminal building. The facility is occupied by a third party maintenance provider, Southern Air Systems Maintenance (SAM). SAM is an FAA Part 145 certified Repair Station and full service maintenance provider capable of major inspections, structural repairs and modifications for aircraft.

Immediately east of the SAM hangar is a third standalone hangar that is referred to as Hangar 4. Hangar 4 was constructed in October 2005. The hangar is 245 feet long by 110 feet deep with a 245 foot long by 20 foot deep administrative and office space area. Extending off the front of this administrative and office space structure is a canopy that extends out over surface parking spaces which provides covered parking for employees and customers. Combined, this hangar encompasses a footprint of an estimated 31,850 SF, excluding the covered parking canopy area. For a summary of estimated building square footage please refer to **Table 4.114.**

Photo: Tampa International Jet Center Hangars 1 and 4. Source: HNTB Corporation

Aircraft Parking Apron

The aircraft parking apron is located along the frontage of all three hangars and the terminal building. The apron extends from the face of Hangar 4, the FBO terminal area and Hangars 2 and 3 northward by approximately 385 feet and is 980 feet in width. The parking apron and aircraft maneuvering area totals approximately 377,300 SF. An additional smaller ramp area located adjacent to the north side of Hangar 4 connects to the east end of this larger apron. The parking apron in front of Hangar 4 adds an additional 30,500 SF, bringing the total square footage of airside apron to 407,800 square feet. Aircraft are parked in two rows parallel to the hangar façades, with an additional row perpendicular to the hangars on the easternmost edge of the apron. All of the aircraft parking is accessed via apron taxilanes. **Table 4.114** provides a summary of estimated apron square footage within the TIJC leasehold.

The TIJC apron area is flexibly used, similar to the operation of the Landmark Aviation ramp. There are available tie-down points along the outer row of parking and along the easternmost edge, but generally a more flexible “open” use of available parking area is used. Aircraft are parked and stored on the apron as they arrive. The existing pavement was constructed by HCAA with pavement strength designed to accommodate the weight of a 737 series aircraft or an approximately 170,000 pound(?) dual wheel configuration. The pavement was approximately four to five years old at the time of this inventory and is in good condition.

Tampa International Jet Center Fuel Facility

The TIJC fuel farm is located on the westernmost end of the TIJC leasehold, landside of the TIJC facilities, in a horseshoe shaped complex. The complex contains four fenced-in fuel tanks that are mounted over a fuel spill containment basin. The facility has direct landside access for fuel deliveries and is easily accessed by mobile refueling trucks that operate on the airside. Adjacent to the tanks are an airside access lane and remote operated gate. **Table 4.116** summarizes the fuel storage capacity at Tampa International Jet Center by fuel type.

Table 4.116
Tampa International Jet Center Fuel Storage Capacity

Fuel Type	Number of Tanks	Tank Capacity (Gallons)	Total Capacity
Jet A	3	20,000	60,000
Avgas	1	10,000	10,000
Total	**4**		**70,000**

Photo: Tampa International Jet Center fuel farm. Source: HNTB Corporation

Landside

Landside access to the TIJC facilities is provided from Jim Walter Blvd., via a total of six primary points of ingress and egress. A seventh drive entrance is at the far west end of the TIJC leasehold and serves to better accommodate tanker truck access to the TIJC fuel farm. The two easternmost entrance points serve Hangars 1 and 4. The two center entrance points provide access to Hangar 4 and are also the primary entrance to the FBO terminal facility. The two westernmost driveways access the parking area in front of Hangar 2 and 3. A Tampa International Jet Center sign is located at the entrance to the FBO terminal area which is perpendicular to the east/west aligned facility.

The access lane directs inbound traffic to the canopied pick-up/drop-off area in front of the FBO terminal facility entrance to the left or allows customers to proceed straight to an airside access gate. The automobile parking is aligned with the parking spaces oriented perpendicular to the hangars and Jim Walter Blvd., with the lots running in an east west orientation. Approximately 280 parking spaces are available along the landside of the complex. A portion of the spaces are covered under a cantilevered cover extending off of Hangars 2, 3 and 4, while the rest are uncovered. An additional 12 spaces are located on the east side of Hangar 1.

