VOLUME 3B

Tampa International Airport

2012 AIRPORT MASTER PLAN UPDATE

BOARD APPROVAL DATE: APRIL 4, 2013

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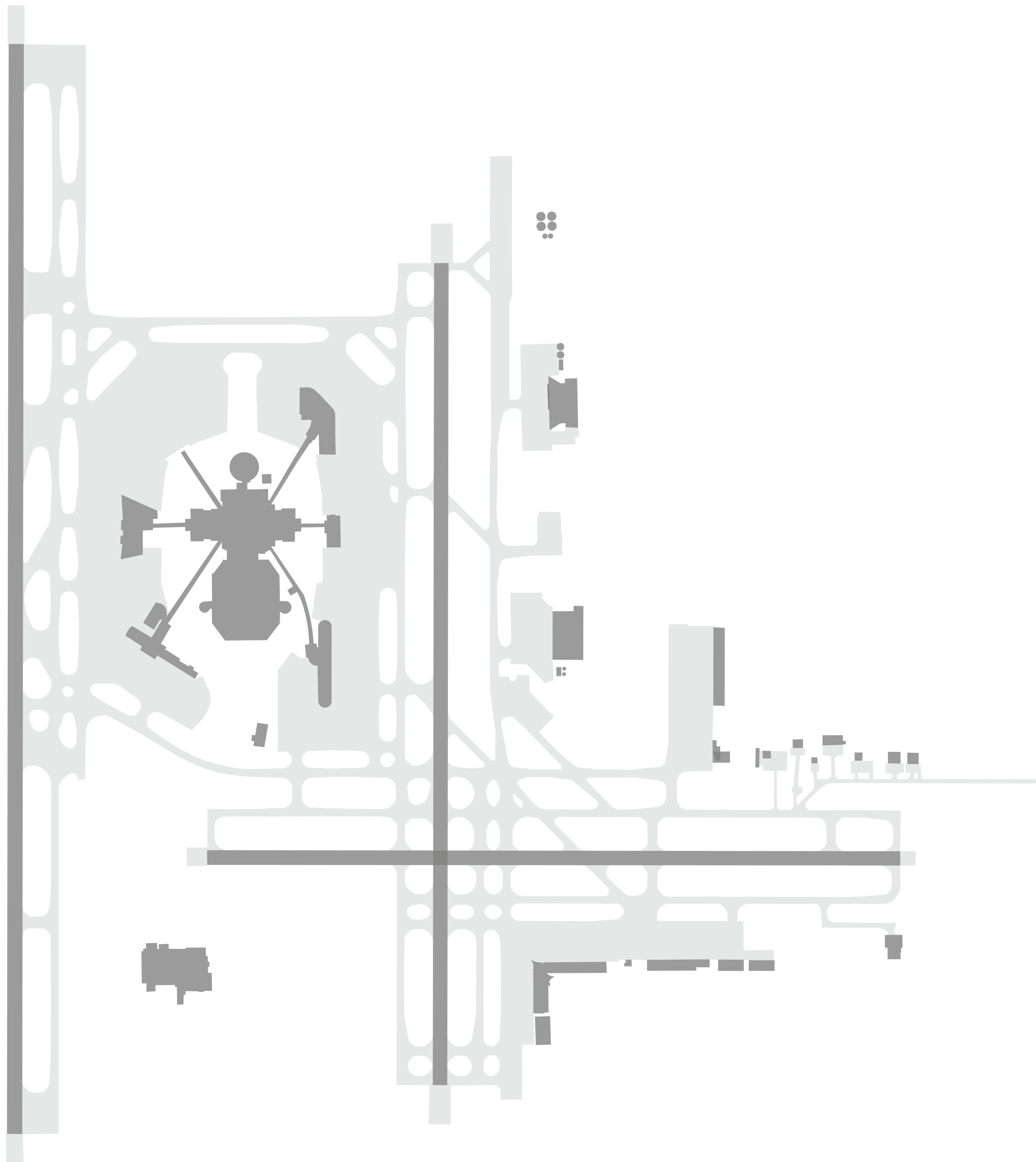
APPENDIX L - APM REPORT



2012 Master Plan Update
Landside APM System Plan - Technical Report
Tampa International Airport

Final Report

April 2013

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Tampa International Airport – 2012 Mater Plan Update
Landside APM System Plan

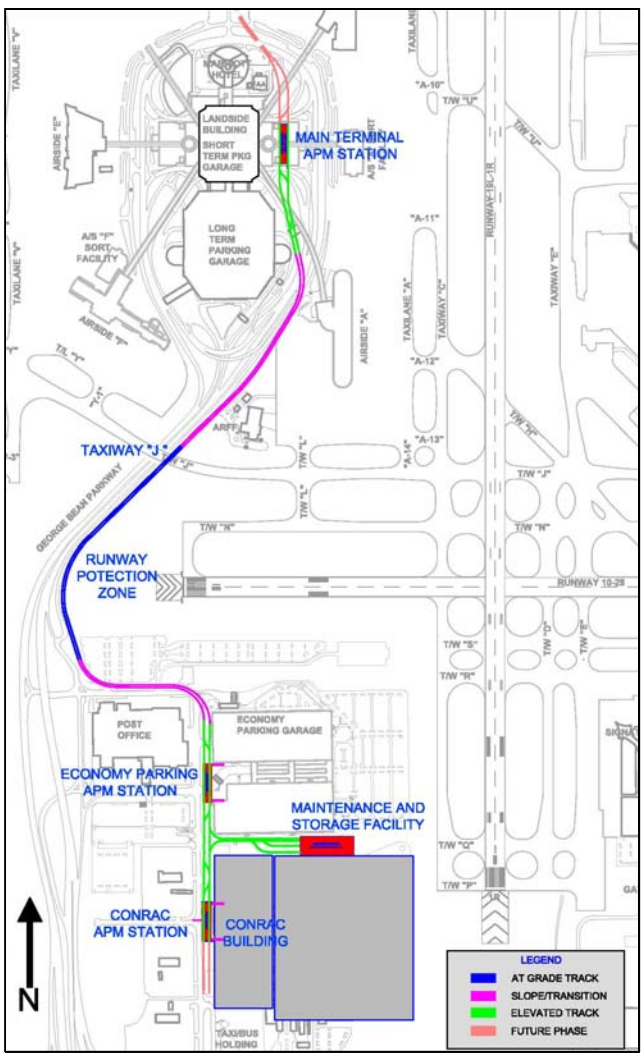
List of Figures and Tables

Landside APM System Overview

An Automated People Mover (APM) System is being considered as a part of the 2012 Master Plan Update for Tampa International Airport (TPA) that would connect the Main Terminal with a Consolidated Rental Car Facility (CONRAC) planned for the South Development Area. The Landside APM system would transport passengers from the Main Terminal APM Station to Stations at the Economy Parking Garage and the CONRAC. The system plan also includes an off-line Maintenance and Storage Facility (MSF) located between the Economy Parking Garage and the CONRAC.

The proposed APM system shown in Figure SO-1 will have the capability to expand to the north and connect to a future North Terminal or extend to the south and connect to a potential future transportation center off-airport.

Figure SO-1: Proposed Layout for APM System



Key findings of this APM System planning portion 2012 Master Plan Update are summarized as follows:

- Several APM alignment options were found to be feasible including the original alignment planned for an LRT through TPA. However, the proposed alignment shown in Figure SO-1 provides the best access to the facilities in the South Development area as currently planned.
- A variety of APM technologies, both self-propelled and cable-propelled, are viable candidates to service the proposed system.
- Three trains approximately 120 ft. long (or three typical APM cars per train) operating on frequencies between two and three minutes would provide sufficient capacity to meet the initial peak period ridership levels projected for the system.
- The total initial fleet would have the four three car trains (or 12 cars) that provide one spare train for maintenance rotations and backup.
- It is recommended that stations be planned to accommodate a maximum length train of 160 feet (typically four APM cars) to accommodate future growth and system expansion.
- Travel time on the APM between the CONRAC station and Terminal station would range from 4.5 to 4.7 minutes.

Operations Analysis

There are several distinctive physical and operational characteristics of APM systems that define that system's alignment configuration. The physical characteristics are used to determine the best configuration to suit a particular application in an airport environment. The different system alignment configurations are illustrated in Figure SO-2 below and include Single-lane shuttle, Single-lane shuttle with bypass, Dual-lane shuttle, Dual-lane with bypass, Loop, Double Loop and Pinched Loop and Table SO-1 summarizes the system features for various airport APM landside systems.

Figure SO-2: APM Alignment Configurations

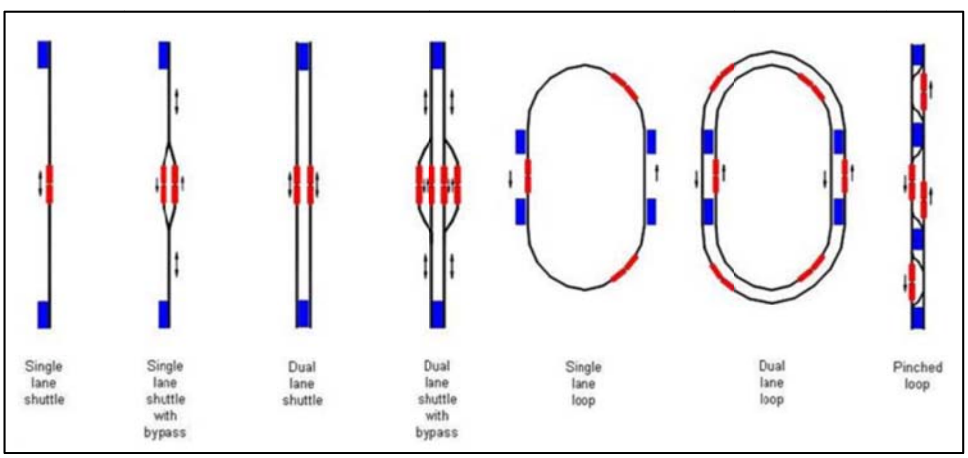


Table SO-1: Airport Landside Systems

Airport Landside Automated Technology Inventory						
Airport	**Automated Technology**	**Year Open**	**Alignment Configuration**	**Facilities Served**	**Length[1] (miles)**	**Capacity (pphpd)**
Houston	APM	1981	Loop	Terminals	1.0[2]	700
London Gatwick	APM	1987	Shuttle	Terminals, Intermodal	0.7	4.200
Tampa	APM	1990	Pinched	Parking, Rental Car	0.6	700
Paris -Orly	APM	1991	Pinched Loop	Terminals, Intermodal	4.5	1,500
Chicago	APM	1993	Pinched Loop	Terminals, Parking, Intermodal	2.7	2.400
Newark	APM	1996	Pinched Loop	Terminals, Parking, Intermodal, Rental Car	3.2	2,100
Minn/St. Paul	APM	2001	Shuttle	Parking, Intermodal, Rental Car	0.2	1,700
Dusseldorf	APM	2002	Pinched Loop	Parking, Intermodal	1.6	2,000
New York – JFK	APM	2003	Pinched Loop	Terminals, Parking, Intermodal, Rental Car	8.1	3,780
Birmingham (UK)	APM	2003	Shuttle	Intermodal	0.4	1,600
San Francisco	APM	2003	Loops	Parking, Intermodal, Rental Car	2.8	3,400
Singapore Changi	APM	2006	Shuttles	Terminals	0.8	1,900
Toronto	APM	2006	Shuttle	Terminals, Parking	0.9	2,100
Paris - CDG	APM	2007	Pinched	Terminals, Parking, Intermodal	2.1	1,900
Beijing	APM	2008	Pinched Loop	Terminals, Intermodal	17.5	N/A
Atlanta	APM	2009	Pinched Loop	Terminal, Rental Car, Convention Center	1.4	2,700
London Heathrow	PRT	2010	Network	Terminals, Parking	1.0	500
Miami	APM	2011	Pinched Loop	Intermodal, Rental Car	1.3	1,600
Sacramento	APM	2011	Shuttle	Terminal	0.2	2,300
Phoenix	APM	2013	Pinched Loop	Terminals, Parking, Intermodal	3.0	2,900

Source: Lea+Elliott, Inc.

1. Length is measured in dual-lane miles of guideway.
2. 2Single-lane loop system converted to dual-lane mile equivalent

Based on the length of guideway and the number of stations the recommended configuration for the Tampa Airport APM is pinched-loop.

Procurement

APM systems are comprised of two primary elements, the Operating System and the Fixed Facilities, which are integrated into a fully functional total system. The Operating System consists of vehicles, running track, guideway equipment, propulsion power, automatic train control and communications subsystems, station and wayside equipment, maintenance equipment and other elements. Fixed Facilities include guideway infrastructure, stations, equipment rooms and buildings for the Maintenance and Control Facility (MSF), command and control facilities (CCF), propulsion power substations and other facilities upon which Operating System elements are installed by the APM system supplier.

The major APM Operating subsystems are proprietary in nature (e.g., vehicles, tracks, switches, control systems, station equipment, etc.) and, as such, equipment from different suppliers cannot be mixed to form a system. Therefore, the Operating System is typically procured under a turnkey design, supply and installation contract. The Operating System of an APM application is then specially configured using “off the shelf” equipment designs that are applied to satisfy site-specific requirements.

The implementation of APM Systems typically occurs in two distinct phases. Phase 1 typically involves the design and construction of the Fixed facilities and the APM operating system and Phase 2 includes the Operations and Maintenance (O&M) of the APM System (Operating System) by the same supplier of the APM operating system in Phase I. As such the systems are typically procured under a Design, Build, Operate, and Maintain (DBOM) approach. The design and construction of all Fixed Facilities required for the APM System can be done by the same team as the Operating System or procured separately. As HCAA intends to procure these elements separately, the review in Section 5 focuses on procurement strategies for a DBOM for the APM Operating System only.

The goal of the procurement of an APM Operating System is to receive a good number of competitive proposals/bids from qualified APM suppliers. Section 5 provides a review of various procurement methods for HCAA consideration and the pros and cons of each that aim to maximize the competition in among suppliers during the procurement process.

1.0 APM SYSTEM PLANNING

This sections describes the factors and criteria that were considered and the process that was followed in developing the overall system plan for the Landside APM System.

1.1 OVERVIEW OF APM REQUIREMENTS AND CONSTRAINTS

APM systems are based on proprietary designs provided by suppliers/manufacturers active in the market place. There are several manufacturers of APM technologies that are candidate suppliers for the Landside APM System for Tampa International Airport. Among these suppliers there is considerable variance in their approaches to the design and implementation of the basic system elements. The planning process begins with a review of candidate technologies which is presented in Section 1.2, followed more detailed definition of the features of specific candidate technologies provided by various suppliers that is present in Section 1.3.

Section 1.4 presents a set of generic criteria that provides guidelines for APM system planning purposes. These criteria are established to ensure that the system layout will provide a sufficient envelope to accommodate that various candidate technologies. The final design criteria will be based on the selected Operating System Contractor's proprietary technology and this update can be expected to occur after the Operating System or APM Contractor has been selected and is under contract.

Section 1.5 reviews the various alignment options that were evaluated based on the forgoing factors and the various site constraints that were taken into account along the route from the Terminal to the South Development area. Section 1.6 reviews proposed locations for the APM stations and Section 1.7 review the location for the MSF.

1.2 AIRPORT LANDSIDE TECHNOLOGY EVALUATION

The following classes of automated conveyance technologies were evaluated for potential application on a system connecting between the CONRAC and Airport Terminal Station.

1. Personal Rapid Transit (PRT)
2. Monorails
3. Cable-driven APM
4. Self-propelled APM

All of these technologies operate in a fully automated, driver-less mode. The site-specific application of the technology is based on proprietary "off the shelf" equipment designs that are customized to satisfy site-specific constraints. There are a limited number of qualified, responsible suppliers for APM Systems. For technology assessment purposes, the recommended screening criteria considered include: (1) technical maturity, (2) safety, (3) reliability, (4) right of way requirements, (5) ability to meet operational requirements, (6) ability to meet ridership demands and (7) opportunities for competitive procurement.

1.2.1 Personal Rapid Transit

Personal Rapid Transit (PRT) is a transit concept characterized by small (4-6 passengers) vehicles, operating over a dispersed network, and designed to provide nonstop, origin-to-destination service to individuals or small groups of passengers. The technology is currently in operation at London Heathrow Airport connecting a terminal to a landside parking lot.

PRT may not be an appropriate technology for the Terminal to CONRAC transport application for several reasons:

1. It is designed to provide convenient service over a dispersed network, and is less suitable for carrying large numbers of passengers in line-haul service among a few stations.

2. While under development, there is currently no PRT system currently operating at an airport that provides the required passenger capacity. As such, it does not have the technical maturity or the proven safety/reliability record desired for the TPA application.

1.2.2 Monorail Technology

Although there are very large monorails in urban transport they have typically not been applied to an airport environment. Monorails that have been applied in airport environments are typically in the small/medium monorail category. These are characterized by separate vehicles, usually operating at slow speeds between 20-30 mph, designed to carry a moderate number of passengers within a geographically compact area. The two examples of the small-vehicle class are the Bombardier UM III Series Monorail in operation at Tampa International Airport (a slightly larger and faster version operates in downtown Jacksonville), and the Bombardier Type III Monorail system in service at Newark International Airport. The Newark system has six-car trains approximately 100 feet long carrying between 75 and 80 passengers per train. The system's capacity is about 2,500 passengers per hour per direction.

Large, high capacity monorails will require significantly longer platform lengths, since much of the train length is taken up by the joints between cars which cannot be used by passengers. Also, the monorail switches are much larger and slower than those for other fixed guideway systems; such switches would be unsuitable for the TPA alignments and operations. As such, monorails are not considered viable for application at TPA.

1.2.3 Cable-Propelled APM

This type of technology consists of medium to large capacity vehicles in trains that use cable propulsion and various types of suspension systems (rubber tire, air levitated or steel-wheel over steel-rail). This technology is best suited for two or three station shuttle applications with relatively straight guideway alignments of a kilometer or less. Otis Transit Systems air levitated, cable pulled systems operate at Cincinnati International Airport, Narita International Airport (Tokyo), Minneapolis/ St Paul International Airport and Zurich. Large vehicle systems (comparable in size to the self-propelled APMs) have been in operation with train lengths of up to 3 cars with maximum speeds of up to 43 km/h.

Doppelmayer Cable Company (DCC) has a cable-propelled system installed at Mexico City Airport, Birmingham Airport in the United Kingdom and Toronto and with systems under implementation at Doha International Airport and Oakland International Airport.

This technology would be a candidate for an application on the TPA system.

1.2.4 Self-Propelled APM

Large vehicle, self-propelled rubber tire APM systems are in widespread use at airports around the world and in some urban areas. Airports where this technology is in operation include the following:

- Miami International Airport
  - Concourse E – Satellite Transit System
  - North Terminal APM System
  - MIA Mover Connector
- Atlanta Hartsfield International Airport
  - CONRAC landside System
  - Airside System
- San Francisco International Airport
- Chicago O'Hare International Airport
- Tampa International Airport
- Orlando International Airport
- Denver International Airport

- Singapore Changi International Airport
- Frankfurt International Airport
- Dallas-Ft. Worth International Airport
- Las Vegas/ Mac Carran
- Seattle-Tacoma International Airport

Typically, these systems feature one, two, three or four vehicle trains operating in a shuttle, loop or pinched loop configuration. Passenger capacity for landside applications with baggage carts typically range between 45 and 55 passengers per vehicle.

Some of the currently available large vehicle self-propelled APM Systems are identified below. Any of these systems could be applied to TPA.

- Mitsubishi Crystal Mover
- Bombardier Innovia
- Standard Japanese APM (Mitsubishi, Kawasaki, Niigata)
- Siemens AirVal

More detailed information about each of these technologies is provided in Section 1.3 of the document.

1.3 POTENTIAL APM SUPPLIER TECHNOLOGIES

The following provides basic specifications for a range of potentially applicable APM technologies. All of these suppliers typically compete for airport APM applications of short to moderate length. Longer and/or more complex APM alignments tend to only have self-propelled technologies bidding on them. Such competition is typically through a “performance” rather than a “detailed design” specification and procurement process. This approach allows for greater competition among technology suppliers, thus should result in lower capital costs. See Section 1.5 for further discussion of rrocurement strategies and considerations.

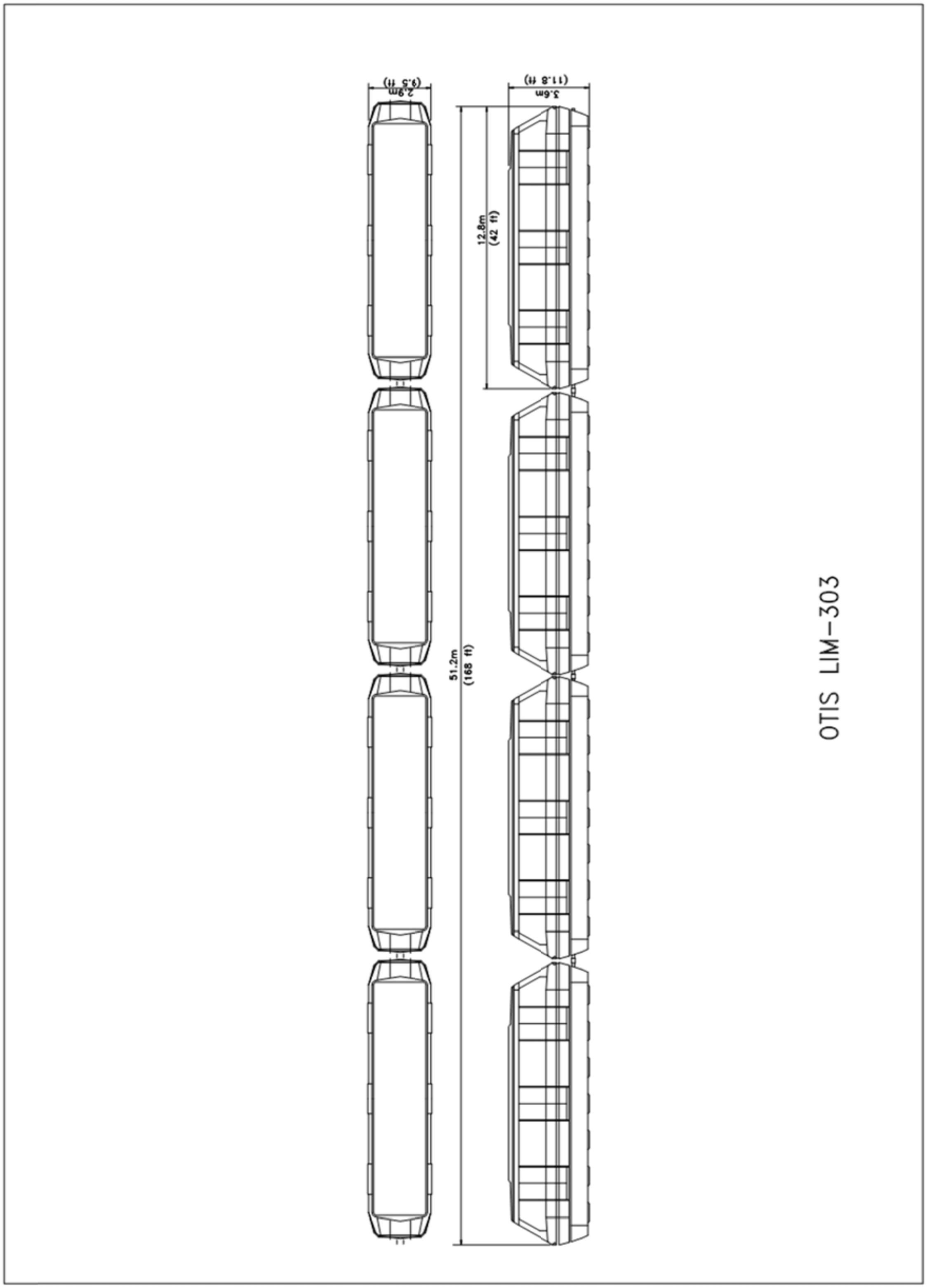
1.3.1 Poma-Otis LIM-303

Poma/Otis – Shuttle II – air levitated, two single-lanes with bypasses at Narita Airport (Tokyo, 1992), dual-lane at Cincinnati Airport (1994), two single-lanes at Minneapolis/St. Paul Airport garage (2001), a single lane with bypass and detachable grip at Minneapolis/ St. Paul Airport Green Concourse (2002), a single-lane with bypass at Detroit Airport (2002) and dual-lane at Zurich Airport (2003).

Supplier:	Poma-Otis
Vehicle Type:	LIM 303
Passenger Capacity:	73 pax /vehicle, 73 standees @ 0.36 m²/pax and 0 seats
Coupling Arrangements:	Automatic Mechanical Coupler
Operating Modes:	Shuttle, loop, or pinched looped, fully automatic
Propulsion System:	Linear induction motor
Suspension System:	Primary: HovairR air cushion
Secondary:	Elastomeric Isolators
Power Distribution:	480 VAC, 50-60 Hz, 3-phase.
Guidance System:	Lateral guidance/rubber wheels on guide rails
Air Conditioning:	Optional
Empty Vehicle Weight (AW0):	34,000 lb. (151 230 N) (per car)
Normal Vehicle Weight (AW1):	47,000 lb. (209 000 N) (per car)
Crush Vehicle Weight (AW2)(*):	64,281 lb. (285 920 N) (per car)
Maximum Cruise Speed:	30 mph (48 km/hr.)
Wheelbase:	N/A
Distance between axles; adjacent vehicles:	N/A
Distance between axles; same vehicle:	N/A
Wheel Gauge:	N/A

(*) The AW2 load has been calculated using vehicle interior floor area, seating, and shelving based on supplier criteria or scaled from supplier drawing. A unit weight of 107 pounds per square foot (5.13 Kpa) was used for standing passengers. A unit weight of 36 pounds per square foot (1.73 Kpa) was used for all other areas.

Figure 1 – Dimensions for Poma/Otis LIM-303



1.3.2 Japanese Standard Technology

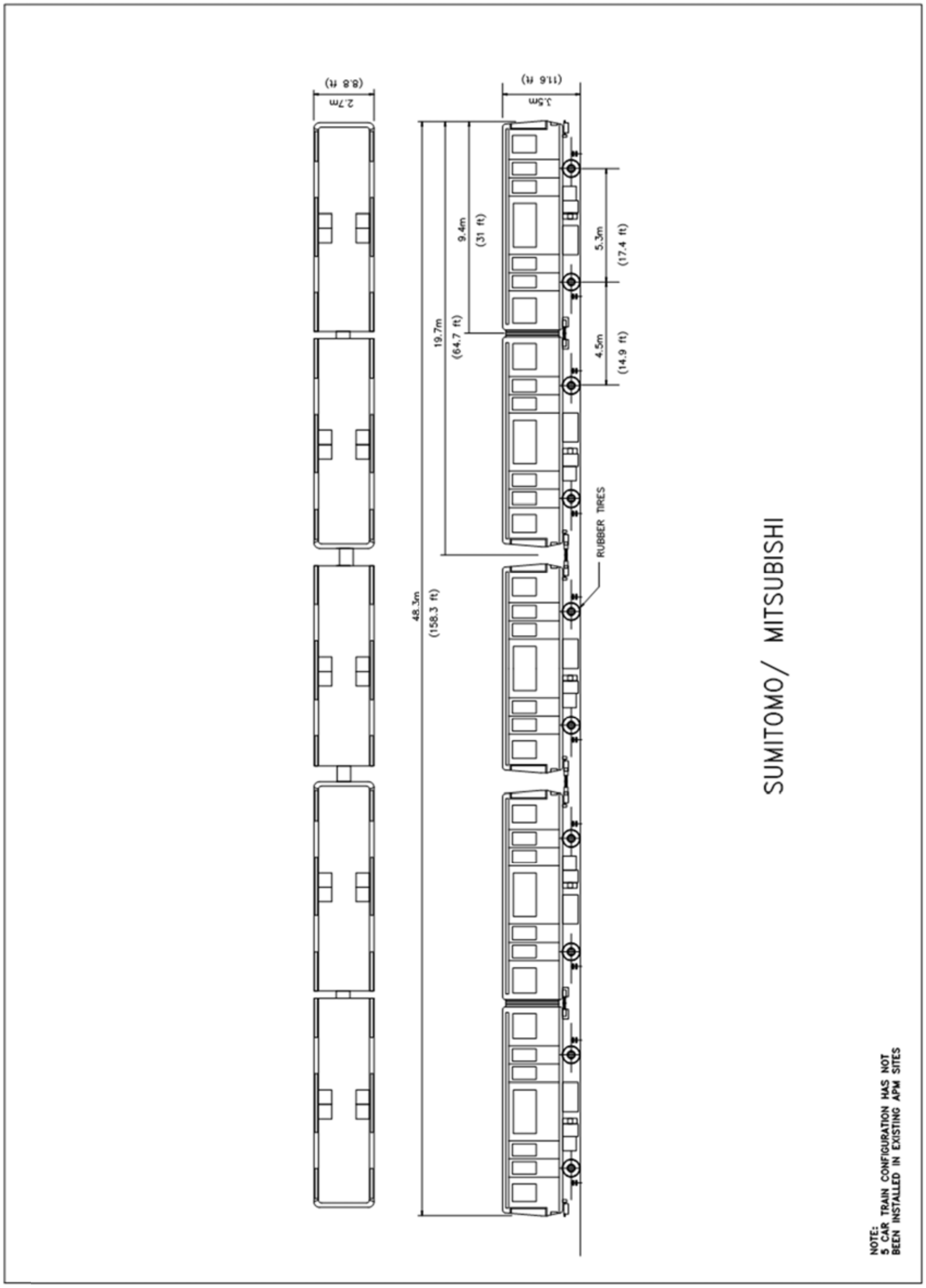
Airport Location: Osaki Kansai. This system has two by-pass shuttles allowing four trains to operate between the two stations.

Supplier:		
Vehicle Type:	Japanese Standard	
Passenger Capacity:	118 pax/married-pair,110 standees @ 0.36 m²/pax and 8 seats. Single vehicle consists of married-pair.	
Coupling Arrangements:	Married-paired, automatic mechanical couplers each end.	
Operating Modes:	Shuttle, loop, or pinched looped, fully automatic	
Propulsion System:	Three phase AC inductor motor VVVF inverter control by IGBT (insulated Gate Bipolar Transistor) for AC induction drive motors 80 Kw AC motor.	
Suspension System:	Primary:	Rubber tires
	Secondary:	Diaphragm air springs with leveling
Power Distribution:	750 VDC	
Guidance System:	Lateral guidance rubber wheels applying on guidance rails.	

Air Conditioning:	Yes
Empty Vehicle Weight (AW0):	48,000 lb (213 500 N) (Married-pair)
Normal Vehicle Weight (AW1):	74,700 lb (332 300 N) (Married-pair)
Crush Vehicle Weight (AW2)*:	92,322 lb (410 650 N) (Married-pair)
Maximum Speed:	44 mph (71 km/hr.)
Wheelbase:	17.4 ft (5.3 m)
Distance between axles; adjacent vehicles:	14.9 ft (4.5 m)
Distance between axles; same vehicle:	17.4 ft (5.3 m)
Wheel Gauge:	5.6 ft (1.7 m)

(*) The AW2 load has been calculated using vehicle interior floor area, seating, and shelving based on supplier criteria or scaled from supplier drawing. A unit weight of 107 pounds per square foot (5.13 Kpa) was used for standing passengers. A unit weight of 36 pounds per square foot (1.73 Kpa) was used for all other areas.

Figure 2 – Dimensions for Mitsubishi Japanese Standard



1.3.3 Sumitomo / Mitsubishi (Crystal Mover)

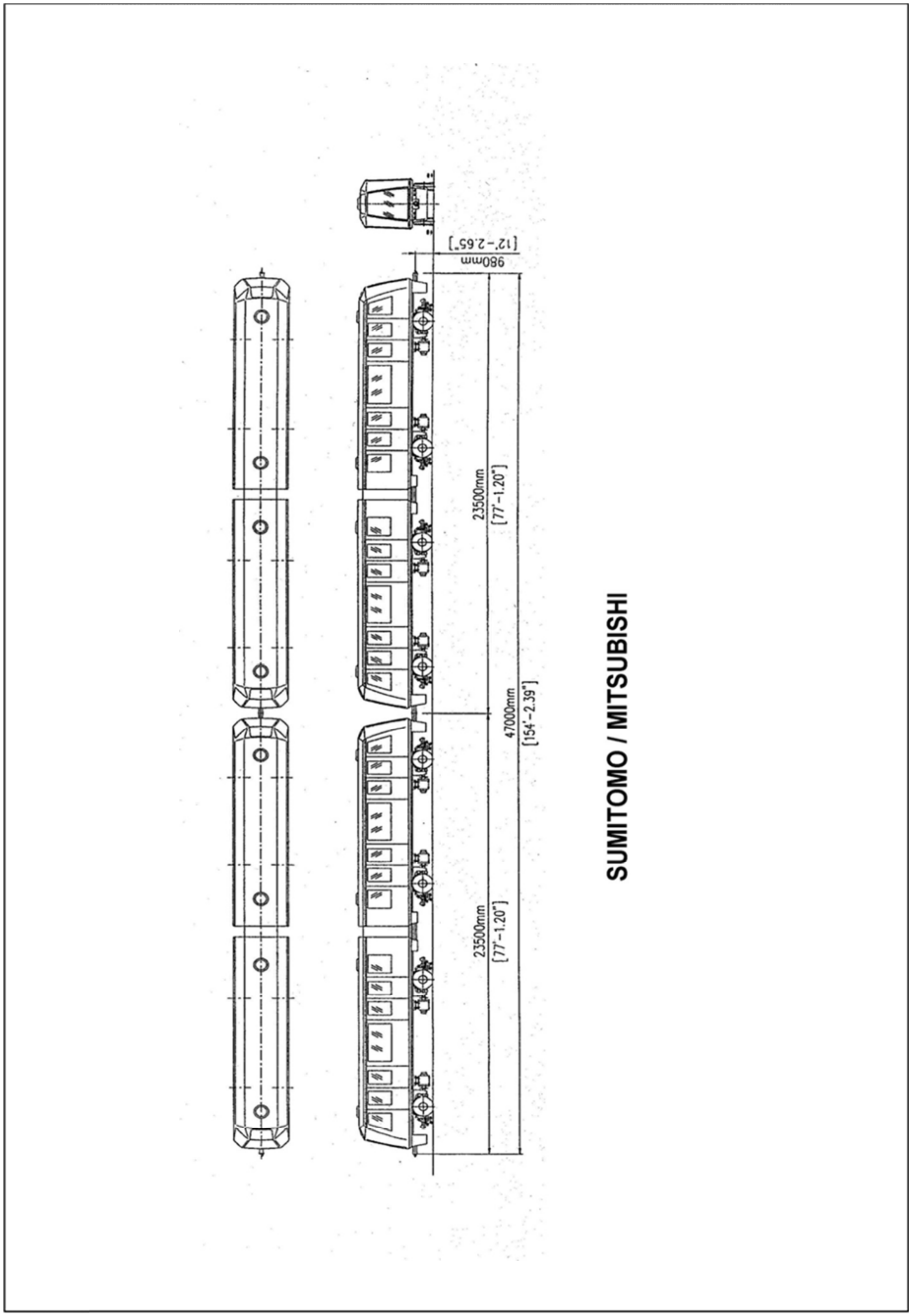
Mitsubishi – Airport locations: Hong Kong and Singapore-Changi, Atlanta (2009, landside) Washington-Dulles (2010, airside), MIA Mover (2011, landside), and MIA North Terminal (2010, Airside).

Supplier: Mitsubishi Heavy Industries, LTD
Vehicle Type: Crystal Mover
Passenger Capacity: 134 pax/married-pair, 108 standees @ 0.36 m^2/pax and 26 seats. Single vehicle consists of married-pair.
Coupling Arrangements: Married-paired, automatic mechanical couplers each end.
Operating Modes: Shuttle, loop, or pinched looped, fully automatic
Propulsion System: Three phase AC inductor motor
Thyrister phase control DC motor propulsion
Suspension System: Primary: Rubber tires
Power Distribution: 750 VDC or 600 VAC
Guidance System: Lateral guidance rubber wheels applying on guidance rails.
Air Conditioning: Yes
Empty Vehicle Weight (AW0): 65,256 lb (290 260 N) (Married-pair)
Normal Vehicle Weight (AW1): 93,984 lb (418 000 N) (Married-pair)
Crush Vehicle Weight (AW2)*: 114,640 lb (510 000 N) (Married-pair)

Maximum Speed: 34 mph (55 km/hr.)
Wheelbase: 22 ft (6.7 m)
Distance between axles; adjacent vehicles: 16.6 ft (5.0 m)
Distance between axles; same vehicle: 22 ft (6.7 m)
Wheel Gauge: 6.1 ft (1.8 m)

(*) The AW2 load has been calculated using vehicle interior floor area, seating, and shelving based on supplier criteria or scaled from supplier drawing. A unit weight of 107 pounds per square foot (5.13 Kpa) was used for standing passengers. A unit weight of 36 pounds per square foot (1.73 Kpa) was used for all other areas.

Figure 3 – Dimensions for Mitsubishi Crystal Mover



1.3.4 Bombardier – Innovia

Bombardier Innovia – Airport Location: Dallas/Fort Worth (2005, airside), London – Heathrow (2008, airside), and soon to begin service at Phoenix.

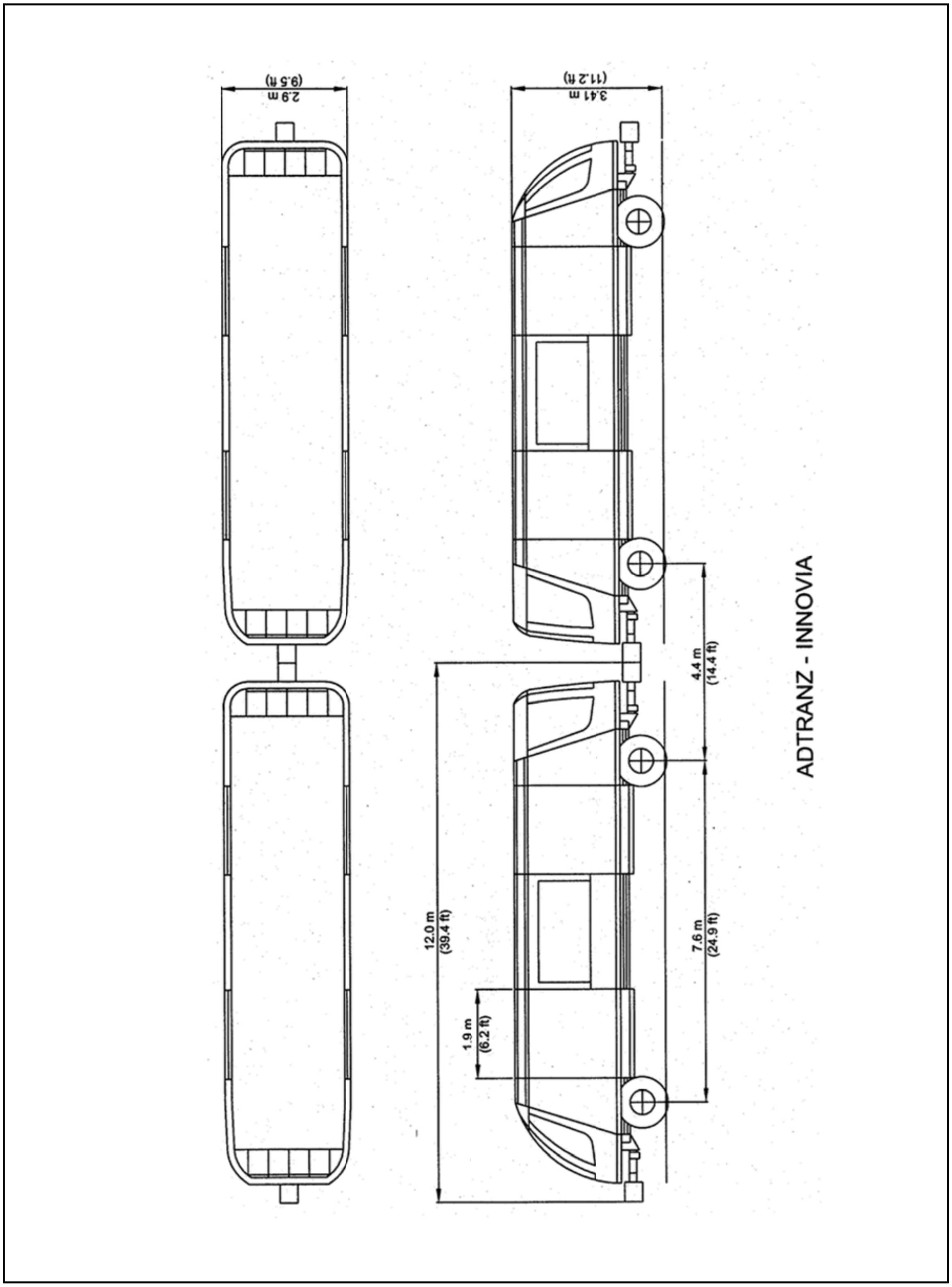
Supplier:	Bombardier, Inc.
Vehicle Type:	Innovia
Passenger Capacity:	69 pax /vehicle, 61 standees @ 0.36 m² / pax and 8 seats.
Coupling Arrangements:	Automatic Mechanical Coupler
Operating Modes:	Shuttle, loop, or pinched looped, fully automatic
Propulsion System:	AC traction motor
Suspension System:	Primary: Rubber tires Guideway: Concrete running surface.
Power Distribution:	750 VDC or 600 VAC
Guidance System:	Center Steel beam

.

Air Conditioning:	Yes
Empty Vehicle Weight (AW0):	32,000 lb (142 343 N) (per car)
Normal Vehicle Weight (AW1):	48,000 lb (213 515 N) (per car)
Crush Vehicle Weight (AW2)(*):	61,600 lb (274 010 N) (per car)
Maximum Cruise Speed:	37 mph. (60 Km/hr.)
Wheelbase:	24.9 ft (7.6 m.)
Distance between axles; adjacent vehicles:	14.4 ft (4.4 m.)
Distance between axles; same vehicle:	24.9 ft (7.6 m.)
Wheel Gauge:	6.67 ft (2 m.)

(*) The AW2 load has been calculated using vehicle interior floor area, seating, and shelving based on supplier criteria or scaled from supplier drawing. A unit weight of 107 pounds per square foot (5.13 Kpa) was used for standing passengers. A unit weight of 36 pounds per square foot (1.73 Kpa) was used for all other areas.

Figure 4 – Dimensions for Bombardier Innovia



1.3.5 Cable-Propelled

This type of technology consists of medium to large capacity vehicles or trains using cable propulsion with various suspension systems. System line speeds of 18 to 28 miles per hour can be achieved. This technology is best suited for two- or three-station shuttle applications with relatively straight guideway alignments. Suppliers of this type of technology at airports include the Doppelmayr Cable Car system details of which are provided below.

Doppelmayr – CABLE Liner – systems operating in Las Vegas (two resorts, 1999 and 2009), Birmingham Airport (2002) in England, Toronto (2006), and Mexico City (2007), as well as implementation at Doha International Airport and Oakland International Airport.

Supplier: Doppelmayr Cable Car
Vehicle Type: CABLELiner Shuttle
Passenger Capacity: 29 pax/car; 19 standees @ 0.36m^2 / pax and 10 seated pax.
Coupling Arrangements: No vehicle coupling; individual cars attached to rope
Operating Modes: Shuttle, pinched looped; fully automatic
Propulsion System: AC motor-driven bullwheel with continuous haul rope

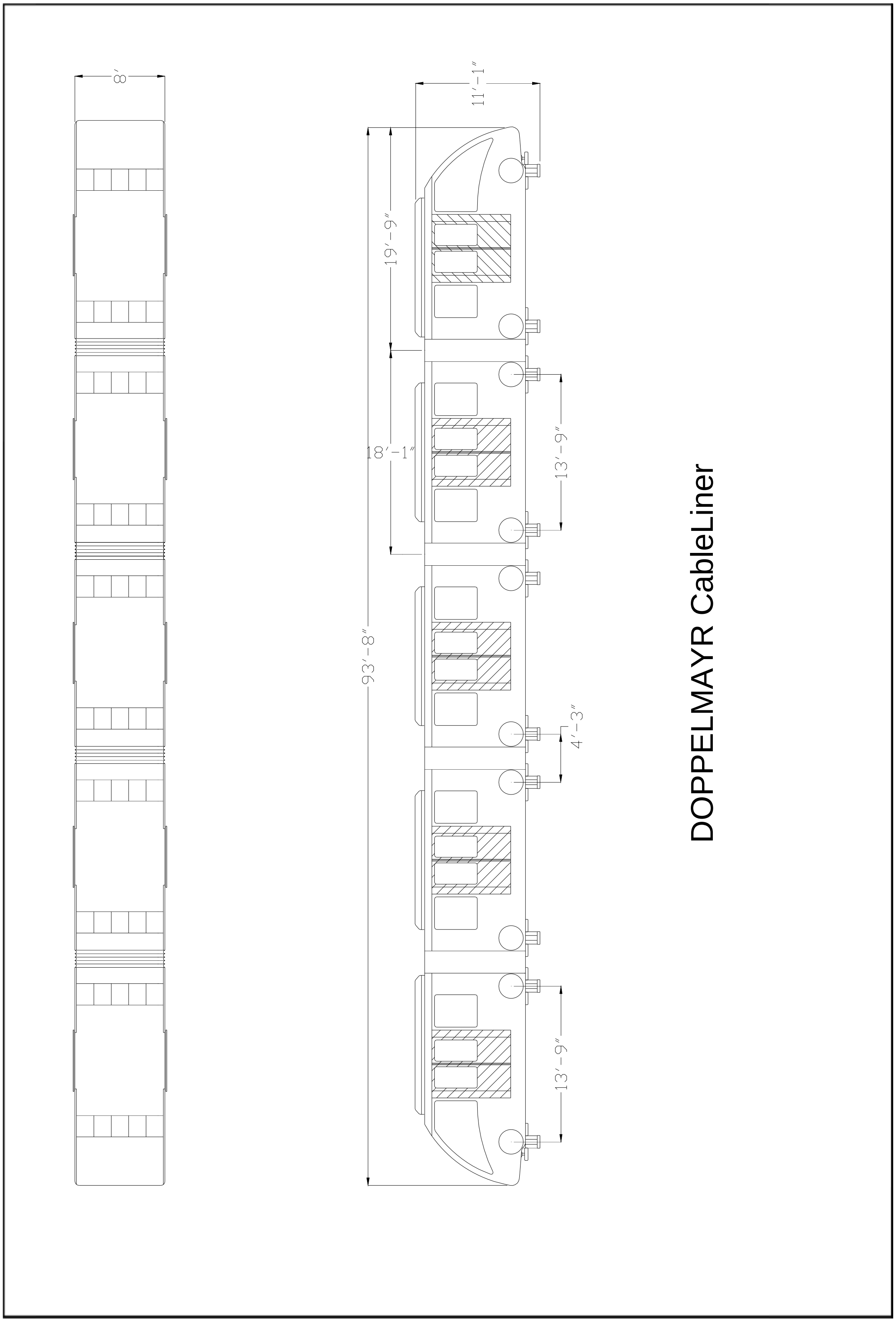
Suspension System: Primary: Rubber tires, shock absorbers and springs
Power Distribution: 600 VAC (drive motor and power rails)
Guidance System: Lateral guidance rubber wheels applying on side guidance rails

Air Conditioning: Yes
Empty Vehicle Weight (AW0): 9,000 lb or 40 034 N (per car)
Design Vehicle Weight (AW1): 14,500 lb or 64 499 N (per car)
Crush Vehicle Weight (AW2)(*): 17,500 lb or 77 844 N (per car)

Maximum Cruise Speed: 28 mph (45.1 Km/hr)
Distance between axles; adjacent cars: 4.3 ft (1.3 m.)
Distance between axles; same car: 13.8 ft (4.2 m.)
Wheel Gauge: 4.0 ft (1.2 m.)