4.5 FBO Facility Requirements

The HCAA operates a system of airports consisting of the commercial service airport TPA and three GA airports that all have FBOs. The following analysis of the GA facility requirements at TPA took into account the support role of the other airports operated by the HCAA.

FBO facility needs are driven by both based aircraft and by itinerant aircraft operations and passenger needs. In defining the potential future facility requirements for FBO's, a combination of statistical methods and reliance on the input from the management staff from individual FBO's is relied upon. Ultimately, the decision to undertake a facility expansion, reconfiguration, modernization or improvement is a business decision of the individual FBO and will be determined by each individual FBO at TPA. This analysis focuses on major components of the existing FBO's at TPA including aircraft parking apron, hangars, fuel farm and vehicle parking.

4.5.1 Transient Aircraft Parking Apron Area Requirements

Transient GA aircraft are typically at an airport for a relatively short period of time, since they are arriving from and then departing to their home airport or other airports. Therefore, parking and storage for transient aircraft are usually provided on apron areas. For convenience and ease of movement, the itinerant aircraft parking area should be in proximity to the FBO terminal/lounge, fuel delivery systems, and ground transportation, where possible. When this is not possible, a passenger drop off in the vicinity of the FBO terminal can be provided to allow passengers to deplane prior to moving the aircraft to an apron parking position. At Tampa, itinerant GA operations comprise the majority of operational activity. While some of this is associated with Tampa based aircraft leaving and returning, a significant portion of this activity is associated with non-based operators. The FAA has developed guidelines for determining the sizing of transient aircraft storage areas in AC 150/5300-13, Change 18, "Airport Design." The steps used to calculate the transient demand are given below:

- Determine the peak month average day itinerant operations. The peak month average day (PMAD) is determined by identifying the month of the year, which may vary from year to year that has the highest number of itinerant operations and dividing the operational number by the number of days in the respective month. PMAD operations for TPA itinerant GA were obtained from the FAA Air Traffic Activity Data System (ATADS) database.
- To determine peak day itinerant operations, a value representing 10 percent of the PMAD activity is added to the figure calculated in step 1. The total number of peak day transient aircraft is defined as being equal to one-half of the peak day itinerant operations. This is based on the assumption that each aircraft typically conducts two operations on the peak day, consisting of a single arrival and a single departure. It is assumed that at any one time, 50 percent of the total number of peak day transient aircraft will need to be accommodated.
- The final value may then be increased by 10 percent based upon the FAA suggestion that the value should be increased by 10 percent to accommodate expansion for a period of approximately two-years of growth

The final value, using the process above, equals the total calculated demand for transient aircraft parking spaces. This number was further broken down to identify the probable transient aircraft types, since business jets typically require a larger parking area than other aircraft. The number of parking spaces for each aircraft type was calculated by multiplying the total parking spaces by the itinerant aircraft fleet mix percentage. The fleet mix percentage was derived using airport noise monitoring data records that record aircraft operations and provide a coded indication of the aircraft type. The results of these calculations are given in **Table 4.117.** It should be noted that just because a specific class of aircraft is identified as requiring a number of itinerant spaces, it does not mean that only that specific number of aircraft can be parked. The values in Table 4.14 are used as a basis of calculating a total amount of apron area that is then used to flexibly meet daily itinerant demand, as well as the occasional Group V or military aircraft.

Table 4.117
Projected Transient Parking Space Requirements

Year	Single Engine Piston	Multi-Engine Piston	Multi-Engine Turboprop	Jet	Helicopter	Total Transient Parking Spaces
Base Year						
2011	8	1	2	26	17	54
Forecast						
2016	7	1	2	28	16	55
2021	6	1	2	29	16	55
2031	5	1	1	33	14	54

Source: FAA ATADS, HNTB Analysis

The FAA suggests that a minimum of 360 square yards (SY) should be considered as the appropriately sized area for each transient aircraft parking space, based on current guidance in the Airport Design Guide. This area is also assumed to allow for adequate maneuvering and taxiing space. In reviewing the typical fleet mix at TPA, this rule of thumb sizing criteria was believed to be appropriate to meet the needs of aircraft in the single and multi-engine piston and turbo prop categories. However, with the increasing size of business jets in the fleet and the prevalence of these larger jets in the TPA market, an adjustment to the 360 SY value has been made based on specific aircraft sizes.

For larger business jet aircraft, storage areas up to 2,283 SY per aircraft may be necessary. For this study, an area of 2,000 SY was used in order to accommodate the larger business jets that routinely utilize the airfield. This provides a reasonable cushion of apron area to accommodate occasional larger business jets such as the Boeing BBJ or Airbus ACJ, as well as charters using larger aircraft. **Table 4.118** illustrates the parking areas required by various business jet aircraft that currently utilize the airfield.

Using the aircraft areas identified above for both small GA and jet aircraft, transient aircraft apron area requirements were calculated. The number of rotorcraft and single and multi-engine aircraft were multiplied by 360 square yards, while the number of jets was multiplied by 2,000 square yards. **Table 4.119** shows the results for each aircraft type as well as the total transient aircraft apron area needed over the planning period.

Table 4.118
Business Jet Parking Area Requirements

Manufacturer/Model	Length / Wing Span (feet)	Required Parking Area (1) (SY)
Gates/Learjet 35A	49 / 40	586
Beech/Beechjet BE-400	48 / 44	624
Israel Aircraft/Westwind 2	52 / 45	664
Gates/Learjet 55C	55 / 44	676
Cessna/Citation V	49 / 52	712
Embraer Phenom 300	52 / 53	746
Hawker 125-700 / 800	51 / 54	748
Cessna/Citation III	56 / 54	789
Dassault/Falcon 200	56 / 54	789
Dassault/Falcon 900	66 / 63	978
Canadair/Challenger	69 / 64	1017
Gulfstream II	80 / 68	1173
Gulfstream IV	88 / 78	1394
Gulfstream V	97 / 94	1735
Gulfstream G550	97 / 94	1735
Global Express	99 / 94	1761
Gulfstream G650	100 / 100	1867
Airbus Corporate Jetliner	111 / 112	2215
Boeing Business Jet	110 / 117	2283

Note: (1) Required Parking Area includes 10± feet of clearance from each wingtip, plus 40± feet in front of the aircraft to the centerline of the taxilane.

Source: Manufacturer aircraft specification manuals.

Table 4.119
Transient Aircraft Parking Requirements

Year	Single Engine Piston (SY)	Multi-Engine Piston (SY)	Multi-Engine Turboprop (SY)	Jet (SY)	Helicopter (SY)	Total Transient Parking Area Required (SY)
Base Year						
2011	2880	360	720	52,000	6,120	62,080
Forecast						
2016	2520	360	720	56,000	5,760	65,360
2021	2160	360	720	58,000	5,760	67,000
2031	1800	360	360	66,000	5,040	73,560

Source: HNTB Analysis

4.5.2 Based Aircraft Parking Apron Area Requirements

Although most based aircraft are stored in hangars at TPA, some based aircraft are also stored in tie-down areas. An analysis was completed to identify the based aircraft apron parking requirements for the 20-year planning period. **Table 4.120** presents the projected fleet mix of based aircraft over the planning period as delineated in the aviation activity forecasts. This mix of aircraft was utilized as an input to determine apron area parking demand for based aircraft.

Table 4.120
Projected Based Aircraft

Year	Single Engine Piston	Multi-Engine Piston	Multi-Engine Turboprop	Jet	Helicopter	Total Based Aircraft
Base Year						
2011	17	2	5	37	8	69
Forecast						
2016	14	2	4	40	8	67
2021	12	1	4	42	8	67
2031	9	1	3	47	7	67

Source: HNTB Analysis

FAA guidance states that 300 SY is a sufficient based aircraft parking area. This is a smaller area than for transient aircraft because based aircraft are usually parked closer together due to less frequent movement on the ramp. The actual layout of parking areas may lead to somewhat different sized parking areas. However, 300 SY is a good minimum amount of space for ramp planning purposes due to the fact that most based aircraft using tie-downs consist of smaller piston aircraft types, since virtually all turbo-prop and jet aircraft are routinely housed in hangars.

To determine the based aircraft parking demand, the percentage of current based aircraft stored outdoors was determined by observation and discussions with the FBO operator. Ten percent (by aircraft type) was agreed to as a good reflection of the current and future percentage of based aircraft that would be stored outside. It was also assumed that due to the higher costs of equipment and wear from exposure to the elements, all jet, turbo-prop and multi-engine piston aircraft would be stored in hangars. With that assumption in place, only single engine piston aircraft are assumed to be stored outside. **Table 4.121** shows the projected amount of aircraft apron area that will be needed to accommodate the based aircraft stored outdoors at TPA over the twenty year planning horizon.