(*) The AW2 load has been calculated using vehicle interior floor area, seating, and shelving based on supplier criteria or scaled from supplier drawing. A unit weight of 107 pounds per square foot (5.13 Kpa) was used for standing passengers. A unit weight of 36 pounds per square foot (1.73 Kpa) was used for all other areas.

Figure 5 – Dimensions for Doppelmayr Cable Liner



1.4 APM SYSTEM PLANNING CRITERIA

Table 1 provides general planning level requirements for APM system that reflect the generic characteristics of the candidate technologies reviewed in previous sections. As noted, these data are preliminary, subject to revision/update after the selection of the APM System Contractor in the future. Also, the space planning guidelines provided herein for the fixed facilities should generally be adequate to accommodate the candidate technologies with again with minor modifications anticipated after a Contractor is selected.

Table 1: General Requirements for APM Systems

ITEM		DESCRIPTION	COMMENTS
1.	Operating Headway (Peak Period)	90 seconds	Operating Headway of the Ultimate System may range between 90 and 180 seconds based on ridership demands.
2.	Design Cruise Speed	31 mph	A cruising speed of 31 mph is expected. An overspeed of at least 1.5 mph should be considered in the designs.
3.	Maximum Train Length	120 feet	An additional 50 feet beyond the normal train stopping location (nose of train) shall be provided at the end Stations to accommodate end-of-line overrun and buffers.
4.	Vehicle Overall Length	41-42.6 feet	Based on generic large APM technology. Smaller car lengths may be possible; however, the number of cars per train is increased.
5.	Vehicle Overall Width	9 – 9.8 feet	Based on generic large APM technology.
6.	Vehicle Overall Height	12 ft. -6 in	Height over running surface
7.	Top of Running Surface to Top of Platform	Approximately 43 in	Varies between technologies
8.	Top of Platform to Top of Guideway Structure Slab	5 ft.	Maximum expected dimension. Can be reduced to approximately 4'-6"based on the selected technology to reduce the dead load from the depth of the running surface.

Table 1: General Requirements for APM Systems

ITEM		DESCRIPTION	COMMENTS
9.	Centerline Guideway to Obstruction	6.25 ft. Centerline of Guideway to edge of guideway + 5 f.t – 0 in from edge of guideway to obstruction	
10.	Tangent length of guideway entering/leaving station	One Car Length	At end-of-line stations, train stopping location shall be such so that the tail end of the arriving train is as close to the end of the platform as possible yet inside the station. The tangent length of guideway beyond the end of platform to the beginning of the switch shall be minimized with due consideration of train vehicle chording into the switch/curves so that the headway of 90 seconds at the end stations can be supported.
11.	Min. Tangent Between Curves	One Car Length	
12.	Min. Curve Radius (Stations)	250 ft	Note that Stations shall be on tangents.
13.	Min. Curve Radius (Mainline)	350 ft. (desirable) 150 ft. (absolute minimum)	A mainline radius has been established in the Alignment programming. No revisions shall be made without further evaluation to determine locations and impacts on train performance/speeds and the area-wide master plan
14.	Max. Grade	4% desirable 6% maximum	Switches shall be 0% grade.
15.	Min. Distance of Platform to Vertical Curve	One Car Length	Note that horizontal and vertical curve combinations should be avoided.
16.	Min. Vertical Curve Length	150 ft.	Note that horizontal and vertical curve combinations should be avoided.
17.	Min. Vertical Tangent Length	One Car Length	Note that horizontal and vertical curve combinations should be avoided.

Table 1: General Requirements for APM Systems

ITEM		DESCRIPTION	COMMENTS
18.	Min. Vertical Clearance	15 ft. – 6 in	3ft. above vehicle. Note that lower clearances may be possible based on type of obstruction. Distance between guideway slab and train running surface is not included in this dimension.
19.	Platform Configuration	Single Center Platform	
20.	Platform Length	Varies	Station Platform Length to be determined by Terminal design teams, and must consider end of platform exit queuing/NFPA. Also, end of line buffer requirements (see Item 3 above) must be considered.
21.	Platform Width	Varies	Station Platform width to be refined by A/E of terminal design team based on passenger circulation requirements, queuing requirements and Code requirements. Switch locations can be impacted by platform circulation requirements/layouts. Headway can also be impacted by the train stopping location.
22.	Centerline Guideway to edge of Platform	5ft.-4in	Final dimension based on technology and clearance/gap requirements between vehicle floor and platform edge. Note that emergency walkway configuration must be considered. Emergency walkway access into the Station must be addressed and coordinated with the respective design team.
23.	Train Configuration	Maximum length 4-car train configuration (in ultimate).	Assuming a maximum 4- car train with each car having 2 doorways per side. A width of 6ft. can be assumed for each doorway for preliminary planning purposes. Exact door locations and sizes are technology dependent.

Table 1: General Requirements for APM Systems

ITEM		DESCRIPTION	COMMENTS
24.	Switch Section of Guideway	Switch turnouts and in crossovers Min. radius 131 ft.	Switches shall not be located on superelevated sections or on vertical curves. Switches may be located only on flat section. Switches are desired to be located on tangent sections that are at 0% grade. The use of "X" switches as double crossovers is technology dependent. Double crossovers or "X" switches are required at end-of-line stations for failure management purposes. The failure management switch shall be as close as possible to the normal switch to minimize line capacity degradation in the event of a normal platform side or normal switch failure.
25.	Max sustained lateral acceleration/deceleration	0.1 g	Superelevation shall be provided as required to maintain the line speed at the curves. Superelevation shall be assumed to occur within the spiral transitions.
26.	Max. sustained vertical acceleration/deceleration	0.05g with respect to 1 g datum	Transition length shall be provided such that the vertical jerk does not exceed 0.04 g/sec

Source: Lea+Elliott, Inc.

1.5 EVALUTION OF ALIGNMENT ALTERNATIVES

The alignment reflects the configuration of the system's guideways in both horizontal and vertical directions. The development of the alignment and location of the stations are based on an iterative process, where the potential location of the station is determined based on its interface and passenger movement with the various airport facilities to be served.

The alignment typically is developed with the overall need to join the stations with tracks that are in compliance with the APM's proprietary criteria. The alignment considers requirements such as; technology specific geometric constraints maximize radii, optimize speed profile to meet system performance and passenger demands, vehicle body roll rates, etc. for applicable candidate APM technologies for the project.

Subsequent modifications to the proposed alignment are likely to be proposed by the APM System Contractor however, it is anticipated that the modifications will be minor in nature. The types of modifications may include minor adjustments to the grade/vertical profiles, curve/spiral geometry, guideway deck or running surface elevation, and super-elevation in curves to better meet the requirements of and to optimize the performance of the selected Operating System.

The following reports and other information provided by TPA provided valuable input in establishing the proposed alignment for the Landside APM system:

- *Conceptual Engineering Report for Existing Terminal Area Transportation Improvements, RS&H, October 14, 2011.*
- *Conceptual Planning for Station and Transit Access, PB Americas, Inc., November 1, 2007*

As described in the following, the alignment for the Landside APM System was developed and evaluated in two separate segments with the Taxiway J Bridge as the midpoint. These segments extend from:

- Taxiway J north to the Main Terminal
- Taxiway J south the South Development Area

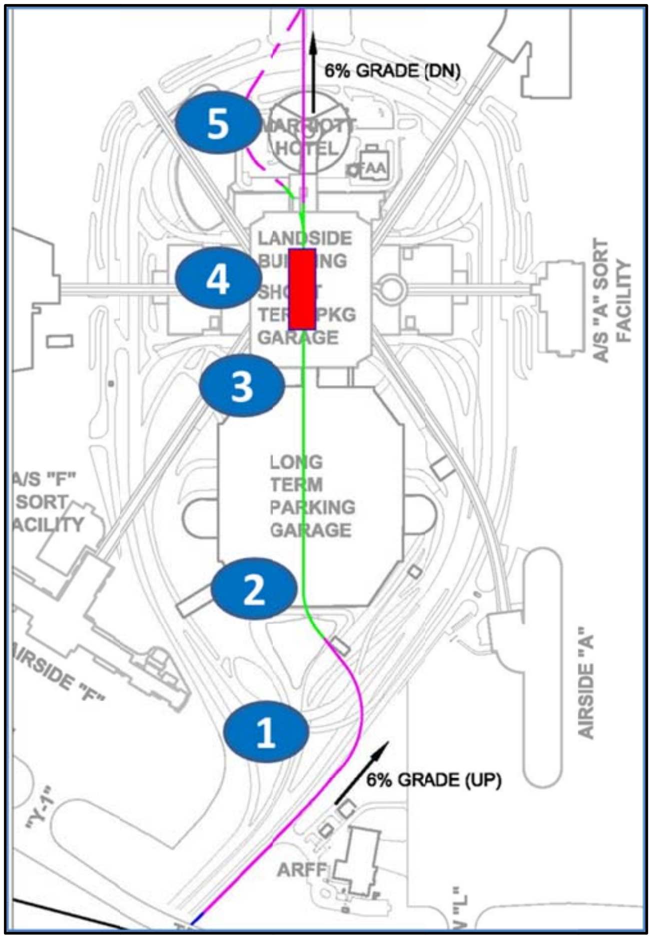
1.5.1 North Alignment - Taxiway J to the Main Terminal

Several alternatives were investigated for the APM alignment in this segment. Among the key considerations was the proximity of the APM station relative to the Main Terminal building and related level of service factors such as walk distance and level changes. In view of these level of service considerations, one option that was considered as illustrated in Figure 6 would have a station at Level 2 of the Short-term Parking Garage above the Main Terminal.

Proceeding north from Taxiway J some of the features of this alignment would be as follows:

1. The guideway would climb from below Taxiway J at 6% grade to clear the vehicle access ramps south of the terminal complex,
2. Then proceed through the opening between the parking garage structures at level 7,
3. The alignment then continues to the Main Terminal building at the second level of the Short-term Parking Garage,
4. The passenger station with supporting columns/structure (see Figure 7) would be over the terminal,
5. A future extension of the guideway to the north would then descend at 6% grade down to the level of existing APM corridor beneath Taxiway A.

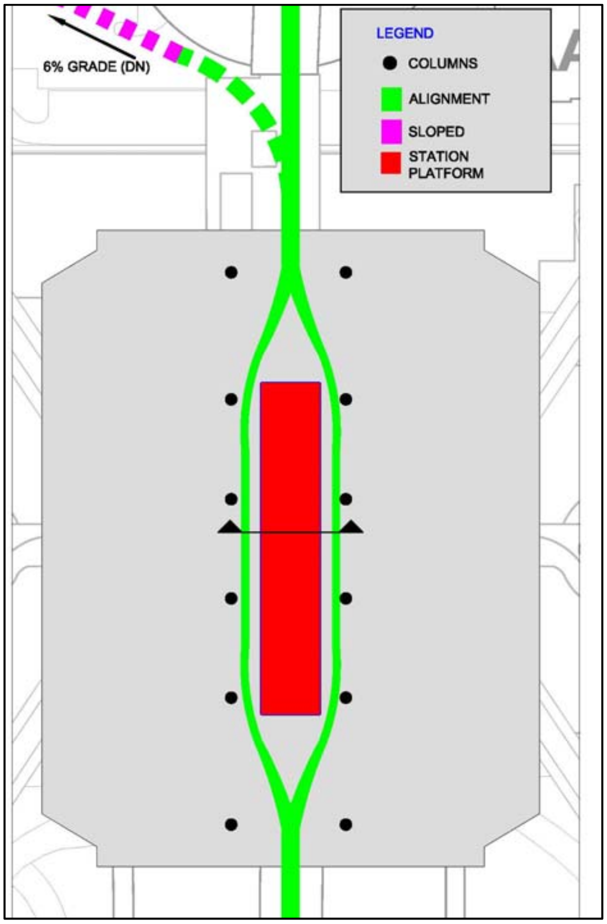
Figure 6 – North Alignment Alternative with Station above the Main Terminal



The evaluation of this alternative revealed the following:

1. The 6% grade up for an extended length is above the preferred maximum used for APM Systems and would impact passenger ride comfort and level of service.
2. To provide for train clearance, slabs at three levels of the garage above the train level in long-term garage would have to be cut thereby disrupting vehicle circulation on these levels of the garage,
3. For train clearance in segment in Short-term garage, 2 of the short-term garage would have to likewise be cut again disrupting vehicle circulation within the garage.
4. As illustrated in Figure 7, six pairs of columns approximately 8 to 10 feet in diameter would have to be constructed through the all levels of parking garage and terminal below presenting construction challenges and significantly impacting existing operations.
5. A future extension to the north would descend at 6% grade which again is above the ideal maximum grade for APM systems.

Figure 7 – Concept Layout for APM Station above the Main Terminal



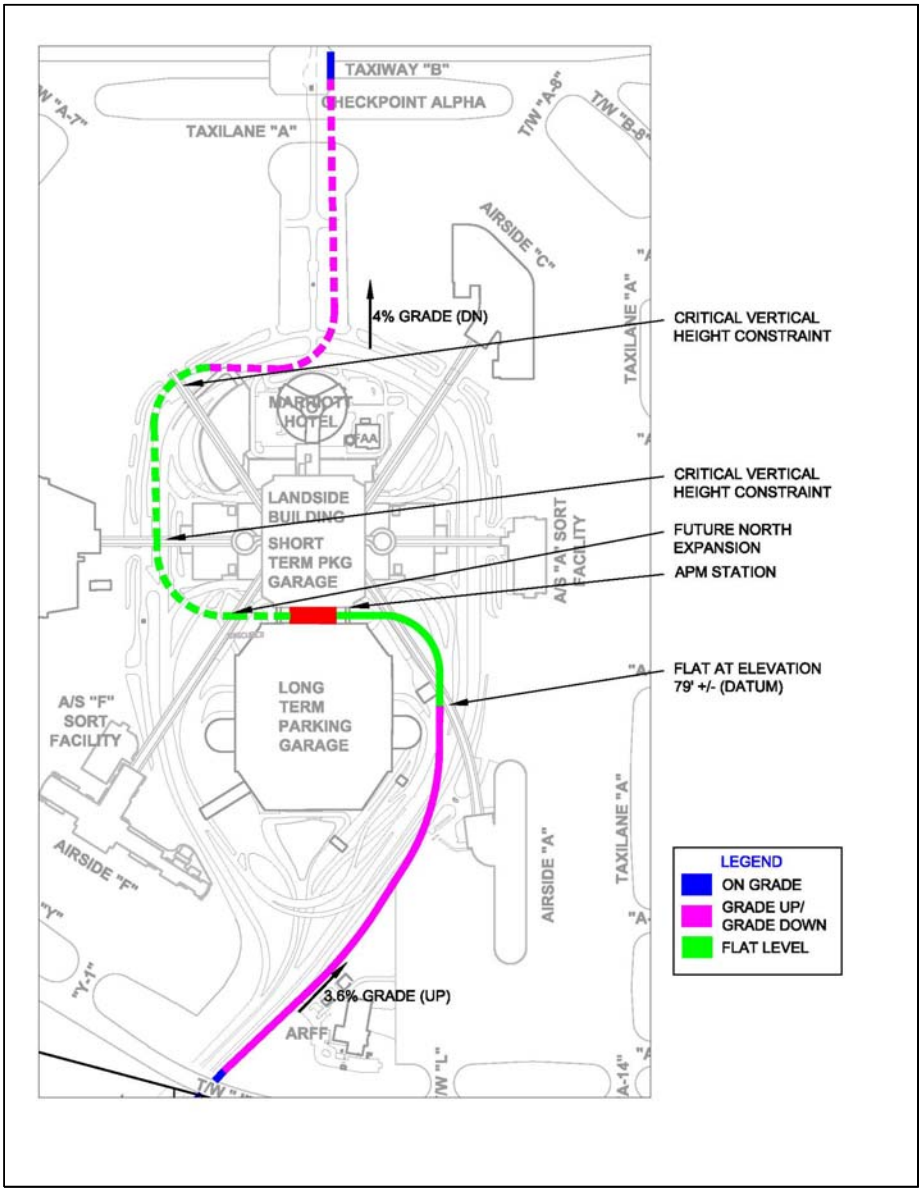
Given the complex construction, steep climb of APM vehicle, and major impact on existing operations the alignment with a station at the top of the terminal was considered to be a viable option.

A second alternative alignment depicted in Figure 8 was explored that would have the station located on the southside of the main terminal. While the grades for this alignment would be more acceptable this option presented several drawbacks such as:

- To make room on the southside for a station the existing monorail connecting the terminal to long-term parking would have to be removed.
- The station would not be centrally located resulting in longer walk distances for passengers going to/from gates on northside of the terminal.
- Construction over the active roadway on the southside would be challenging and disruptive to operations as would a future extension to the north.

Based on these factors, this alternative alignment was also eliminated from further consideration.

Figure 8 – North Alignment Alternative with Station on Southside of Main Terminal

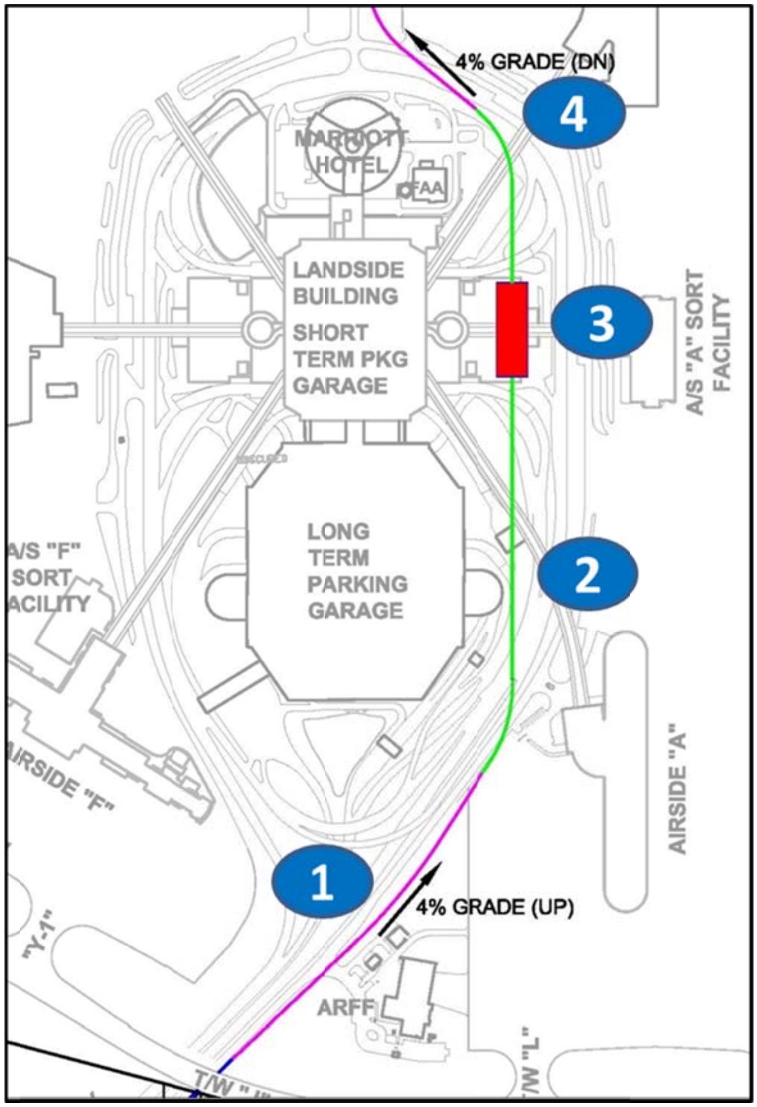


A third alternative that was considered for this segment is shown in Figure 9. Proceeding north from Taxiway J, the characteristics of this alternative are as follows:

1. The guideway would climb at a less steep 4% grade from Taxiway J to reach an elevation necessary to clear the Airside A train,
2. A flat section of guideway at an elevation of approximately 69 feet would then continue over the Airside A Train and into the station.

3. The Station would be located over the existing pedestrian bridge feeding into the Terminal.
4. For the future extension to the north the flat section of guideway would then proceed to clear over the Airside C train and then descend at 4% grade to reach the level of the existing corridor reserved for an APM system beneath Taxiway A.

Figure 9 – North Alignment Alternative with APM Station on Eastside of the Main Terminal



Given that the grade up from Taxiway J would be at a more acceptable 4%, provisions can be made in the terminal program to provide for direct vertical connections to/from the APM station platform and the transfer, baggage and ticketing levels with manageable walking distances, and the potential to extend to the north is preserved lead to the conclusion that this alignment provides the best option for the north segment.

Subsequent refinements were made to the alignment to move the station closer to the terminal building. Also, an enabling project was identified to avoid blocking the vehicle entrance to the

ARFF by the APM alignment. In this case, the ARFF entrance will need to be shifted to the north at point where a vehicle clearance of 16'-6" is achieved in compliance with Florida Department of Transportation's standard clearance requirements.

1.5.2 South Alignment – Taxiway J to the South Development Area

This segment extends from the Taxiway J Bridge south to the South Development area. The critical constraints in this segment include the Runway Protection Zone (RPZ), 40:1 departure surface and Part 77 surfaces associated with Runway 10/28. As such, the planning considerations for this segment included identifying an alignment that would efficiently link the terminal with the South Area, provide the flexibility to serve the planned layout of the South Area, avoid conflicts with the Runway 10/28 protected surfaces and preserve the option for extending the alignment to the South in the future to a possible intermodal center off-airport.

One alternative that was evaluated was an alignment defined in the prior 2007 study for a LRT system referenced above. This option follows George Bean Parkway south, passes under Taxiway J and continues south past the existing Post Office building then turns to the east to a station between the Economy Parking Garage and the planned CONRAC. This alignment alternative was eliminated from further consideration as it provides limited flexibility to serve the proposed layout of the South Development area and it does not allow for a future extension to the South.

A second alignment displayed in Figure 10 was then developed that followed the general alignment of the airport service road in its approach from the Taxiway J to the South Development area. The alignment passes under Taxiway J, follows the configuration of the airport service road through the RPZ, then turns to the east just after the RPZ; then continues east and ramps up before turning south. This alignment is compatible with the existing airspace limitations for Runway 10/28 and is able to clear over the parking garage exit road from the Economy Parking garage before continuing south to stations at Economy Parking and the CONRAC. This alignment also preserves the option to extend the alignment further to the south past the CONRAC Station in the future. Per recent guidance, the section through the RPZ will subject to review by the FAA.

A third alignment shown in Figure 11 was also evaluated. The major feature of this option is that is follows a more direct path from Taxiway J to the South Development area. While this option would reduce the length of the guideway and travel times, the Runway 10 RPZ and Runway 28 departure surface would have to be displaced to the east 1,905' and 1,460' respectively to mitigate any airspace conflicts. As HCAA preferred not to modify the length Runway 10/28 this option was not considered further.

Going forward then, the preferred option was to employ the alignment depicted in Figure 10 subject to refinement as it assumed no changes to Runway 10/28.

Figure 10 – South Alignment Alternative
With <u>Existing</u> RPZ and Departure Surface for Runway 10/28

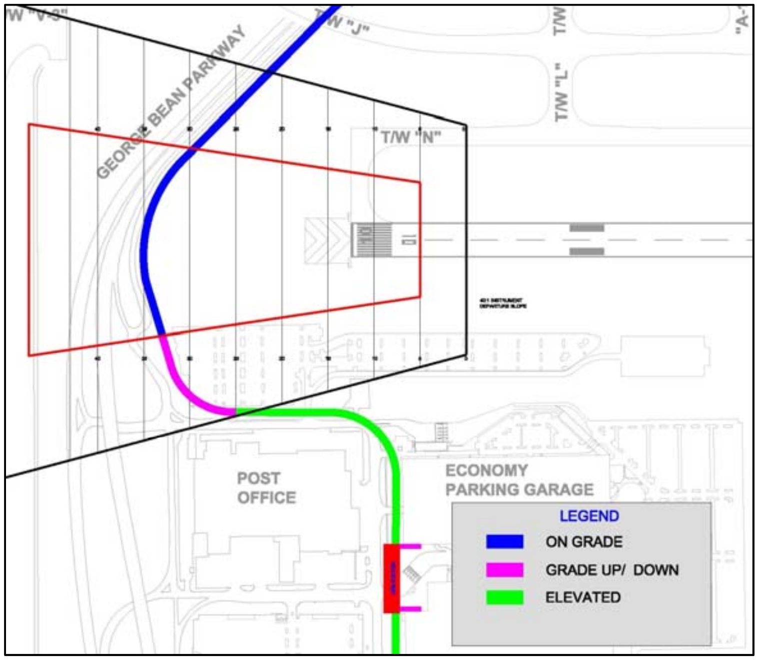
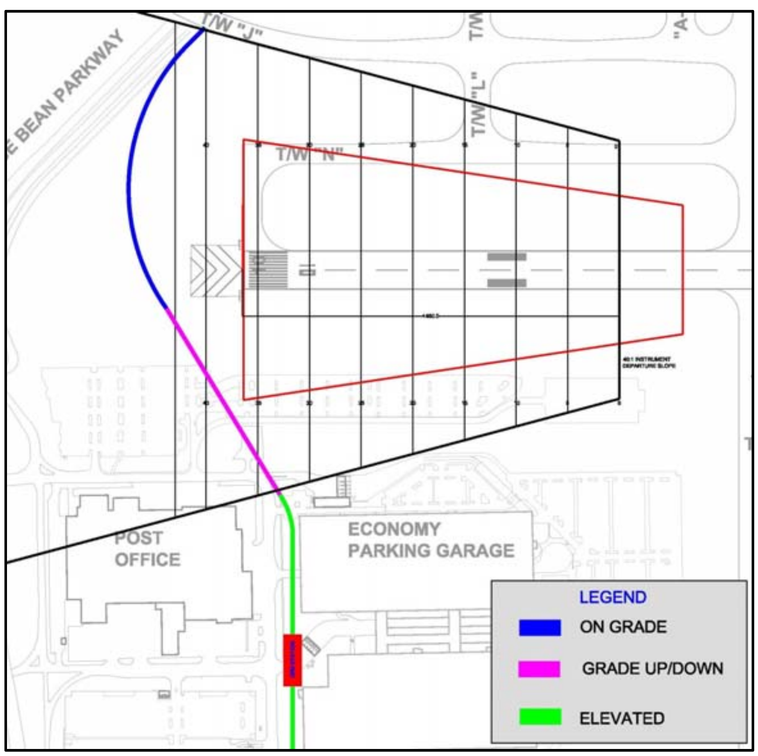


Figure 11 – South Alignment Alternative
With <u>Modified</u> RPZ and Departure Surface for Runway 10/28



1.6 PASSENGER STATION FEATURES AND LOCATIONS

Passenger station locations and designs must provide for the efficient and convenient movement of passengers between the APM vehicle and the passenger air or rail terminal.

Factors in developing concept locations for passenger stations include:

- the functions to be accommodated and potential layout and dimensions of the station facilities,
- passenger level of service,
- compatibility with existing or planned roadways and facilities, and

The functional spaces within APM stations typically include boarding/deboarding platforms, vertical cores for circulation and system equipment rooms. Features of each are as follow:

a) Station platforms provide for passenger deboarding/boarding, circulation and queuing at platform doors and are typically sized per the following criteria:
   - projected peak passenger demands,
   - space per passenger (including allowances for bags and bag carts),
   - accessibility and associated life safety requirements,
   - dimensional requirements of candidate APM technologies,
   - projected maximum length trains,
   - storage for bag carts (if applicable)

b) Vertical circulation elements include escalators, elevators and stairs and requirements are typically determined based on:
   - capacity to facilitate life-safety platform passenger clearing and exiting requirements,
   - level of service provided to deboarding passengers in terms of wait time for both escalators and elevators,
   - locations that do not conflict with passenger horizontal circulation and queuing areas on the platforms

c) Equipment rooms are required in each station to house Automated Train Control (ATC) equipment, interface equipment for station doors, dynamic graphic, station CCTV, and public address systems and Uninterruptible Power Supply (UPS) equipment. If feasible, a station equipment room is typically located in close proximity to the guideway.

Three passenger stations are anticipated for the initial phase of the APM System at the following locations:

- Eastside of the Terminal Building

- Adjacent to the existing Remote Economy Parking Garage

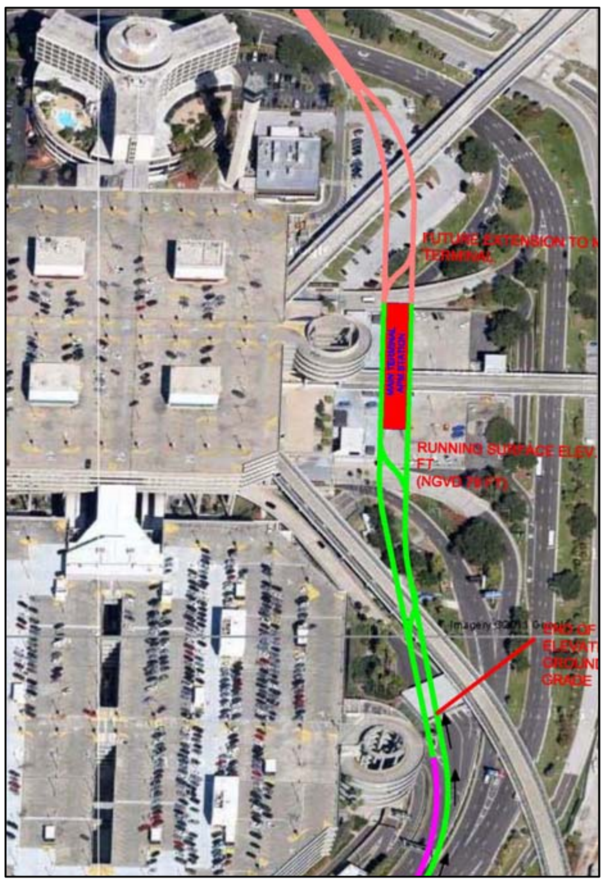
- Adjacent to planned CONRAC that would serve both the CONRAC and a potential future Intermodal Transfer Facility.

The proposed location of each station is described in the following.

1.6.1 APM Station at Main Terminal

As described in the alignment section, the location of the Main Terminal APM Station was strategically chosen to facilitate passenger access to the different levels of the main terminal building. As such, the terminal program provides for vertical circulation (elevators/escalators) that will enable Boarding/disembarking passengers will be able to go directly to/from the station platform and the transfer, ticketing or baggage claim level.

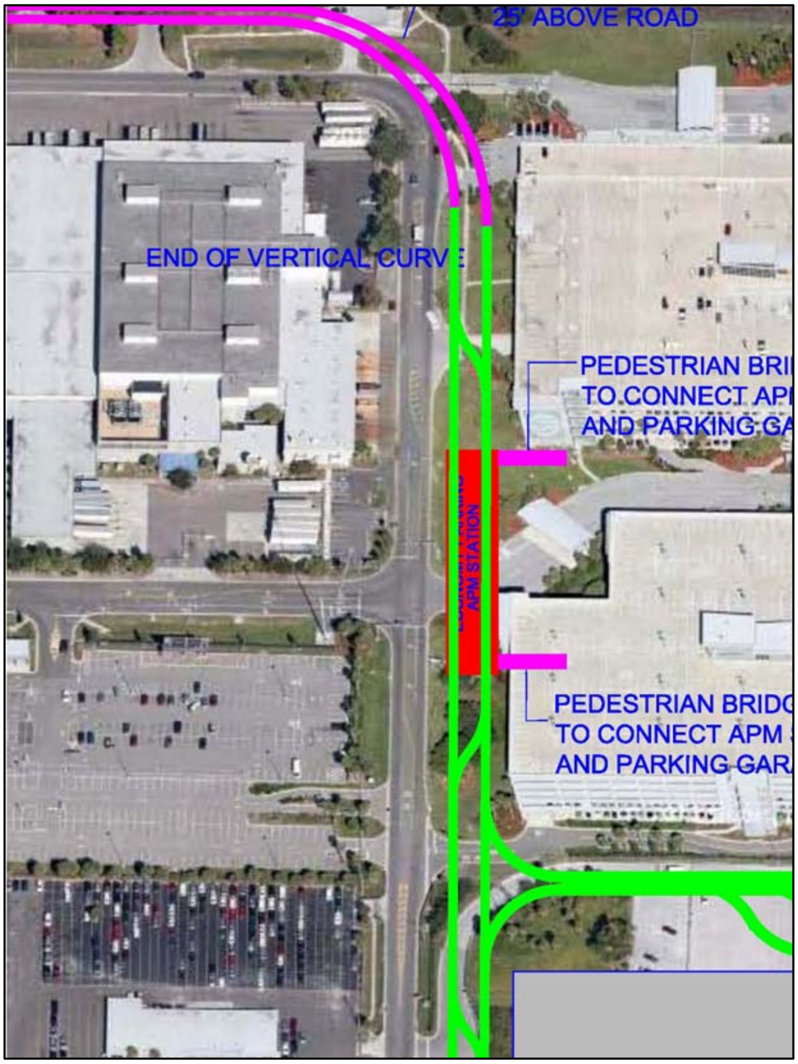
Figure 12 - Main Terminal APM Station



1.6.2 APM Station at Economy Parking Garage

The first stop of the APM coming from the Main Terminal will be at the Economy Parking Garage; a station which services the parking garage will eliminate the need for shuttle buses and free up traffic around the terminal.

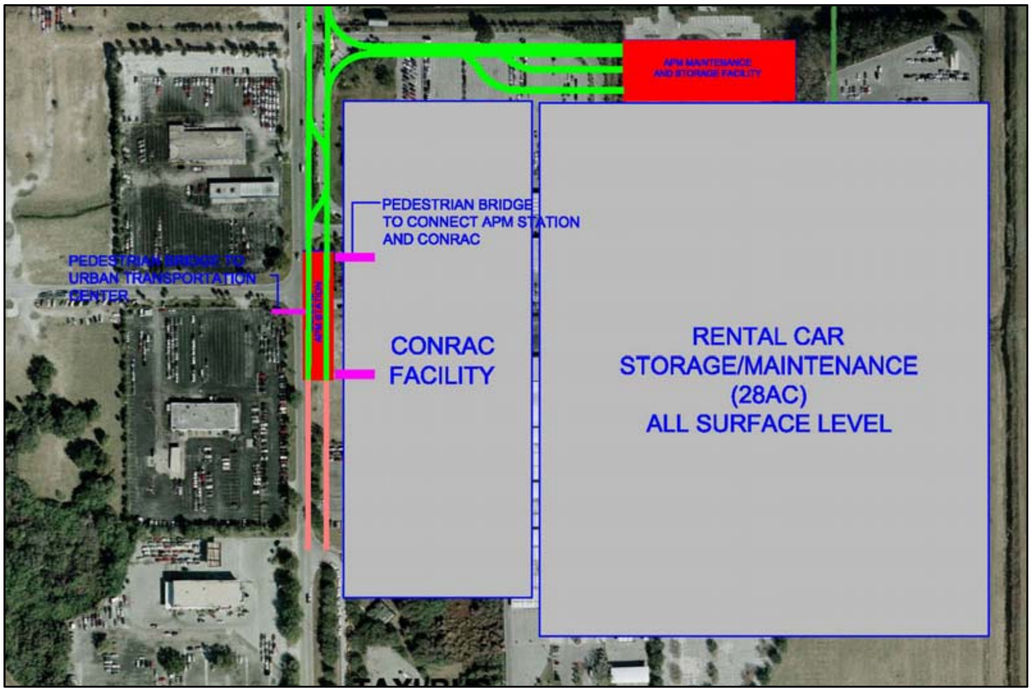
Figure 13 - Economy Parking APM Station



1.6.3 <u>CONRAC APM Station</u>

The final station on the initial system is the CONRAC APM Station. To preserve the option to extend this station cannot be made as an end of line station. To accommodate passenger movements between the station and the COPNRAC, the current station plan provide a mezzanine level above the station platform that connects over the APM guideway to the CONRAC facility.

Figure 14 - CONRAC APM Station



1.7 APM MAINTENANCE AND STORAGE FACILITY (MSF)

The MSF houses the operation and maintenance related functional spaces required for the APM System. These include the Central Control Room (CCR), administrative offices, spare parts and consumable storage, and space for regular maintenance, inspection, service, testing and repairs, replacement of parts for the system vehicles and other system equipment.

The following functional areas are required within a maintenance facility:

- Central Control Facility
  - Central Control Console Room
  - Central Control Equipment Room
  - UPS room (including batteries).
- On-line Maintenance Platforms
- Machine/Mechanical/Pneumatic Shop
- Electrical/Electronic Shop
- Spare Parts Storage (including expendable parts, tools, other flammable material storage)
- Receiving and Loading Area
- Administrative Spaces and other Offices
- Personnel Support (restrooms, lockers, showers, break, training)

Additionally a Power Distribution Substation is also required and is typically located near the midpoint of the alignment. In some APM System the PDS Substation is collocated with the MSF if the location is near the midpoint of the system.

1.7.1 Types of Maintenance Facility

The space constraints and operational need of the system dictates whether an APM system can be served with an On-line Maintenance Facility or an Off-line Maintenance Facility.

On-line Maintenance Facility is typically at the end-of-line station. These are suitable for shuttle systems or systems with smaller fleets. In this acse, the maintenance facility is located a level below the end station where an APM vehicle parked at its station platform berth can be maintained during the off-peak or night period. The following are the advantages and disadvantages of the on-line maintenance facility.

- It is typically more economical.
- It is most suitable for shuttle operations where a track and related station platform is dedicated to an APM train.
- It may also be feasible for a three-train system, where blocking one station platform and track lane is acceptable in the off-hours or night-hours for a minimum of 4 to 6-hour duration.
- The on-line maintenance can only support light maintenance. Heavy maintenance is supported by removal of the large and long-lead items away from the maintenance facility.

Off-line Maintenance Facility is used for systems with larger fleet where the APM trains can be maintained and serviced at the off-line facility, thus not impacting the mainline. The following are the advantages and disadvantages of the off-line maintenance facility.

- The offline maintenance lanes are completely separated from the mainline.
- Some of the maintenance lanes can be designed for light maintenance and others can be programmed for heavy maintenance which results in a more efficient maintenance operation.
- This type of facility is well suited for pinch loop systems with have multiple trains in operation.
- Can support systems with larger fleets and passnsger demand antipcated at TPatype APM system or airports with large passenger demands.
- Supports future fleet addition and expansion of the APM System.

Due to the pinch loop nature of the project and the probability of need to preserve for expansion of the APM guideway and fleet APM fleet in the future, an off-line maintenance facility is recommended for the Tampa Landside APM System.

1.7.2 MSF Location

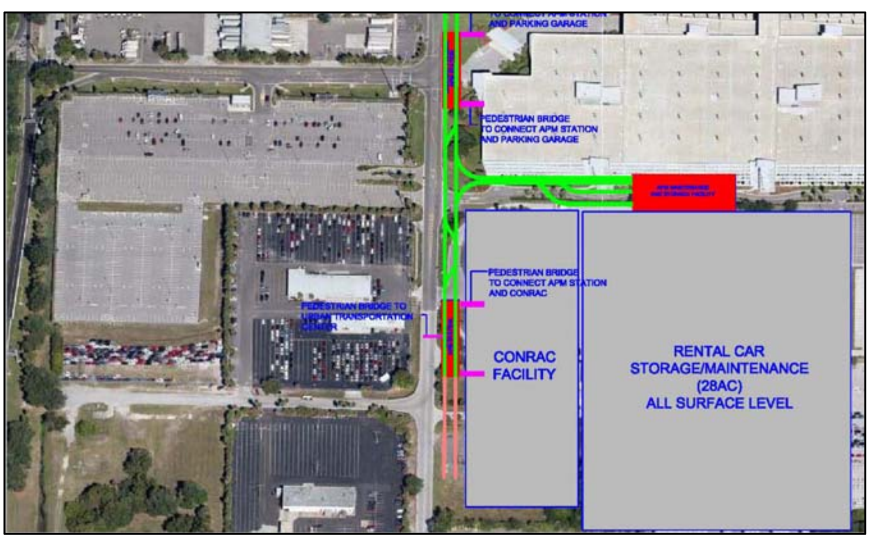
The following factors were considered in reviewing potential sites of a sufficient size to accommodate an MCF with the functions above:

- Compatibility with existing and planned facilities,
- Minimize disruption and interference with existing AirTrain operations,
- Constructability and phasing
- Accessibility
  - Personnel
  - Deliveries
  - Injection and removal of vehicles from System
- Operational flexibility
- Movement of vehicles to/from system
- Maintenance logistics

Based on these factors, the ideal location for an MSF to be at the midpoint of the alignment; however, because of geometric or right-of-way constraints such a location is not always available.

Several alternate locations for the MSF that were evaluated. One option considered would be an at-grade MSF at the site of current Post Office building. However, based on the land use plan for the South Development area this site was not available. The second candidate site considered is an elevated facility between the Economy Parking Garage and the future CONRAC building.

Figure 15: Maintenance Facility Location



This candidate site satisfies the location criteria noted above for the MSF and is included the overall plan for the Tampa Landside APM System accordingly.

2.0 APM OPERATIONS

2.1 APM OPERATIONS BACKGROUND

Having defined the general layout of the APM system this section reviews operations analyses that were conducted based for the planned system.

The APM operations analysis consists of a number of investigations and analyses. These tend to be sequential in nature and the results form the basis to establish train length, fleet size and space for needed for MSF. The investigations and analyses include:

- Ridership estimation
- Technology applicability, and
- Train performance (travel time)

2.2 APM RIDERSHIP PROJECTIONS

The projected ridership determines the APM fleet size, operating configuration (shuttle vs. pinched loop), and APM fleet composition (cars per train). These, in turn, determine station platform length and the maintenance facility size.

The peak hour passenger peak direction ridership estimates in the table below were developed by Lea+Elliott based on input data provided by other members of the Master Plan Team.

Table 2
Peak Hour Peak Direction APM System Ridership Estimate

Year	Rental car (1)	Economy parking(2)	Other(3)	Total
2016	1,770	280	160	1,720
2021	1,980	340	180	2,270
2026	2,215	380	200	2,540
2031	2,500	420	225	2,835

Notes and Sources:
1. Transystems
2. Multimodal Transportation Analysis
3. Transit and other modes at 5% share of air passengers

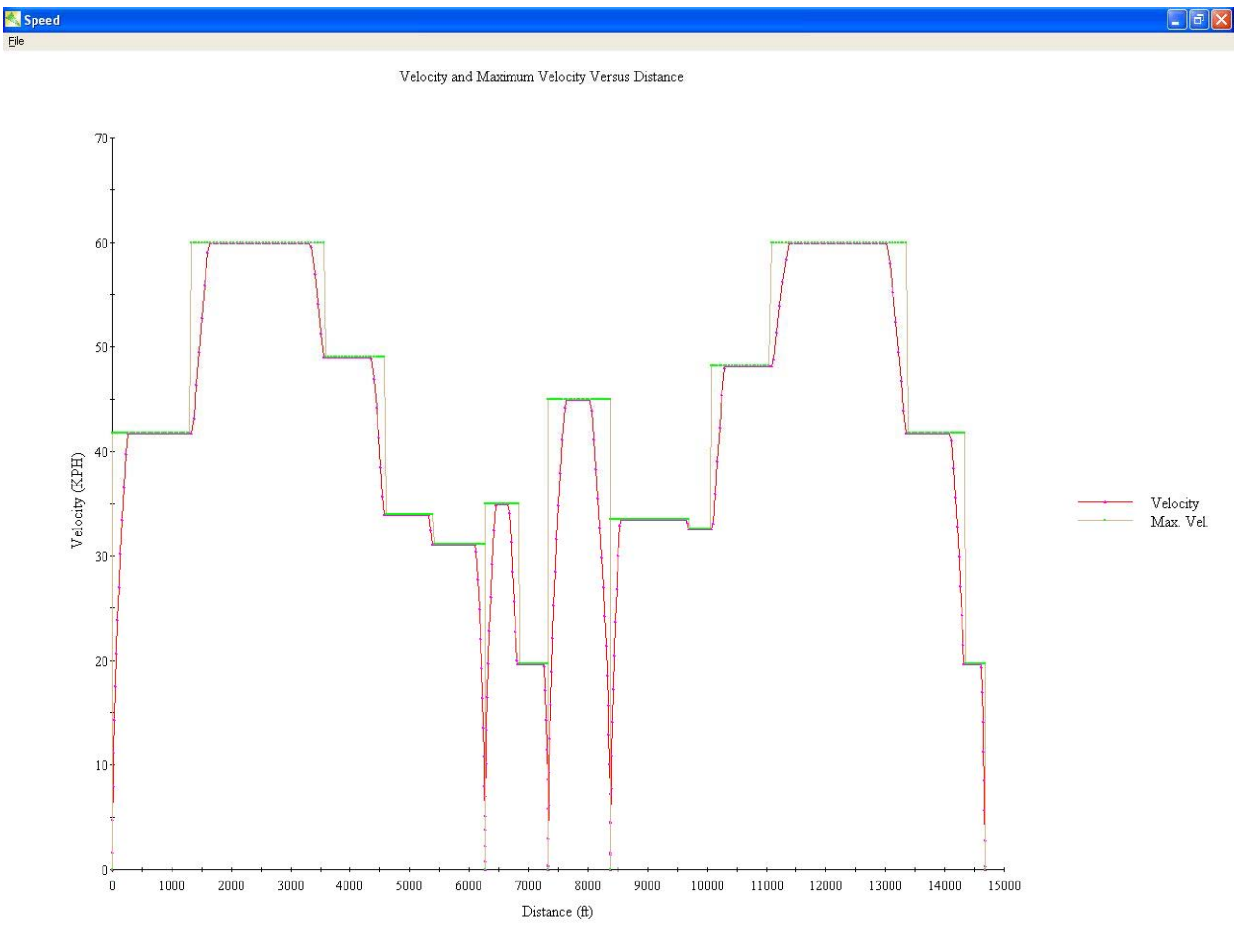
2.3 APM OPERATIONS ANALYSIS

The APM operations analysis combines the alignment, ridership and technology capabilities to determine the appropriate fleet size and operations.

2.3.1 APM Train Round Trip Time

The preferred alignment geometry was input into Lea+Elliott's proprietary Train Performance Simulator (TPSim). A generic three-car APM train is simulated over the alignment with 35-second dwells at each station. Graphical output showing train speed against distance is generated from TPSim. These outputs are presented in Figure 16 below. The round trip time is 9.2 minutes.

Figure 16
Train Round Trip Performance



2.3.2 APM Fleet Requirements

The key output from the Train Performance Simulator is the APM train's round trip time. This output is the foundation of the subsequent APM operations analysis.

Round trip time is converted into the number of round trips per hour. The number of round trips is then multiplied by the number of trains operating during the peak period (3) and by the number of cars per APM train (3 car per train) and the passenger/car capacity (50 passengers per car), to determine the peak hour operating capacity as measured in passengers per hour per direction (pphpd). Capacity is calibrated to exceed the surged peak hour demand determined in Section 2.2 of the Report.

The results of the operations analysis are summarized in Table 3 below. The key outputs of this analysis is the system Headway (train frequency), the Cars per Train and the Total Fleet. Cars per Train determine the length of the APM trains and therefore the station length. Total fleet is used in estimating the system capital costs (see Section 3.0).

Table 3
Operations Analysis

Alignment	Round Trip Time (min)	No. of Trains	Head-way (min.)	Cars per Train	Operating Capacity (pphpd)	Initial System Demand (pphpd)	Total Fleet (cars)
Main Terminal To CONRAC	9.2	3	2.94	3	2,935	2,500	12

The results indicate that an operation consisting of 3 three car trains will provide sufficient capacity to accommodate the initial level of demand project for the system. A spare three car train is also recommended provide backup and facilitate maintenance rotations bringing the initial recommended fleet to 12 cars. To preserve options for future growth it is recommended however that the stations and MSF be sized to accommodate 4 car length trains.