Table 4.121
Based Aircraft Apron Area Requirements

Year	Single Engine Piston (SY)	Multi-Engine Piston (SY)	Multi-Engine Turboprop (SY)	Jet (SY)	Helicopter (SY)	Total Based Aircraft Apron requirements (SY)
Base Year						
2011	600	0	0	0	300	900
Forecast						
2016	300	0	0	0	300	600
2021	300	0	0	0	300	600
2031	300	0	0	0	300	600
Note: All based multi-engine and jet aircraft are assumed to be stored in hangars.						

Source: HNTB Analysis

4.5.3 Summary of Transient and Based Aircraft Apron Area Requirements

The projected area of aircraft parking apron needed, excluding taxiing and storage areas, is given by adding the transient and based aircraft parking demands from the tables above. At present, the total aircraft parking apron serving Landmark Aviation and TIJC, excluding the U.S. Customs apron and apron associated with the Hawker Beechcraft operation, amounts to 83,453 SY. A summary of the total apron area requirements at TPA are given in **Table 4.122**.

Table 4.122
Summary of Transient and Based Aircraft Apron Area Requirements

Year	Total Transient Aircraft Parking Area Required (SY)	Total Based Aircraft Parking Area Required (SY)	Total Aircraft Apron Area Required (SY)
Base Year			
2011	62,080	900	64,991
Forecast			
2016	65,360	600	67,976
2021	67,000	600	69,621
2031	73,560	600	76,191

Source: HNTB Analysis

With an existing apron area of 83,453 SY, the existing parking apron serving the two FBO's is adequate to meet the forecast level of peak month average day demand over the twenty year planning horizon. However, numerical values do not always address all of the factors that impact the adequacy of an operational apron. The efficiency of the available space is dependent upon both the configuration of the parking apron and the operating procedures of the two main FBOs. The FBOs arrange aircraft parked on the ramp as necessary to accommodate the anticipated mix of aircraft from day to day.

During the inventory site visit, Landmark noted that the relatively long and somewhat narrow configuration of the ramp presented challenges, particularly when larger aircraft were being parked. Operations by a number of professional sports team charters and by the larger fleet of corporate jets present a challenge in providing adequate maneuvering space on the ramp while maintaining access into and out of their hangars and terminal facility. To address these challenges, the FBO's sometimes request the temporary closure of Taxilanes E and R to provide additional depth and maneuvering space.

It should also be noted that an additional common-use ramp owned by HCAA is available south of Hawker Beechcraft and east of the Runway 1R end. This apron is used by the FBOs during periods of very high demand. The ramp is approximately 110 by 550 feet (6700 SY) and is used as overflow aircraft storage for the airport. It can be made available should additional itinerant space be required for the FBOs or air carrier operators on an as-needed basis. It is, however, not included in the apron calculations above.

4.5.4 Hangar Demand

The majority of all based aircraft at TPA are typically stored in hangars. Hangar usage is affected by many factors including the type of aircraft, typical weather conditions for the area, and the availability of and cost to lease different hangar types. It should be noted that the largest influence on the hangar type utilized is the need or desire of the individual aircraft owner. **Table 4.123** shows the estimated total number of non-jet and jet based aircraft presently stored in hangars at TPA. This number was utilized to determine the number and size of hangars needed throughout the planning period.

Table 4.123
Projected Hangar Demand

Year	Single Engine Piston	Multi-Engine Piston	Multi-Engine Turboprop	Jet	Helicopter	Total Number of Hangared Aircraft
% Hangared	90%	100%	100%	100%	100%	
Base Year						
2011	15	2	5	37	8	67
Forecast						
2016	13	2	4	40	8	66
2021	11	1	4	42	8	66
2031	8	1	3	47	7	66

Source: HNTB Analysis

The number of aircraft per hangar varies depending on the hangar owner or operator and the size of the facility involved. During the inventory site visit, it was noted that some large hangars only stored one aircraft while other hangar facilities often stored up to four or more aircraft. Given the variability of size, use and aircraft storage requirements, an alternate approach was used to determine the needed hangar area for based aircraft. Instead of determining the number of required hangars to meet the forecasted based aircraft, a square footage of hangar space was calculated. This approach involved a brief study of aircraft currently in the TPA GA fleet to determine an appropriate square footage based upon aircraft type.

From this analysis, area requirements were developed for three basic classifications of aircraft type. The area requirements by classification for hangar position sizing were calculated as follows: 1,400 square feet for single-engine, 1,900 square feet for multi-engine and rotorcraft, and 3,000 square feet for jet aircraft. These figures include clearance on all sides of the aircraft as well as square footage for storage, office and work areas. These values were then applied to the projected number of aircraft to be stored in hangars for each of the planning years. The results of this analysis are provided in **Table 4.124**.

Table 4.124
Projected Hangar Requirements

Year	Single Engine Piston (1400 SF)		Multi-Engine Piston (1900)		Multi-Engine Turboprop		Jet		Helicopter		Total Number of Hangared Aircraft	
% Hangared	Number	SF Required	Number	SF Required	Number	SF Required	Number	SF Required	Number	SF Required	Number	SF Required
Base Year												
2011	15	21,000	2	3,800	5	9,500	37	111,000	8	15,200	67	160,500
Forecast												
2016	13	18,200	2	3,800	4	7,600	40	120,000	8	15,200	66	164,800
2021	11	15,400	1	1,900	4	7,600	42	126,000	8	15,200	66	166,100
2031	8	11,200	1	1,900	3	5,700	47	141,000	7	13,300	66	173,100

Currently, there is approximately 175,100 square feet of FBO hangar area at TPA, excluding the hangar area devoted to the Hawker Beechcraft maintenance operations. There is an additional 59,000 square feet of aircraft storage space split between four private corporate hangars at TPA. Combined, a total of approximately 234,100 square feet of GA hangar space is currently located at TPA.

Aircraft owner demand for hangar space typically includes a mix of operators that opt to store their aircraft with a FBO and a limited number of operators that opt to develop a stand-alone hangar facility, like those situated along the north side of Runway 10-28 east of the air cargo area. Based on the current hangar space provided by the two FBO's, it is clear that adequate storage area is available to meet demand over the course of the planning period. This is based on the assumption that all of the additional based aircraft opt to store aircraft with one of the two FBO's. In the event that some operators were to desire to develop a stand-alone hangar, land area would need to be preserved to accommodate additional corporate/private hangar development. The 2005 AMPU identified two locations on the airport for additional corporate hangar development. These locations consist of presently undeveloped property located east of the existing corporate hangars (between Tampa Bay Blvd. and the alignment of Runway 10-28) and a second site situated to the east of the TIJC leasehold. Ample area is presently allocated to fully accommodate the need for additional corporate hangar development throughout the 20-year planning horizon.

The 2005 AMPU noted a need for the development of an additional 60,000 square foot paint hangar. Additional hangar space was constructed between the completion of the 2005 AMPU and this 2012 AMPU. However it was not constructed as a paint facility, but rather has been employed for additional GA aircraft maintenance. This confirms the adequacy of the existing inventory of storage hangar space. The actual hangar space presently available is projected to be adequate to meet forecast based demand through the 20-year planning horizon. However, it remains prudent to ensure that land in proximity to existing FBO's is preserved to either accommodate the possibility of future unforeseen demand or to meet demand for hangar space that may be associated with some itinerant aircraft operators.

4.5.5 FBO Fuel Farm Requirements

Determination of aircraft fuel farm requirements is routinely a business based decision on the part of the individual FBO, and as such it is typically the role of a master plan to ensure that adequate land area is reserved to ensure the ability to expand the current fuel facilities.

4.5.5.1 Landmark Aviation Fuel Farm Requirements

Based on information provided by representatives of Landmark Aviation during site visits and stakeholder interviews, the existing fueling facilities were reported as being in excellent condition with adequate capacity to meet both current and projected demand. Landmark representatives noted that the current split of capacity between Jet A fuel and 100LL was being reconsidered as demand for 100LL had dropped significantly. In response to this trend, Landmark is considering plans to convert one of its two 20,000 Avgas tanks to a Jet A tank to better address market demands. This would reallocate existing capacity to serve the higher flowing volumes of Jet A without having to incur added cost of facility expansion. This action will bring the total Jet A storage capacity to 42,000 gallons. Based on the FBO's own analysis, this action will meet demand for Jet A and not adversely impact the ability to meet the demand for Avgas. Additionally, the FBO noted two options that exist in the event of increase in demand beyond the level projected. First, the delivery schedule for fuel from their supplier could be increased to offset fuel flowage. Second, should trends suggest a long term alteration in demand; room exists in the vicinity to add additional storage capacity.