3.0 OVERVIEW OF SYSTEM PLAN

As noted previously, an APM system is comprised of two major elements, the Operating System and Fixed Facilities, which are integrated into a fully functional total system. The Operating System consists of vehicles, running surface/track, guideway equipment, propulsion power, automatic train control and communications subsystems, station and wayside equipment, maintenance equipment and other elements. Fixed Facilities include guideway infrastructure, stations, equipment rooms and buildings for the Maintenance and Storage Facility (M&SF) including the Command and Control Center (CCC), propulsion power substations and other facilities upon which Operating System elements are installed by the APM system supplier. Based on the forgoing, proposed APM System plan is presented in the Figure x. The features of the plan include:

- Three passenger station (Main Terminal, Economy Parking and CONRAC),
- Guideway that provides a dedicated right-of-way for the movement of driverless APM vehicles between the Terminal and the planned South Development,
- An off-line Maintenance and Storage Facility (M&SF),
- Provisions for future extensions to the north and south.

Based on the findings presented in the foregoing sections of the report, the following provides a brief overview of the major features of the Fixed Facility and Operating System elements of the Landside APM System proposed for 2012 Master Plan Update depicted in Figure

3.1 GUIDEWAY

It is anticipated that the guideway shall be designed in a manner that provides the clearance envelope and structural load capacity needed to accommodate the selected APM vehicle technology and related guideway equipment.

The general characteristic of the guideway are assumed to be as follows:

- Guideway structure recommended to have a 50 year design service life.
- Guideway is estimated to be approximately 8,300 feet long and breaks down approximately as follows:
    - Guideway North of Taxiway J Bridge
        a. On- embankment: 700 lf
        b. Elevated: 2,100 lf
    - Guideway South of Taxiway J Bridge
        a. On-grade: 2,000 lf
        b. On embankment: 800 lf

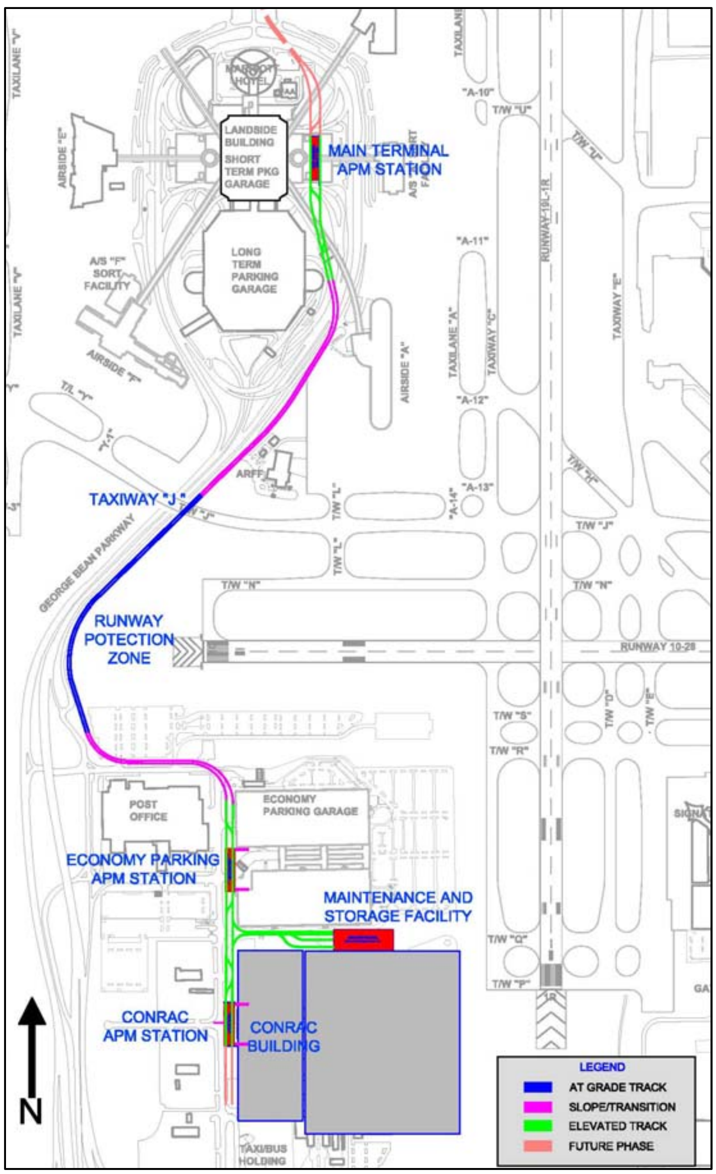
c. Elevated: 2,100 lf

- Guideway into MSF

a. Elevated: 600 lf

- Guideway deck would nominally be 32 feet wide along most if its length and widen to 50 feet approximately 200 feet before and after stations.
- In the elevated sections the support columns would nominally be spaced at 90 feet but longer spans anticipated in some sections.

Figure 17 – Landside APM System Plan



3.2 PASSENGER STATIONS

Three passenger stations are anticipated for the initial phase of the APM System at the following locations:

- Eastside of the Terminal Building
- Adjacent to the existing Remote Economy Parking Garage
- Adjacent to planned CONRAC that would serve both the CONRAC and a potential future Intermodal Transfer Facility.

Features common to each station would be as follows:

- Designed to accommodate a maximum train length of 160 feet (or 4 typical APM cars).
- Two levels including a platform level for passenger boarding/deboarding and mezzanine level above or below the platform for passenger circulation and pedestrian connections to the adjacent facility.
- Vertical circulation cores at each end of the platform that would include a pair of escalators, stairways, and elevators.
- Associated mechanical and electrical rooms, including a dedicated room for APM related equipment.

The platform area at the Main Terminal station is anticipated to be approximately 45 feet by 350 feet and the platforms at the other stations would be about 40 feet by 200 feet. At this stage of planning, it is anticipated that the mezzanine level at the Main and Economy Parking Stations would be below the platform while the mezzanine at the CONRAC Station would be above the platform level.

3.3 POWER DISTRIBUTION SUBSTATIONS

It is anticipated that one and perhaps two Power Distribution Substations (PDS) will be required to house transformers, primary and secondary switchgear, DC rectifiers, and other related equipment that will be installed by the APM supplier for vehicle propulsion power for the system. If only a single PDS is required, it would ideally be located near the midpoint of the guideway. The building for a PDS would be about 100 feet by 50 feet with 13 feet of overhead clearance and would require road access, grounding, ventilation, house power, and connections to primary service.

3.4 MAINTENANCE AND STORAGE FACILTIY (MSF)

As depicted in Figure 1, it is anticipated that an off-line M&SF for the APM system would be located between the Remote Economy Garage and the planned CONRAC.

Preliminary estimates of the MSF area requirements are:

- Initial Phase (3 lanes plus switch yard) – a total of about 27,000 square feet of closed building. The closed building would include the MSF guideway lanes, offices and the Central Control Room. The guideway "switch yard" would not be enclosed and would require approximately 7,500 sq. feet.

- Full-build-out MSF (total of 5 lanes plus switch yard) – a total of about 45,000 square feet of closed building. The closed building would include the M&SF guideway lanes, offices and the Central Control Room. The guideway "switch yard" would not be enclosed and would require a total of approximately 13,000 sq. feet.

Given the planned expansion of the system in the future it is recommended that the full-build out of the M&SF be considered at this time.

3.5 APM OPERATING SYSTEM

Elements of the APM operating systems are identified in more detail in Section 4.1 but generally include:

- Automatic Train Control (ATC)
- Vehicles
- Communication Systems
- Supervisory Control and Data Acquisition (SCADA) System
- Traction Power Distribution System
- Guideway equipment

It is assumed that the APM system would be comprised of either self-propelled or cable-propelled vehicles and with an initial line capacity to accommodate approximately 2,500 passengers per hour per direction (pphpd). It is estimated that an initial fleet of three 120 foot trains (or three typical APM cars per train) with one spare train would provide sufficient to capacity to accommodate the initial projected line capacity requirement.

3.6 SUSTAINABILITY CONSIDERATIONS

The incorporation of sustainability into the design of a new APM system has increased in importance for many airports. While sustainability practices typically focus on facility design, similar practices can be incorporated into the system (equipment) elements of an APM project. Specific areas of the APM system (and facilities) in which sustainability should be incorporated into the schematic design include:

- Facility Site Selection and Building Orientation
- Low Emission/Fuel Efficient Maintenance Vehicle
- Stormwater Management
- Light Pollution Reduction

- Water Efficiency Considerations
- Energy Efficiency Considerations
    - Load Profile Optimization
    - Regenerative Power
    - Green Power
    - On-site Renewable Energy
- System Commissioning
- Materials and Resource
    - Regional Materials
    - Construction Waste Management
    - Recycled Content
    - Rapidly Renewable Materials
- Environmental Quality
    - Ventilation
    - Low Emitting Materials
    - Construction Indoor Air Quality
    - Chemical and Pollutant Source Control
    - Controllability of Systems
        - Thermal
        - Lighting

It is critical that the relationship required by LEED or BREEAM (design, construction and commissioning to share the overall goals that result in long term sustainability) can be enforced or put in procurement documents. The biggest issue appears to be project delivery timeline where the subsequent parties (stakeholder in the process) are not at the table. It is recommended having the designer, contractor and end users to work together from the start of the project to reap the most benefits. However, some of the procurement processes force a separation between the entities for a considerable period of time.

The challenge is to establish sustainability certification goals to meet the Owner's rules and regulations. This requires the establishment at planning/procurement stage a feasible sustainability target.

4.0 APM SYSTEM CAPITAL AND O&M COSTS

As noted in the introduction, APM systems comprise two major elements, the Operating System and Fixed Facilities, which are integrated into a fully functional total system. This section presents the cost estimates for the APM Operating System only. Costs estimates for the Fixed Facilities were prepared by the other members of the Master Plan and are presented elsewhere.

It is anticipated that implementation of APM Systems will occur in two distinct phases with Phase 1 involving the design and construction of the fixed facilities and the APM operating system and Phase 2 includes the Operations and Maintenance (O&M) of the APM Operating System. As such, the estimates for the Phase 1 capital costs and Phase 2 O&M costs are presented herein accordingly.

4.1 APM OPERARTING SYSTEM CAPITAL COST ESTIMATE

APM Operating Systems are proprietary designs that must be procured as complete packages. The major subsystems (e.g., vehicles, tracks, switches, control systems, station equipment, etc.) from different suppliers cannot be mixed to form a system. Therefore, the Operating System must be procured under a turnkey design, supply and installation contract. The Operating System of an APM application is specially configured using supplier developed equipment designs that are applied to satisfy site-specific requirements. As a result, costs within the APM industry vary widely on a project by project basis as APM suppliers implement their unique proprietary technology for a particular system. Costs for different projects by the same supplier may also vary significantly because of differences in fleet size, capacity requirements, and so forth. Thus, estimating and comparing the cost of a proposed APM system, or even an extension of an existing system against “standard industry costs” is difficult because repeatable and consistent costs within the industry are quite elusive. Given the cost characteristic of historical projects, for cost estimating purposes Lea+Elliott has developed a model that can be programmed to create a theoretical composite APM system most like the APM system planned for the subject project. The cost model considers prices from an extensive database and averages only the costs of APM systems with similar characteristics to the system being estimated.

Inputs to the model include the projected features of the system described in Section 3.0 including guideway length, configuration and number of passenger stations, size of the MSF, number of propulsion power substations and fleet size.

Based on these inputs, the output of the cost model provides estimated costs for a number of discreet elements of the APM operating system including the following:

1. APM vehicles;

2. Guideway surfaces, guidance devices, wayside propulsion equipment (if required), walkways, railings and related equipment;
3. Station equipment, including automatic platform barrier doors, emergency egress doors, closed circuit television cameras, emergency telephones and dynamic signage;
4. Maintenance facilities, including work bays, shops, storage areas, locker rooms and administrative offices, costs for room finish-out and HVAC, furnishings, machines, tools, work area power distribution (stingers) and car washing and cleaning equipment;
5. Central control facility, including computers and display monitors, costs for finish-out, raised floor systems, ergonomic lighting and soundproofing;
6. Power distribution system, including substations, power cables, guideway power contact rails, related SCADA controls and cabling, power monitoring systems and emergency power shutoff (blue light) stations;
7. Backup power, including a large diesel generator and uninterruptible power supply (UPS) systems for all essential control equipment;
8. Control systems, including automatic train control, station controls, communications, public address systems, closed-circuit television monitoring, internal telephone systems and related cabling and signal transmission equipment;
9. A 12-month supply of expendable and spare parts, lubricants, cleaning equipment and supplies, and other consumables; and,
10. Other system facilities and equipment, such as test equipment and instrumentation, passenger emergency/evacuation supplies and equipment, specialized fire suppression systems, and any special security provisions.

Each of these elements are grouped into a series of subsystem categories and the estimated cost for each category are summarized in Table 4 in current dollars.

In addition, note that markups are included for project design and management by the APM System Contractor. Finally, due to the early stage project development and the variability of costs among various APM system projects a contingency factor is applied as well. Since markups are also applied to the APM system costs in the overall project estimate presented elsewhere for project management and contingency, the project management and contingency factors in the system cost estimate presented herein limited to 10% and 5% respectively.

The estimated cost for the Operating System is $145,903 for the project wide contingency factors are applied. Total estimated cost for the APM Operating System with the project wide contingency factors applied is presented elsewhere in the Master Plan documents.

Table 4 – APM Operating System Cost Estimate

ID #	CATERGORY OR SUBSYSTEM	COST
1.1	GUIDEWAY FACILITIES	$ 4,768,528
1.2	STATION FACILITIES	$ 1,653,270
1.3	MAINTENANCE AND STORAGE FACILITY	$ 14,025,425
1.4	POWER DISTRIBUTION SYSTEM SUBSYSTEM FACILITIES	$ 507,398
1.5	COMMAND, CONTROL, AND COMMUNICATIONS FACILITIES	$ -
1.6	FIXED FACILITY VERIFICATION AND ACCEPTANCE	$ -
1.7	INFRASTRUCTURE AND SITE WORK	$ -
1.8	APM EQUIPMENT ROOMS AND UPS/BATTERY SPACES	$ -
1.9	FACILITIES CONTRACTOR'S PROJECT MANAGEMENT AND ADMINISTRATION - 21%	$ 4,190,924
2.1	GUIDEWAY EQUIPMENT	$ 17,468,493
2.2	STATION EQUIPMENT	$ 6,831,729
2.3	MAINTENANCE AND STORAGE FACILITY EQUIPMENT	$ 6,040,821
2.4	POWER DISTRIBUTION SYSTEM EQUIPMENT	$ 11,519,068
2.5	AUTOMATIC TRAIN CONTROL EQUIPMENT	$ 12,788,058
2.6	COMMUNICATIONS EQUIPMENT	$ 5,119,716
2.7	CARS	$ 33,649,618
2.8	OTHER OPERATING SYSTEM EQUIPMENT OR FACILITIES	$ 3,605,992
2.9	OPERATING SYSTEM VERIFICATION AND ACCEPTANCE	$ 1,940,470
2.10	OPERATING SYSTEM CONTRACTOR'S PROJECT MANAGEMENT AND ADMINISTRATION - 15%	$ 14,844,595
FACILITIES TOTAL		$ 25,145,545
SYSTEM TOTAL		$ 113,808,560
GRAND TOTAL		**$ 138,955,000**
CONTINGENCY FACTOR - 5% (1)		$ 6,947,750
TOTAL (IN CURRENT YEAR DOOLARS)		**$ 145,903,000**

1. Assumes project wide contingency factors and markup to be applied separately
Estimate Prepared by Lea+Elliott

4.2 O&M COST ESTIMATE

This section presents the estimated annual operation and maintenance (O&M) costs for the operating system. Similar to the model for the capital cost estimate, the O&M cost estimate is likewise based on actual costs incurred on systems of similar scope and scale of operations. O&M costs are directly related to the type of operations, the number of trains that are put in service and the service schedule. For the purposes of the O&M Cost estimate a preliminary schedule was assumed as defined in Table 5. This operating schedule forms the basis for estimating vehicle miles of use, and, in turn, labor and materials costs for maintaining vehicles, system equipment and power consumption.

Table 5 – Preliminary Operating Schedule for APM System

Operating Period	Hours/Day	Number of Trains	Headway (sec)
Peak	10	3	180
Off Peak	9	2	270
Night – On demand	5	1	500
Train Size (Cars per train)	3		

Based on this preliminary schedule, the annual O&M cost is estimated to be in the range of $3m to $3.3m. In addition, annual utility costs for similar systems are typically in the range of $500,000 to $800,000 depending on local cost factors.

5.0 SYSTEM PROCUREMENT CONSIDERATIONS

5.1 PROCUREMENT BACKGROUND

APM systems are comprised of two primary elements, the Operating System and the Fixed Facilities, which are integrated into a fully functional total system. The Operating System consists of vehicles, running track, guideway equipment, propulsion power, automatic train control and communications subsystems, station and wayside equipment, maintenance equipment and other elements. Fixed Facilities include guideway infrastructure, stations, equipment rooms and buildings for the Maintenance and Control Facility (MSF), command and control facilities (CCF), propulsion power substations and other facilities upon which Operating System elements are installed by the APM system supplier.

The major APM Operating subsystems are proprietary in nature (e.g., vehicles, tracks, switches, control systems, station equipment, etc.) and, as such, equipment different suppliers cannot be mixed to form a system. Therefore, the Operating System is typically procured under a turnkey design, supply and installation contract. The Operating System of an APM application is then specially configured using “off the shelf” equipment designs that are applied to satisfy site-specific requirements.

The design and construction of all Fixed Facilities required for the APM System can be done by the same team as the Operating System or procured separately. As HCAA intends to procure these elements separately, the review in this section focuses only on strategies for structuring the procurement of APM Operating System only for HCAA consideration.

5.2 GOALS OF THE PROCUREMENT METHOODOLOGY

Due to the proprietary nature of the APM technologies, there is a limited number of potential suppliers/vendors who may be qualified and who may participate in the procurement process. Suppliers who own such technologies tend to be multinational corporations – many are based in North America, Europe and Asia. As such, a competitive environment in the procurement of the Operating System is critical.

The procurement methodology (including permissible teaming arrangements) and evaluation methodology must facilitate the following critical goals that can directly impact the quality, cost and delivery schedule of the project:

- Permit maximum number of possible applicable technologies (including from the same supplier) to be proposed. This will allow TPA the opportunity to consider the benefits of a full range of available technologies that may result in a more optimized project, possibly providing schedule and budget benefits.

- Foster interest and competition within the limited pool of potential suppliers/vendors, thus likely resulting in more competitive pricing.

- Balance the requirements of any applicable public records laws, with the ability to maintain confidentiality on certain aspects of the proposals through the evaluation process until selection is completed. The APM project scope is unique and different from traditional design-build projects and will require detailed technical and management proposals. If aspects of a proposer's proposal are known to their competitors, then an Owner's ability to seek clarification of the contents of the proposals and identify potential savings and technical enhancements would be compromised as would the competitive nature of the procurement itself.

- Minimize risk of protest.

- Structure the procurement in a manner to maximize flexibility to the Owner to reduce project costs. For example, there will likely be cost benefits to the Owner if proposals with varied technologies are received for consideration.

It is very important that the procurement methodology for the new APM be carefully thought out, rigorously followed, and fairly applied to minimize the risk of legal complications that could delay the project resulting in substantial schedule and budget overruns. Past experience indicates that legal complications/protests typically occur when the proposal submittal requirements and/or the procurement process deviates from the procurement norms of the Owner and/or the process has not been clearly identified. To minimize this risk the following issues must be identified, evaluated and adhered to:

- Strictly conform to the applicable laws, regulations and guidelines, including those that apply to the Airport. Where deviations from the Owner's procurement norms are necessary due to the specialized nature of the APM procurement, these must be identified and evaluated. As appropriate, action should be taken by the Owner authorizing the deviation.

- Treat suppliers both professionally and fairly. The procurement process must be clearly identified together with a strict communication protocol between the potential supplier and the Owner. This is necessary to maintain the "integrity of the procurement." In this matter, it is crucial that not only the process be fair and impartial, but it also be perceived as being fair and impartial by the industry.

- The procurement documents must clearly identify the following:

    - Scope of Work.
    - Submittal Requirements.
    - Responsiveness and Responsibility Criteria.
    - General Evaluation Process including selection criteria.

- o Process to allow for a fair hearing and resolution of any protests and any conditions associated with using the process.

Due to the proprietary nature of APM Operating System technologies, there can be a wide variation in the specific approach of each supplier to the project specific requirements. To provide for a fair competitive environment, the technical requirements for the project should be established as performance based requirements together with site-specific constraints that must be adhered to. This permits each supplier to evaluate their specific proprietary technology for the project and identify the adaptations that must be made to meet the project specific performance based requirements. This will maximize the competitive environment while assuring that the best technology can be proposed and selected for the project to meet its needs in an optimal manner.

5.3 SCOPE OF OPERATING SYSTEM PROCUREMENT

The APM contract is expected to occur in two distinct phases:

Phase 1:

The initial or implementation phase of the Contract will involve the design, analysis, construction, manufacture, supply, fabrication, assembly, factory testing, shipping, installation, integration, testing and demonstration of the following Operating System elements and any other elements that are required for the operation of the system:

- Automatic Train Control (ATC)
- Vehicles
- Communication Systems
- Supervisory Control and Data Acquisition (SCADA) System
- Traction Power Distribution System
- Guideway equipment

Typically, the design process includes the adaptation of “off the shelf” proprietary designs to site-specific constraints. The system equipment is manufactured off-site and installed at the site by the APM supplier.

Phase 2:

Phase 2 of the Operating System Contract will include the Operations and Maintenance (O&M) of the APM System (Operating System) by the same Contractor (or APM Supplier) for a period defined by HCAA. The O&M requirements include operations to meet the passenger demands at desired levels of reliability. Also, maintenance of the system (vehicle maintenance, equipment maintenance, etc.) is performed.

Typically, the O&M aspect of the contract can begin with a five year (or shorter) term with an Owner option to extend services in multiple year increments up to maximum number years. Recent experience indicates that Industry is willing to provide pricing for up to 15 years of O&M services. It is “service oriented” type of work wherein, usually, only the Operating System supplier would provide the scope of services, which include operating and maintaining the Operating System to provide the contractually required level of reliability and availability for passenger service (99.5% availability is easily achievable by the major APM suppliers). The O&M phase contract can be structured in a manner such that HCAA, at any time in the O&M phase, can terminate part or all of the services and assign another contractor or HCAA staff to take over. Specific requirements and pricing for “training the AAS designated staff”, as well as guaranteed fair market pricing requirements for proprietary parts and consumables can be included in the O&M phase contract requirements. It is recommended that the APM supplier/contractor be required to provide at least 2-years of O&M services after initiation of passenger service; this is typically the time period during which any problem areas will likely surface and be addressed by the contractor as part of his scope of work, and at no cost to the Owner.

To facilitate this two phased approach APM Operating Systems it is recommended that systems be procured under a Design-Build-Operate and Maintain or DBOM arrangement whereby the APM system contractor will initiate the O+M phase upon the successful completion of the Phase I supply and installation of the respective APM system.

5.4 ALTERNATIVE PROCUREMENT PROCESSES

Having established that DBOM is the preferred project delivery method, there are different procurement processes that have been used successfully for public DBOM procurements for APM Operating Systems. Although they are referred to by numerous other terms, they can be all reduced to the following four basic methods:

1. Non-Competitive – Sole Source Option
2. Competitive One-Step Option, including the one-step low price and one-step best value
3. Competitive Two-Step Option, including the two-step low price and two-step best value
4. Competitive Negotiated Procurement, also referred to as the Best and Final Offer (BAFO).

Each method is briefly described in the following.

5.4.1 Non-Competitive Sole Source Option

In this option, the Owner has determined that only one supplier is capable and/or preferred for the public procurement. Many state and local statutes/ordinances permit agencies to make this determination if they can demonstrate that this is in the best interests of the project (due to existing conditions, budget, schedule, etc.) and that a competitive procurement process would not yield any benefits. In such a case, the Owner enters into negotiations with the single supplier for scope of work and price(s) leading to a negotiated contract that is awarded.

In most cases, however, most public entities are required to pursue and/or seek the benefits realized through a competitive bid process. As such, this Option is generally not suitable for most public procurements.

5.4.2 Competitive One-Step Option

The competitive one-step procurement approach is the most commonly used approach in public procurements. It is characterized by a single action (one-step) advertisement/solicitation by the Owner for the procurement of the specified product(s) and/or services. The vendor(s) submit their technical and bid proposals in response the solicitation at one time; the Owner evaluates the responses and makes a determination on responsibility and responsiveness of the proposal(s) and then makes final determination for bid award. There are two basic variations to this procurement approach – the One-Step Low Bid approach and the One-Step Best Value approach.

5.4.2.1 One-Step Low Bid approach

Typically, if the product and/or services to be procured are very well defined (such as with a solicitation for construction of facilities based on design drawings and specifications prepared by a professional A/E firm on behalf of the Owner) and therefore all proposals are considered equal, then the award determination is based on a low-bid preference among bids/proposals that are found responsive and responsible. This approach is typically referred to as the One-Step Low Bid approach.

Under this method the proposals offered by all responsive bids from responsible bidders are considered to be equal except for price. The evaluation consists of determining if the proposal is responsive to the requirements of the plans and specifications and contract terms and conditions and if the bidder is qualified (responsible) to successfully perform the contract. Therefore, all responsive bids by responsible bidders are considered to be equal, except for price, and the award is made on the basis of lowest bid.

5.4.2.2 One-Step Best Value Approach

This approach is more suitable for procurement of products/services wherein all proposals (responses to the solicitation) are not or may not be considered equal – in terms of technical merit/quality and price. In this process, the respondents to the solicitation are required to submit a technical proposal and a separate price proposal at the same time. To avoid possible bias due to knowledge of pricing information, the technical proposals are evaluated first for responsibility and responsiveness and then scored based on a pre-determined criteria for technical merit (only if found responsible and responsiveness). Technical proposals are evaluated against a set of minimum technical requirements however; proposers can also propose alternates, in addition to the base proposal, that may generate costs savings. If alternate approaches are considered to be acceptable or feasible with some minor modifications then they are included for further consideration.

The corresponding price proposals are then opened and evaluated for responsibility and responsiveness; the price and technical merit scores are combined in a pre-established manner to identify the best value responsive and responsible proposal. The best value may be based on a pre-determined weighted combination of the price and technical merit score or based on ranking determined by dividing the technical merit score into the price (the lower the number, the higher the value of the proposal).

Variations to the basic process described above include the ability for the Owner to seek clarifications from each of the vendors/respondents on the technical proposal prior to final technical merit scoring. The exact procedure is developed in coordination with the Owner's normal contracting/procurement procedures in conjunction with the applicable laws/regulations governing the procurement to assure that the risk of protest is mitigated.

5.4.3 Competitive Two-Step Option

The competitive two-step procurement approach is often used when the product and/or services which are being solicited are not or may not be considered equal – in terms of technical merit/quality and price. This approach is characterized by a double action (two-step) advertisement/solicitation by the Owner for the procurement of the specified product(s) and/or services. It is similar to the One-Step Best Value approach except that the pricing proposal is obtained as a second-step and only from those vendors who are found qualified after evaluation of their technical proposals obtained in step-one.

In step-one, the Owner solicits only technical proposals in response to the specified products and/or services to the procured. The vendors submit their technical proposals. These are reviewed for responsibility and responsiveness prior to determination of the vendors' qualifications and or capabilities to provide the products and/or services in a satisfactory manner. Responsive and responsible vendors found capable and qualified through this first step evaluation are then requested to submit a price proposal; this being the second step of the process.

Maintaining the confidentiality of the contents of the technical proposals (and their evaluations for technical merit and/or ranking) is crucial; if competitors are aware of the contents (and/or evaluation) of each other's technical proposals, it is likely to influence their pricing strategy when they are asked to submit their pricing proposals in step-two. There is also a risk that, after evaluation of the technical proposals, the number of vendors found qualified to participate in step-two may be too small and this could have an impact on the degree of competitiveness for the pricing proposals.

Variations to the process include the ability of the Owner to request and obtain clarifications from the vendors on their technical proposal(s) prior to determining their qualification to participate in their second step and/or scoring of the technical proposals for technical merit.

5.4.3.1 Two-Step Low Bid approach

In this approach, during the first-step the vendor's qualifications and or capabilities to participate in the second step (submitting price proposals) are determined as described in Section 4.3 above. During the second step, the "prequalified" vendors are requested to submit price proposals. These are evaluated for responsiveness and responsibility. The contract award recommendation is based on the lowest responsive and responsible price. The implicit assumption in this approach is that after the first step, when the vendor qualifications are determined, that all technical proposals are equal in technical merit and quality and that the only difference is in price.

5.4.3.2 Two-Step Best Value Approach

In this approach, during the first-step the vendor's qualifications and or capabilities to participate in the second step (submitting price proposals) are determined as described in Section 4.3 above and then scored for technical merit based on pre-established criteria. Technical proposals are evaluated against a set of minimum technical requirements however; proposers can propose alternates, in addition to the base proposal, that may generate costs savings. If alternate approaches are considered to be acceptable or feasible with some minor modifications then they are included for further consideration.

Again, maintaining the confidentiality of the contents of the technical proposals (and their evaluations for technical merit and/or ranking) is crucial; if competitors are aware of the contents (and/or evaluation) of each other's technical proposals, it is likely to influence their pricing strategy when they are asked to submit their pricing proposals in step-two.

The corresponding price proposals, obtained during the second-step, are then opened and evaluated for responsibility and responsiveness; the price and technical merit scores are combined in a pre-established manner to identify the best value responsive and responsible proposal. The best value may be based on a pre-determined weighted combination of the price and technical merit score or based on ranking determined by dividing the technical merit score into the price (the lower the number, the higher the value of the proposal).

The exact procedure is developed in coordination with the Owner's normal contracting/procurement procedures in conjunction with the applicable laws/regulations governing the procurement to assure that the risk of protest is mitigated.

5.4.4 Competitive Negotiated Procurement

In the Competitive Negotiated Procurement method an award is made on the basis of price and other evaluation factors that are considered to be in the best interest of the Owner. This approach is a variation of the Best Value approaches except the Owner has the ability to negotiate with multiple vendors at the same time in strict confidence on all matters including technical and price issues.

The term "bid" is not to be used in this method. The Competitive Negotiated Procurement method has been successfully applied for many federal government procurements and other public procurements where it was determined that the goods and/or services that would result could not be determined to be equal, as in the case of the Competitive Bid – Low Price methods.

The acceptability and quality of a proposal may be assessed in terms of a minimum set of requirements and evaluation criteria. For complex systems and products, where the success or failure of a project is highly sensitive to the system or product being procured, the qualifications of the proposer may be considered very important. Therefore, most Competitive Negotiated Procurements score the qualifications of proposers as part of the basis for the award. Finally the price must be considered because it is the determinant of affordability and value of the proposal.

The approach is the same as for the best value approach. However, the Owner opens the Technical and Price proposals at the same time and then determines a negotiation strategy with each proposer. Negotiations, on technical and price matters, are conducted with the multiple suppliers/vendors concurrently.

Upon completion of negotiations, the Owner may amend the Request for Proposals and request Best and Final Offers (BAFO). The BAFO will take the same format as the initial proposals and may be in the form of amendments to the initial proposal documents. BAFOs are evaluated in accordance with the same criteria and procedures as the initial proposals, essentially as updates to the original evaluations. The award is made on the basis of price and other evaluation factors that are considered to be in the best interest of the Owner. At any point in the process, the Owner may decide to award the contract without further consideration (or request for BAFOs) or may decide to re-advertise.

While this approach maximizes an Owner’s flexibility during the procurement process it is viable only if applicable laws and statutes permit a public procuring agency to negotiate with multiple vendors/suppliers in confidence on technical and price matters.

5.5 EVALUATION OF PROCUREMENT OPTIONS

A first screening of the available procurement approaches, described above, can be based on an evaluation of the product/services to be procured. However, further evaluation relative to the applicable legal and contractual processes/requirements will be necessary in order to narrow the choices and then develop the appropriate procurement strategy. The following key factors should be considered during this first screening:

1. Due to the proprietary nature of the APM technologies, there are a limited number of potential suppliers/vendors who may be qualified and who may participate in the procurement process. Suppliers who own such technologies tend to be multinational corporations - based in North America, Europe and Asia. Some suppliers own multiple different technologies that could potentially be proposed on the project.

2. Early and immediate need to identify the range of potential technologies and their specific interface requirements to a) provide early input to the Fixed Facility programming in support of timely designs and construction to meet the project completion dates; and b) avoid “generic technology” designs that would then have to be updated to the selected technology – thus minimizing schedule and cost impacts if the range of technologies is closely defined.

3. Requirements of applicable public records act (varies) as they relate to handling of proposals received by a public agency and conduct of meetings whether or not the Owner has ability to maintain the confidentiality of any proposals, negotiations, or information.

4. The minimum technical requirements that may be required as part of the procurement.

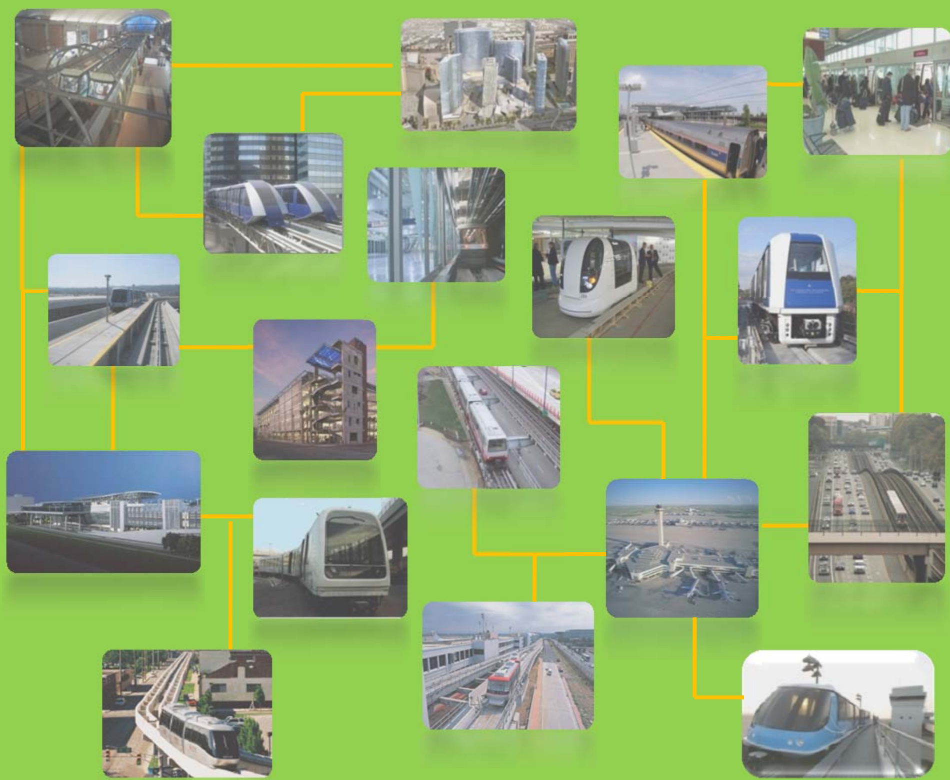
Based on these criteria, an evaluation of options could proceed as follows.

If public records and open public meeting requirements apply, then the Non-Competitive Sole Source Option and the Competitive Negotiated Procurement Option would not be viable leaving either the Competitive One Step or Two Step Options.

Next, consider if the Request for Proposals (RFP) establishes the desired minimum technical criteria that must be complied with (these may include minimum service-proven criteria, etc.). If a minimum requirement stipulation is made in the solicitation, it is likely (but not guaranteed) that after the technical evaluations (after appropriate negotiations/clarifications from the proposers) one may find that all the proposals are equal on the basis of technical merit. In such a case, the only difference would be price and, by default, the lowest responsive, responsible bid would be the best value and thus the award determinant – thus making it a Two-Step Low Bid approach. However, if multiple technologies are feasible and can be proposed, it is possible that all proposals will be not found equal on the basis of technical merit in which case the One-Step or Two-Step Low Bid approaches would not be appropriate and then the Competitive One or Two Step Best Value Approach would be preferred.

APPENDIX A

PEOPLE MOVER OPTIONS BRIEFING
AIRPORT MASTER PLAN UPDATE
TAMPA INTERNATIONAL AIRPORT
JULY 26, 2012



PEOPLE MOVER OPTIONS BRIEFING
AIRPORT MASTER PLAN UPDATE
TAMPA INTERNATIONAL AIRPORT
JULY 26, 2012

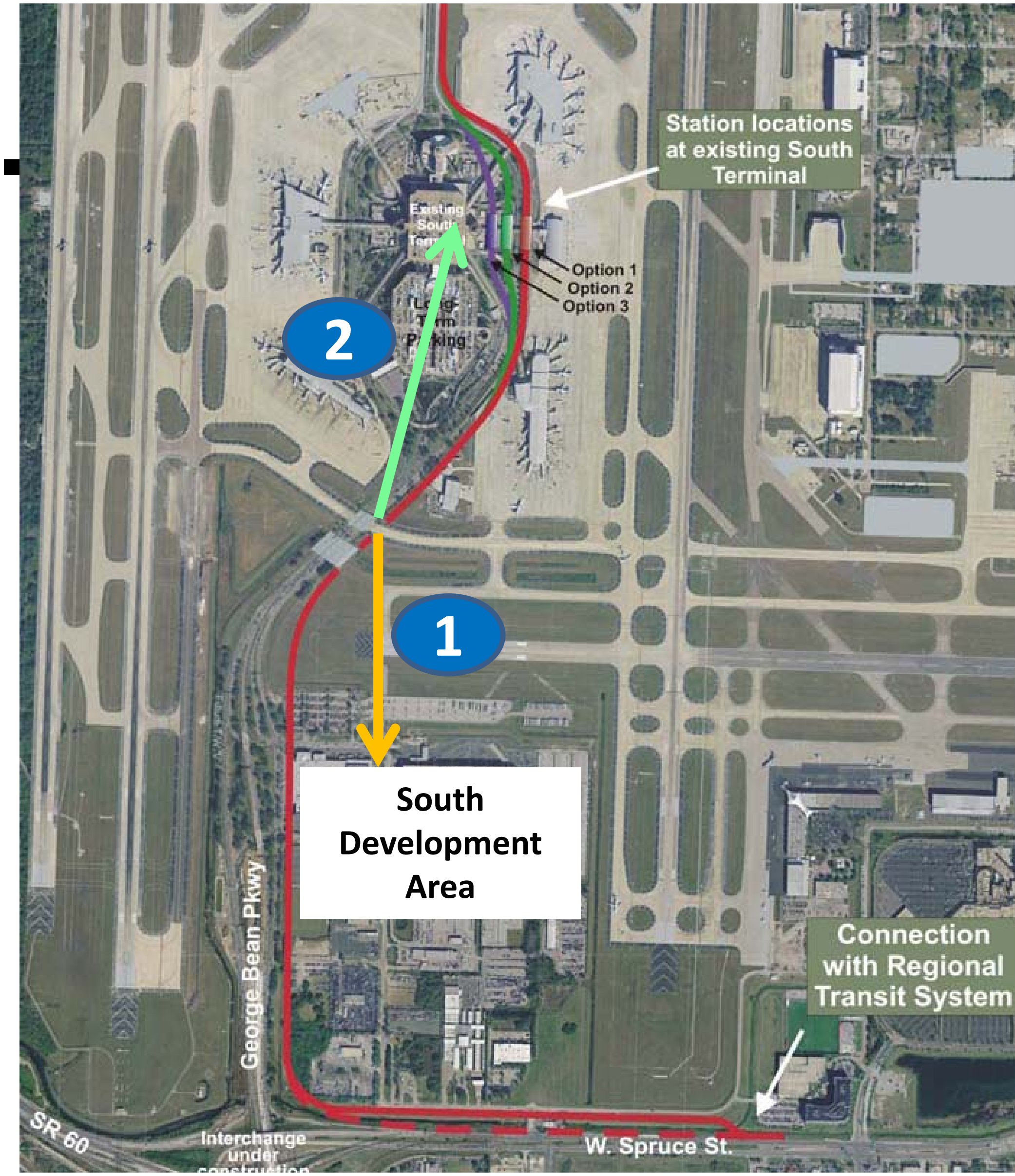
Tampa International Airport

HNTB

LEA + ELLIOTT

Presentation Overview

- **Service Corridor Overview**
- **Potential Technologies**
  - Automated People Mover (APM)
  - Personal Rapid Transit (PRT)
- **Preliminary Ridership Projections**
- **Options from Taxiway J to South Area**
- **Options from Taxiway J to Terminal Area**
- **Next Steps**



Service Corridor

- Previous study defined alignment through TPA to the North Area.
- Master Plan focus is on connection from Terminal to the South Development Area while preserving option for extension in future to a north terminal.
- Presentation of alignment options from Terminal to South Area divided into two segments:
  1. Taxiway J to South Area
  2. Taxiway J to Terminal Area

Landside Airport Mobility Needs

- **Activity Centers Connected, Passenger Types and Volumes**
  - Terminals, Parking, Rental Car, Intermodal Rail/Transit, Hotels, etc.
  - Airline pax, Airline/Airport employees, Meeters/Wellwishers, Comm'l
  - Varies with Airport Size, many over 2000 pax per hr per direction (pphpd)

- **Intra Facility Distances**
  - 0.5 mi to over 3.0 mi at major Airports

- **Travel Time Requirements**
  - Short-term parking = under 3 minutes
  - Long-term parking = over 20 minutes

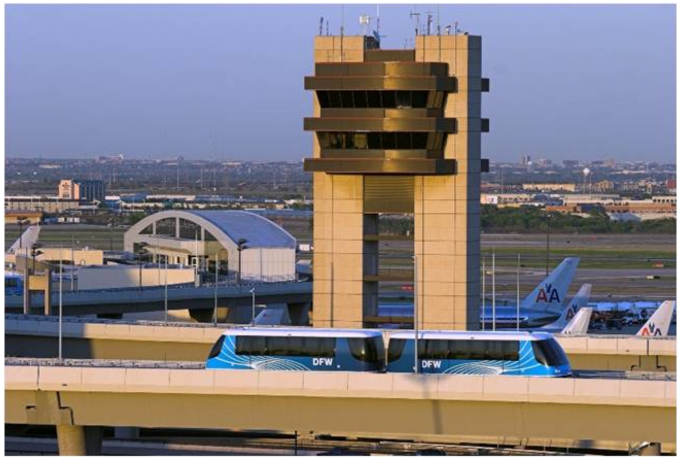
Landside Automated Technologies

Automated People Movers

PRT

Automated People Movers (APM)

Cable and Self-Propelled



- **Speeds**

  30 to 40 mph

- **Frequency**

  2 – 3 minutes

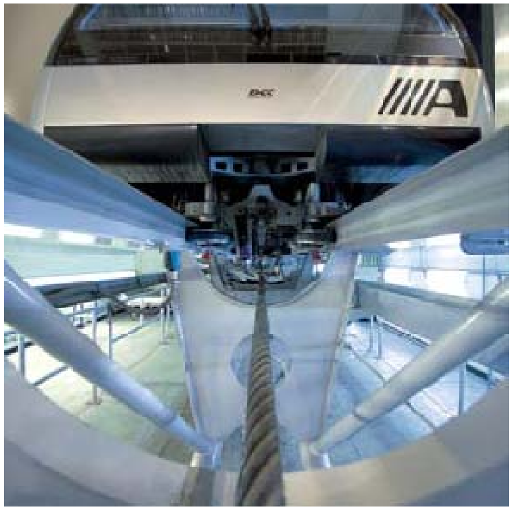
- **Capacities**

  50 pax / vehicle, 4000 to 6000 pphpd

- **Distances Served**

  1 to 10 mi, most are 2 to 3 mi

- **Dedicated Line-Haul Route**



Personal Rapid Transit (PRT)

- **Speeds**

  20 to 35 mph

- **Frequency**

  # station berths

  Merging train control

- **Capacities**

  1 to 4 pax/vehicle

  500 pphpd current

  2500 pphpd in future (pending further technical development)

- **Distances Served**

  2.0 mi current

- **Dedicated Grid Network**

Airport Landside Systems

Airport Landside Automated Technology Inventory						
Airport	**Automated Technology**	**Year Open**	**Alignment Configuration**	**Facilities Served**	**Length[1] (miles)**	**Capacity (pphpd)**
Houston	APM	1981	Loop	Terminals	1.0[2]	700
London Gatwick	APM	1987	Shuttle	Terminals, Intermodal	0.7	4.200
Tampa	**APM**	**1990**	**Pinched**	**Parking, Rental Car**	**0.6**	**700**
Paris -Orly	APM	1991	Pinched Loop	Terminals, Intermodal	4.5	1,500
Chicago	APM	1993	Pinched Loop	Terminals, Parking, Intermodal	2.7	2.400
Newark	APM	1996	Pinched Loop	Terminals, Parking, Intermodal, Rental Car	3.2	2,100
Minn/St. Paul	APM	2001	Shuttle	Parking, Intermodal, Rental Car	0.2	1,700
Dusseldorf	APM	2002	Pinched Loop	Parking, Intermodal	1.6	2,000
New York – JFK	APM	2003	Pinched Loop	Terminals, Parking, Intermodal, Rental Car	8.1	3,780
Birmingham (UK)	APM	2003	Shuttle	Intermodal	0.4	1,600
San Francisco	APM	2003	Loops	Parking, Intermodal, Rental Car	2.8	3,400
Singapore Changi	APM	2006	Shuttles	Terminals	0.8	1,900
Toronto	APM	2006	Shuttle	Terminals, Parking	0.9	2,100
Paris - CDG	APM	2007	Pinched	Terminals, Parking, Intermodal	2.1	1,900
Beijing	APM	2008	Pinched Loop	Terminals, Intermodal	17.5	N/A
Atlanta	APM	2009	Pinched Loop	Terminal, Rental Car, Convention Center	1.4	2,700
London Heathrow	PRT	2010	Network	Terminals, Parking	1.0	500
Miami	APM	2011	Pinched Loop	Intermodal, Rental Car	1.3	1,600
Sacramento	APM	2011	Shuttle	Terminal	0.2	2,300
Phoenix	APM	2013	Pinched Loop	Terminals, Parking, Intermodal	3.0	2,900

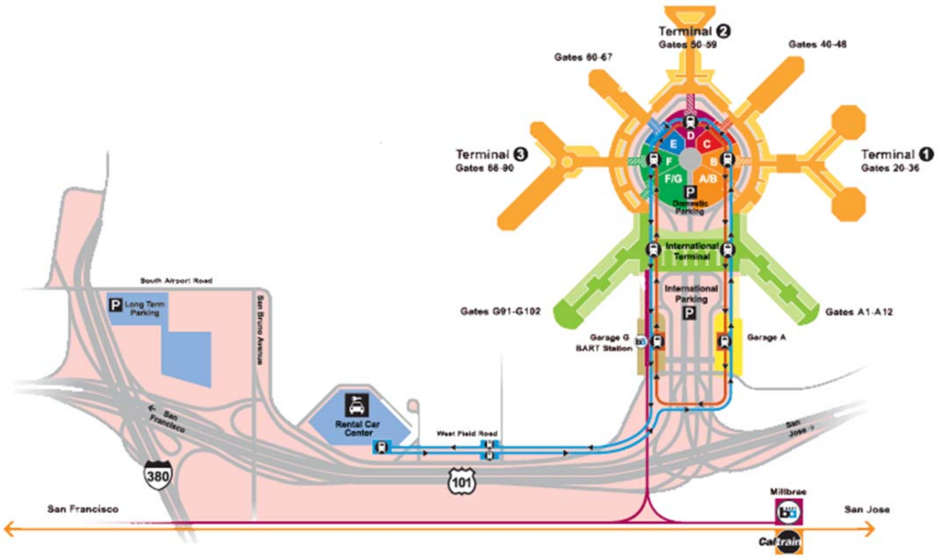
Source: Lea+Elliott, Inc.
[1]Length is measured in dual-lane miles of guideway.
[2]Single-lane loop system converted to dual-lane mile equivalent.