4.5.5.2 Tampa international Jet Center Fuel Farm Requirements

Based on information provided during the initial stakeholder interviews with TIJC, the existing fueling facilities were reported as being in excellent condition with adequate capacity for anticipated future levels of operational activity. As was the case for Landmark Aviation, should unforeseen levels of demand emerge, the FBO noted the capability to increase the frequency of deliveries of fuel from their supplier to the FBO's fuel farm as a means offsetting demand. It is anticipated that the need for added storage capacity would be driven by the need for added Jet A storage capability. The current fuel farm location could be expanded to accommodate additional tank capacity. However, the expansion would necessitate the reconfiguration of access roadways that border the east and west sides of the fuel farm, in order to provide area for the expansion of the containment basin and the placement of an additional 20,000 gallon Jet A tank.

4.5.6 FBO Auto Parking

Both FBOs have substantial amounts of parking for their facilities and the tenants that occupy them. The inventory of parking is provided in the existing conditions section. Based on information provided during the site visits and stakeholder interviews, both operators reported their parking facilities as being in acceptable condition, possessing adequate capacity for current operations and having room to accommodate future growth. It is assumed that the parking areas will require routine maintenance and rehabilitation over the course of the twenty-year planning period to maintain the pavement in acceptable condition.

Landmark Aviation parking is adequate for the projected level of future demand with one potential exception being the addition of new hangar space south of the Hawker Beechcraft facility. Under this scenario, additional parking adjacent to the additional hangar would be required, not so much to meet numerical demand, but rather to provide parking proximate to the new facility.

The spaces directly in front of TIJC have a tendency to fill up. However, a large number of spaces remain available to the east and west of the TIJC terminal facility located in front of the adjacent hangars. Additionally, a portion of this demand is addressed through the provision of a valet parking service that places customer vehicles airside on the far eastern side of their leased apron, adjacent the eastern end of Hangar 4. Similar to the situation with Landmark, additional parking facilities would be required should the FBO decide to add additional hangar space within their leasehold. This added parking would be configured adjacent to any proposed hangar and sized to meet the demand associated with the activities conducted from any new facility.

4.6 Corporate Tenant Facilities

A number of corporate/GA tenants also operate at TPA. A number of these tenants opt to base their aircraft at one of the two FBO's, while several have developed their own individual hangars. There are six separate facilities; five on the north side of Runway 10-28 and one on the south side of Runway 10-28, all located toward the Runway 28 end. It should be noted that Flight Express Air Cargo is not counted among the corporate/GA Tenants. The tenants are as follows:

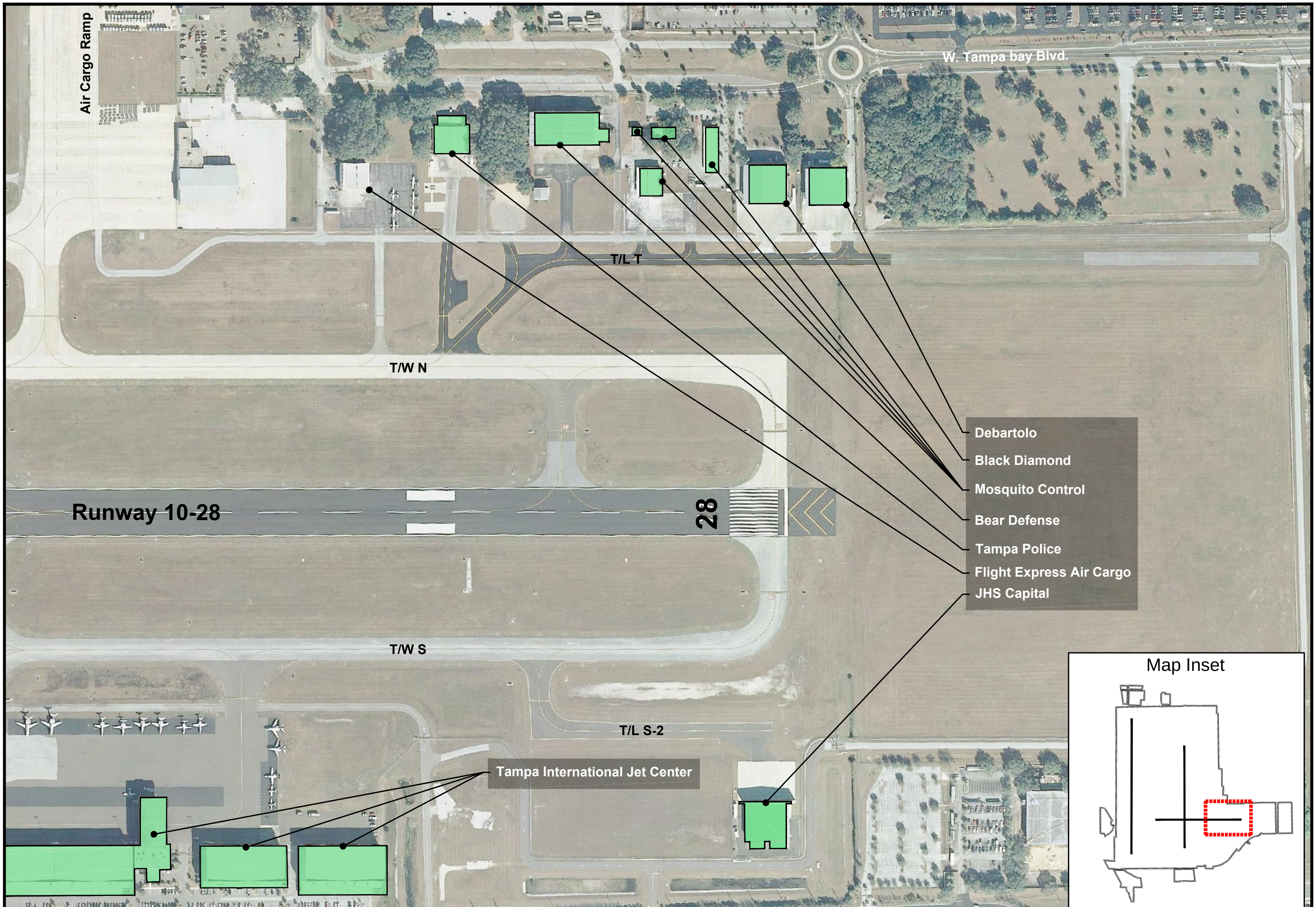
- City of Tampa Police
- Bear Defense
- Hillsborough County Mosquito Control
- Black Diamond Aviation
- Debartolo LLC
- JHS Capital Advisors

The only two notable changes associated with the individual corporate tenant hangars since the completion of the 2005 AMPU is the construction of the JHS Hangar. The JHS Hanger is the one hanger situated south of the Runway 28 end, adjacent to the newly constructed Taxiway S and S2. Additionally, the tenant Walter Industries was replaced by Bear Defense.

For a tabular summary of facilities see **Table 4.125** and see **Figure 4.110** for a depiction of the facilities and their locations. Additional information on these facilities can also be found in Volume V of the 2005 AMPU.

Table 4.125
Corporate Tenant Facilities

Tenant	Hangar Area (SF)	Lot Size (AC)
City of Tampa Police	10,000	1.98
Walter industries	21,100	2.76
Hillsborough County Mosquito Control	2,000	3.48
Black Diamond Aviation	10,000	1.98
Debartolo LLC	10,000	1.98
JHS Capital Advisors	18,000	1.50



P:_Projects\57785 – Tampa MP\00-CADD\HNTB_Team_Dwg_files\TPA_Support Facility Figure_Rev2.dwg 4 -GA Facilities Aug 01, 2013 – 9:11am

0' 200' 400'
SCALE: 1" = 400'

HNTB

2900 SOUTH QUINCY STREET,
SUITE 200
ARLINGTON, VIRGINIA 22206
PH (703) 824-5100
FAX (703) 671-6210

Corporate Tenants

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

DATE:
Aug 01, 2013

FIGURE:
4-110

Prepared by:

HNTB Corporation

C&S Companies
Cost Management Inc.
Curtis Transportation Consulting
Lea+Elliott
TransSystems
Quest Corporation of America
TransSolutions