Atlanta CONRAC

- 1.4 mi
- Fleet – 12 cars
- Capacity - 2,700 pphpd
- Serves Terminals, Rental Car, and Convention Center
- Supplier: Mitsubishi

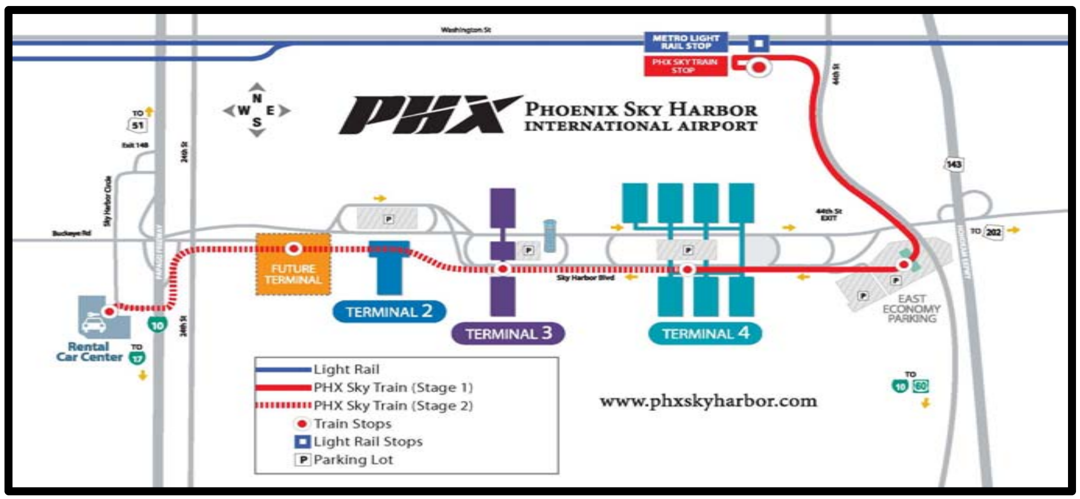
San Francisco AirTrain

- 2.8 mi
- Fleet - 38 cars
- Capacity - 3,400 pphpd
- Serves Terminals, Parking, Intermodal, Rental Car
- Supplier: Bombardier



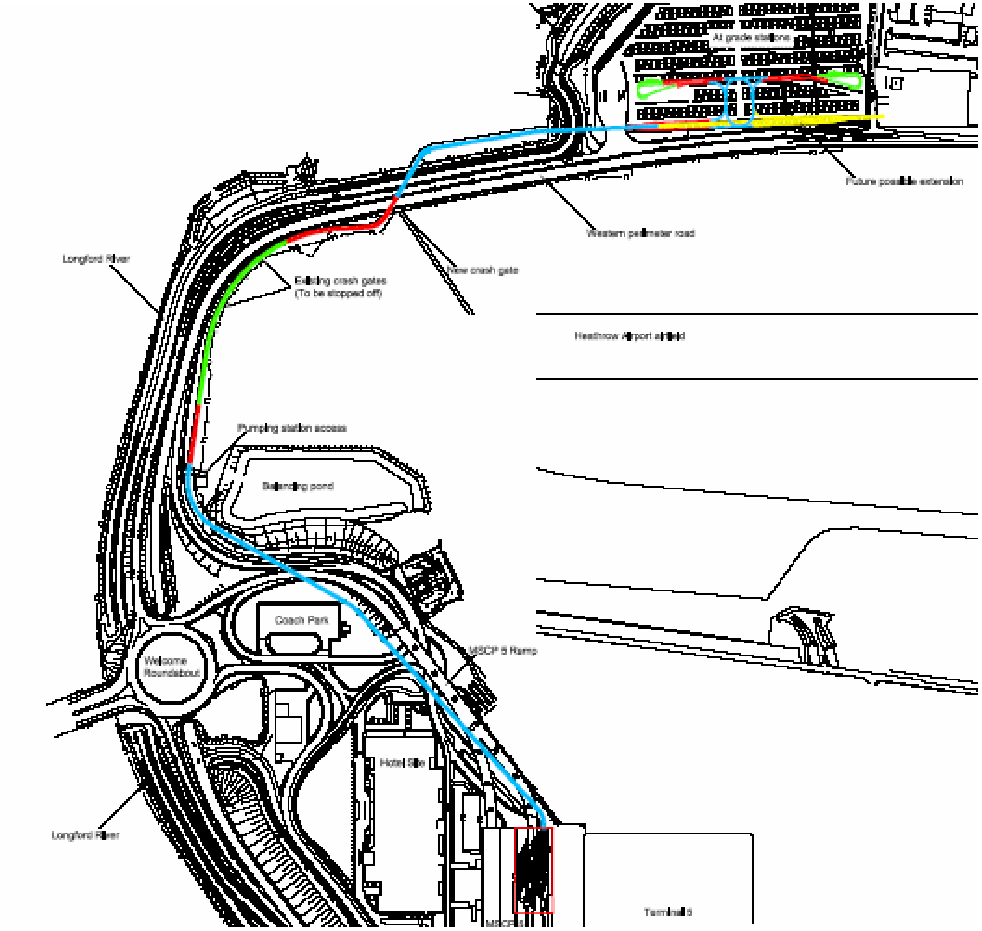
PHX Sky Train™

- **Two stage implementation**
- **Stage 1 (opens early 2013)**
  - 1.7 mi
  - Fleet - 18 cars
  - Capacity - 2,900 pphpd
  - Serves Terminals, Remote Parking & Intermodal (Regional Light Rail)
- **Stage 2**
  - Adds 2.4 mi
  - Will serve future terminals
  - and Rental car Center
- **Supplier: Bombardier**



London Heathrow PRT

- 1.0 mi
- 500 pphpd
- Serves Terminals, Parking



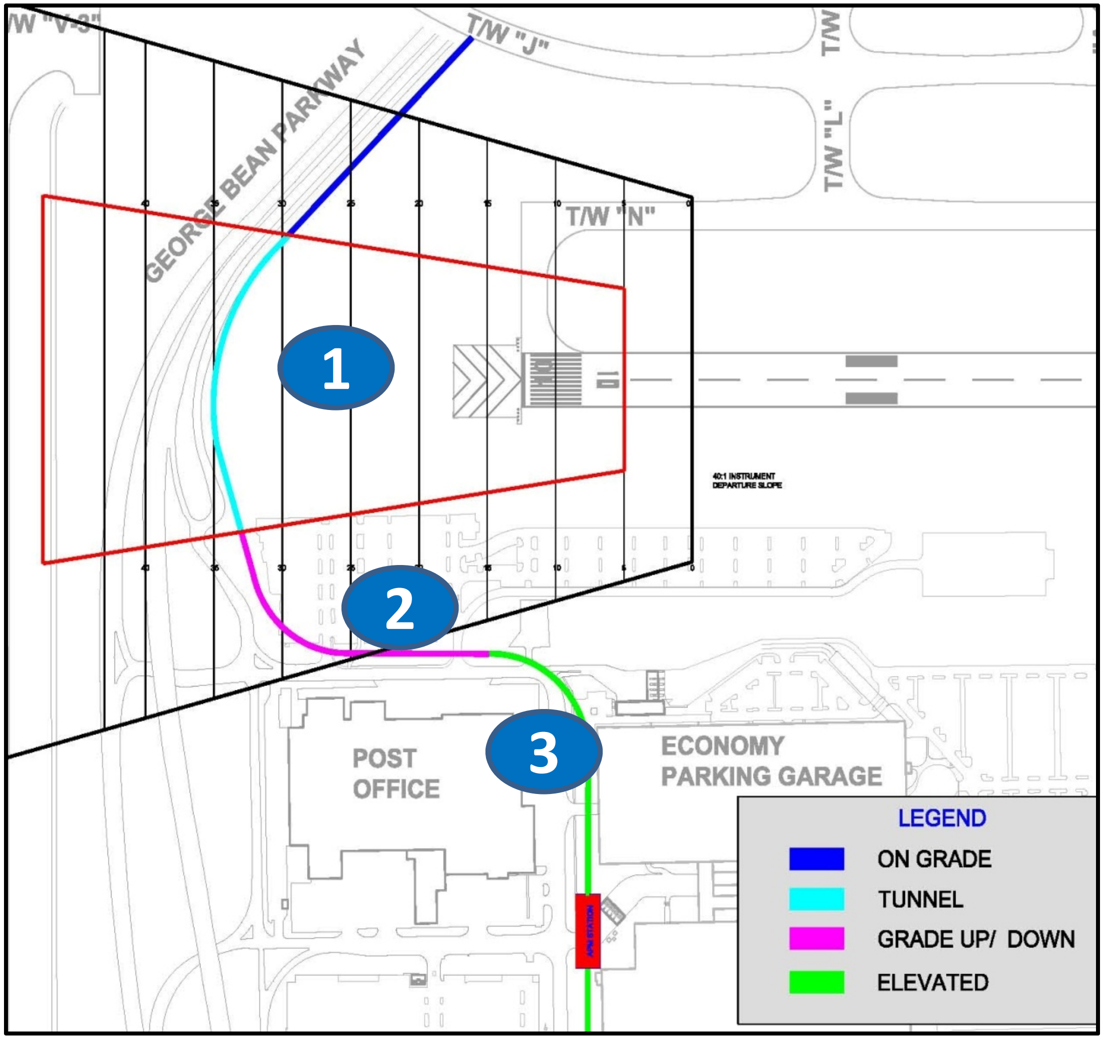
TPA Preliminary Ridership Projections

Peak Hour Passengers in Peak Direction
TPA Terminal to South Development Area

Year	Rental Car[1]	Economy Parking[2]	Other[3]	Total
2016	1,770	280	160	1,720
2021	1,980	340	180	2,270
2026	2,215	380	200	2,540
2031	2,500	420	225	2,835

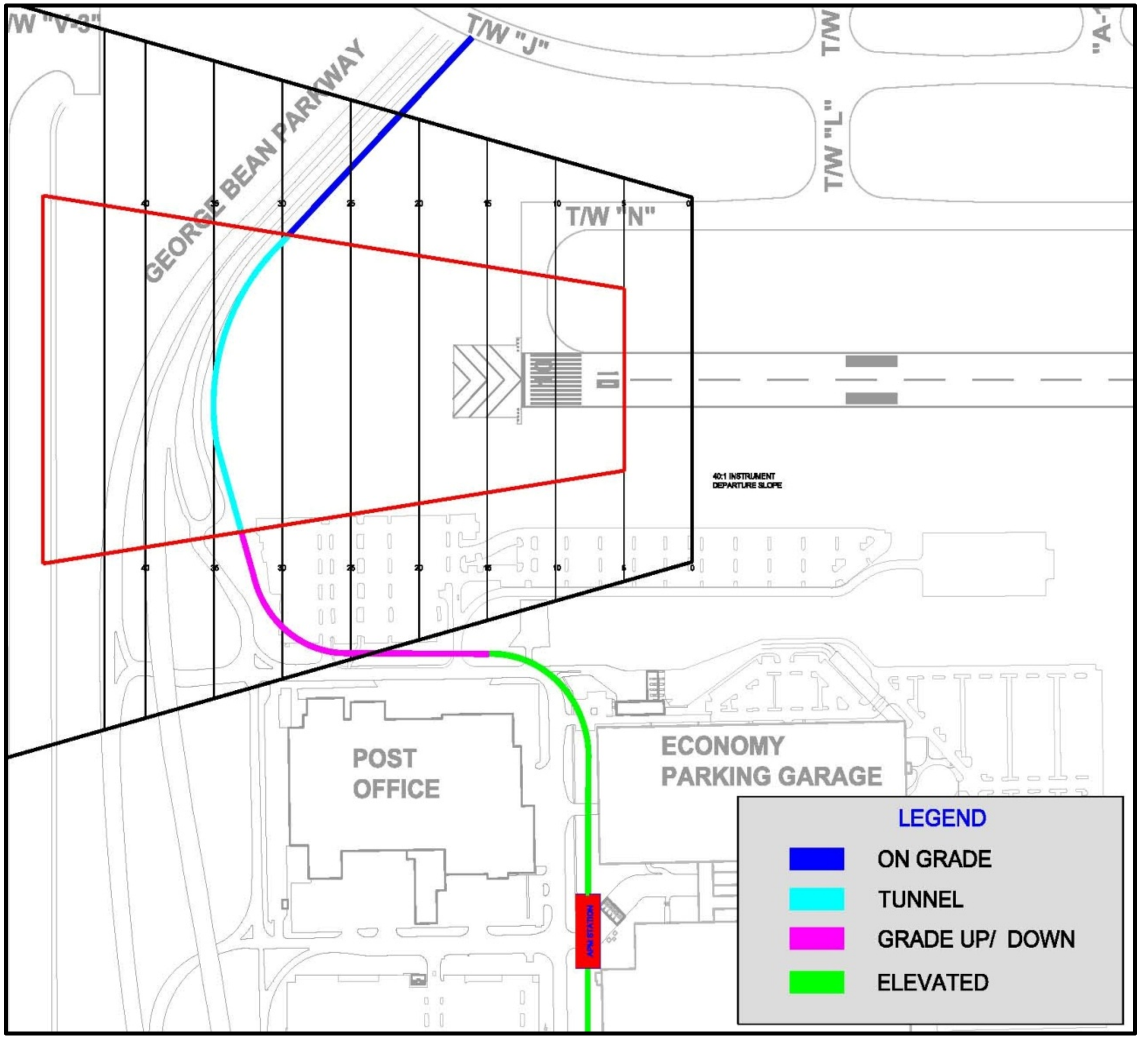
Notes and Sources:
1. Transystems
2. Multimodal Transportation Analysis
3. Transit and other modes at 5% share of air passengers
4. **For fleet and capacity planning purposes values are typically increased by 25% to account for surges in peak passengers**

Alignment Factors from T/W J to South Area



1. **Must avoid conflicts with RWY 10/28 RPZ, 40:1 Departure Surface and Part 77 Surfaces.**
2. **Guideway needs to rise up to clearance height to go over Service Road exit from Economy Parking.**
3. **Maximize radius of last turn before station at Economy Parking Garage.**

APM to South with Current RPZ



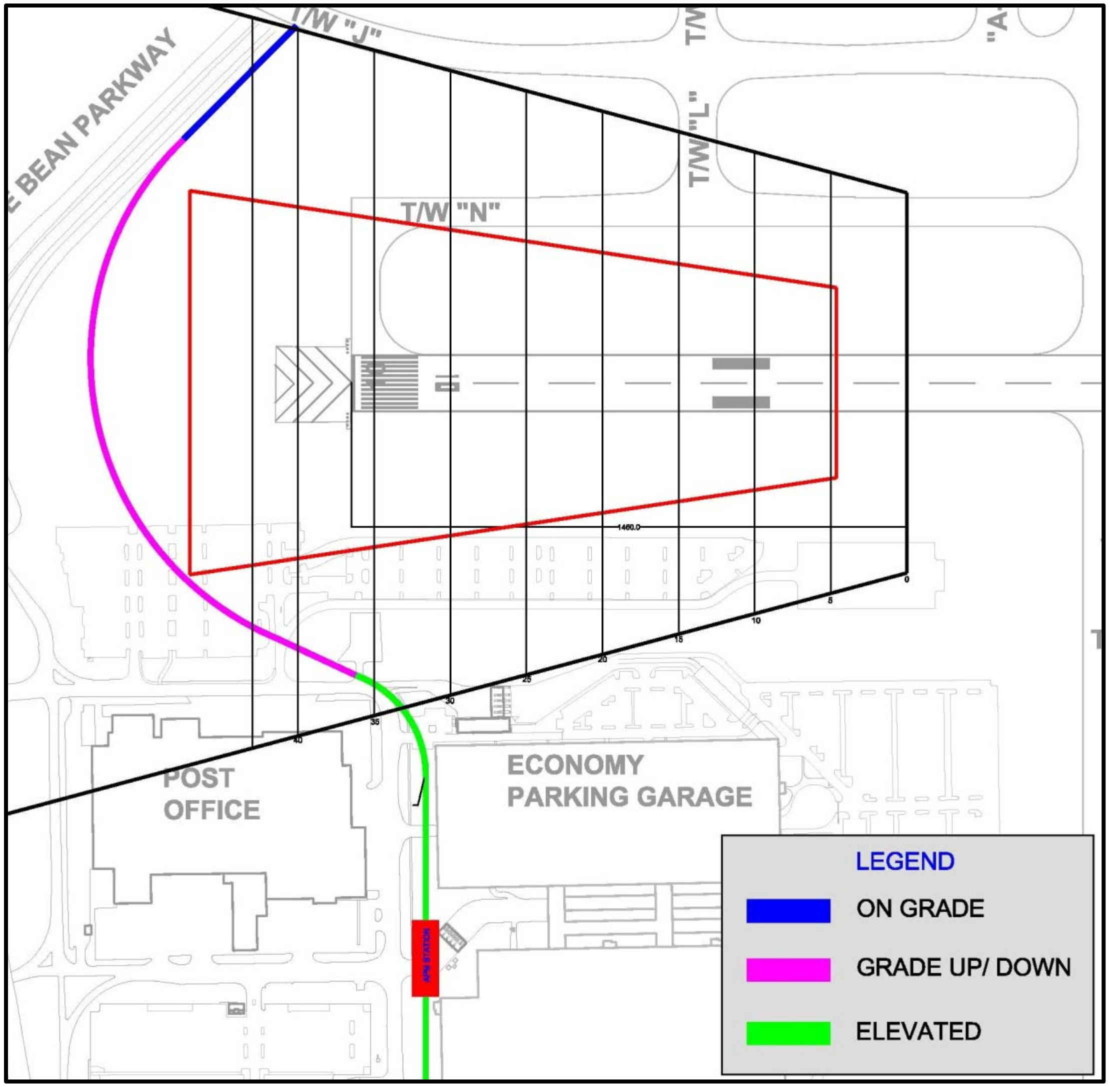
Alignment Features

- **Tunnel below RPZ,**
- **Rises up parallel to Service Road to avoid Departure Surface before crossing over roadway,**
- **Tight radius in last turn before station,**
- **Longest length of 3 options.**

Track Length – T/W J to Station

- **On Grade: 290’**
- **Tunnel: 900’**
- **Sloped: 1,370’**
- **Elevated: 840’**
- **Total Length: 3,400’**

APM to South with RPZ displaced 1,475' & Departure Surface shifted 1,460'



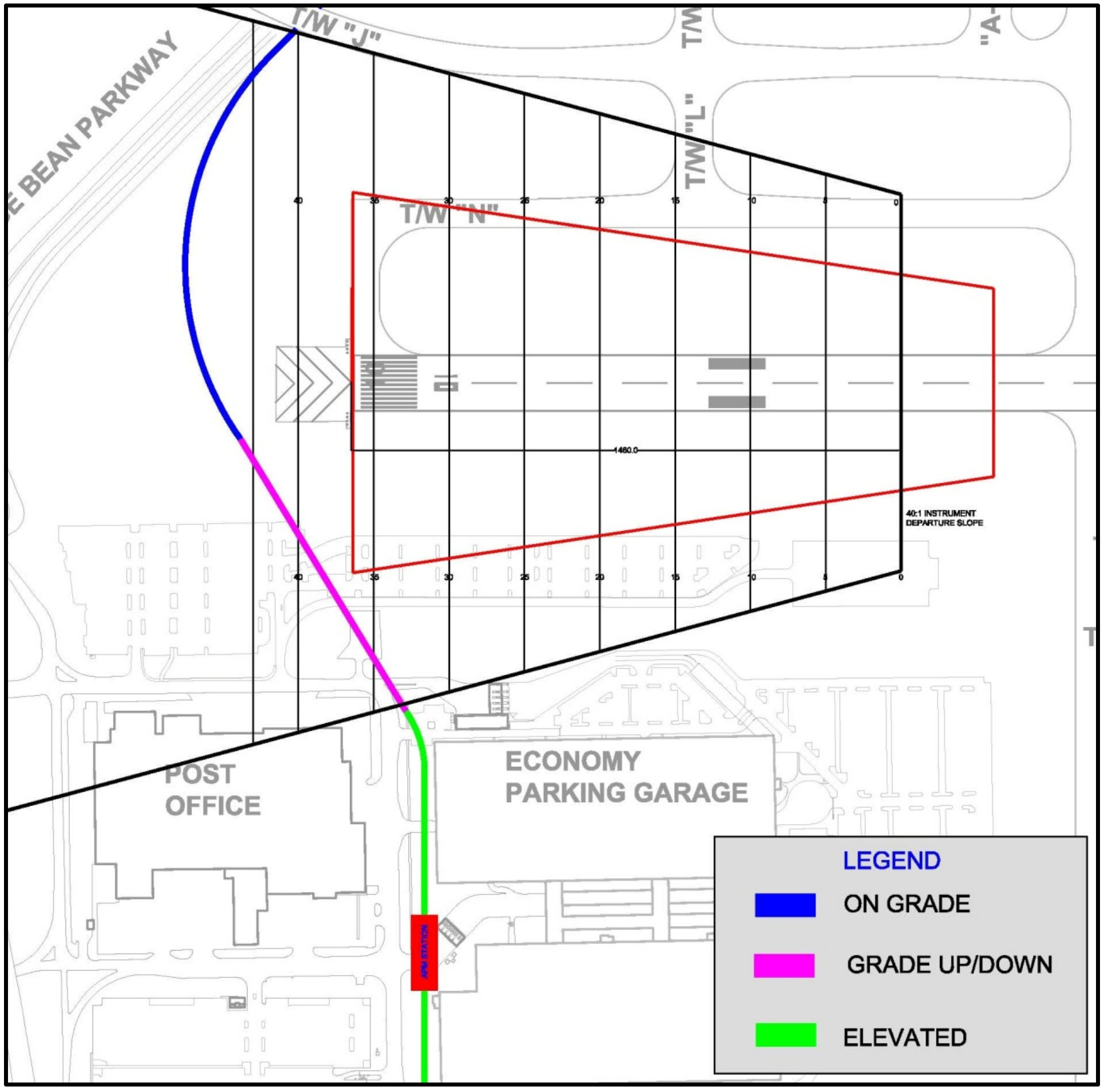
Alignment Features

- **Shifting RPZ and Departure Surface to east allows for more direct path to South Area without need for a tunnel.**
- **Allows for larger radius in last turn before station.**
- **Would have long sloped section around end of RPZ to rise up and clear over Service Road.**

Track Length – T/W J to Station

- **On Grade: 410'**
- **Sloped: 1,810'**
- **Elevated: 730'**
- **Total Length: 2,950'**

APM to South with RPZ displaced 1,905' & Departure Surface shifted 1,460'

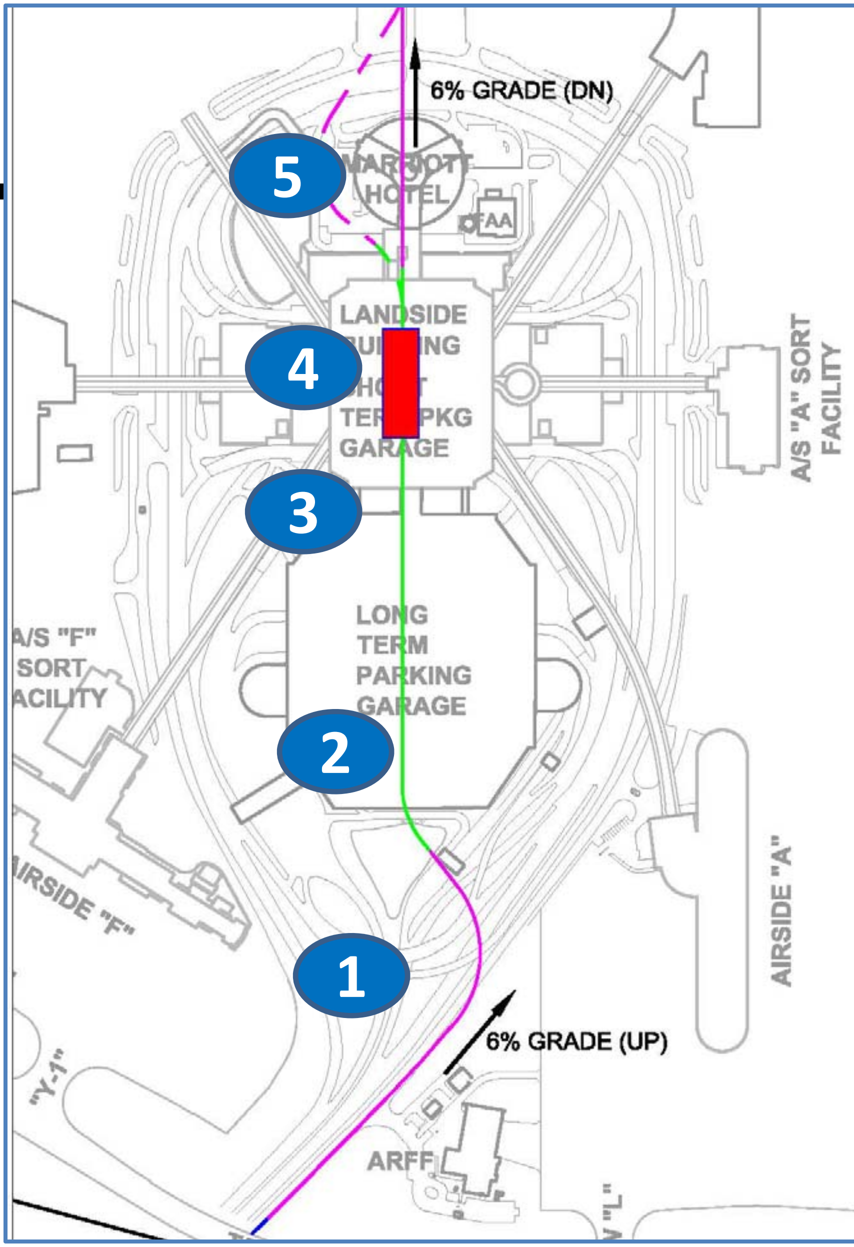


Alignment Features

- **Additional shift of RPZ to east further shortens overall alignment path without need for a tunnel.**
- **Alignment would be flatter and have more gradual turns improving ride quality for passengers.**
- **Would also allow for faster speeds through section and shorter travel times.**

Track Length – T/W J to Station

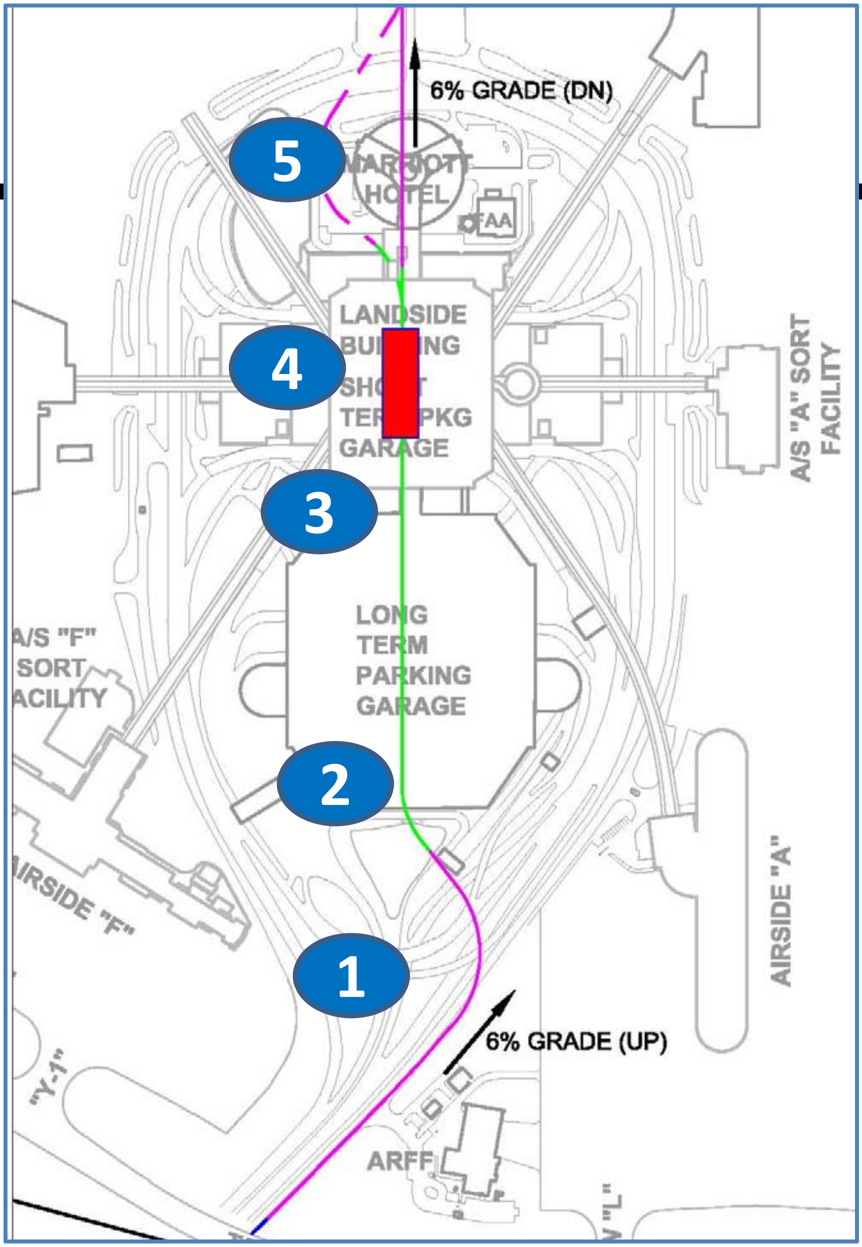
- **On Grade: 1,210'**
- **Sloped: 840'**
- **Elevated: 570'**
- **Total Length: 2,620'**



Alignment from T/W J to Station over Terminal

Proceeding south to north:

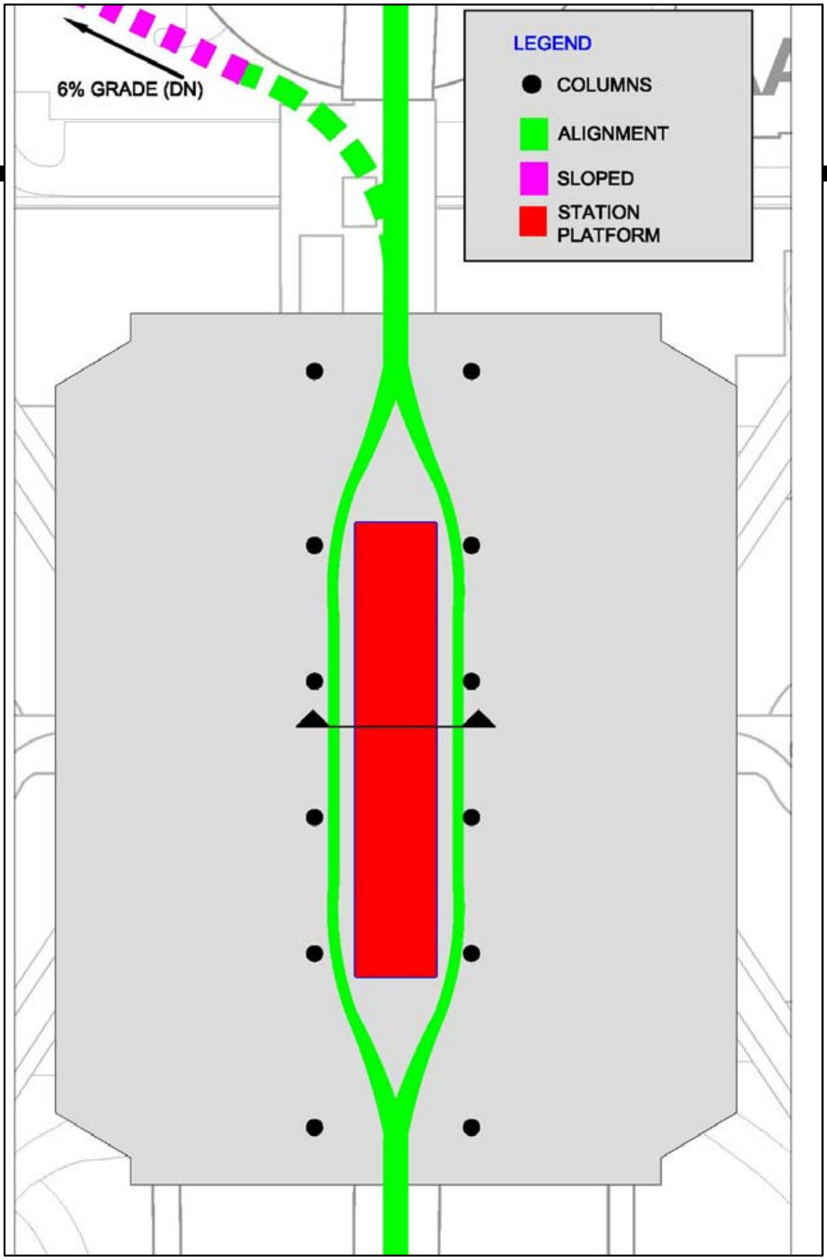
1. **Has to climb from T/W J at 6% to clear vehicle ramps in from of terminal.**
2. **Enters in opening between garage structures at level 7.**
3. **Enters short-term parking over terminal building at 2nd level of parking.**
4. **Passenger Station with supporting column/structure would be over the terminal.**
5. **Future extension to north has to descend at 6% to reach level of existing corridor beneath Taxiway A.**



Alignment Review

Proceeding south to north:

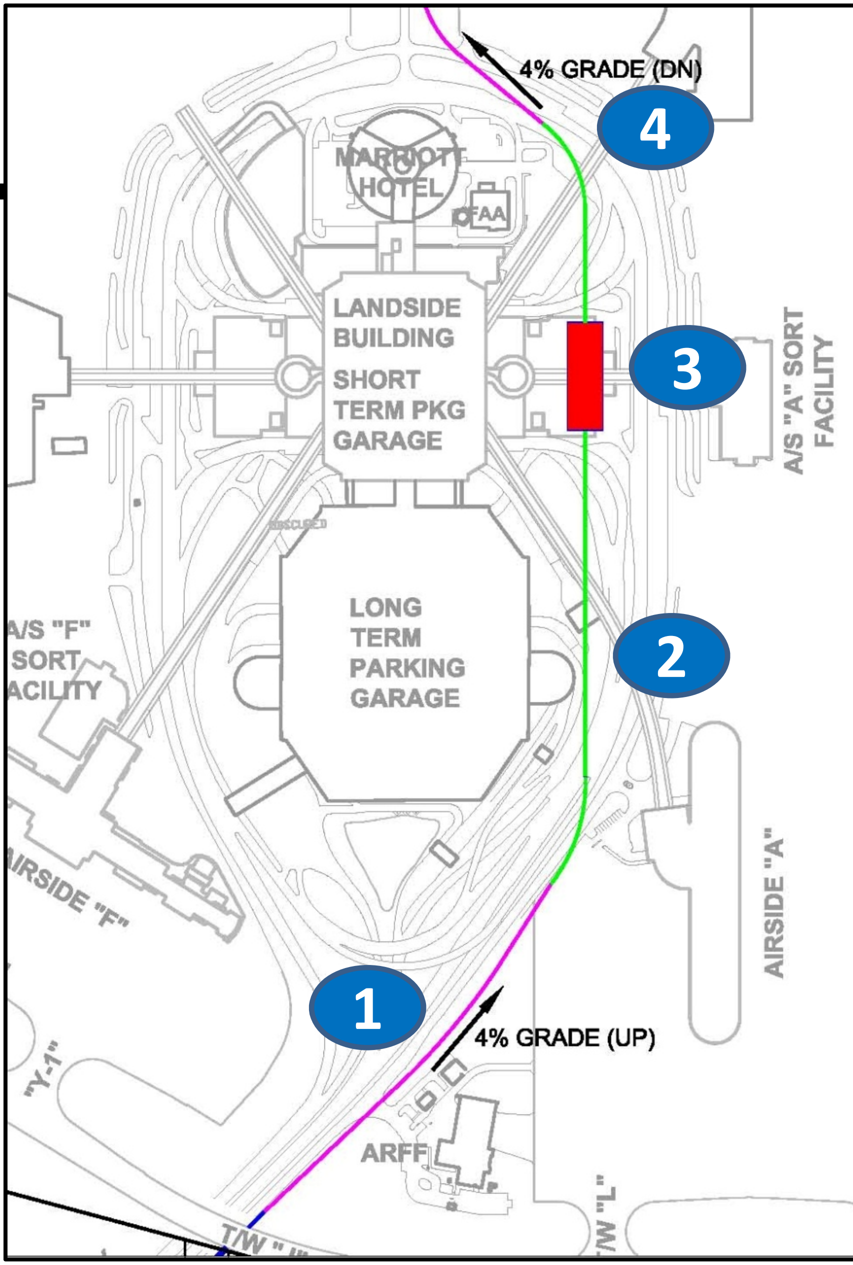
1. **The 6% grade is above typical maximum used for APM Systems**
2. **For train clearance, slabs at three cross sections on level above in long-term garage would have to be cut disrupting vehicle circulation.**
3. **For train clearance, slab at level x of the short-term garage would have to be cut disrupting vehicle circulation.**
4. **Six pairs of columns approximately 8 to 10 feet in diameter would have to constructed through the all levels of parking garage and terminal below. (see next slide)**
5. **Future extension to north descending at 6% is again above typical maximums used for APM.**



Concept Layout of Station at Terminal

- Station at 2nd level of short-term parking garage over terminal building.
- Estimated that six pairs of columns would be needed to support station and guideway through the terminal.
- Columns would be approximately 8 to 10 feet in diameter and would penetrate through every level of the existing parking garage and terminal below.
- Would involve complex construction that would impact existing operations and facilities.

Insert photo here illustrating column size

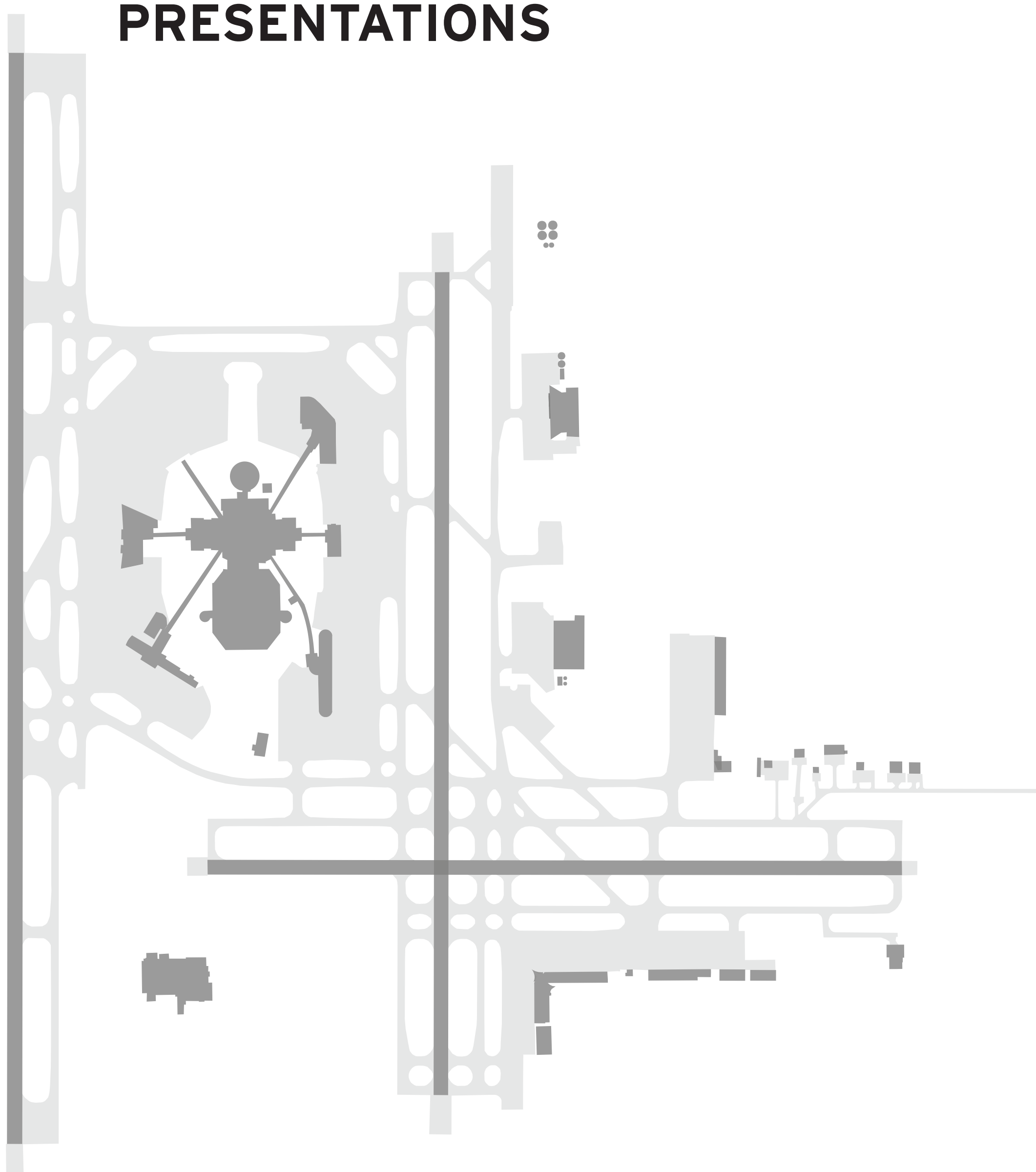


Alternate Alignment Previously Defined

Proceeding south to north:

1. **Climbs at less steep 4% grade from T/W J to reach elevation to clear Airside A train.**
2. **Flat section of guideway continues over Airside A Train and into station.**
3. **Station would be located over existing bridge feeding into Terminal.**
4. **Future extension to north would proceed over Airside C Train and then descend at 4% grade to reach level of existing corridor beneath Taxiway A .**

APPENDIX M - MEETING PRESENTATIONS



APPENDIX M:
Meeting Presentations

This appendix includes a wide range of powerpoint presentation slides that were developed during the Airport Master Planning Process.

Level of Service in Airport Terminals

March 14, 2012

HNTB

1

Tampa International Airport

Level of Service in
Airport Terminals

March 14, 2012

HNTB

2

Level of Service Defined

- Level of Service (LOS) represents the quality and conditions of service of one or more facilities as experienced by passengers.
- Service levels (waiting time, processing time, walking time, and crowding) have implications to an airport:
  - Costs
  - Image
  - Reflection of community goals
  - Travelers notice good LOS and may avoid poor LOS
- Level of Service is usually described in terms of flow, delays, and level of comfort.

3

Level of Service Defined

The relationship between available space, time and level of service is impacted by many factors:

- Passenger behavior patterns
- Passenger convenience
- Passenger comfort
- Distance traveled

Level of service is measured on a scale from “A” through “F”, with “A” being the highest and “F” being the lowest

Most airports are designed to serve the passenger processing at a LOS C as defined by the International Air Transport Association (IATA)

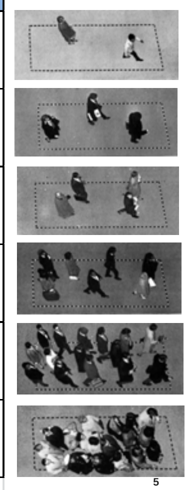
4

Description of Levels of Service

HNTB

IATA describes each level of service standard as follows:

Level of Service	Flows	Delays	Comfort
A - Excellent	Free	None	Excellent
B - High	Stable	Very Few	High
C - Good	Stable	Acceptable	Good
D - Adequate	Unstable	Passable	Adequate
E - Inadequate	Unstable	Unacceptable	Inadequate
F - Failure	System Breakdown	System Breakdown	Unacceptable



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

5

Level of Service Performance Criteria

HNTB

- Level of service A is generally seen as cost prohibitive to implement
- Level of service B is an excellent design practice if:
  - Budget allows
  - The airport authority desires a higher level of service
  - Extra flexibility and room to grow is an airport goal
- **Level of service C is recommended by IATA and is typically used as a performance criteria target for most airport terminals**
- Brief (no more than 15 minutes in duration) periods of level of service D are permissible during the peak hour
- Level of service E and F are not acceptable

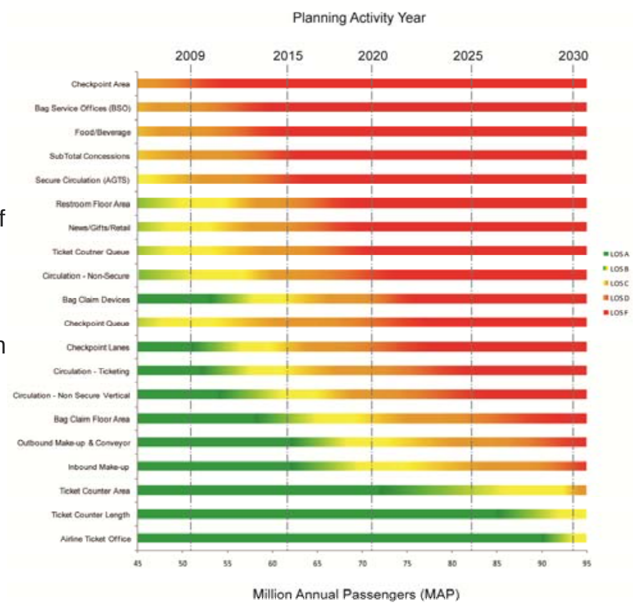
6

Stoplight Chart

HNTB

Example of a Stoplight chart developed by HNTB that depicts the Level of Service of each functional element graphed over a period of time.

This is a useful tool to determine when to begin to plan for replacement facilities.



Check-in/Ticketing

HNTB

IATA Check-in Levels of Service (ft^2/occupant)

Level of Service	A	B	C	D	E
Few Carts, Few Bags	18.3	15.1	12.9	11.8	9.7
Few Carts, 1-2 Bags per Pax.	19.4	16.1	14	12.9	11.8
High Cart Use	24.6	20.5	18.3	17.2	16.1
Heavy Flight Loads, High Cart Use, 2+ Bags per Pax.	28.0	24.8	21.5	20.5	19.4

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

- Recommend using IATA LOS C – 14 sf per passenger (few carts and an average of 1-2 bags per passenger)
- Full/Special Service Counters – 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

8

Security Screening Checkpoints

HNTB

IATA Government Inspection Levels of Service (ft²/occupant)

Level of Service	A	B	C	D	E
Space Standard (ft²/occupant)	15.0	12.9	10.8	8.6	6.5

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

- 95% of passengers during the peak hour should spend 10 minutes or less in queue at the security screening checkpoint (SSCP)
- All passengers should reach a TSA document checker within 15 minutes
- Passengers in the queue should be provided LOS C or better at all times – 10.8 sf per passenger

9

Customs/Immigration

HNTB

IATA Check-in Levels of Service (ft²/occupant)

Level of Service	A	B	C	D	E
Primary Passport Control	15.0	12.9	10.8	8.6	6.5
Bag Claim (excluding claim)	21.5	19.4	17.2	15.1	12.9
Exit Control and Secondary Processing Areas	19.4	16.1	14	12.9	11.8

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

- CBP target – 95% of passengers not requiring secondary should complete CBP processing in 45 minutes or less, measured from flight arrival to exit of CBP facility
- 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
- 95% of all passengers should complete their inbound passport control process within 15 minutes

10

Baggage Claim

IATA Baggage Claim Levels of Service - Retrieval & Peripheral Area (ft^2/occupant)					
Level of Service	**A**	**B**	**C**	**D**	**E**
Space Standard (ft^2/occupant)	21.5	19.4	17.2	15.1	12.9

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

- The retrieval and peripheral area where passengers wait to circulate to retrieve their checked bag from the carousel is 12 feet deep
- Level of service C should be used. Brief (no more than 15 minutes in duration) periods of LOS D are permissible during the peak hour. LOS E and F are not acceptable.

11

Departure Lounges

IATA Departure Lounge Levels of Service (ft^2/occupant)					
Level of Service	**A**	**B**	**C**	**D**	**E**
Space Standard (ft^2/occupant)	15.1	12.9	10.8	8.6	6.5

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

- IATA recommends 10.8 sf per passenger for departure lounges
- HNTB recommends using 17 sf per seated passenger and 12 sf per standing passenger
- Aircraft seat load factor = 90%
- Passengers not in a club (if applicable) = 80%
- 90% of remaining passengers are seated = 65% of seats on plane
- Podium and exit aisle = 900 sf for NB, 1,200 sf for WB

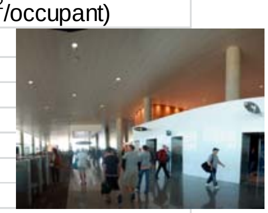
12

Passenger Corridors

HNTB

Passenger Space/Level of Service Definition for Corridor (ft^2/occupant)

Level of Service	Corridors/Common Areas
A	> 35
B	25 - 35
C	15 - 25
D	10 - 15
E	5 - 10
F	< 5



Source: Fruin, Pedestrian Planning and Design, 1971, rev 1987

- IATA recommends unaided maximum walking distance should not exceed 300 meters (or approximately 1,000 feet)
- 1.0 to 1.5 feet should be subtracted from the sides of each corridor for level of service calculations (Fruin)

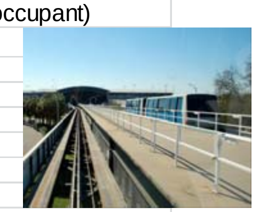
13

APM Platforms/Stations

HNTB

Passenger Space/Level of Service Definition for Platform (ft^2/occupant)

Level of Service	Corridors/Common Areas
A	> 13
B	10.0 - 13.0
C	5.9 - 10.0
D	3.0 - 5.9
E	2.0 - 3.0
F	< 2.0



Source: Fruin, Pedestrian Planning and Design, 1971, rev 1987

- Each passenger waiting on the APM platform should be provided approximately 10 sf of personal space based on Fruin's Level of Service C for a restricted circulation zone
- No waiting passenger should be denied boarding due to limited capacity.

14

Tampa International Airport

Gated Flight Schedule Summary

May 21, 2012

HNTB

1

Forecast Analysis

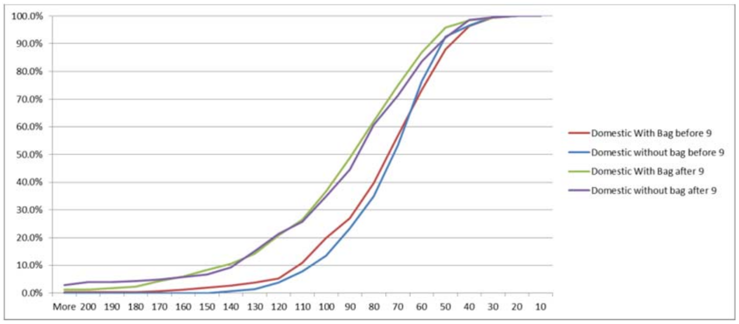
HNTB

- HNTB developed gated flight schedules for the average day during the peak month (March) of 2011 and for the forecasted average day peak month (also March) in 2031.
- Passenger traffic for intermediate years (2016, 2021 and 2026) was interpolated using a straight line (constant) growth rate between the 2011 and 2031 data points.
- Peak hour originating passengers were calculated two ways:
  – At the standard time of departure, 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

2

Forecast Analysis

HNTB



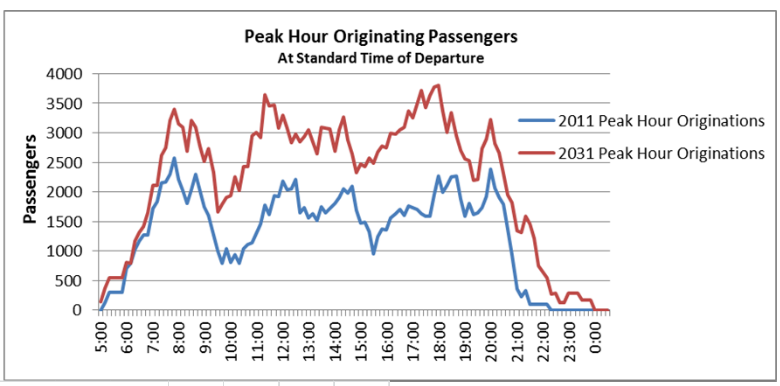
Passenger Arrival Curve developed by HNTB from passenger survey data collected by TransSolutions at TPA in December 2011

- Peak hour originating passengers are calculated by airside and in total.
- Peak hour terminating passengers are calculated by assigned baggage claim (red or blue) and in total.
- Departing flights were tallied in 10-minute increments and using a rolling peak hour.

3

Originating Passengers

HNTB



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

Departing Flights

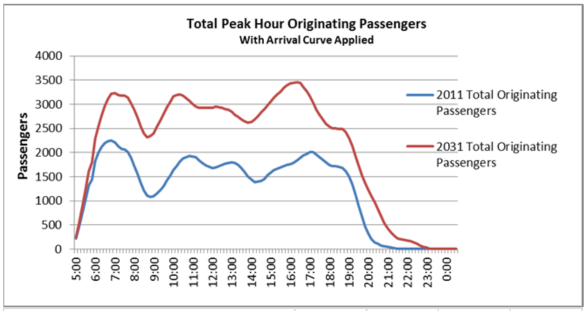
Airside		2011	2016	2021	2026	2031
A	Peak (10 min)	3	3	3	3	3
	Peak hour	7	7	8	8	9
C	Peak (10 min)	5	5	5	6	6
	Peak hour	13	14	15	17	18
E	Peak (10 min)	2	2	2	2	2
	Peak hour	6	6	6	7	7
F	Peak (10 min)	3	3	3	3	3
	Peak hour	6	7	7	8	9
Total	Peak (10 min)	9	9	9	9	9
	Peak hour	24	26	28	30	33

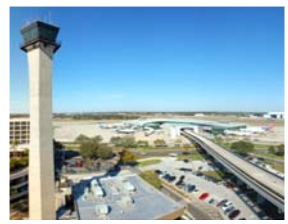
Source: HNTB Analysis

4

Originating Passengers

HNTB





Originating Passengers

With Passenger Arrival Curve Applied

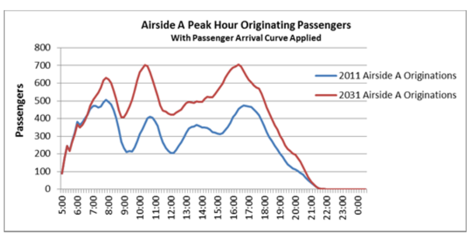
Airside		2011	2016	2021	2026	2031
A	Peak (10 min)	97	103	110	117	124
	Peak hour	505	549	597	649	706
C	Peak (10 min)	151	173	199	228	261
	Peak hour	842	968	1,114	1,281	1,473
E	Peak (10 min)	112	122	133	145	158
	Peak hour	577	649	730	821	923
F	Peak (10 min)	127	135	143	151	160
	Peak hour	593	664	743	831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

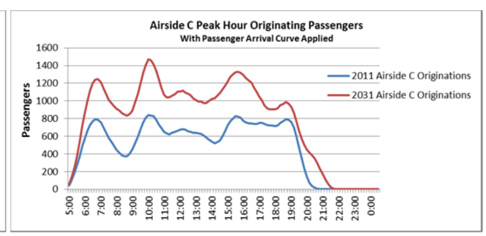
Source: HNTB Analysis

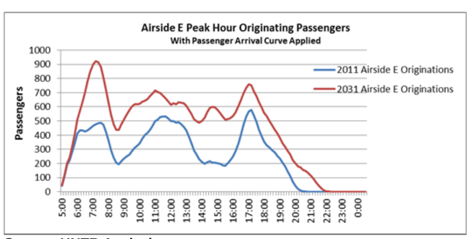
5

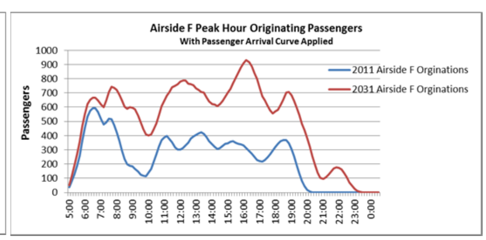
Originating Passengers by Airside

HNTB









Source: HNTB Analysis

Annual Passengers by Airside

Annual Passengers

Includes both enplaning and deplaning passengers

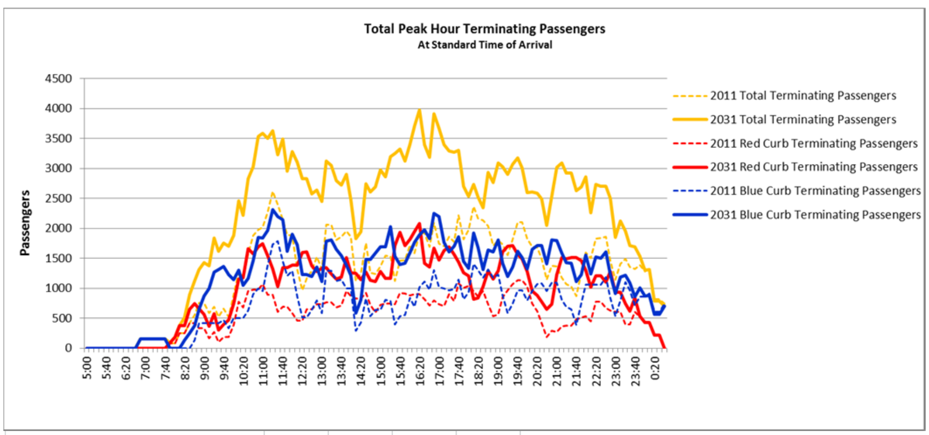
Airside		2011	2016	2021	2026	2031
A	Annual Passengers	3,434,911	3,801,984	4,208,285	4,658,005	5,155,785
C	Annual Passengers	6,718,340	7,612,840	8,626,436	9,774,986	11,076,457
E	Annual Passengers	3,084,182	3,585,957	4,169,367	4,847,694	5,636,380
F	Annual Passengers	3,494,618	4,132,772	4,887,459	5,779,961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

Airside		2011	2016	2021	2026	2031
A	Distribution %	20.5%	19.9%	19.2%	18.6%	18.0%
C	Distribution %	40.2%	39.8%	39.4%	39.0%	38.6%
E	Distribution %	18.4%	18.7%	19.0%	19.3%	19.6%
F	Distribution %	20.9%	21.6%	22.3%	23.0%	23.8%
Total	Distribution %	100.0%	100.0%	100.0%	100.0%	100.0%

Airside		2011	2016	2021	2026	2031
A	5-yr Growth Rate	0.00%	10.69%	10.69%	10.69%	10.69%
C	5-yr Growth Rate	0.00%	13.31%	13.31%	13.31%	13.31%
E	5-yr Growth Rate	0.00%	16.27%	16.27%	16.27%	16.27%
F	5-yr Growth Rate	0.00%	18.26%	18.26%	18.26%	18.26%
Total	5-yr Growth Rate	0.00%	14.45%	14.45%	14.45%	14.45%

Source: HNTB Analysis

Terminating Passengers



Terminating Passengers

At Standard Time of Arrival

Curb		2,011	2,016	2,021	2,026	2,031
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

8

Source: HNTB Analysis

HNTB

Tampa International Airport

Planning and Modeling Assumptions

May 21, 2012

9

Passenger Characteristics

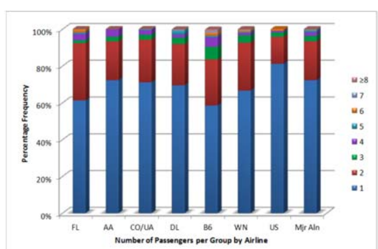
HNTB

- Group Sizes
  - Number of passengers traveling and checking-in together.
  - A combination of legacy airlines' data will be used for airlines that do not show up in the table below.

Overall Group Size Distribution

Passengers in Group	AirTran	American Airline	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	**1.56**	**1.38**	**1.38**	**1.47**	**1.78**	**1.48**	**1.26**	**1.40**

Source: Data collected at TPA by TransSolutions in December 2012
‡ The airlines include American Airlines, United/Continental, Delta, and US Airways



10

Passenger Characteristics

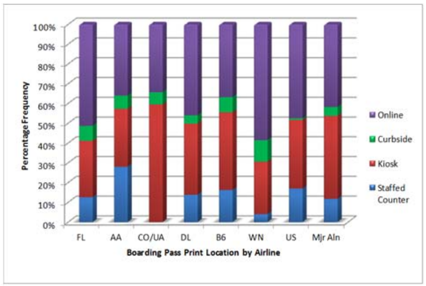
HNTB

- Boarding Pass Location
  - Online check-in has the highest (or close to highest) frequency among the passengers
  - A combination of legacy airlines' data will be used for airlines that do not show up in the table below.
  - At the United/Continental check-in lobby, all the positions were equipped with kiosks.

Boarding Pass Location

Boarding Pass Location	AirTran	American Airline	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%

Source: Data collected at TPA by TransSolutions in December 2012
‡ The airlines include American Airlines, United/Continental, Delta, and US Airways
*Includes "inline" kiosks, the kiosks located along with the ticket counters
**Includes mobile devices



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Passenger Characteristics

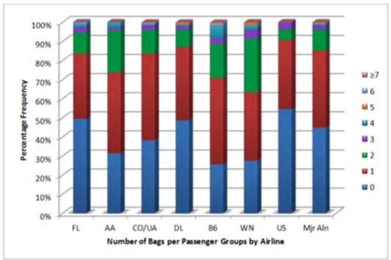
HNTB

- Checked Bags
  - Average bag/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, the average bags/pax is calculated.
  - The average number of checked bags per passengers varies by the airlines and mostly affected by the airlines' baggage fee policies. Southwest Airlines, which has no fee for the first two checked bags, has the highest average bags per passengers.
  - A combination of legacy airlines' data will be used for airlines that do not show up in the table below.

Checked Bags per Passenger Group

Number of Bags per Group	AirTran	American Airline	United/ Continental	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%	0.28%
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**

Source: Data collected at TPA by TransSolutions in December 2012
‡ The airlines include American Airlines, United/Continental, Delta, and US Airways



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Passenger Characteristics

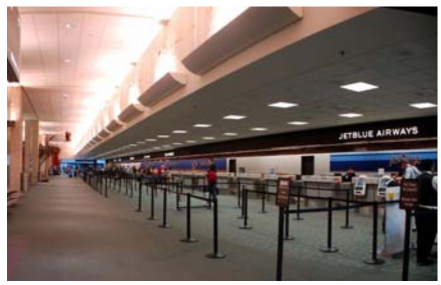
HNTB

- Check-in Location and Processing Times
  - Approximately 15% of passengers using the kiosk are assumed to need agent assistance requiring them to wait in the staffed counter/kiosk assist queue as well.
  - Passengers who check-in online and have to check bags go directly to the Bag Drop/Staffed positions in the check-in lobby.
  - 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.
  - A combination of legacy airlines' data will be used for airlines that do not show up in the table below.

Average Check-In Processing Time per *Passenger Group*

Airline	Staffed Counter (minutes)	Kiosk** (minutes)
AirTran	2.58	3.67
American Airline	2.68	--*
Continental/ United	N/A	3.89
Delta	2.62	3.36
Frontier	3.13	N/A
JetBlue	1.60	2.52
Southwest	--*	2.54
US Airways	--*	2.33
Major‡ Airlines	2.66	3.53

Source: Data collected at TPA by TransSolutions - Dec 2012
* Not enough data-points to draw a distribution
** Includes bag tagging time if passenger has bag(s)
‡ The airlines include American Airlines, United/Continental, Delta, and US Airways



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Check-in/Ticketing

HNTB

IATA Check-in Levels of Service (ft^2/occupant)

Level of Service	A	B	C	D	E
Few Carts, Few Bags	18.3	15.1	12.9	11.8	9.7
Few Carts, 1-2 Bags per Pax.	19.4	16.1	14	12.9	11.8
High Cart Use	24.6	20.5	18.3	17.2	16.1
Heavy Flight Loads, High Cart Use, 2+ Bags per Pax.	28.0	24.8	21.5	20.5	19.4

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

- Recommend using IATA LOS C – 14 sf per passenger (few carts and an average of 1-2 bags per passenger)
- Full/Special Service Counters – 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

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Department of Homeland Security

HNTB

- Security Screening Checkpoint (SSCP) Throughput
  - Single-lane configuration ranged between 124 and 212 passengers per hour
  - Double-lane configuration ranged between 225 and 300 passengers per hour

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 2012

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 2012

- Future SSCP lane throughput will average 180 pax per lane per hour, regardless of single or double-lane configuration

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Security Screening Checkpoints

HNTB

IATA Government Inspection Levels of Service (ft^2/occupant)

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

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

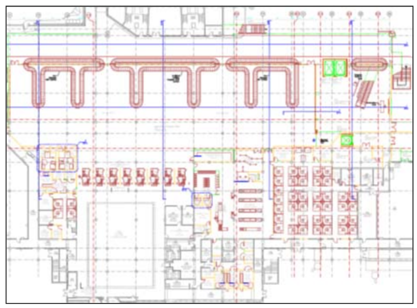
- 95% of passengers during the peak hour should spend 10 minutes or less in queue at the security screening checkpoint (SSCP)
- All passengers should reach a TSA document checker within 15 minutes
- Passengers in the queue should be provided LOS C or better at all times – 10.8 sf per passenger

16

Department of Homeland Security

HNTB

- Customs and Border Protection
  - Immigration processing
    - US passport holders – 80 passengers per hour
    - Foreign national passport holders - 45 passengers per hour
  - Exit Control Process
    - 7.5 seconds per passenger, or 8 passengers per minute
  - Secondary processing (including Customs) will not be modeled



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Customs/Immigration

HNTB

IATA Check-in Levels of Service (ft^2/occupant)

Level of Service	A	B	C	D	E
Primary Passport Control	15.1	12.9	10.8	8.6	6.5
Bag Claim (excluding claim)	24.8	20.5	18.3	17.2	16.2
Exit Control and Secondary Processing Areas	24.8	20.5	18.3	17.2	16.2

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

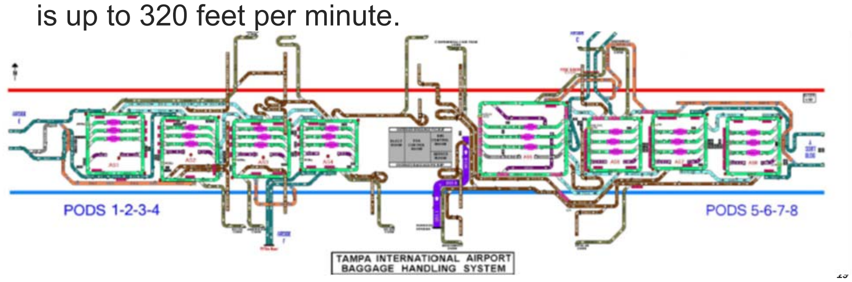
- CBP target – 95% of passengers not requiring secondary should complete CBP processing in 45 minutes or less, measured from flight arrival to exit of CBP facility
- IATA recommends an average distance between two individuals waiting in the same line (inter-person spacing) to be 2.6 to 3.0 feet at the inbound passport area
- 95% of all passengers should complete their inbound passport control process within 15 minutes

18

Department of Homeland Security

HNTB

- Checked Baggage Inspection System (CBIS)
  - Modeling current EDS configuration and each forecast year to determine point when demand exceeds system capacity
  - Baggage Screening Rate = 360 bags per hour
  - Using current TSA Planning Guidelines & Design Standards (PGDS) regarding on-screen resolution (OSR) and Level 3 screening to determine system performance.
  - Belt speed between terminal and 26 airside sortation devices is up to 320 feet per minute.



Baggage Claim

HNTB

- Baggage Claim Area Assignments
  - Existing baggage claim hall assignments maintained
  - New entrants assigned to least busy baggage claim curb
  - Current assignments:

<u>Red Claim Hall/Curb</u>

- Air Canada
- British Airways
- Cayman Airways
- Frontier
- Sky King
- Southwest Airlines/AirTran
- Spirit Airlines
- West Jet
- New Int'l Entrant 1
- New Int'l Entrant 2

<u>Blue Claim Hall/Curb</u>

- American
- Delta Air Lines
- JetBlue
- United
- US Airways
- New Domestic Entrant 1
- New Int'l Entrant 3
- New Int'l Entrant 4
- New Int'l Entrant 5

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Baggage Claim

HNTB

Baggage Claim					
IATA Baggage Claim Levels of Service - Retrieval & Peripheral Area (ft^2/occupant)					
Level of Service	**A**	**B**	**C**	**D**	**E**
Space Standard (ft^2/occupant)	24.8	20.5	18.3	17.2	16.2
Source: IATA Airport Development Reference Manual, 9th Edition, dated January 2004					

- The retrieval and peripheral area where passengers wait to circulate to retrieve their checked bag from the carousel is 12 feet deep
- Level of service C should be used. Brief (no more than 15 minutes in duration) periods of LOS D are permissible during the peak hour. LOS E and F are not acceptable.

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Departure Lounges

HNTB

IATA Departure Lounge Levels of Service (ft^2/occupant)					
Level of Service	**A**	**B**	**C**	**D**	**E**
Space Standard (ft^2/occupant)	15.1	12.9	10.8	8.6	6.5
Source: IATA Airport Development Reference Manual, 9th Edition, dated January 2004					

- IATA recommends 10.8 sf per passenger for departure lounges
- HNTB recommends using 17 sf per seated passenger and 12 sf per standing passenger
- Aircraft seat load factor = 90%
- Passengers not in a club (if applicable) = 80%
- 90% of remaining passengers are seated = 65% of seats on plane
- Podium and exit aisle = 900 sf for NB, 1,200 sf for WB

22

Commercial Program and Amenities

HNTB

- **Rental Car Facilities:** Facility requirements determined by TranSystems and HNTB Landside Planners
  - In terminal
  - Separate consolidated facility
- **Concessions:** *Food and Beverage, Merchandise, Duty Free, Services, Concessions Storage.* – HNTB will coordinate concessions requirements with Bhavesh Patel and Unison.

23

HCAA and Other Areas

HNTB

- **HCAA –** *Administrative Offices, Janitorial, Terminal Maintenance, etc.* – Meeting scheduled with Paul Ridgeway to discuss:
  - High level discussion regarding adequacy (deficiency or surplus) of available space today
  - Agreement on growth rate required (typically lower than passenger growth rate)
- **Loading Docks –** *Terminal and Airside* – HNTB will coordinate loading dock requirements with Bhavesh Patel and Unison.
  - High level discussion regarding adequacy (deficiency or surplus) of available space today
  - Factor in Consolidated Concessions Storage and Distribution
  - Agreement on growth rate required (typically lower than passenger growth rate)

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HCAA and Other Areas

HNTB

- **Concessions Offices –** *Administrative Offices* – HNTB will coordinate concessions requirements with Bhavesh Patel and Unison.:
  - High level discussion regarding adequacy (deficiency or surplus) of available space today
  - Agreement on growth rate required (typically little to none)
- **USO –** *Ticketing level plan has been incorporated* – USO determined to be adequately sized through Master Plan Update planning period.
- **Public Restrooms –** *Spaced no greater than 400 feet between facilities (i.e. maximum walking distance to a restroom should be 200 feet)* – Meeting scheduled for HNTB to discuss adequacy of current public restrooms with Paul Ridgeway.
  - Provide facilities for men, women, family or companion care and janitor closets at each location.
  - Fixture numbers based on codes and area occupancy

25

Areas Dependent on Configuration

HNTB

- **Mechanical, Electrical & Plumbing (MEP) and Communications Rooms (IT) –** Currently 9.6% of gross building area. Target: 10% – Meeting scheduled for HNTB to discuss adequacy of current MEP and IT areas with Paul Ridgeway.
- **Public and Non-public Circulation –** Currently 24.7% of gross building area. Target: 25%
- **Tug Drives –** Currently 6.8% of gross building area. Target: 6.8%

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Tampa International Airport

Terminal and Airside Facility Requirements

August 2, 2012

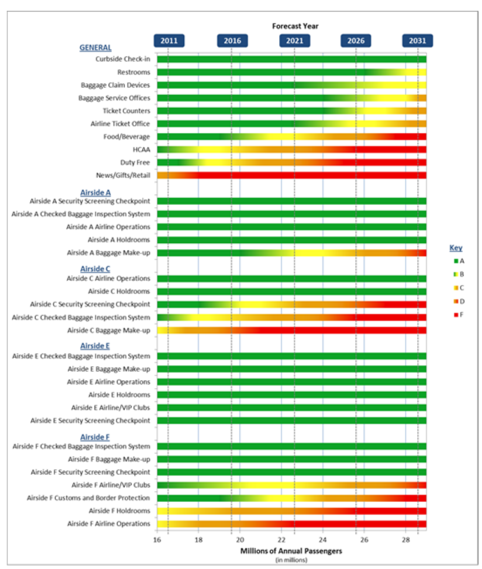
HNTB

1

Stoplight Chart

HNTB

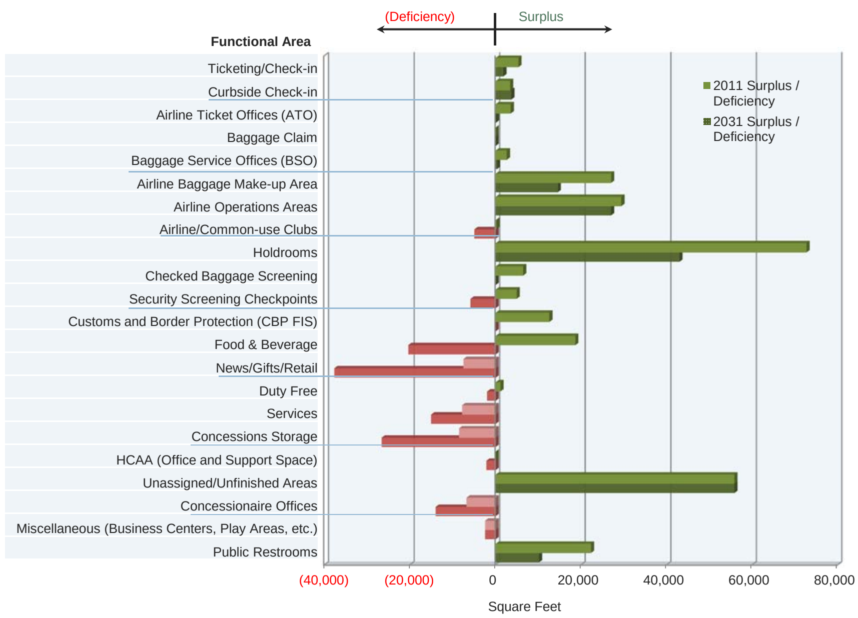
- The "Stoplight" chart illustrates each major terminal complex component and its associated level of service (LOS) throughout the planning horizon.
- This is a useful tool used to determine when to begin planning the replacement of facilities.



2

Terminal Space Needs

HNTB



3

Concessions

HNTB

- Concessions requirements are provided by Unison through the HCAA Concessions group.
- Preliminary annual area requirements (shown below) were provided to HNTB on July 9, 2012.
- Breakouts for each concession category by Airside and pre-security versus post-security will be provided to the Master Plan Update team around August 10th.
- Greatest deficiencies are found in News & Gifts/Retail and Services.
- Concession storage requirements need to be studied on ramp level at each airside.
- Analysis needed to potentially convert some surplus holdroom area to concessions.

Preliminary Space Requirements
(*Existing Square Footage Information Updated July 9, 2012*)

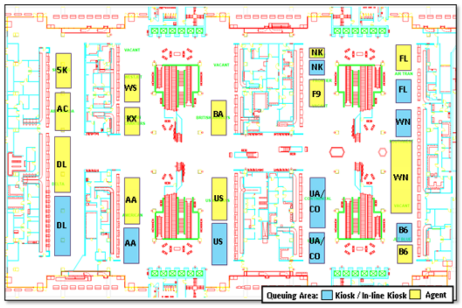
	SUF	Existing	2011	2016	2021	2026	2031
Food & Beverages	6.57	72,632	55,304	62,949	72,042	82,448	94,359
Retail Concessions	5.08	23,190	42,719	48,624	55,648	63,686	72,886
Duty Free	4.52	1,361	914	2,090	2,806	3,466	4,020
Subtotal		97,183	98,936	113,662	130,496	149,601	171,265
Services		760	9,894	11,366	13,050	14,960	17,126
Storage Space		17,245	24,734	28,416	32,624	37,400	42,816
Office Space		3,211	9,894	11,366	13,050	14,960	17,126
Total Requirements		**118,399**	**143,457**	**164,810**	**189,219**	**216,922**	**248,334**
Enplanements			8,411,737	9,574,536	10,957,622	12,540,500	14,352,032
International			202,129	462,273	620,770	766,789	889,337

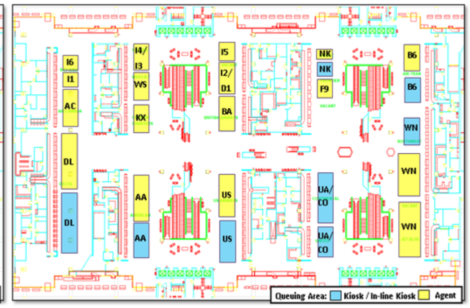
Notes:
SUFs are based on top 25% of comparable airports (Appendix)
Existing square footage from HNTB.
Enplanement projects from updated Master Plan forecast dated May 9, 2012.

4

Ticketing/Check-in

HNTB





2011

	Existing	Req'd
❑ Agent Positions/In-line Kiosks	210	156
❑ Standalone Kiosks	15	15
❑ Curbside Check-in Positions	82	32

- ❑ 32 vacant agent check-in positions
- ❑ 48 vacant curbside check-in positions
- ❑ All airlines serve pax at LOS A, except AirTran and Southwest, whose agent positions have queues with LOS C for short periods.

Note: Ticketing/Check-in/Curbside counter requirements are being reviewed via telephone survey with respective airline facilities and properties staff and are subject to change based on the results of this survey. Any changes will be coordinated with HCAA.

2031

	Existing	Req'd
❑ Agent Positions/In-line Kiosks	210	192
❑ Standalone Kiosks	15	15
❑ Curbside Check-in Positions	82	28

- ❑ 12 vacant agent check-in positions
- ❑ 52 vacant curbside check-in positions
- ❑ Most airlines serve pax at LOS A. AA, DL, NK, and International Entrant 4 have agent position queues with LOS B for short periods. B6, F9, WN, and International Entrant 5 have agent position queues with LOS C for short periods.

5

ATO, Airline Operations, & BSO Areas

HNTB

ATO Offices

❑ Existing ATO office area	19,644 sf
❑ Currently leased ATO office area	15,957 sf
❑ *2011 surplus*	*3,507 sf*
❑ New entrant airline ATO area requirement	550 sf each
❑ 2031 ATO office area requirement	19,628 sf
❑ *2031 surplus*	*36 sf*

Airline Operations Areas (Airside)

❑ Existing airline operations area	118,810 sf
❑ Currently leased airline ops area	89,462 sf
❑ *2011 surplus*	*29,348 sf*
❑ New entrant airline ops area requirement	500 sf each
❑ 2031 airline ops area requirement	91,889 sf
❑ *2031 surplus*	*26,921 sf*

Baggage Service Offices (BSO)

❑ Existing BSO area	6,922 sf
❑ Currently leased BSO area	4,336 sf
❑ *2011 surplus*	*2,586 sf*
❑ New entrant BSO area requirement	330 sf each
❑ 2031 BSO area requirement	6,646 sf
❑ *2031 surplus*	*276 sf*

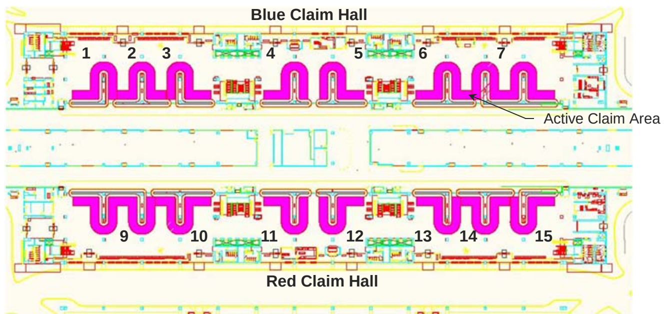
Note: These three functional areas are being reviewed via telephone survey with the respective airline facilities and properties staff and are subject to change based on the results of this survey. Any changes will be coordinated with HCAA.

6

Baggage Claim

HNTB

- ❑ The number of passengers waiting in the active claim area determines the level of service of each baggage claim carousel.
- ❑ The existing baggage claim carousels served passengers at LOS A or B in 2011 (Baggage Claims 1 and 3 each hit LOS B once a day).
- ❑ By 2031, 6 of the 14 baggage claim carousels will be operating at LOS B, typically only once per day. The remaining carousels maintain LOS A.



Baggage Make-up Area - Carts

HNTB

Airside	Existing Cart/ Dolly Capacity	2011 Cart Req't	2031 Cart Req't
❑ **A**	48	35	49
Surplus / (Deficiency)		*13*	*(1)*
❑ **C**	46	47	67
Surplus / (Deficiency)		*(1)*	*(21)*
❑ **E**	70	28	33
Surplus / (Deficiency)		*42*	*37*
❑ **F**	66	35	49
Surplus / (Deficiency)		*36*	*16*

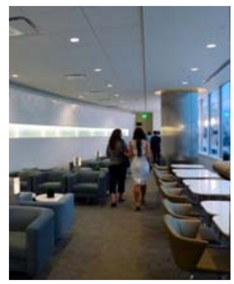
- ❑ Airside A has sufficient space to add two additional carousels to serve up to 16 carts should demand or number of carriers served at Airside A require additional capacity.
- ❑ Airside C requires approximately 6,500 sf of additional baggage make-up area, plus tug circulation.

Note: Baggage make-up requirements are being reviewed via telephone survey with respective airline facilities and properties staff and are subject to change based on the results of this survey. Any changes will be coordinated with HCAA.

Airline / Common-use Clubs

- Current airline clubs will remain:
  - Airside E: Delta Air Lines – 7,422 sf
  - Airside F: US Airways – 6,568
- Existing airline club space will be reviewed with airline properties and facilities staff. Modifications, if any, will be coordinated HCAA.
- Proposed Airside F Common-use Club – 3,040 sf

- Assumption: Three new entrant international carriers will serve TPA as early as 2021 driving the need for an additional 2,500 sf of common-use club area near the international gates.
- Assumption: Three additional new entrant international carriers will serve TPA by 2031 driving the need for an additional 2,500 sf of common-use club area near international gates.



9

Holdrooms

N

Airside E

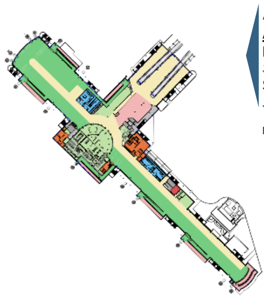
Area	Existing	2011	2031
North Holdrooms	22,341 sf	15,200 sf	15,913 sf
Surplus / (Deficiency)		*7,141 sf*	*6,428 sf*
South Holdrooms	20,409 sf	9,117 sf	14,625 sf
Surplus / (Deficiency)		*11,292 sf*	*5,784 sf*

Note: Airside E has 4 unoccupied (spare) gates in 2011 and 1 unoccupied gate in 2031

Airside C

Area	Existing	2011	2031
North Holdrooms	30,751 sf	21,151 sf	24,106 sf
Surplus / (Deficiency)		*9,600 sf*	*6,645 sf*
South Holdrooms	19,871 sf	10,993 sf	12,769 sf
Surplus / (Deficiency)		*8,878 sf*	*7,102 sf*

Note: Airside C has 1 unoccupied (spare) gate in 2011 and 0 unoccupied gates in 2031



Airside F

Area	Existing	2011	2031
North Holdrooms	18,017 sf	17,381 sf	19,610 sf
Surplus / (Deficiency)		*636 sf*	*(1,593) sf*
South Holdrooms	15,610 sf	13,885 sf	15,272 sf
Surplus / (Deficiency)		*1,725 sf*	*338 sf*

Note: Airside F has 2 unoccupied (spare) gates in 2011 and 0 unoccupied gates in 2031

Airside A

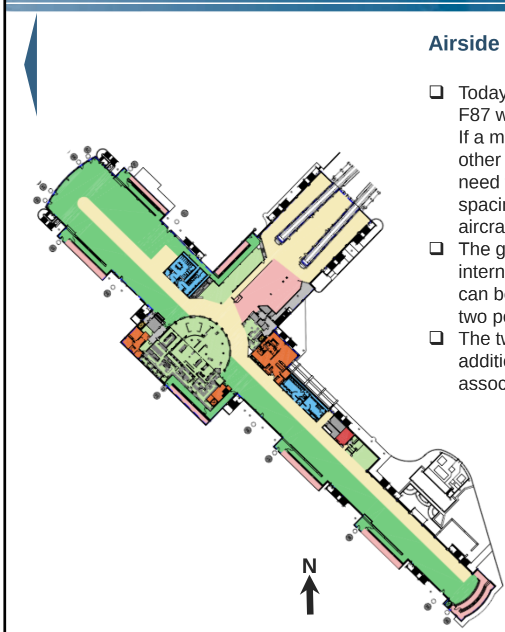
Area	Existing	2011	2031
North Holdrooms	18,185 sf	9,990 sf	11,960 sf
Surplus / (Deficiency)		*8,195 sf*	*6,225 sf*
South Holdrooms	28,704 sf	12,724 sf	19,100 sf
Surplus / (Deficiency)		*15,980 sf*	*9,604 sf*

Note: Airside C has 7 unoccupied (spare) gates in 2011 and 3 unoccupied gates in 2031

10

Gates/Holdrooms

HNTB



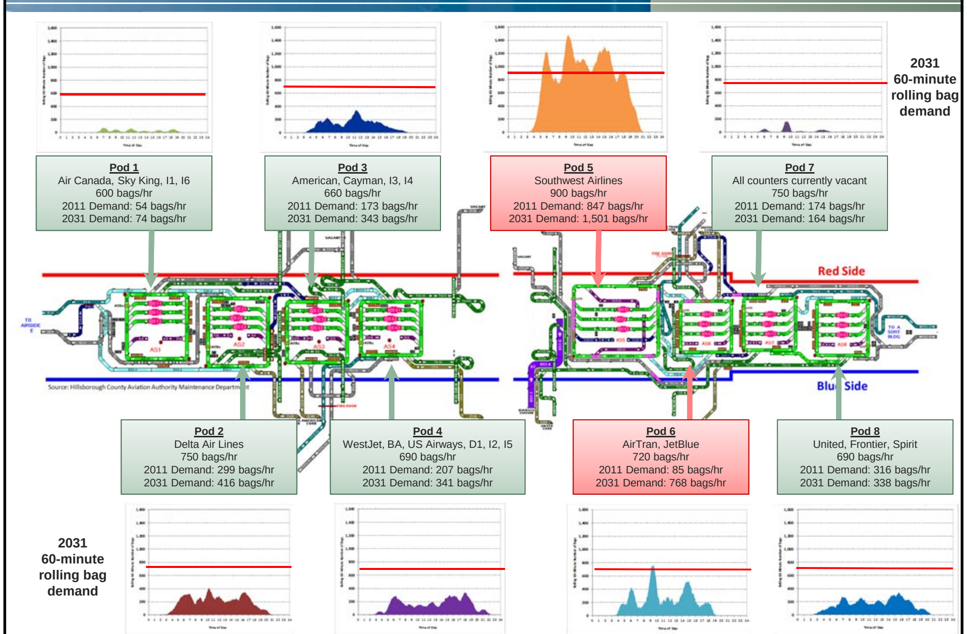
Airside F Gates and Holdrooms

- Today, US Airways parks their aircraft at Gates F82 – F87 with less than industry standard wingtip clearance. If a minimum 20' wingtip clearance was enforced or other airlines use these gates, the parking positions will need to be reconfigured to meet industry standard spacing. HCAA Planning estimates up to two existing aircraft parking positions may be lost at Airside F.
- The gated flight schedule for 2031 has two more international widebody aircraft parking positions than can be accommodated at the existing Airside F. These two positions require access to the CBP facility.
- The two international widebody gates generate an additional holdroom requirement of 6,610 sf, plus associated circulation and MEP areas.

11

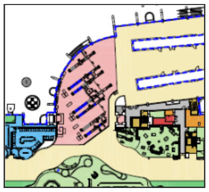
Checked Baggage Inspection System

HNTB



Security Screening Checkpoints

HNTB

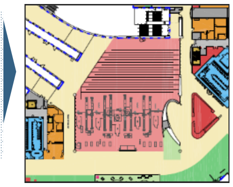


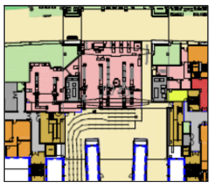
Airside A

	2011	2031
Rolling 60-minute Passengers:	532	716
Existing number of lanes:	7	
SSCP Lanes Required:	4	5
Surplus / (Deficiency)	3	2
Level of Service:	A	A

Airside C

	2011	2031
Rolling 60-minute Passengers:	1,015	1,747
Existing number of lanes:	8	
SSCP Lanes Required:	8	12
Surplus / (Deficiency)	0	(4)
Level of Service:	A	F
LOS with 4 additional SSCP lanes (12 total):	-	A





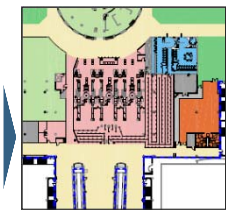
Airside E

	2011	2031
Rolling 60-minute Passengers:	566	842
Existing number of lanes:	7	
SSCP Lanes Required:	5	6
Surplus / (Deficiency)	2	1
Level of Service:	A	B

Airside F

	2011	2031
Rolling 60-minute Passengers:	527	872
Existing number of lanes:	5	6
SSCP Lanes Required:	5	6
Surplus / (Deficiency)	0	0
Level of Service:	A	A

Note: Airside F is being reconfigured with 6 SSCP lanes prior to 2016.



13

Customs and Border Protection

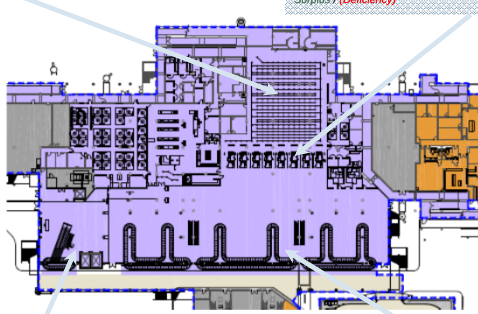
HNTB

Primary Immigration Queue

Level of Service	2011	2031
US Citizen/Resident	A	A
Foreign National	A	A
Peak hour passengers	230	906
Maximum pax in queue	127	238

Primary Immigration Processing Booths

	2011	2031
Existing and proposed booths	12	16
US Citizen/Resident req't	4	6
Foreign National req't	8	12
Total required	12	18
Surplus / (Deficiency)	0	(2)



Proposed Customs and Border Protection facility reconfiguration scheduled to open prior to 2016

Exit Control

Level of Service	2011	2031
2 Exit Control Agents	A	-
3 Exit Control Agents	-	A
Peak hour passengers	230	881

Baggage Claim

Level of Service	2011	2031
1 Baggage Claim Device	A	-
3 Baggage Claim Devices	-	A

14

Restrooms

HNTB

Airport restrooms are typically not adequately sized when using local building codes; even those designated for "transportation facilities".

HNTB uses industry proven planning factors to calculate airport restrooms area requirements:

- ❑ 4 sf per peak hour passenger for secure side restrooms (Airsides)
- ❑ 2 sf per peak hour passenger for non-secure restrooms (Terminal area)

Restrooms

Location	Existing Area (sf)	Peak Hr Pax 2011	Peak Hr Pax 2031	Area Req't (sf) 2011	Area Req't (sf) 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
Assumption	4	sf/pk hr pax secure side			
	2	sf/pk hr pax non-secure side			

- ❑ 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 per fixture is 55 sf. Therefore, this shortfall equates to approximately 1 ½ fixtures.

15

Other Areas

HNTB

HCAA Offices and Support Areas

- ❑ Growing by 550 sf every 5 years through 2031. This supports adding two medium size offices, two 8'x8' cubicles, and associated circulation space per milestone period.

Loading Docks

- ❑ Existing loading docks are sufficiently sized to support future needs at landside and airsides. Assuming consolidated concessions distribution center will be implemented in near to mid-future. No growth anticipated.

Unassigned/Unfinished Areas

- ❑ 55,758 sf of unassigned or unfinished areas identified throughout the terminal complex. The majority of these spaces are located on the ramp level of the airsides.

Concessionaire Offices

- ❑ There is currently 3,077 sf of concessionaire offices located on the mezzanine of Airside E. HCAA Concessions consultant recommends 9,894 sf of office space in 2011, growing to 17,126 sf by 2031. This growth supports multiple concessionaire vendor contracts in the future. Not all concessionaire office space needs to be accommodated in the terminal or airsides.

United Services Organization (USO)

- ❑ New USO is 1,401 sf. No additional USO facilities are anticipated through the planning horizon.

Miscellaneous (Business Centers, Play Areas, etc.)

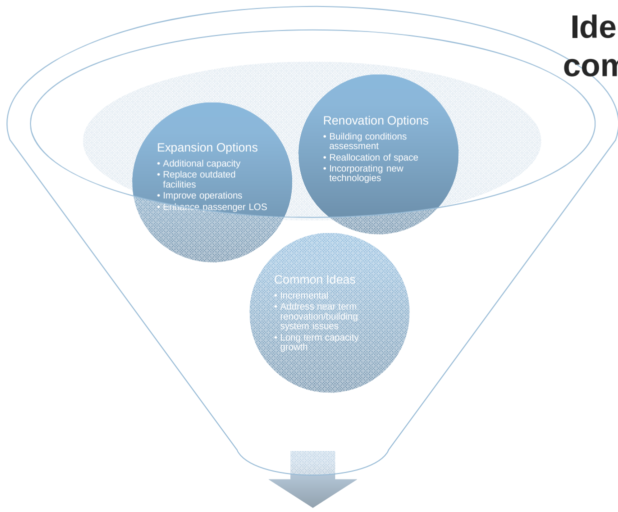
- ❑ There is approximately 6,767 sf of existing business center and play area space located on Airsides A and E. An additional 2,500 sf is allocated to this category to provide a similar high passenger level of service features at Airsides C and F.

16

Merging Requirements with Vision

HNTB

Identify key components

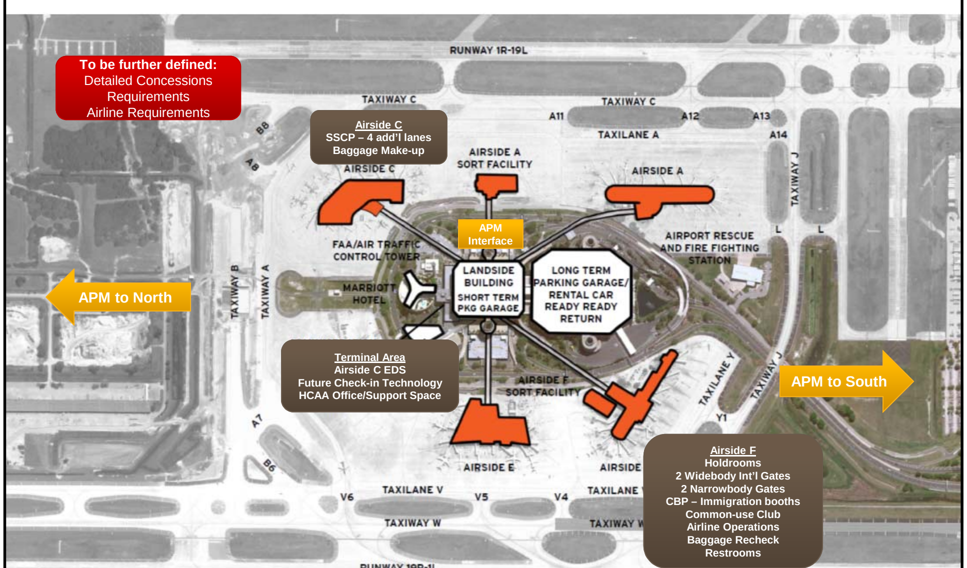


Development Solution

17

Marrying Requirements with Vision

HNTB



18

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Outline

1 ***AIRSIDE C-D***
- ❑ AIRCRAFT LAYOUTS / OPTIONS
- ❑ FIS OPTIONS
- ❑ TRACON/ATCT INTEGRATION

2 ***FUTURE APM (MAIN TERMINAL)***
- ❑ SOUTH OF TERMINAL
- ❑ EAST OF TERMINAL
- ❑ TERMINAL ACCESS

3 ***TRANSFER LEVEL***
- ❑ AIRSIDE APM OPTIONS
- ❑ MEETER/GREETER

4 ***TICKETING***
- ❑ FUTURE CHECK-IN / BAG DROP

5 ***SOUTH & EAST LAND USE***
- ❑ SOUTH LAND USE
- ❑ EAST LAND USE

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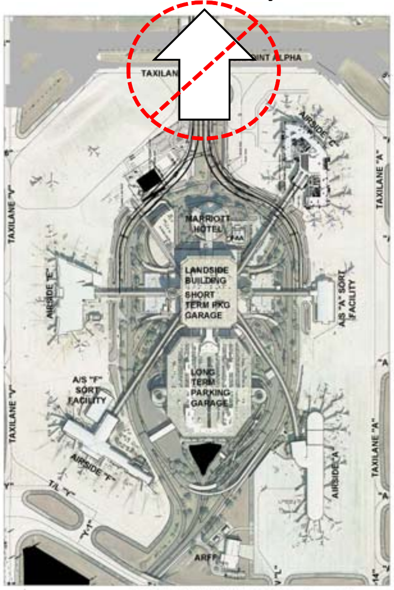
What is a CHARRETTE?

- What is a **CHARRETTE**?
  - *A Charrette is a collaborative session in which a group quickly generates ideas to solve a design challenge. The structure varies depending on the design problem and the individuals in the group.*

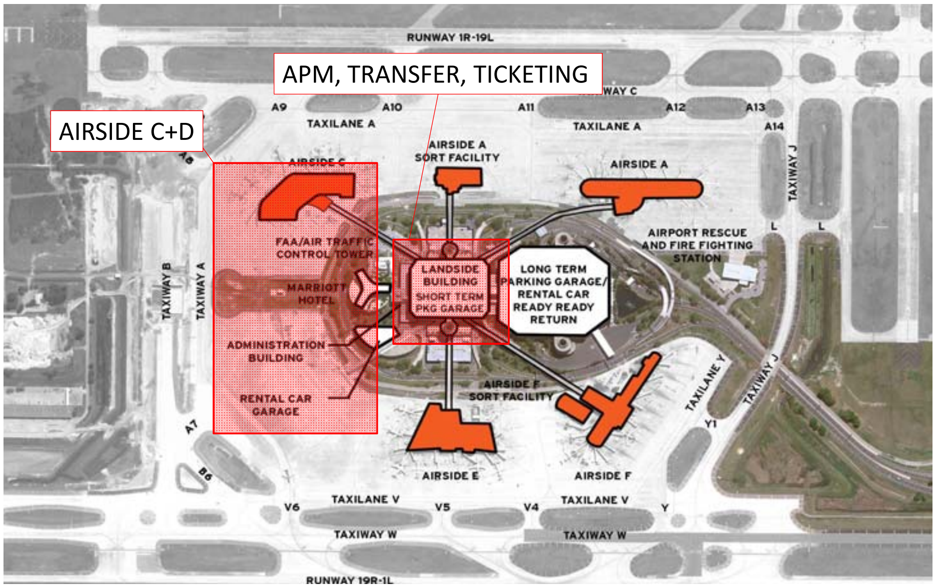
- Charrette Rules
  - Keep an open mind.
  - Start with a clean slate.
  - No idea is a bad idea.
  - Work with the process.
  - All ideas are a work in progress.
    (nothing is final)

GOAL - Priority



✓ *Does it defer building a billion dollar North Terminal?*

Overview



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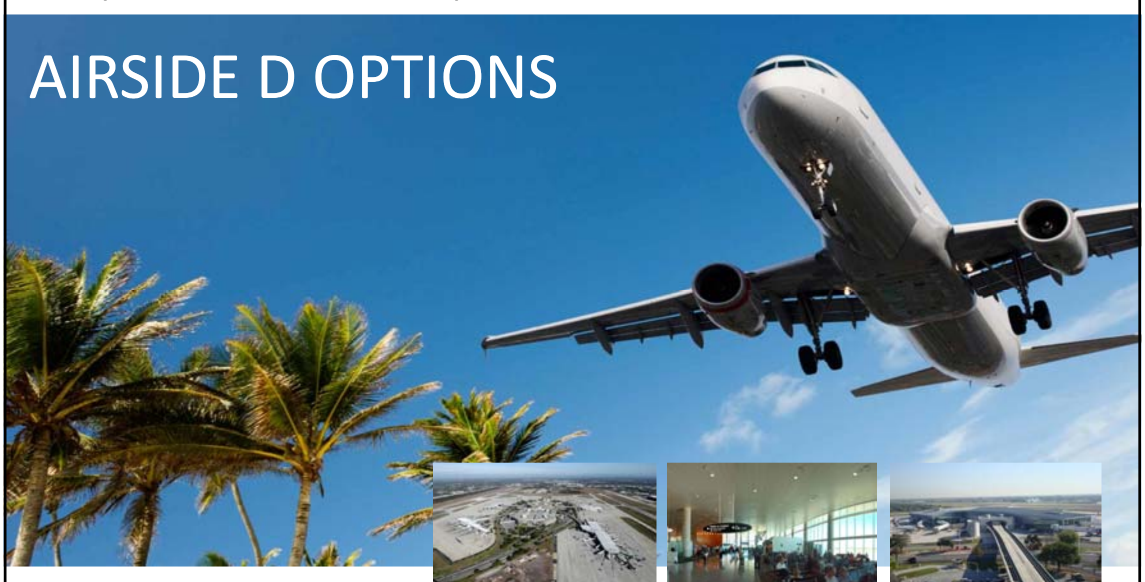

1 Airside D Options

Airside D

- Criteria/Program
- Integration with Airside C (WN)
- FIS
- Integration with ATCT/TRACON

Aircraft Requirements:

		C	D
III	737-800w	14	10
IV	757-200w/300	2	3
V	787-900	0	2
V	747-400	0	1
		16	16

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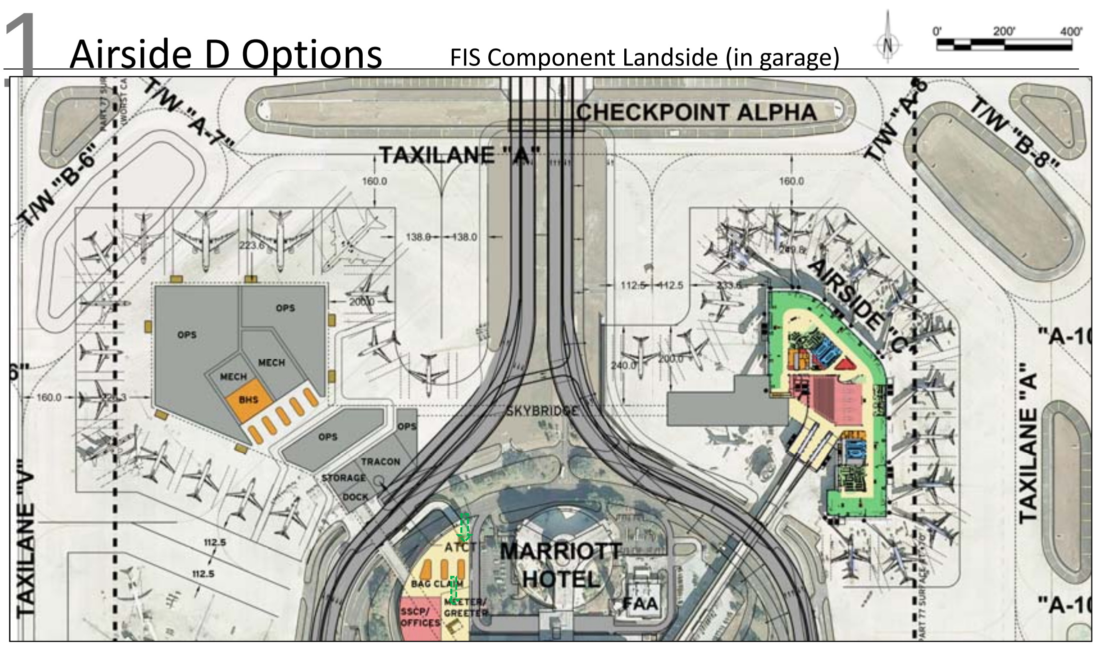
1 Airside D Options

FIS Component Landside (in garage)



D = 16 AIRCRAFT | OPTION 1 | C = 16 AIRCRAFT

APRON LEVEL

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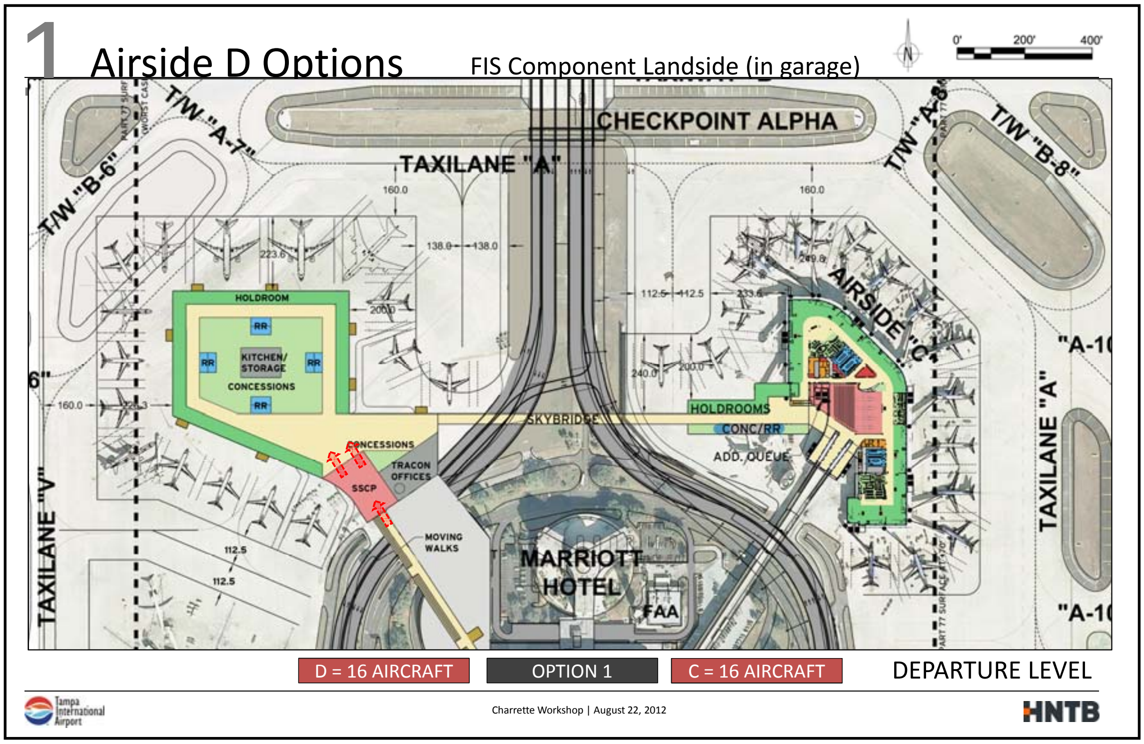
1
Airside D Options
FIS Component Landside (in garage)
CHECKPOINT ALPHA
TAXILANE "A"
T/W "A-7"
T/W "B-6"
T/W "A-8"
T/W "B-8"
HOLDROOM
KITCHEN/ STORAGE
CONCESSIONS
RR
SKYBRIDGE
CONCESSIONS
TRACON OFFICES
SSCP
MOVING WALKS
MARRIOTT HOTEL
FAA
AIRSIDE "C"
HOLDROOMS
CONC/RR
ADD. QUEUE
TAXILANE "V"
TAXILANE "A"
D = 16 AIRCRAFT
OPTION 1
C = 16 AIRCRAFT
DEPARTURE LEVEL
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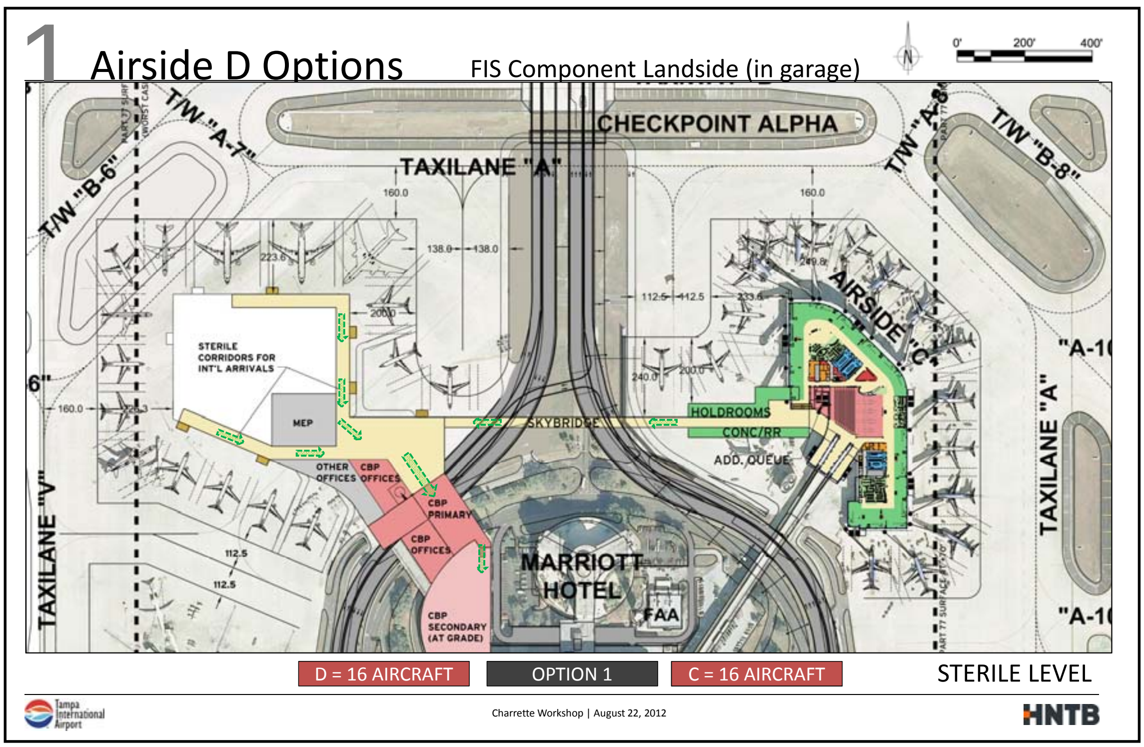
1
Airside D Options
FIS Component Landside (in garage)
CHECKPOINT ALPHA
TAXILANE "A"
T/W "A-7"
T/W "B-6"
T/W "A-8"
T/W "B-8"
STERILE CORRIDORS FOR INT'L ARRIVALS
MEP
SKYBRIDGE
OTHER OFFICES
CBP OFFICES
CBP PRIMARY
CBP OFFICES
CBP SECONDARY (AT GRADE)
MARRIOTT HOTEL
FAA
AIRSIDE "C"
HOLDROOMS
CONC/RR
ADD. QUEUE
TAXILANE "V"
TAXILANE "A"
D = 16 AIRCRAFT
OPTION 1
C = 16 AIRCRAFT
STERILE LEVEL
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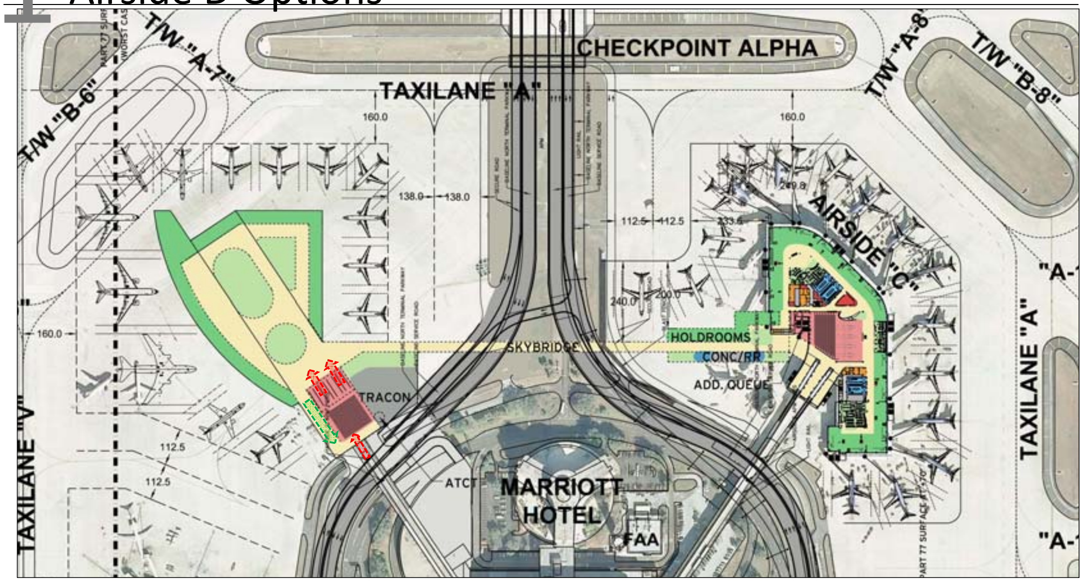
1 Airside D Options



D = 14 AIRCRAFT | OPTION 2 | C = 16 AIRCRAFT | DEPARTURE LEVEL

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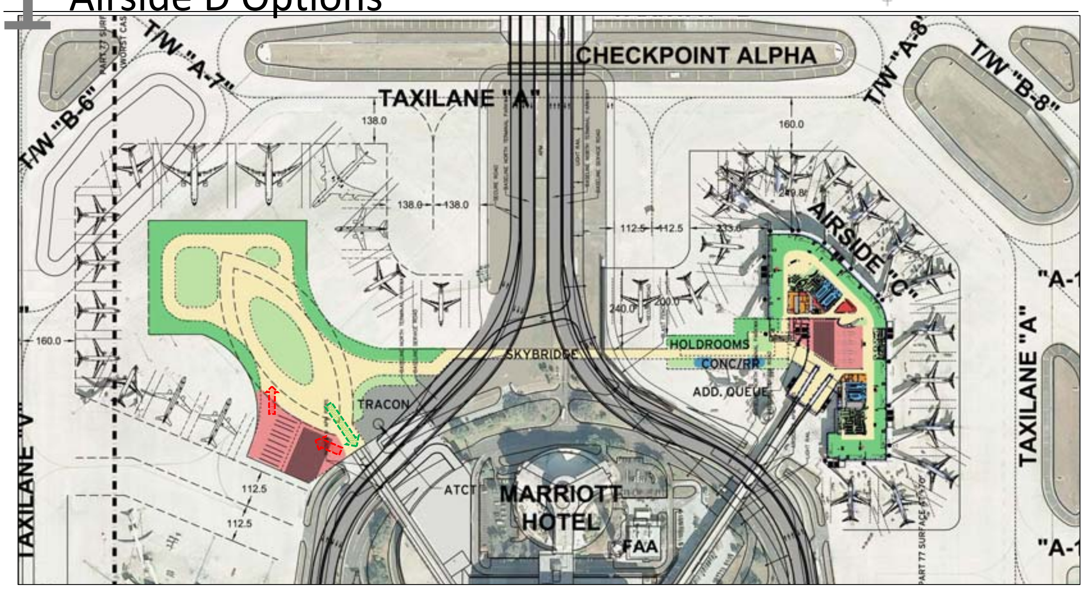
1 Airside D Options



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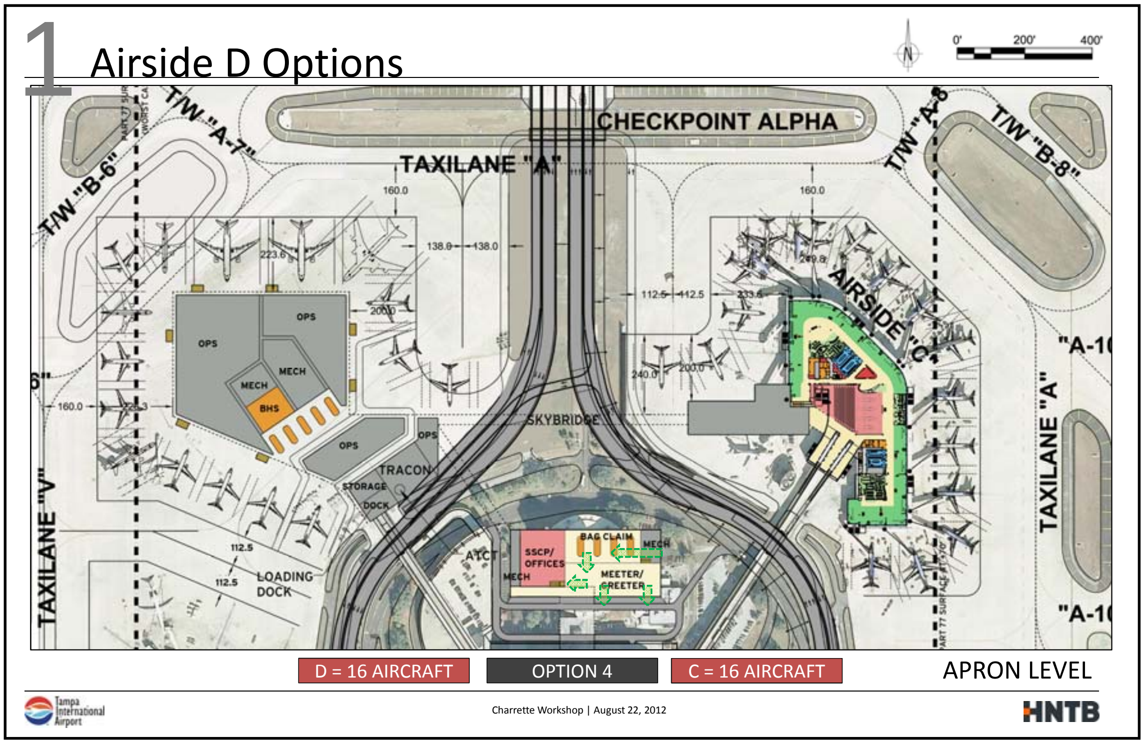
1 Airside D Options
CHECKPOINT ALPHA
TAXILANE "A"
T/W "A-7"
T/W "B-6"
T/W "A-8"
T/W "B-8"
TAXILANE "V"
TAXILANE "A"
AIRSIDE "C"
SKYBRIDGE
OPS
MECH
BHS
TRACON
STORAGE
DOCK
LOADING DOCK
ATCT
SSCP/ OFFICES
BAG CLAIM
MEETER/ GREETER
D = 16 AIRCRAFT
OPTION 4
C = 16 AIRCRAFT
APRON LEVEL
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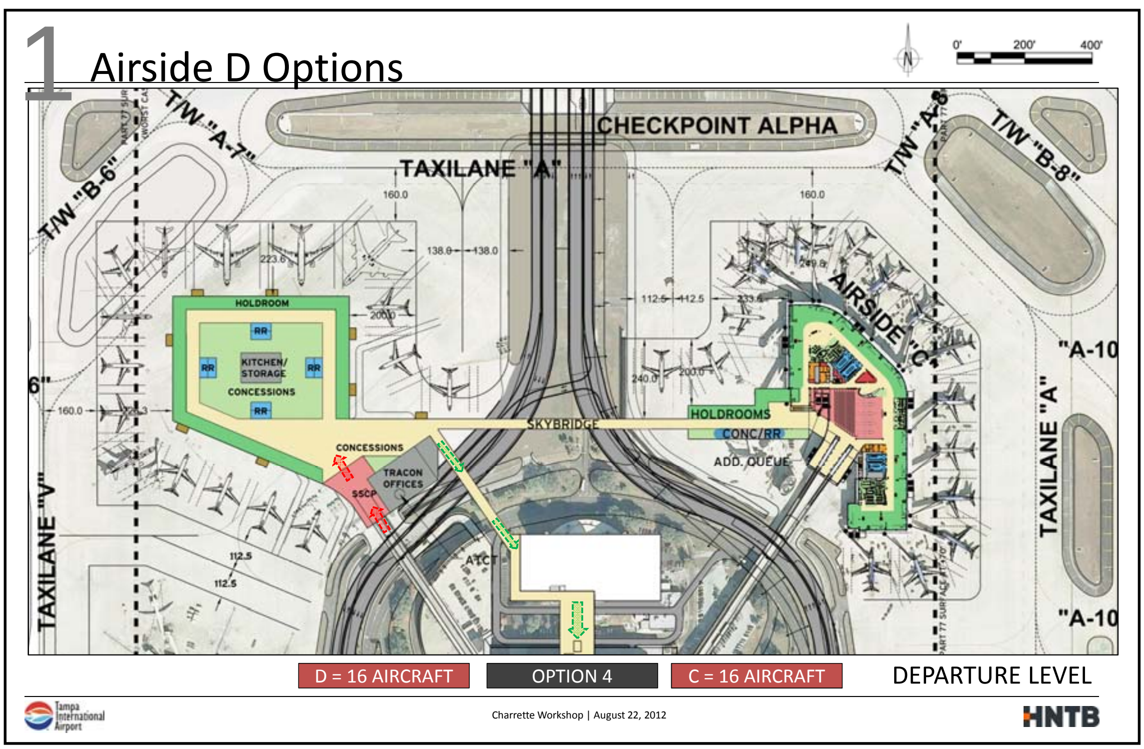
1 Airside D Options
CHECKPOINT ALPHA
TAXILANE "A"
T/W "A-7"
T/W "B-6"
T/W "A-8"
T/W "B-8"
TAXILANE "V"
TAXILANE "A"
AIRSIDE "C"
HOLDROOM
RR
KITCHEN/ STORAGE
CONCESSIONS
SKYBRIDGE
SSCP
TRACON OFFICES
ATCT
HOLDROOMS
CONC/RR
ADD. QUEUE
D = 16 AIRCRAFT
OPTION 4
C = 16 AIRCRAFT
DEPARTURE LEVEL
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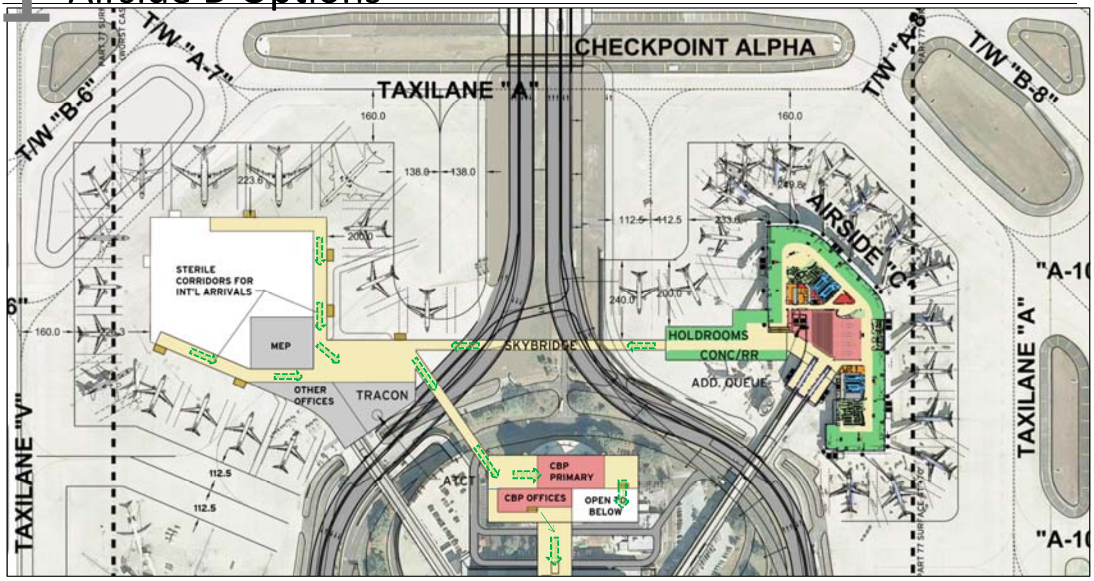
1 Airside D Options



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STERILE LEVEL

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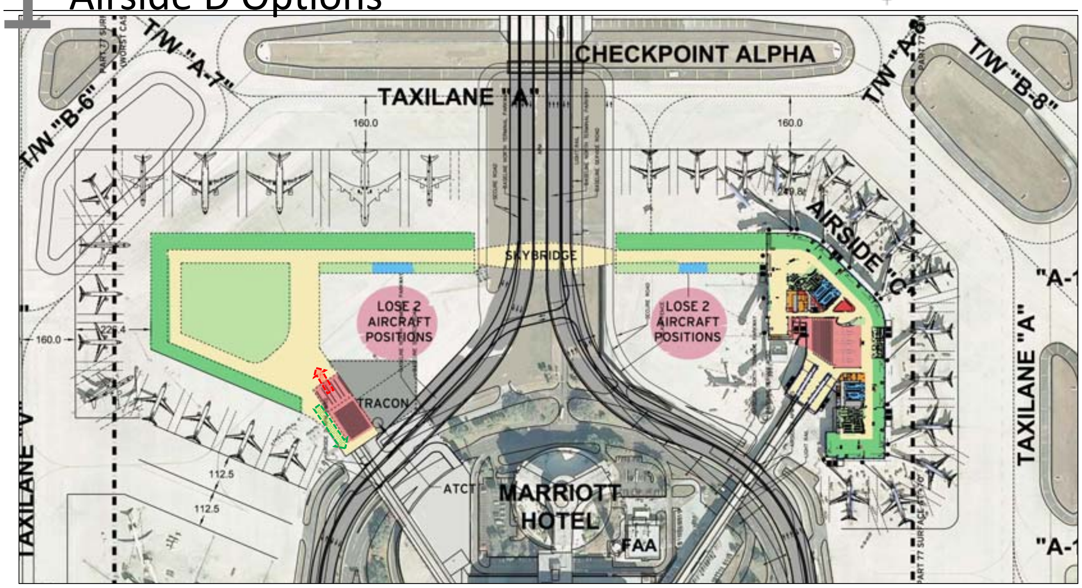
1 Airside D Options



D = 14 AIRCRAFT | OPTION 5 | C = 14 AIRCRAFT

DEPARTURE LEVEL

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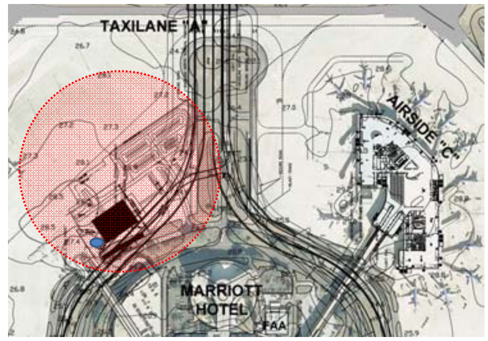
1 Airside D Options – Integrated TRACON/ATCT

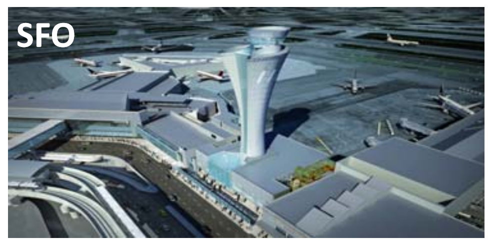
CONSOLIDATED FOOTPRINT

- Land Efficiency for Future

COMPONENTS

- TRACON Offices
- ATCT
- Parking
  - Surface vs. Parking Garage
- Phasing





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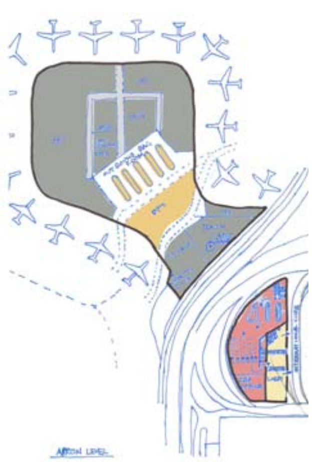
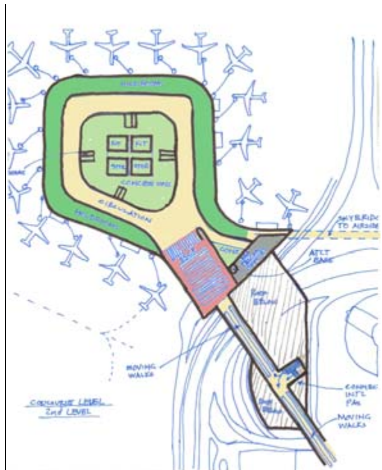
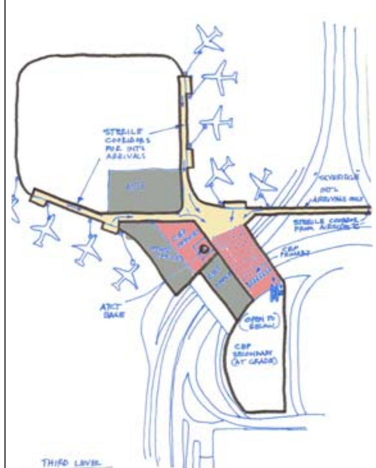
1 Airside D Options – FIS (Red Garage Option)



Apron Level



Departure Level



Sterile Level

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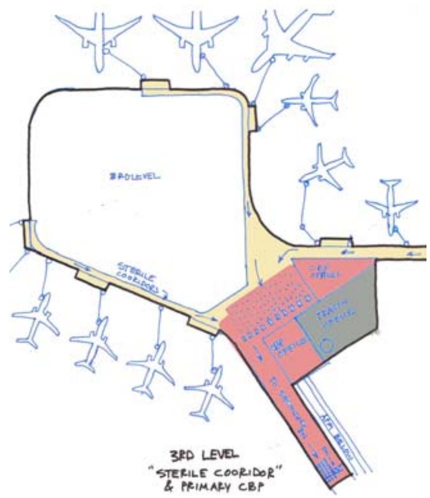
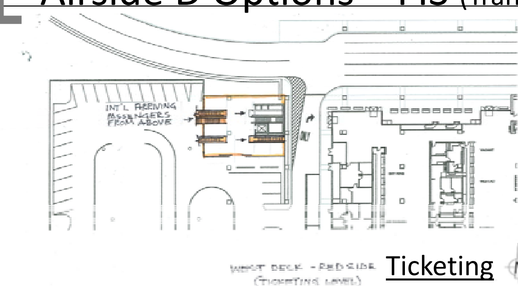
1 Airside D Options – FIS (Transfer Level Connection)

Departure Level

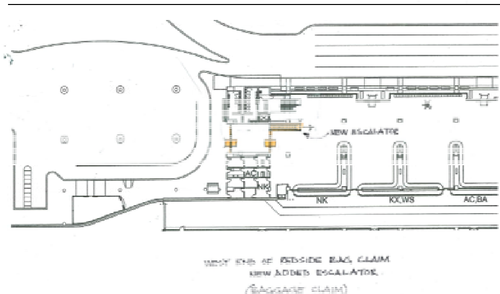


Sterile Level

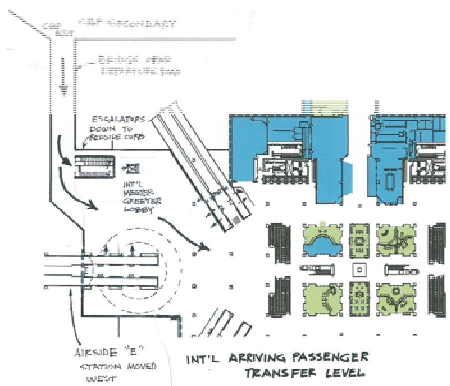
1 Airside D Options – FIS (Transfer Level Connection)



Ticketing



Baggage



Transfer

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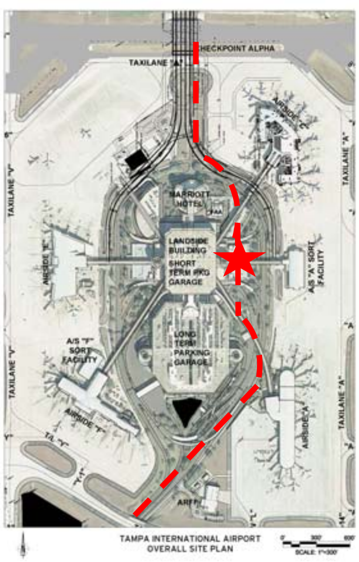
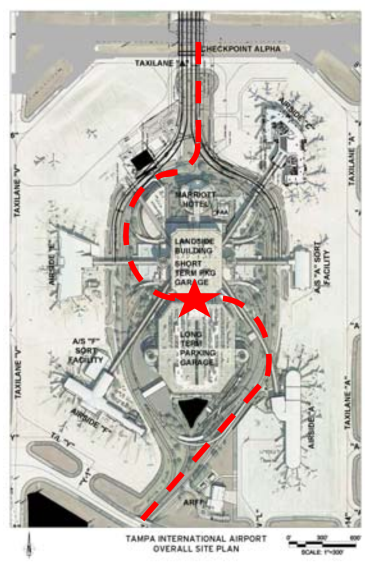
FUTURE APM

2 Future APM (East vs. South)



EAST APM

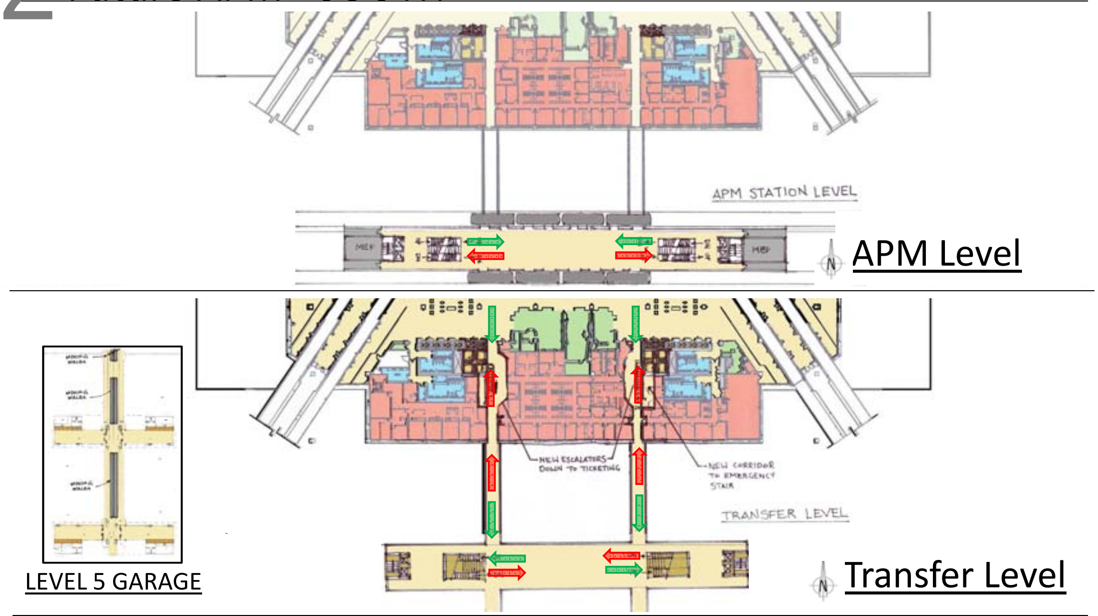
Source: Lea+Elliott



SOUTH APM

2 Future APM - SOUTH

Departures
Arrivals



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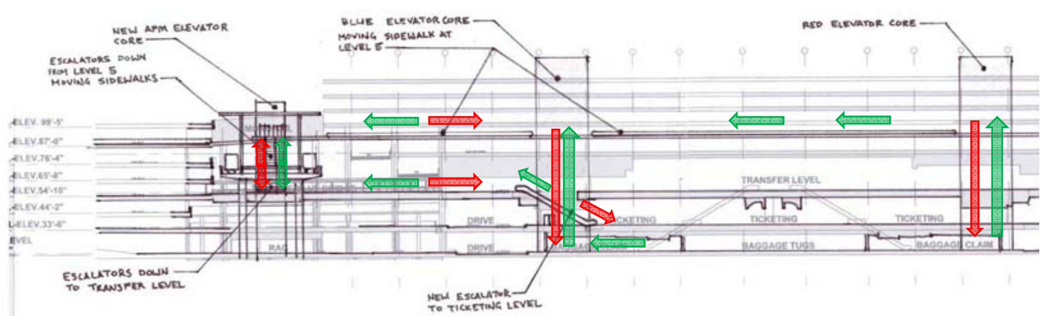
2 Future APM - SOUTH

Departures
Arrivals



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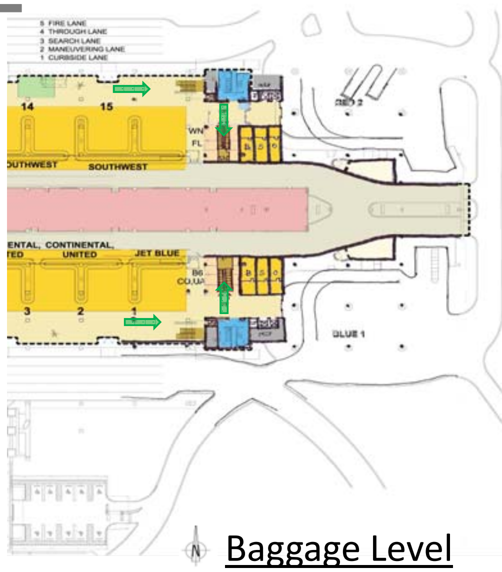
2 Future APM - EAST

Departures

Arrivals



Baggage Level

Ticketing Level

Tampa International Airport

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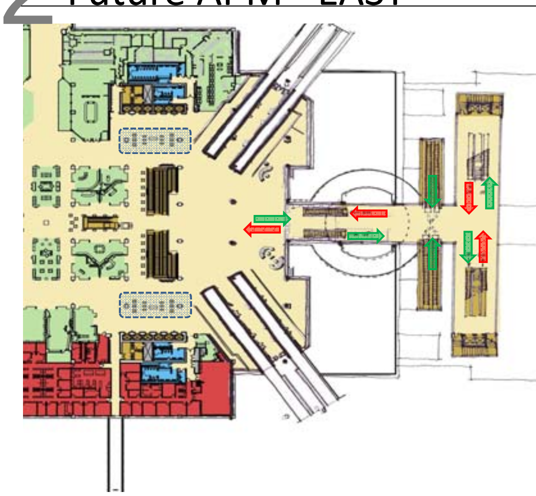
HNTB

2 Future APM - EAST

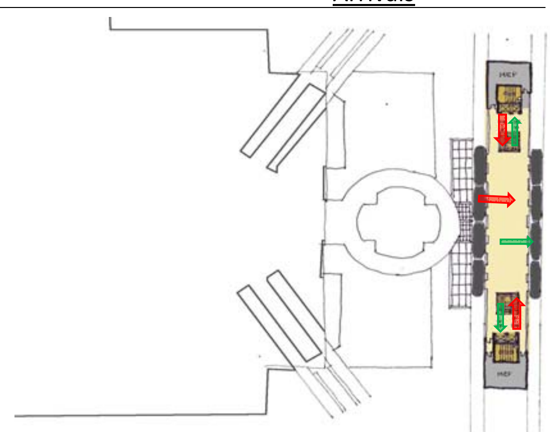
Departures

Arrivals



= POTENTIAL KIOSK LOCATION

Transfer Level



APM Level

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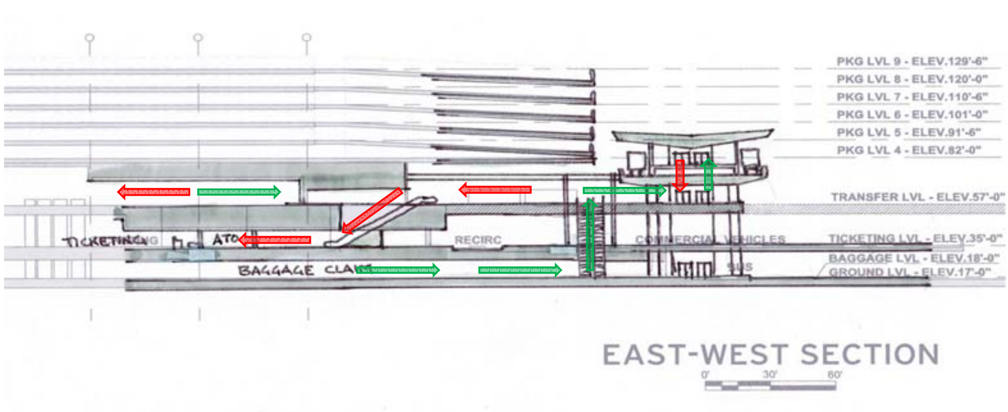
2 Future APM - EAST

Departures
Arrivals



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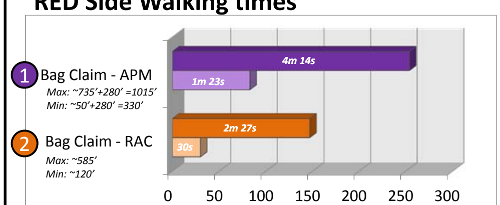
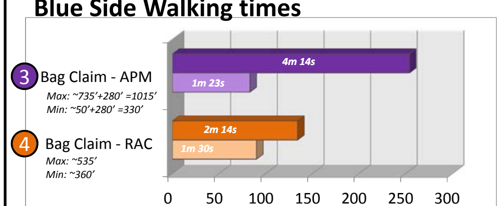
2 Future EAST APM –WALKING DISTANCES

= EXISTING RAC
= FUTURE EAST APM

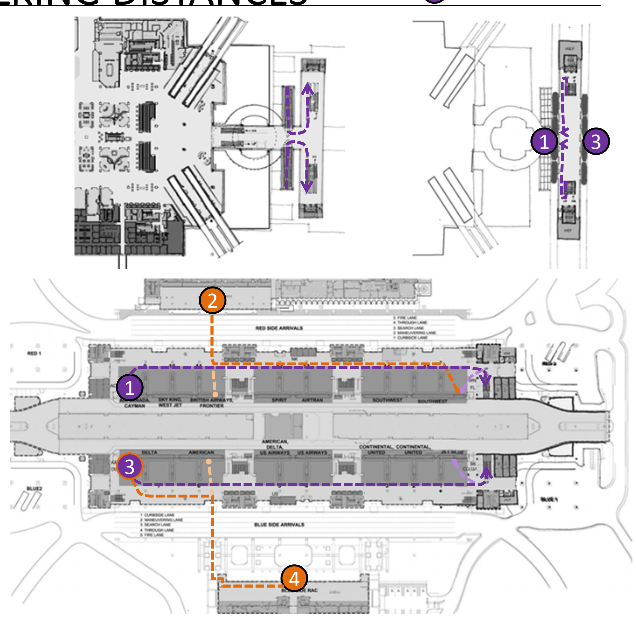
RED Side Walking times



Blue Side Walking times



****Walk Rate: 4 ft/sec*



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TRANSFER LEVEL

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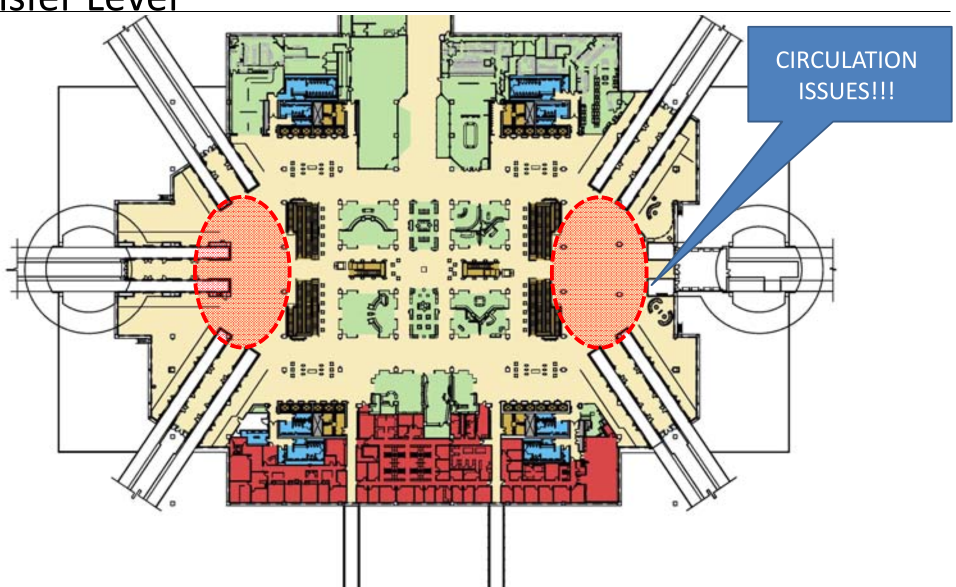
3 Transfer Level



EXISTING - TRANSFER LEVEL

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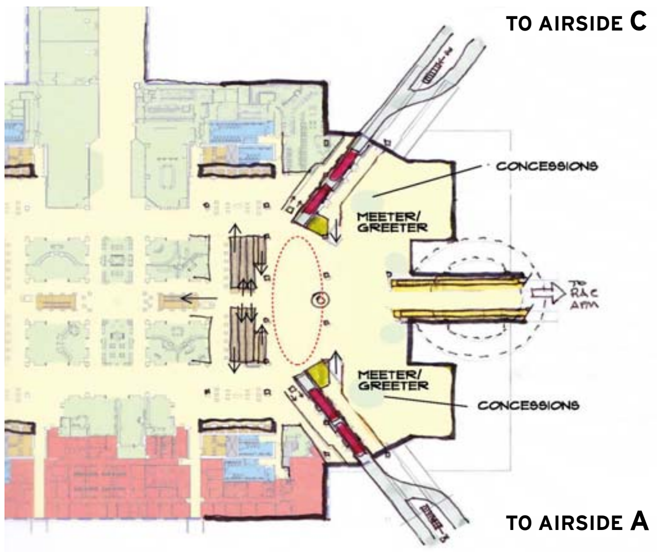
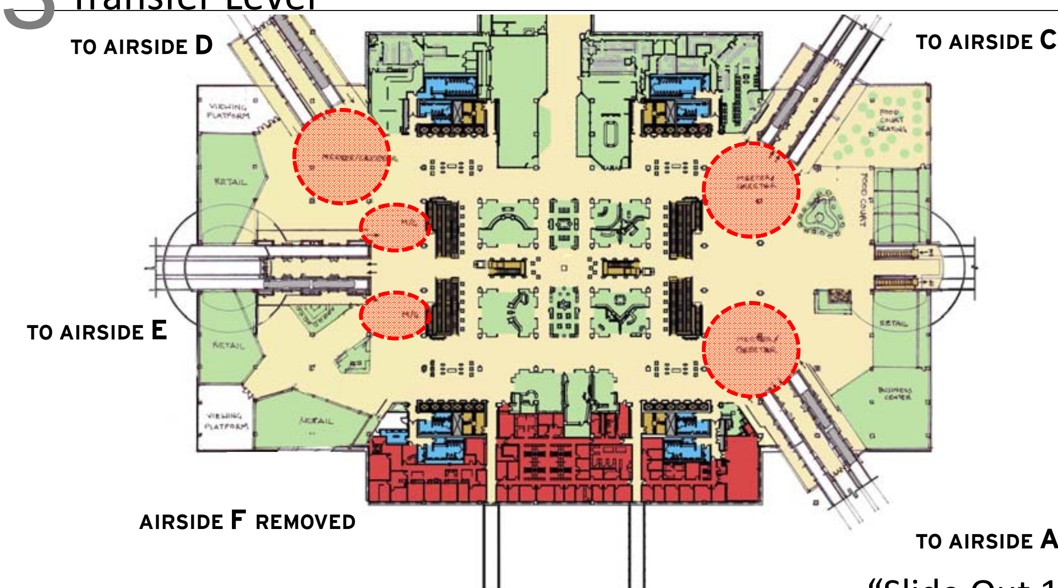
3 Transfer Level



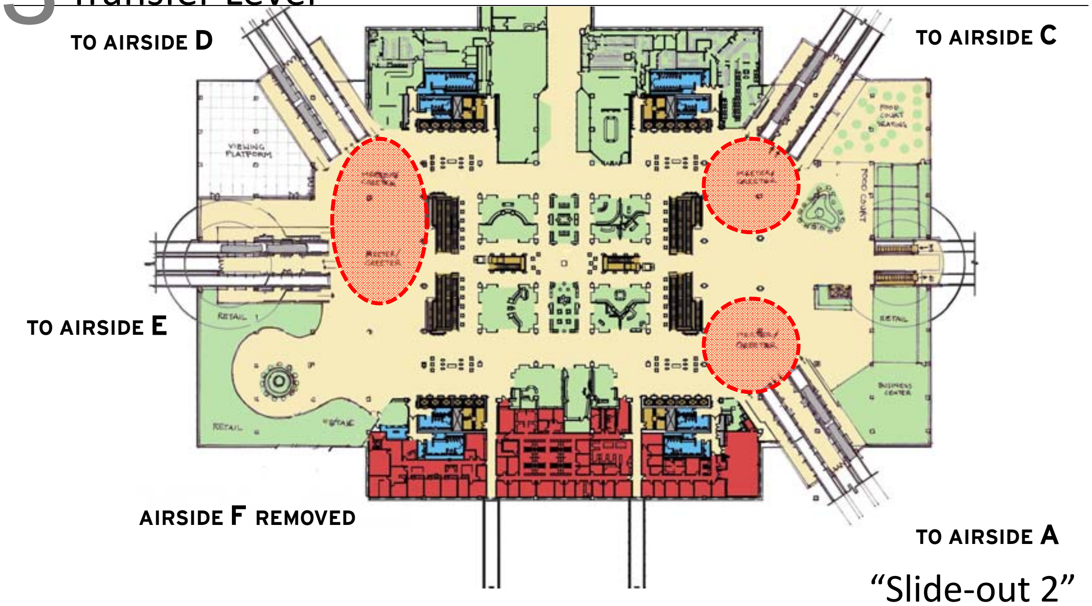
"Pinched Loop"

3 Transfer Level



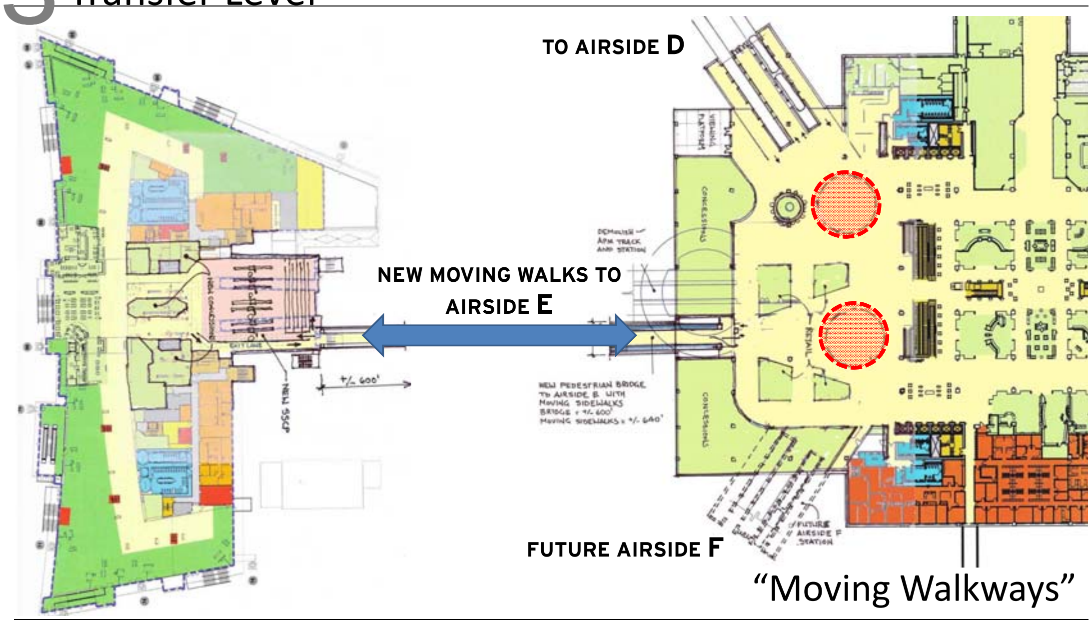
"Slide Out 1"

3 Transfer Level



"Slide-out 2"

3 Transfer Level



"Moving Walkways"

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TICKETING / CHECK-IN

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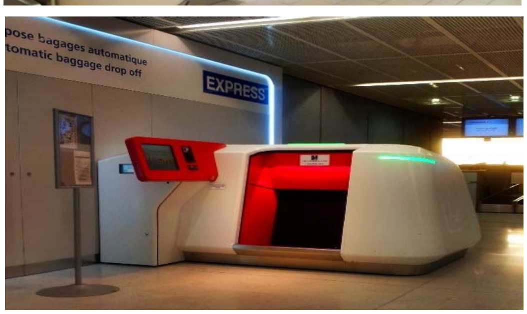
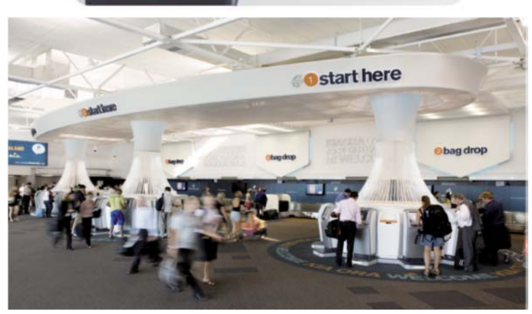
4 Ticketing & Check-In





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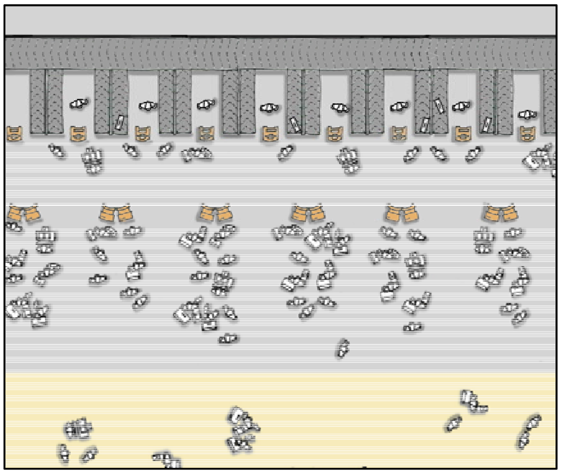
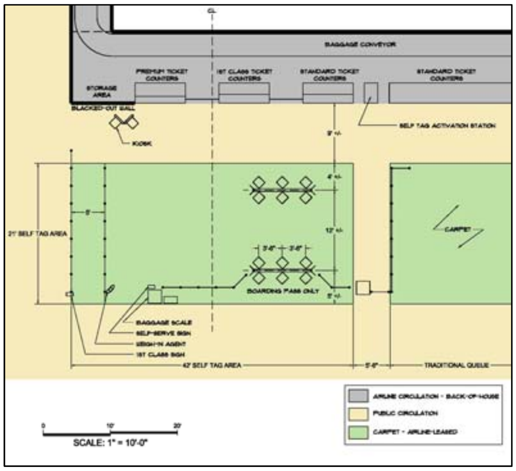
4 Ticketing & Check-In – ALASKA “2-STEP”



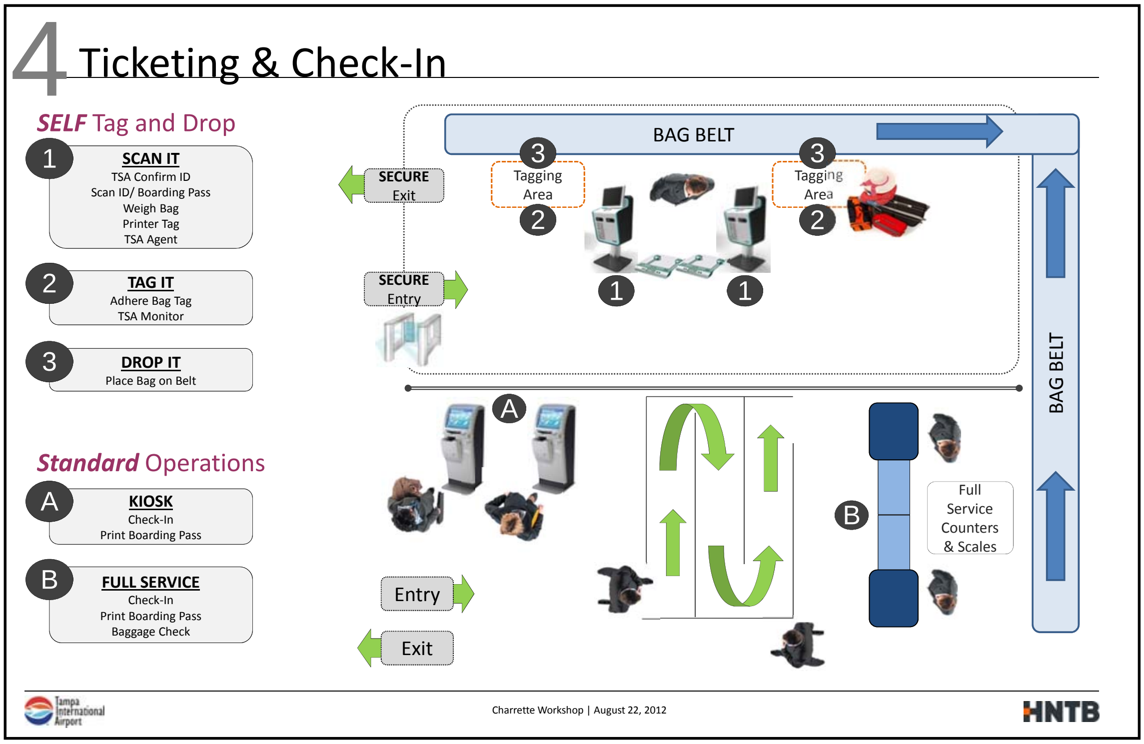
Self Check / Bag Tag
Alaska Airlines

4 Ticketing & Check-In – AUSTIN SELF CHECK-IN



AUS

Self Check
American Airlines


4 Ticketing & Check-In
SELF Tag and Drop
1 SCAN IT
TSA Confirm ID
Scan ID/ Boarding Pass
Weigh Bag
Printer Tag
TSA Agent
2 TAG IT
Adhere Bag Tag
TSA Monitor
3 DROP IT
Place Bag on Belt
Standard Operations
A KIOSK
Check-In
Print Boarding Pass
B FULL SERVICE
Check-In
Print Boarding Pass
Baggage Check
BAG BELT
SECURE Exit
SECURE Entry
Tagging Area
Tagging Area
BAG BELT
Full Service Counters & Scales
Entry
Exit
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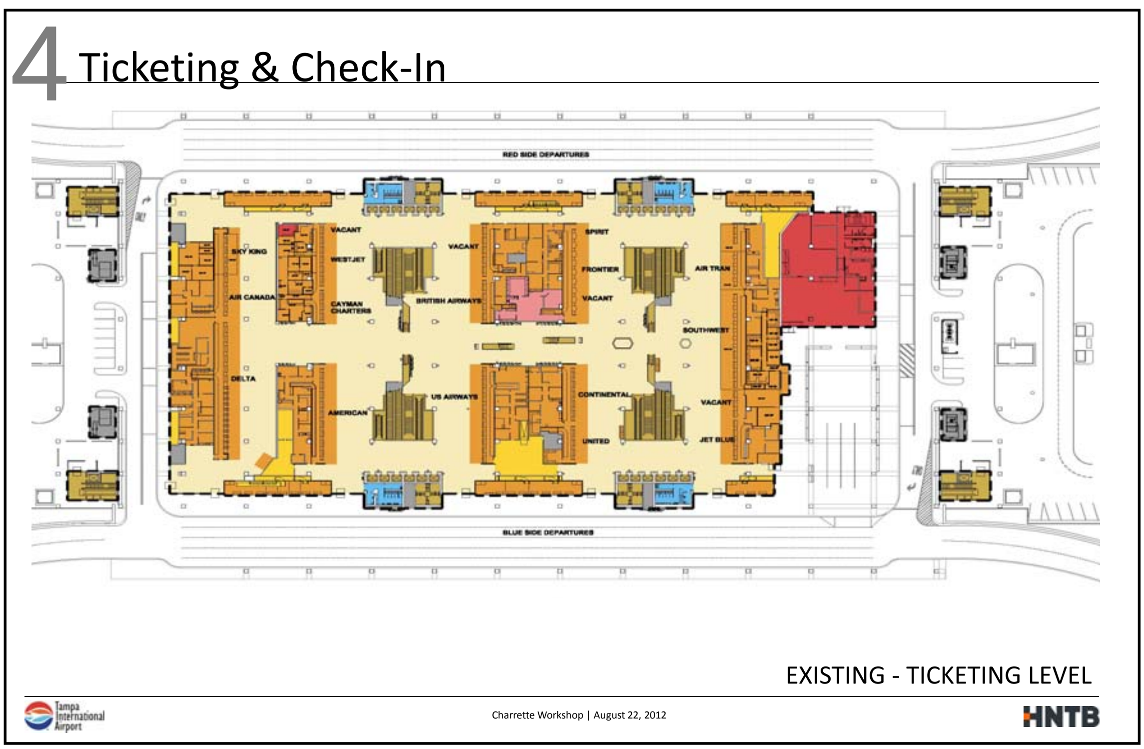
4 Ticketing & Check-In
RED SIDE DEPARTURES
VACANT
SKY KING
WESTJET
AIR CANADA
CAYMAN CHARTERS
BRITISH AIRWAYS
VACANT
SPIRIT
FRONTIER
VACANT
AIR TRAN
SOUTHWEST
DELTA
AMERICAN
US AIRWAYS
CONTINENTAL
UNITED
VACANT
JET BLUE
BLUE SIDE DEPARTURES
EXISTING - TICKETING LEVEL
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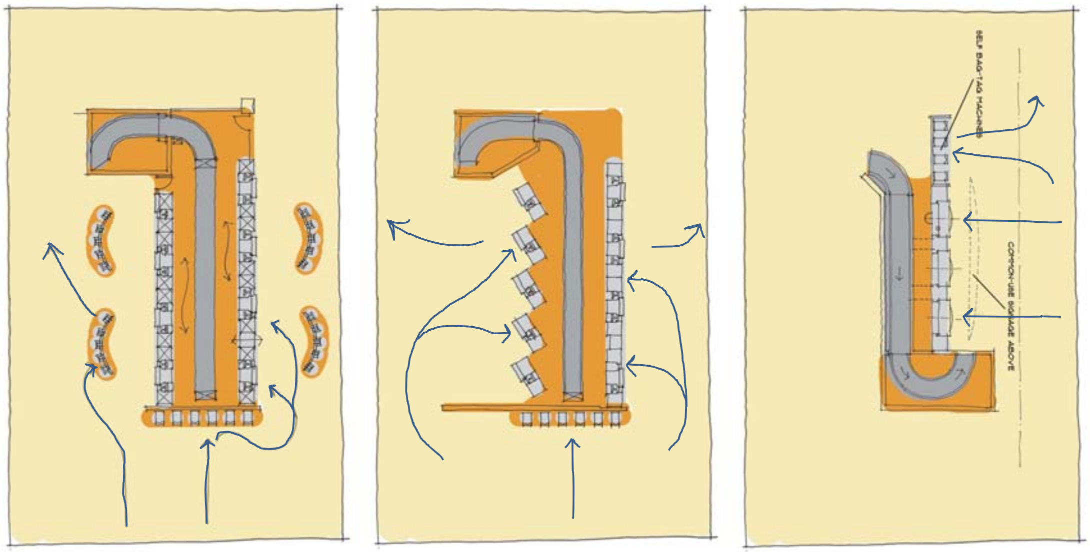
4 Ticketing & Check-In



OPTION 1

OPTION 2

OPTION 3

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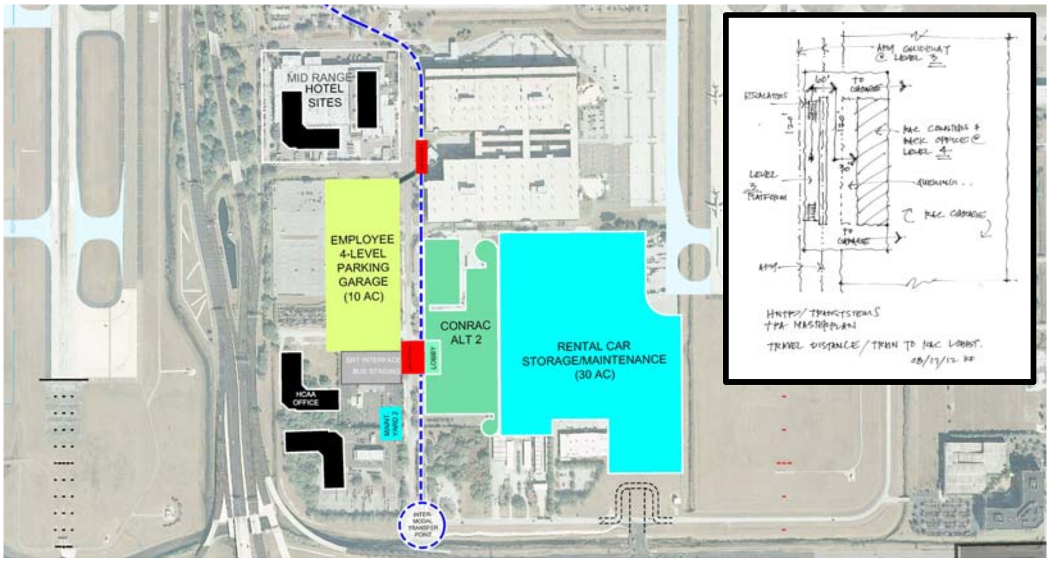
5 South & East Land Use



SUMMARY + NEXT STEPS

1 ***AIRSIDE C-D***
- ❑ AIRCRAFT LAYOUTS / OPTIONS
- ❑ FIS OPTIONS
- ❑ TRACON/ATCT INTEGRATION

2 ***FUTURE APM (LANDSIDE)***
- ❑ SOUTH OF TERMINAL
- ❑ EAST OF TERMINAL
- ❑ TERMINAL ACCESS

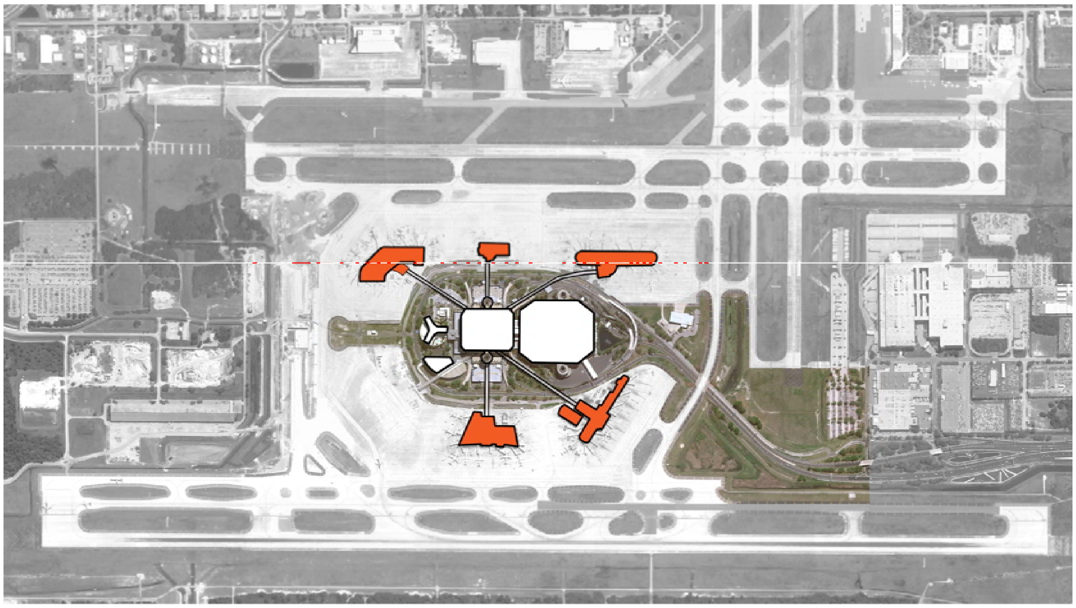
3 ***TRANSFER LEVEL***
- ❑ AIRSIDE APM OPTIONS
- ❑ MEETER/GREETER

4 ***TICKETING***
- ❑ FUTURE CHECK-IN / BAG DROP

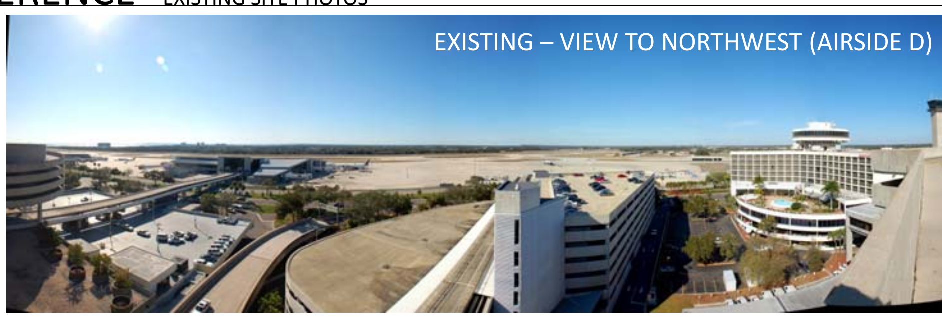
5 ***SOUTH & EAST LAND USE***
- ❑ SOUTH LAND USE
- ❑ EAST LAND USE

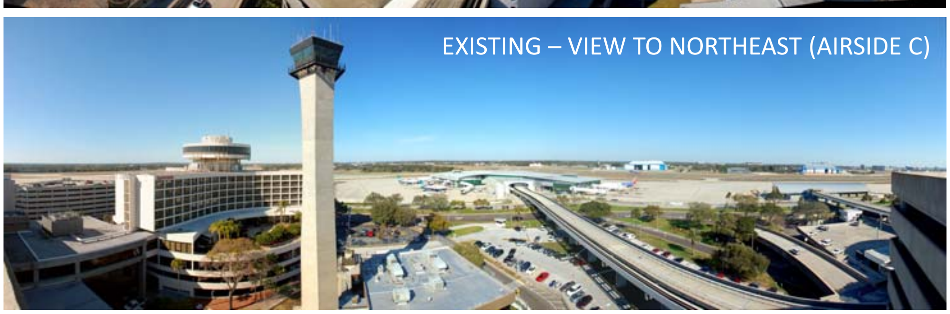
NEXT STEPS!!!

REFERENCE – AERIAL



REFERENCE – EXISTING SITE PHOTOS





REFERENCE – EXISTING SITE PHOTOS

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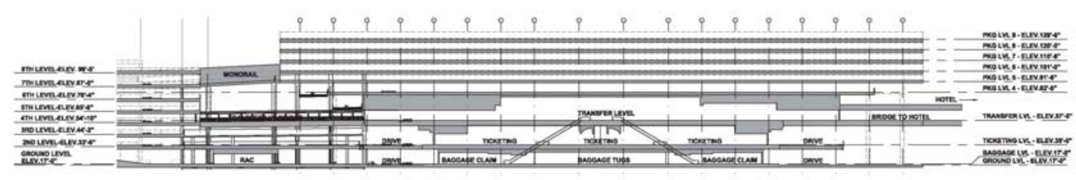
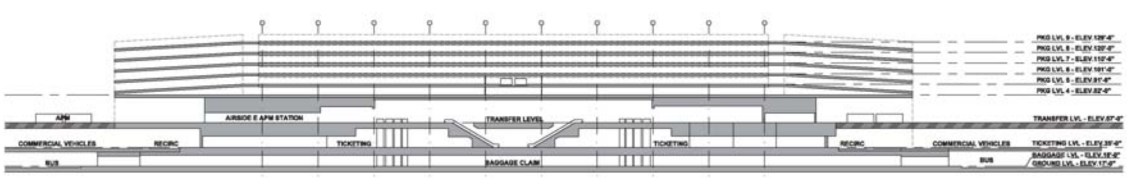
REFERENCE – SECTIONS



NORTH-SOUTH SECTION



EAST-WEST SECTION

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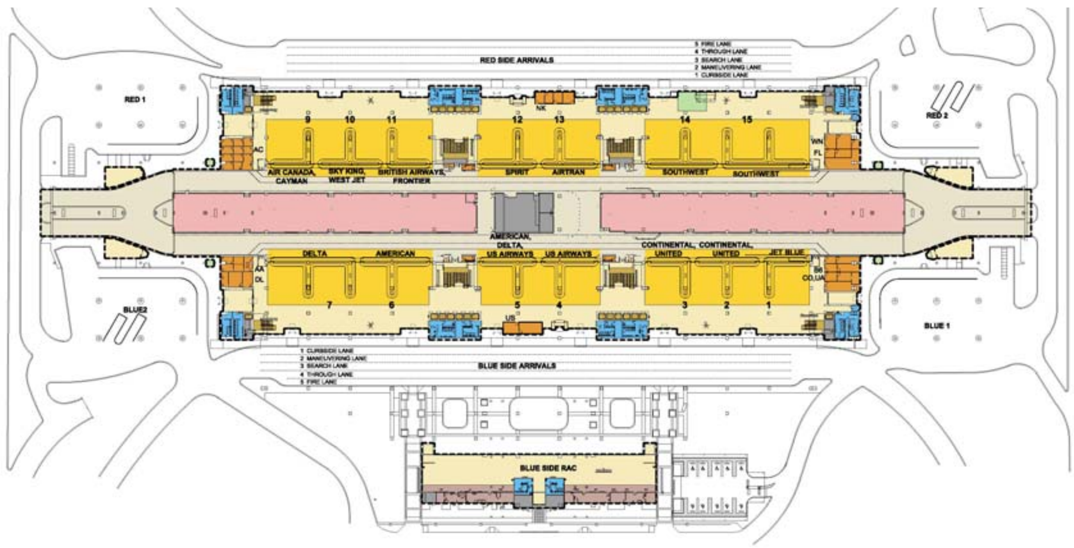
REFERENCE – BAGGAGE LEVEL



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REFERENCE – TICKETING LEVEL

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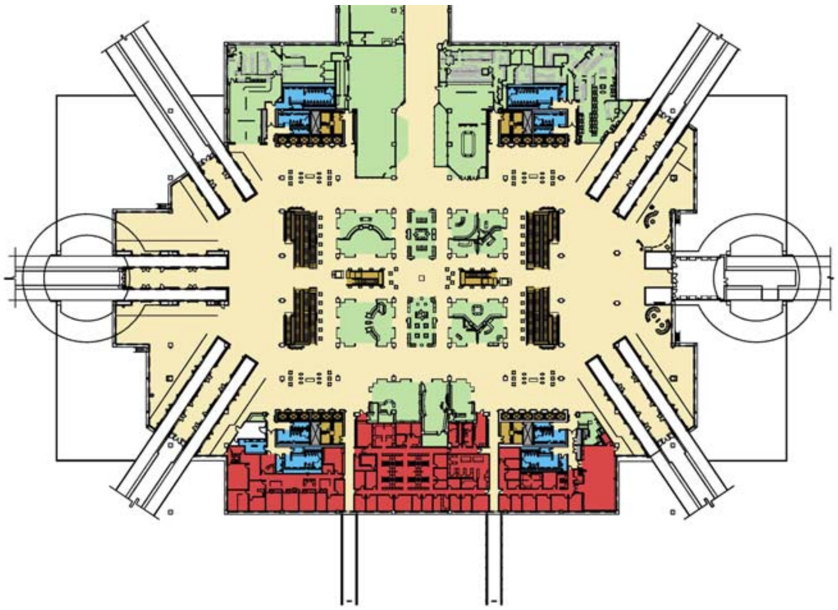
REFERENCE – TRANSFER LEVEL



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REFERENCE – AIRSIDE C

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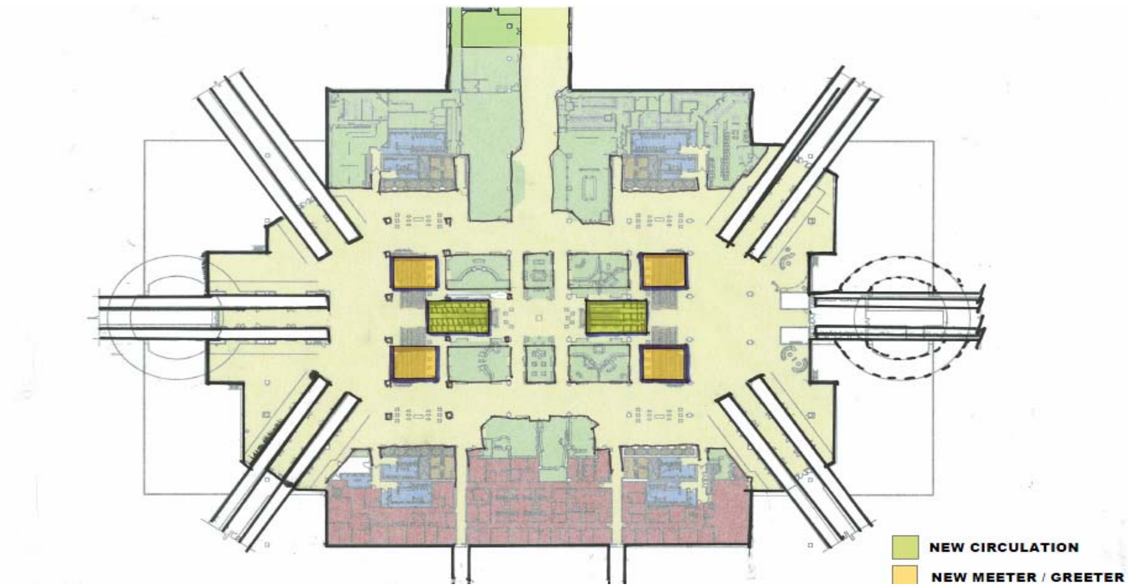
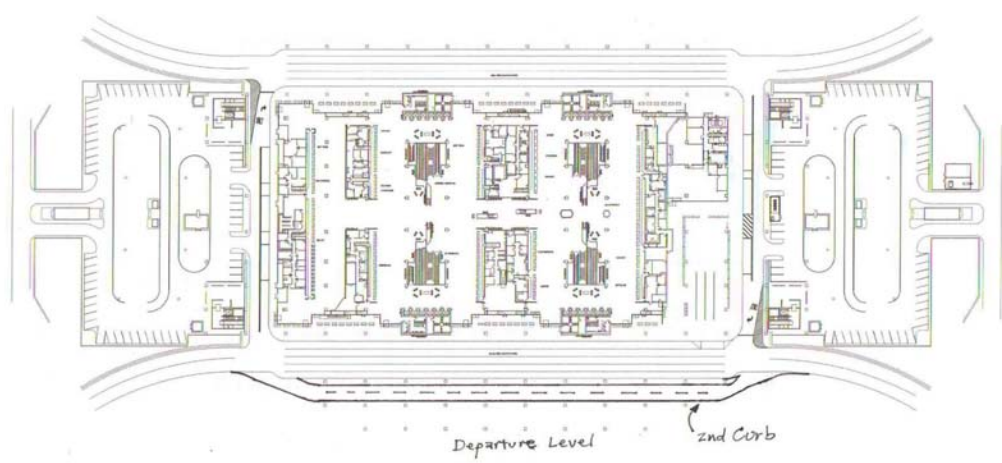
REFERENCE – AIRSIDE C

REFERENCE – TICKETING & CHECK-IN - REORIENT VERTICAL CIRCULATION

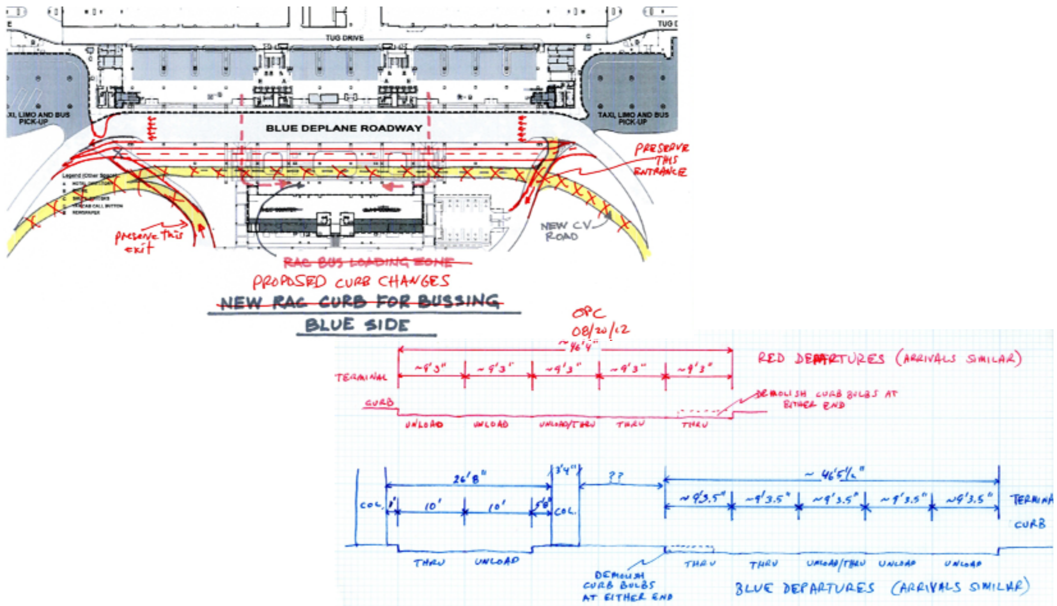
REFERENCE – TRANSFER LEVEL – REORIENT VERTICAL CIRCULATION



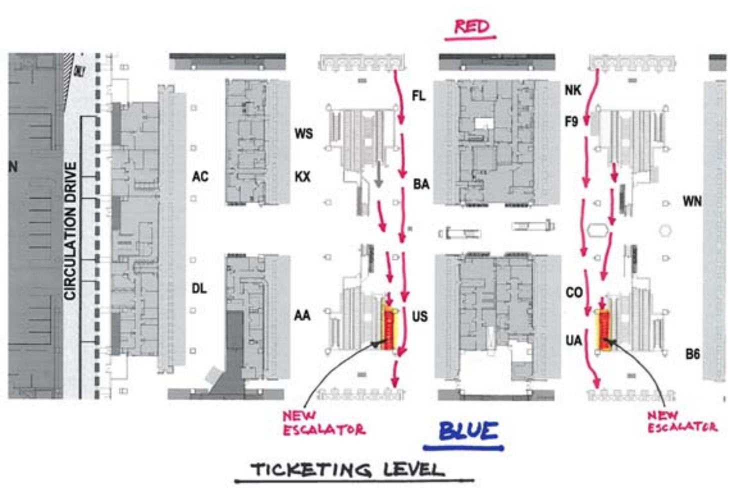
REFERENCE – BLUE DEPARTURE ROADWAY EXPANSION



REFERENCE – BLUE DEPARTURE ROADWAY EXPANSION



REFERENCE – LANDSIDE TERMINAL PASSENGER FLOW



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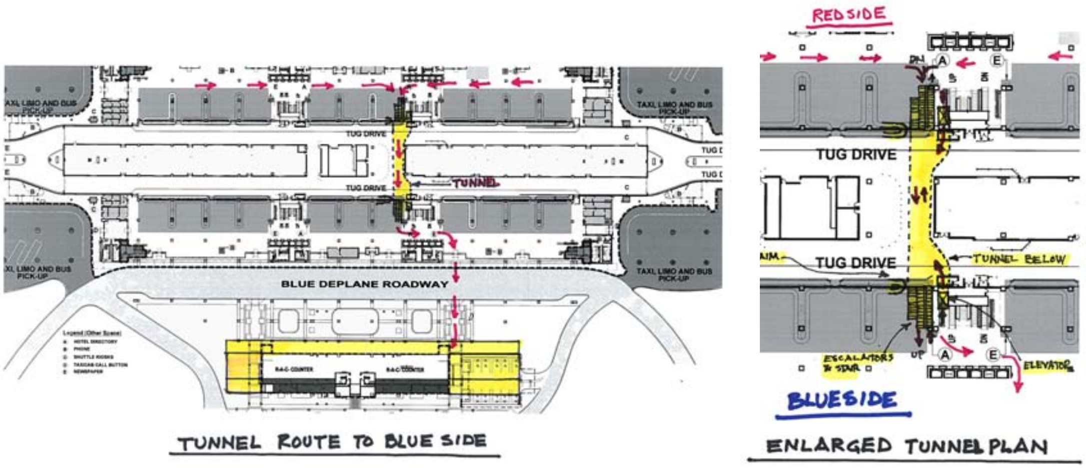

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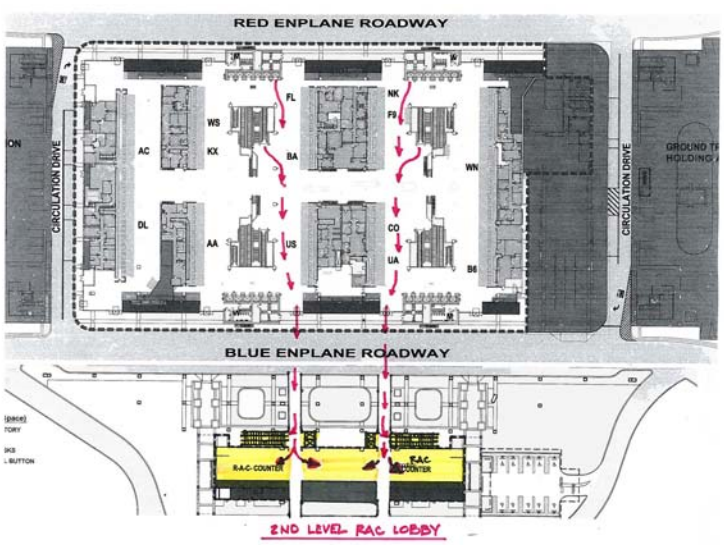
REFERENCE – LANDSIDE TERMINAL PASSENGER FLOW



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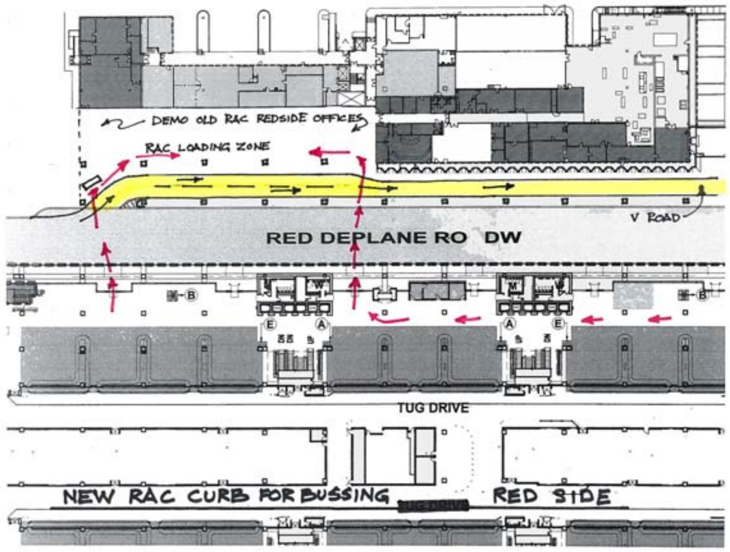
REFERENCE – LANDSIDE TERMINAL PASSENGER FLOW



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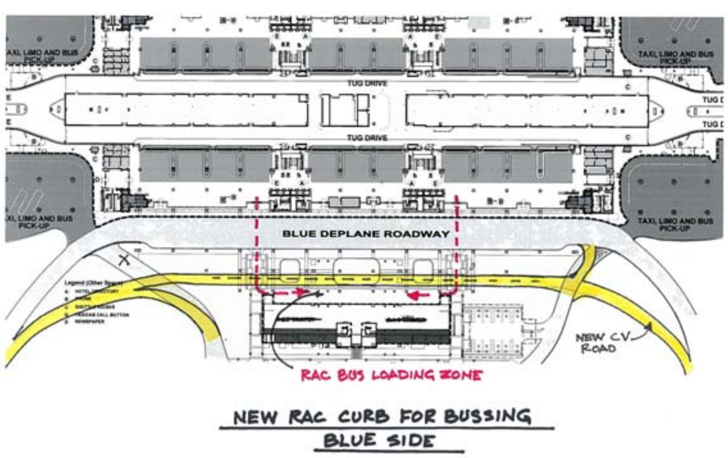

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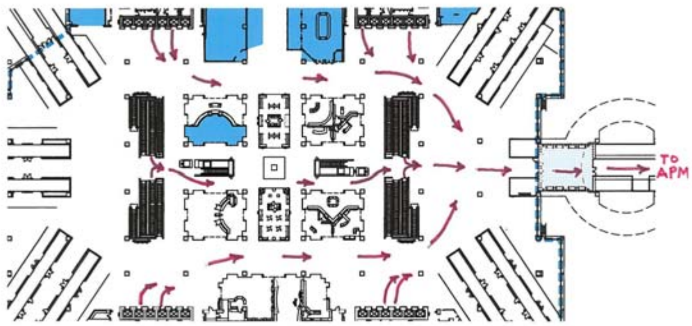

RAC CUSTOMERS TO APM STATION
OPTION A

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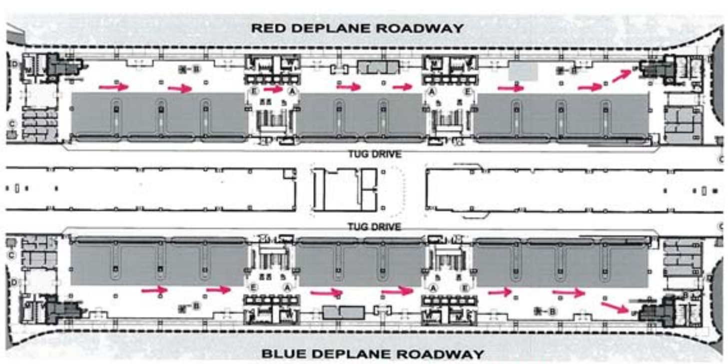
REFERENCE – LANDSIDE TERMINAL PASSENGER FLOW



RAC CUSTOMERS TO APM STATION
OPTION B
BAG CLAIM LEVEL

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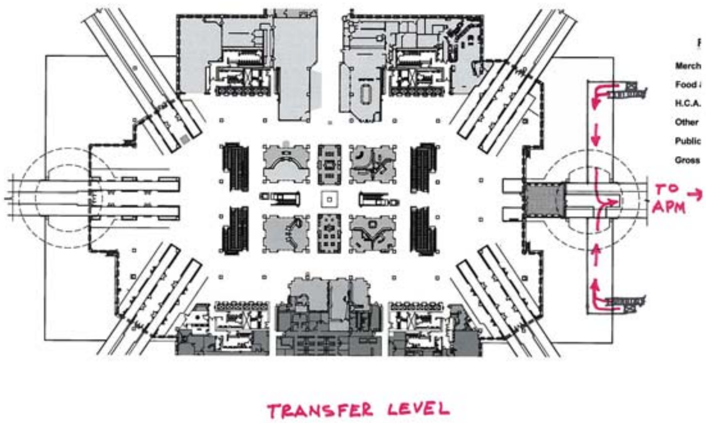
REFERENCE – LANDSIDE TERMINAL PASSENGER FLOW



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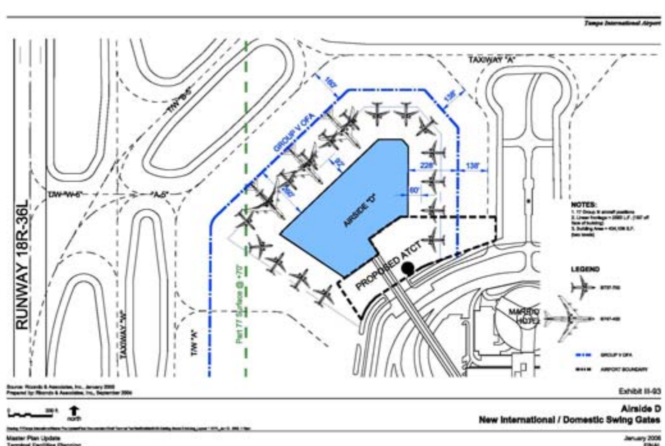
REFERENCE – RICONDO DIAGRAMS



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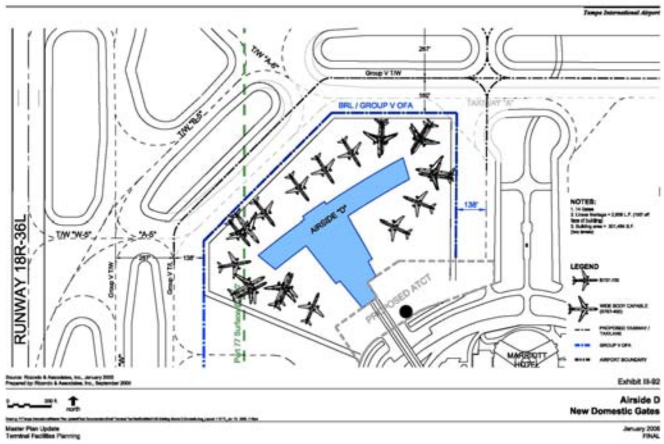
REFERENCE – RICONDO DIAGRAMS



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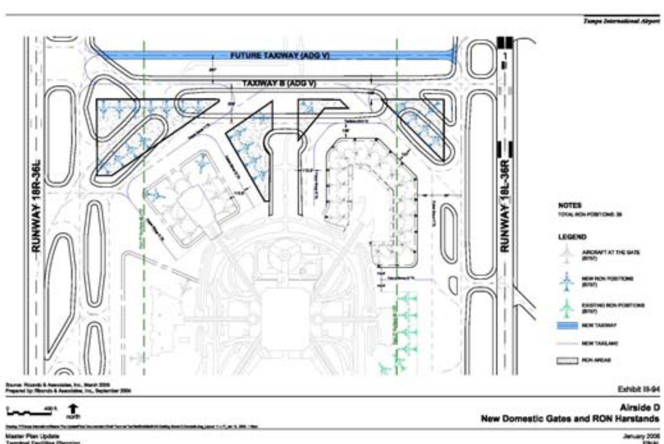

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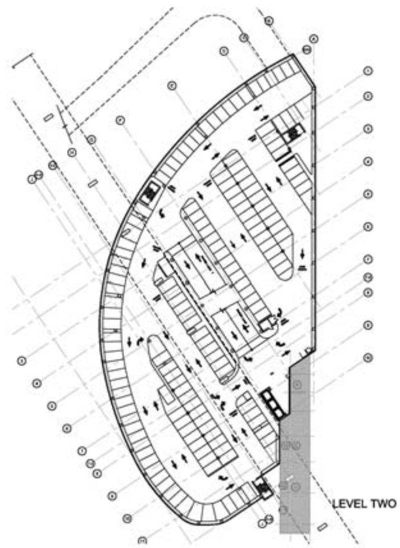

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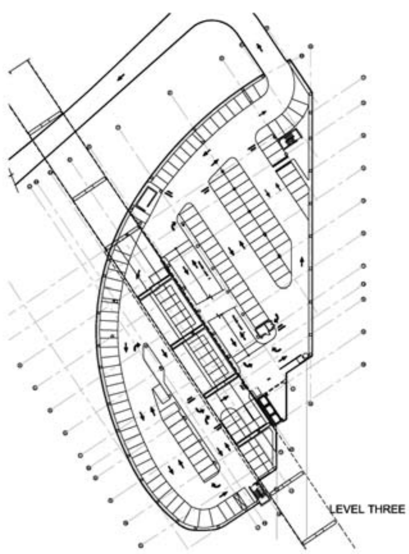
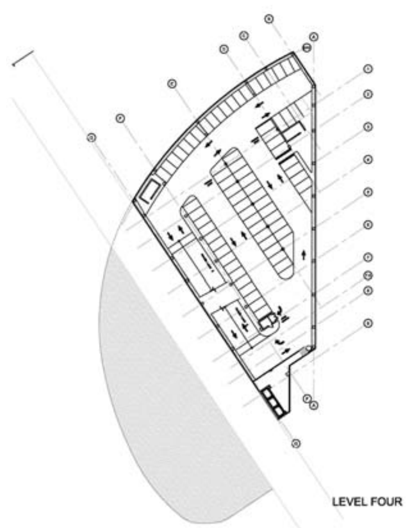
REFERENCE – RED GARAGE





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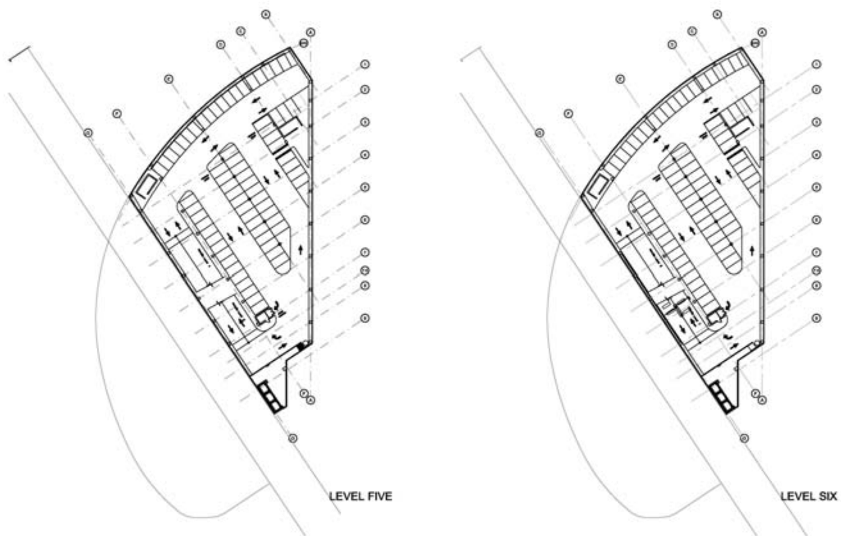
REFERENCE – RED GARAGE



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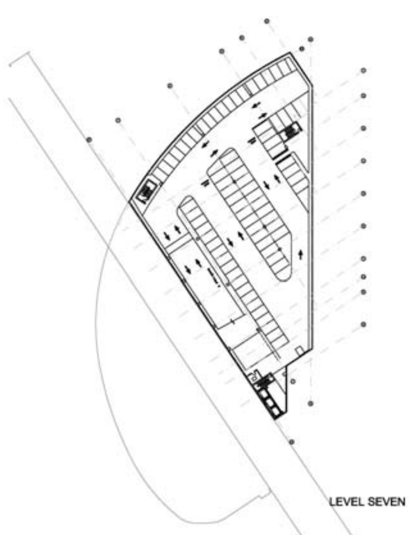

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Outline

1 ***SHARED USE PASSENGER PROCESSING SYSTEMS (SUPPS)***
- ❑ SUPPS FEASIBLITY REPORT SUMMARY
- ❑ RECOMMENDATIONS
- ❑ HCAA DECISION POINTS

2 ***BAGGAGE HANDLING SYSTEM***
- ❑ SCREENING CAPACITY
- ❑ CONCEPT

3 ***BLUE CURBSIDE EXPANSION***
- ❑ COLUMNS AND CONCEPTS

4 ***CUSTOMS AND BORDER PROTECTION CONCEPT ALTERNATIVES***
- ❑ CONCEPTS 1 - 7
- ❑ MAXIMIZED AIRCRAFT PARKING

5 ***SOUTH EXPANSION OF TRANSFER LEVEL***
- ❑ CONCEPT

6 ***AIRSIDE CONCESSIONS GROWTH***
- ❑ AIRSIDE CONCEPTS

7 ***APM STATIONS***
- ❑ UPDATED AESTHETICS

8 ***EAST APM***
- ❑ ORIGINAL CONCEPT
- ❑ SINGLE-UP ESCALATOR FROM BAG CLAIM

9 ***TRANSFER LEVEL***
- ❑ CONCEPTS 1 - 5

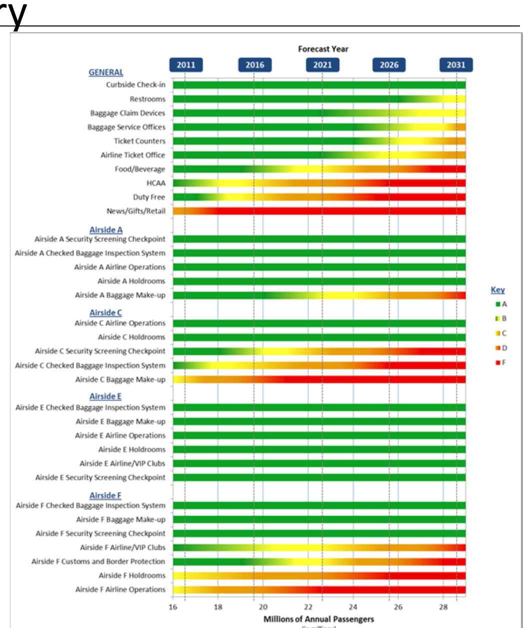
10 ***RE-GATING AIRSIDE F***
- ❑ GATE DEFICIENCIES
- ❑ SCHEDULE COMPARISON

Tampa International Airport

FACILITY REQUIREMENTS REFRESHER/CHARRETTE GOALS

Facility Requirements Summary

- The "Stoplight" chart illustrates each major terminal complex component and its associated level of service (LOS) throughout the planning horizon.
- This is a useful tool used to determine when to begin planning the replacement of facilities.



Facility Requirements Summary

3

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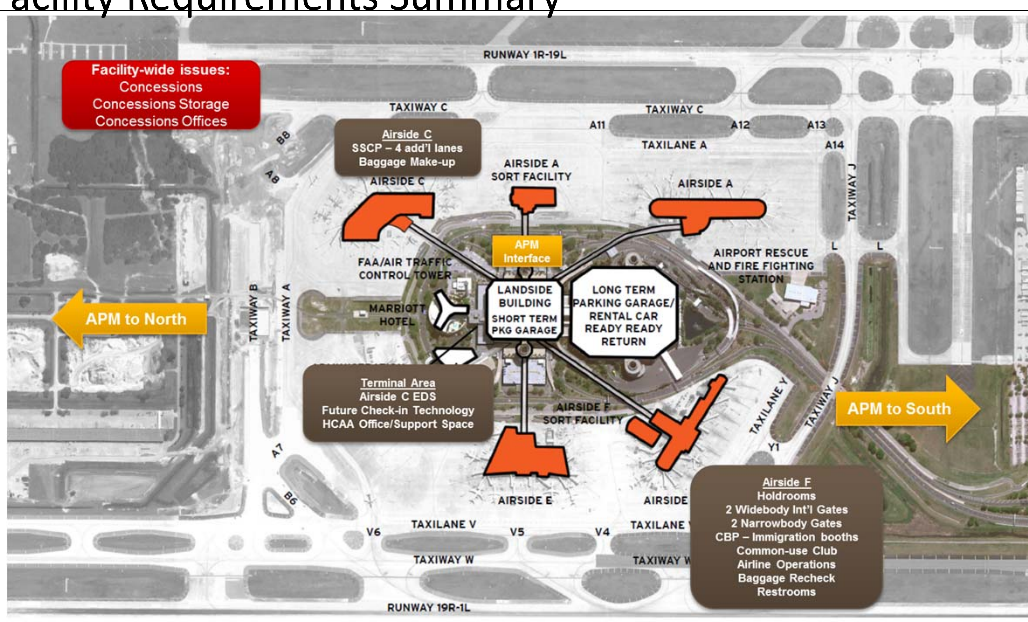
Facility Requirements Summary



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1 Decisions Required from this Charrette

- Shared Use Passenger Processing System (SUPPS) Direction
- Baggage Handling System Upgrades
- Blue Curbside Expansion
- New FIS Location
- Security Screening Checkpoint Locations/Airside Concessions Growth
- New Hotel in Terminal Area
- East APM Access
- Transfer Level Modifications

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1 Agenda

- Shared Use Passenger Processing System (SUPPS) Feasibility Summary
- SUPPS Impact at TPA
- Options for self-baggage check-in
- Recommendations
- HCAA Decision Points

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1 SUPPS Feasibility Report Summary

- Goal – Determine Feasibility of Shared Use at TPA
  - Baseline Existing Operations without SUPPS
  - Model Potential Operations with SUPPS

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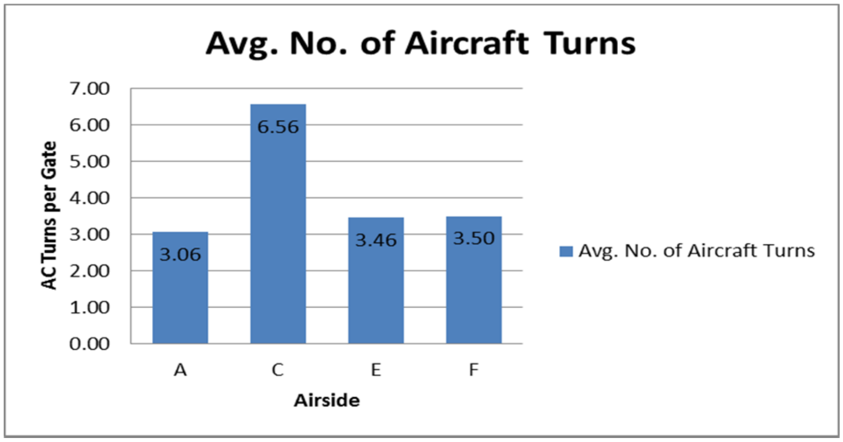
1 SUPPS Feasibility Report Summary



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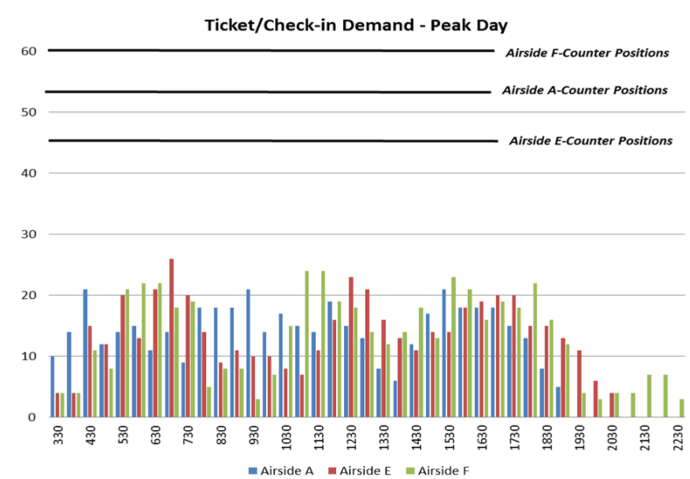
1 SUPPS Feasibility Report Summary



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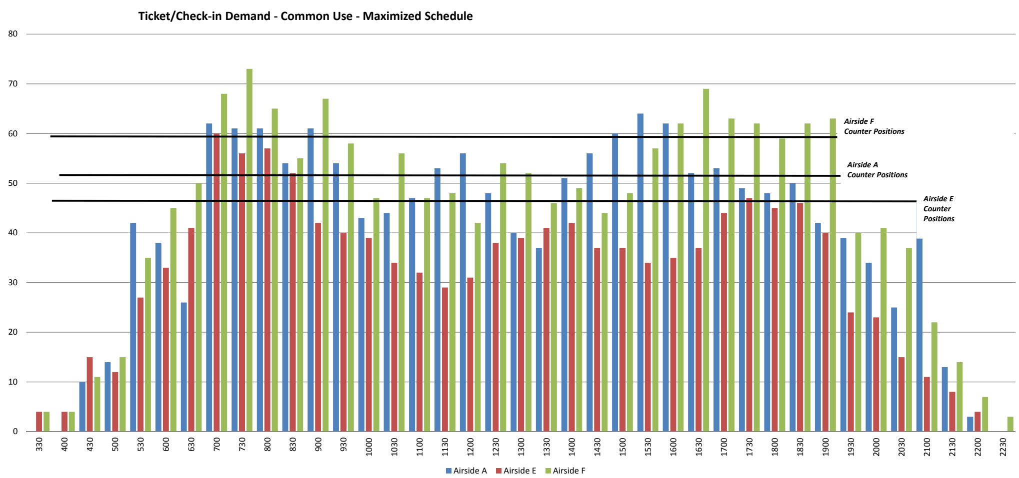
1 SUPPS Feasibility Report Summary



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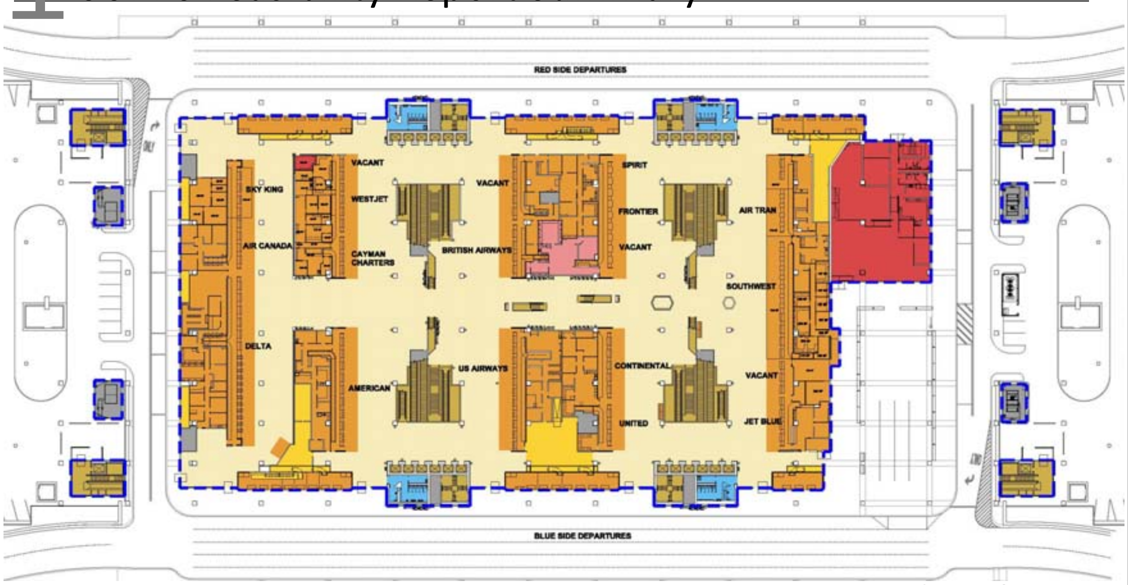
1 SUPPS Feasibility Report Summary



TICKETING LEVEL

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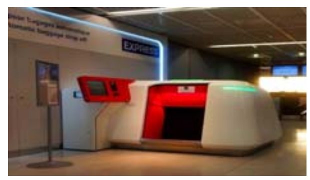
1 Impact of SUPPS at TPA

- Airline Acceptance / Adoption
  - SUPPS acceptance varies with individual Airline
    - Foreign flags and charters – very open
    - Legacy carriers less inclined to accept
    - Southwest very opposed
  - CUSS acceptance is widespread
- Supporting Infrastructure easy to establish at TPA
  - LAN and Cabling
  - Signage
- Initial Capital Costs
  - Cost Recovery Models



1 Impact of SUPPS at TPA

- Operations and Maintenance
  - Costs and Recovery
  - Operating Policies and Procedures (requires Use and Lease Agreement modifications)
    - Flight Submission
    - Scheduling
    - Facility Occupancy Policies (time on resource)
    - Maximized thresholds (# turns per day at a gate)
    - Airline usage policies
    - Consumables
    - Ground services

1 Current European Check-in Systems – A Comparison

Common Use Automated Bag Drop

Ryanair Bag Drop Budapest Airport

Source: Alstef (left), HTA (right)

1 European Check-in – Full Service Carriers

Current European System:
Two Step

Step 1: Mandatory Kiosk Check-In

(only for passengers that did not use Web Check-in or a common use Kiosk)

Step 2: Bag Drop

- Currently, most baggage tags are printed at baggage drop stations.
  - Air France and KLM provide bag tags at kiosks. Passengers apply tags to bags.
  - More airlines trending toward kiosks that print bag tags.

Source: HTA (Top), LH (Bottom)

1 Self Check In - Advantages

Primarily:

- Cost savings to airlines (reduced workforce)

Secondary:

- Capacity increases, especially with regard to two step Check In process

Source: Internet File (Top), HTA (Bottom)

1 Self Check In – Baggage Drop

- Staffed and automated baggage drops available at European Airports
- Currently mainly in use: staffed bag drops
- In 2010, Luthansa implemented automated bag drops that failed; new automated bag drops to be implemented in Hamburg in the near future
- Automated bag drops are in operation in Amsterdam and Paris Orly (Sky Team)
- Only few common use bag drops in operation in Europe

Source: Internet File (Top), KLM (Bottom)

1

Other Automated Terminal Components

- Boarding Pass Control

- Boarding Gates

- Baggage Handling System

Source: Wanzl (left), LH (top right), Siemens (bottom right)

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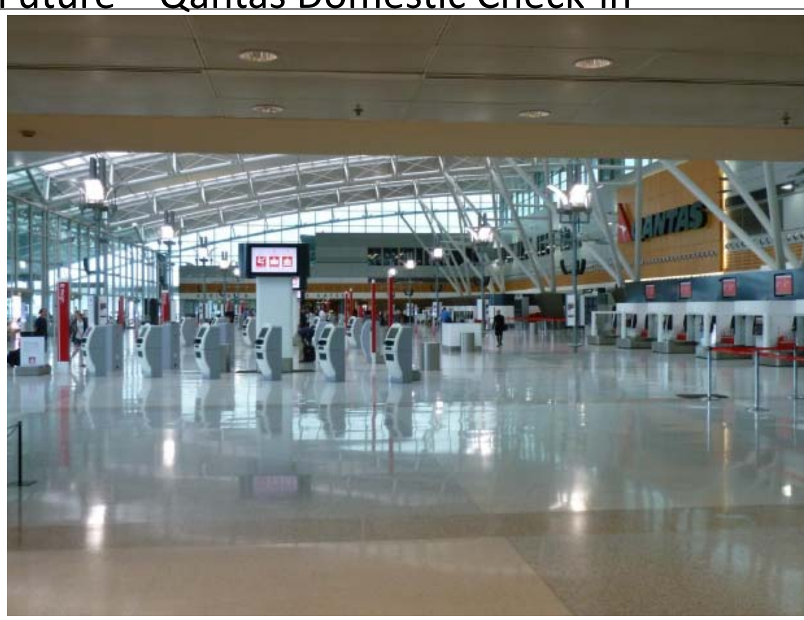
1

The Future – Qantas Domestic Check-in



Source: HTA

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1 Four Options for Self-Bag Check-in

1. Strongly encourage each airline offer it themselves
2. In next Use/Lease Agreement require all airlines to offer self-baggage check-in facilities as an option to their other check-in processes.
3. In next Use/Lease Agreement require airlines in each bag system grouping, to form consortium to create a common use baggage drop location with adjacent airlines.
4. TIA creates a **common use** self-baggage check-in system (hardware and software) and pays for it.
   A. Staffed by HCAA
   B. Staffed by Airlines

1 Shared Use Self-Baggage Check-in Questions to HCAA

- Does Tampa International Airport want to be in the passenger check-in business?.....with all its responsibilities and liabilities?
  - Is TPA willing to take on the TSA requirement to match bags and passengers ?
  - Is TPA willing to add full-time staff?
  - Is TPA willing to buy, maintain, and operate with IT staff (or outsourced 3rd party) to fix software and hardware problems quickly?
  - Passengers complaints : Who resolves? The airlines or TIA?

1 Recommendations

- We recommend a phased approach over time, taking the following steps:
  - Implement CUSS Kiosks for all airlines
    - Strategically located to align with passenger flows
  - Implement Shared Use for Int'l Carriers and Charters (currently in Airside F – future Airside D)
  - Implement Shared Use in Check-In Counters associated with Int'l and Charter Gates
    - Provide capability for two-step self-baggage tagging process

1 Recommendations

- Implement Shared Use at all "non-leased gates" (and associated check-in counters)
- Implement Shared Use at gates that do not meet the "Minimum turns/day"
  - As defined in new Use/Lease Agreement
- Implement Shared Use at peripheral gates/counters of higher utilized gates – for market flexibility
- Implement at all remaining gates/counters regardless if max utilized

1 HCAA Decision Points

- HCAA Policy on Shared Use
  - How hard will TPA push airlines if they say no?
- Who is the driver for new technologies (HCAA or Airlines)?
  - Self-baggage tagging
  - Self-boarding
- Should HCAA directly implement? Or, require performance criteria in Use/Lease Agreement for airlines to implement?
- Establish future decision points to develop operating policies and procedures

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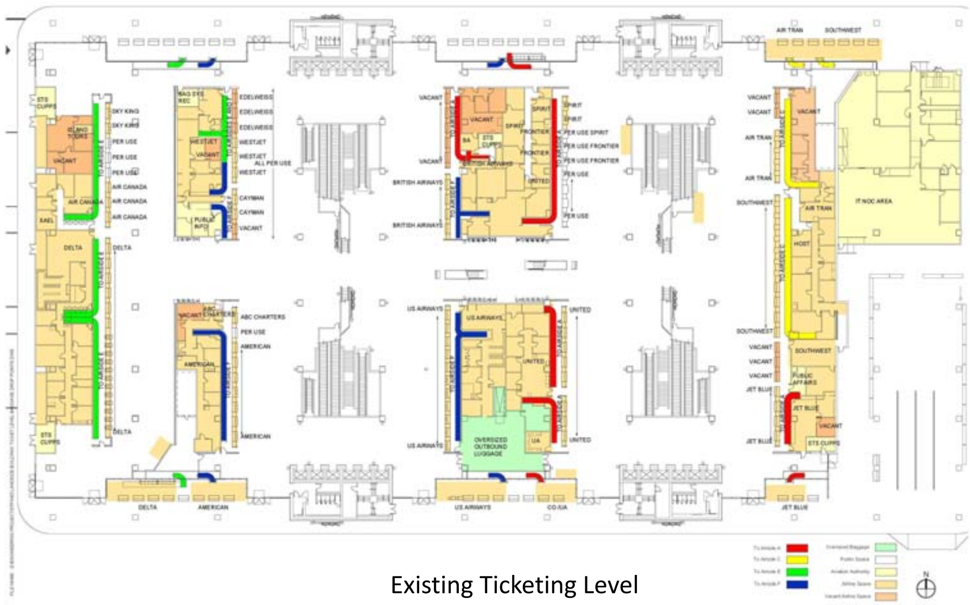
2 Baggage Handling System



Existing Ticketing Level

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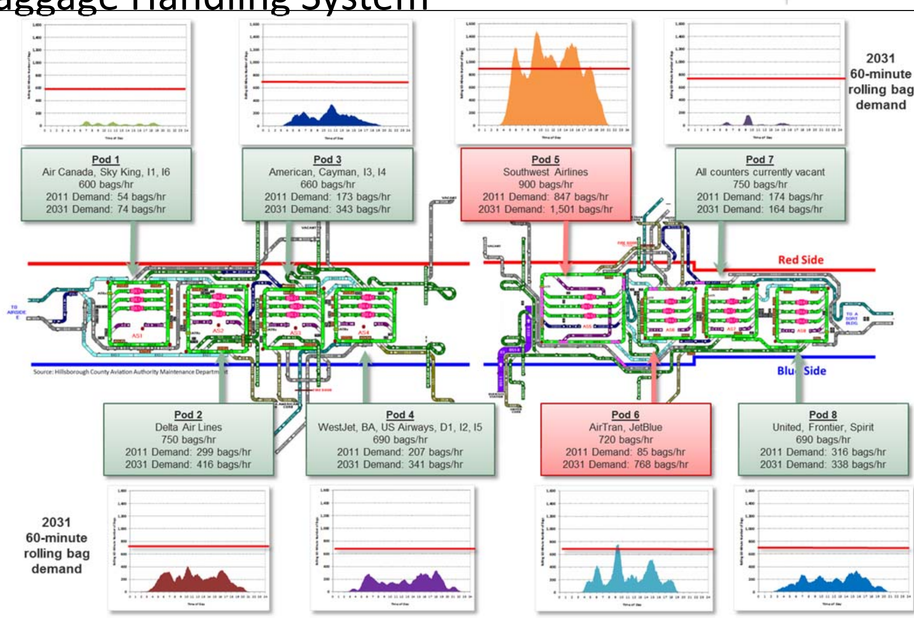
2 Baggage Handling System



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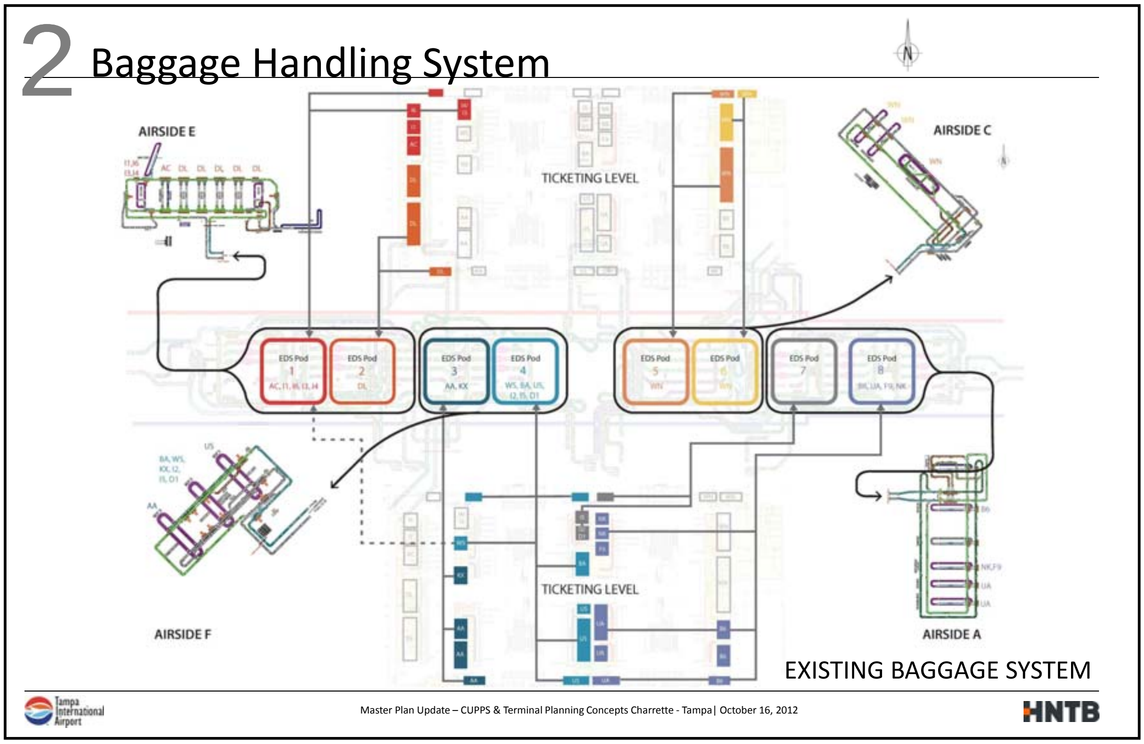
2 Baggage Handling System
AIRSIDE E
AIRSIDE C
TICKETING LEVEL
AIRSIDE F
TICKETING LEVEL
AIRSIDE A
EXISTING BAGGAGE SYSTEM
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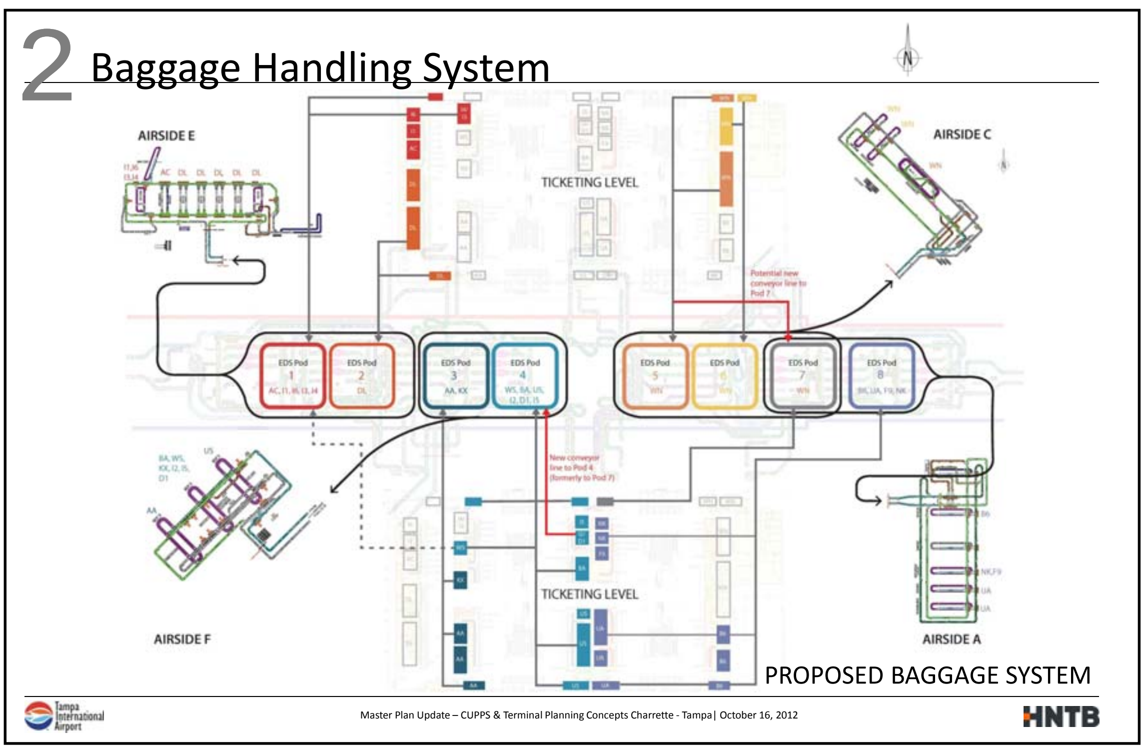
2 Baggage Handling System
AIRSIDE E
AIRSIDE C
TICKETING LEVEL
AIRSIDE F
TICKETING LEVEL
AIRSIDE A
PROPOSED BAGGAGE SYSTEM
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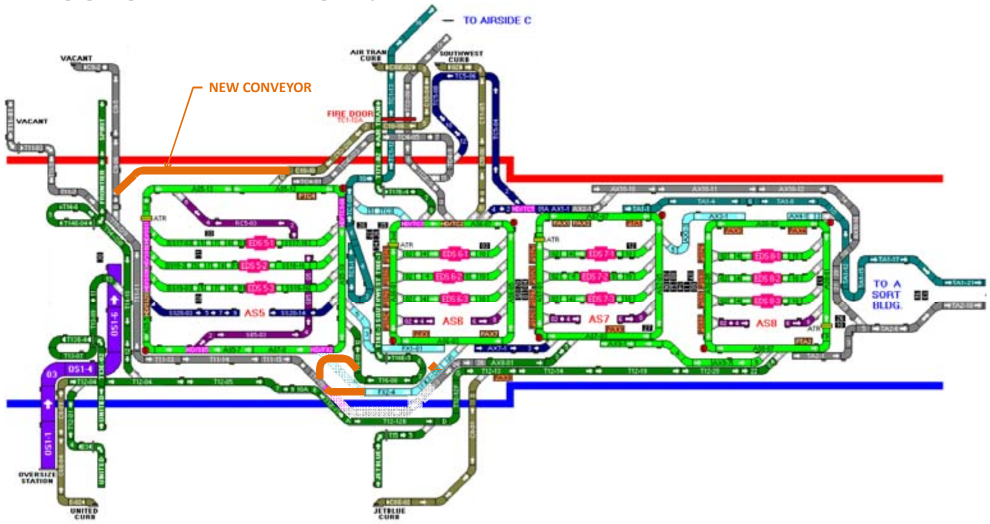
2 Baggage Handling System



LANDSIDE (PODS:5-6-7-8)

PROPOSED CHANGES FOR SOUTHWEST AIRLINES

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CURBSIDE EXPANSION OPTION

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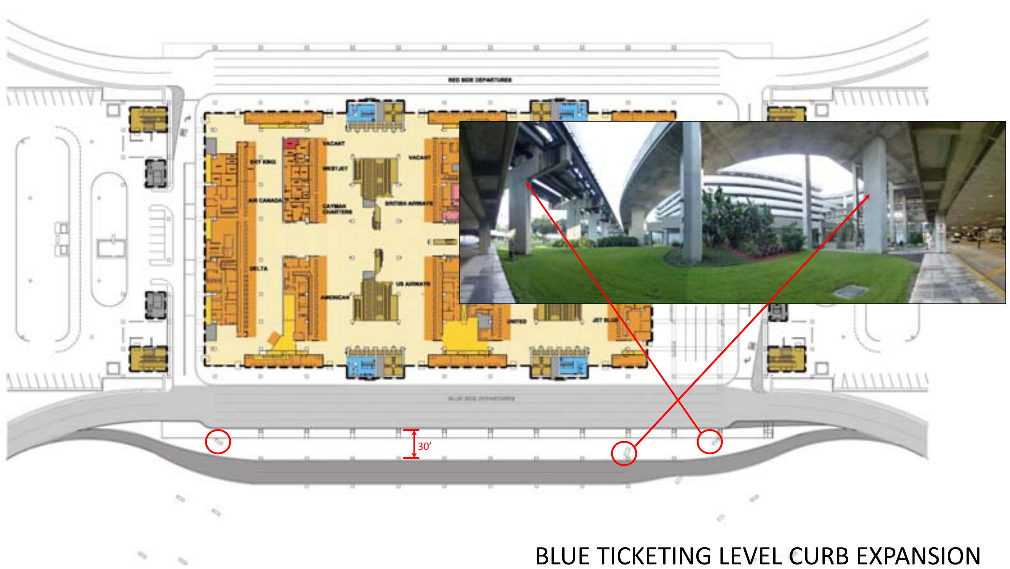
3 Curb Expansion Requirements

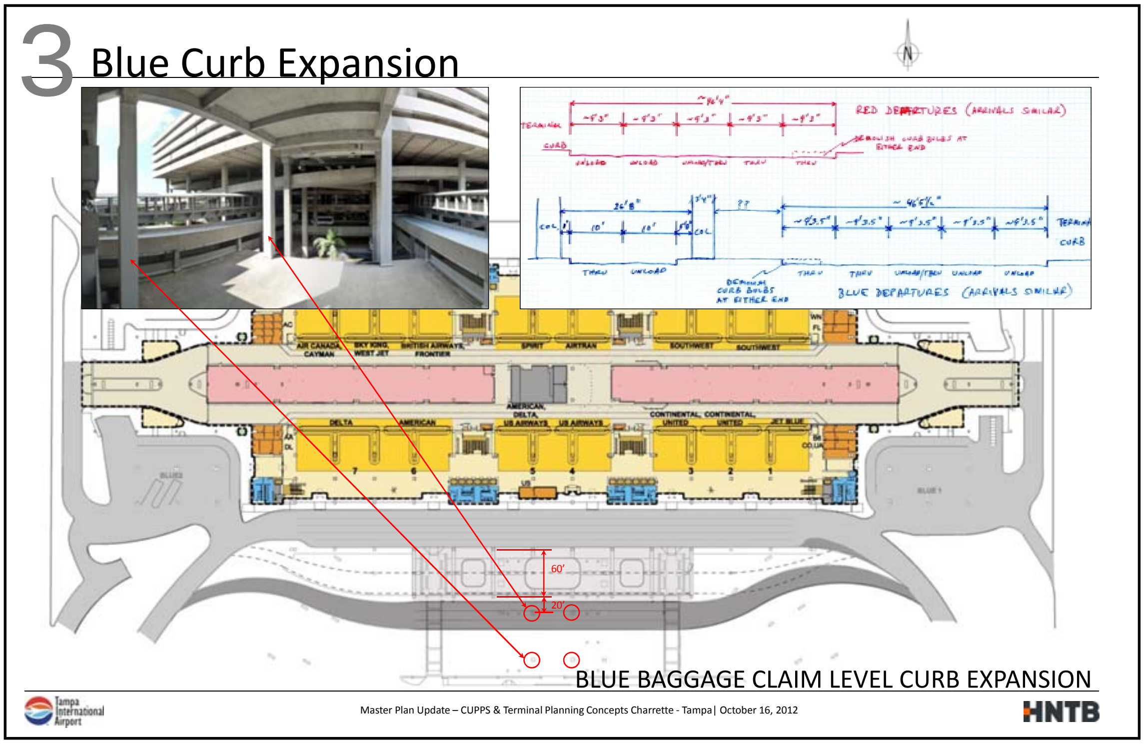
Curb	2011			2016			2021			2026			2031		
	Vol	Cap	V/C	Vol	Cap	V/C	Vol	Cap	V/C	Vol	Cap	V/C	Vol	Cap	V/C
Current Dwell Times															
Blue Dep	692	1086	0.64	769	1082	0.71	881	1083	0.81	982	1084	0.91	1083	1084	1.00
Red Dep	587	1242	0.47	653	1257	0.52	746	1259	0.59	830	1260	0.66	914	1261	0.72
Blue Arr	595	660	0.90	565	594	0.95	650	594	1.09	727	594	1.22	804	594	1.35
Red Arr	380	464	0.82	395	432	0.91	454	432	1.05	508	432	1.18	561	432	1.30
Adjusted Dwell Times															
Blue Arr	595	997	0.60	565	917	0.62	650	917	0.71	727	917	0.79	804	917	0.88
Red Arr	380	966	0.39	395	916	0.43	454	917	0.50	508	917	0.55	561	917	0.61

Levels of service color code:
Green = acceptable level of service
Yellow = moderate congestion
Orange = significant congestion
Red = massive congestion

3 Blue Curb Expansion



BLUE TICKETING LEVEL CURB EXPANSION


3 Blue Curb Expansion
RED DEPARTURES (ARRIVALS SIMILAR)
BLUE DEPARTURES (ARRIVALS SIMILAR)
AIR CANADA, CAYMAN
SKY KING, WEST JET
BRITISH AIRWAYS, FRONTIER
SPIRIT
AIRTRAN
SOUTHWEST
SOUTHWEST
DELTA
AMERICAN
AMERICAN, DELTA, US AIRWAYS
US AIRWAYS
CONTINENTAL, UNITED
CONTINENTAL, UNITED
JET BLUE
60'
20'
BLUE BAGGAGE CLAIM LEVEL CURB EXPANSION
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CUSTOMS AND BORDER PROTECTION CONCEPT ALTERNATIVES
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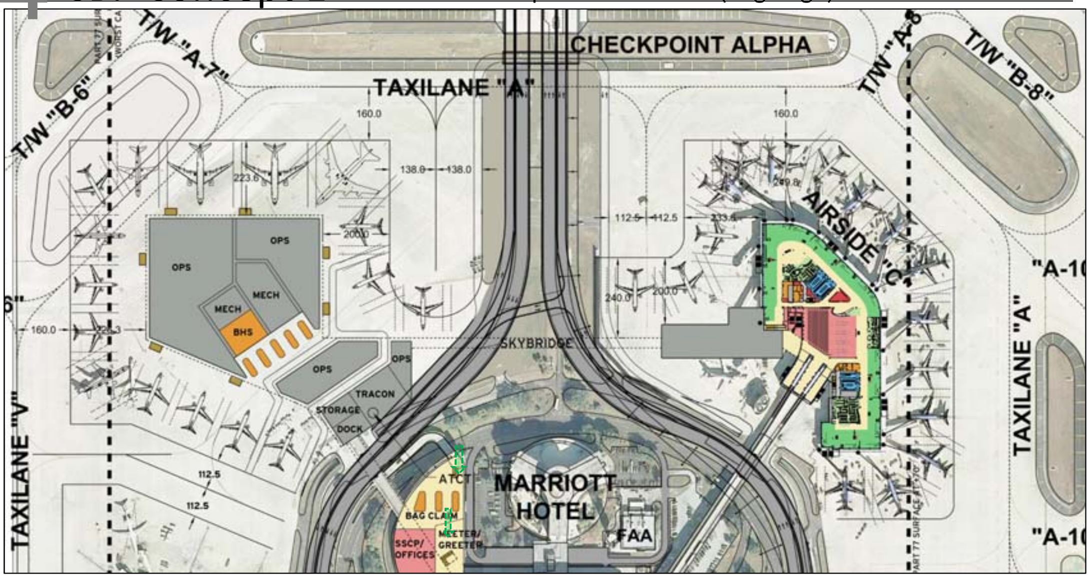
4 CBP Concept 1

FIS Component Landside (in garage)

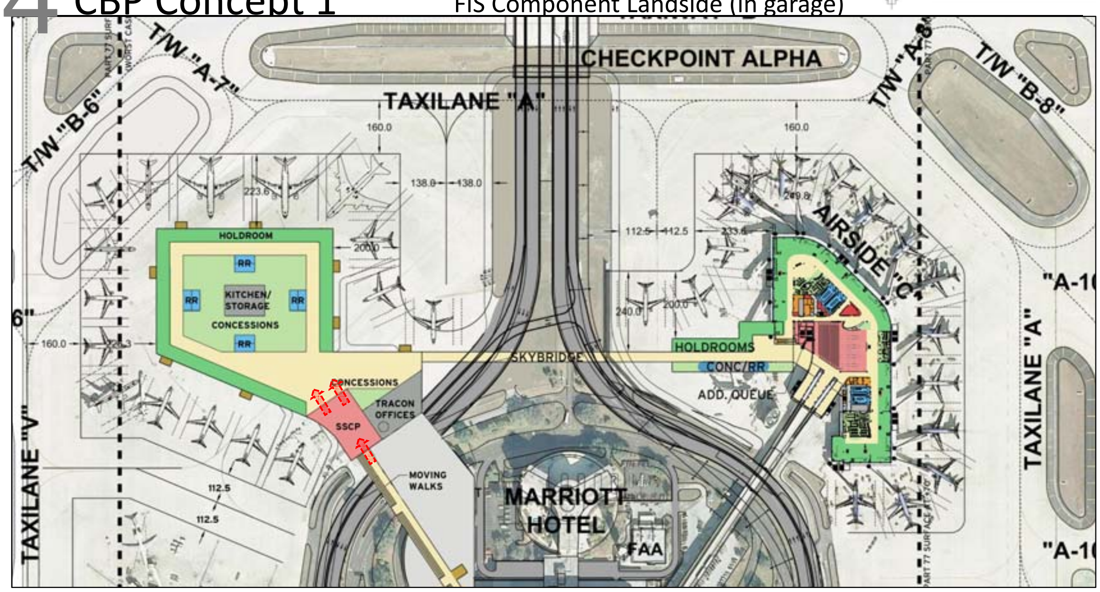


D = 16 AIRCRAFT | OPTION 1 | C = 16 AIRCRAFT

APRON LEVEL

4 CBP Concept 1

FIS Component Landside (in garage)



D = 16 AIRCRAFT | OPTION 1 | C = 16 AIRCRAFT

DEPARTURE LEVEL

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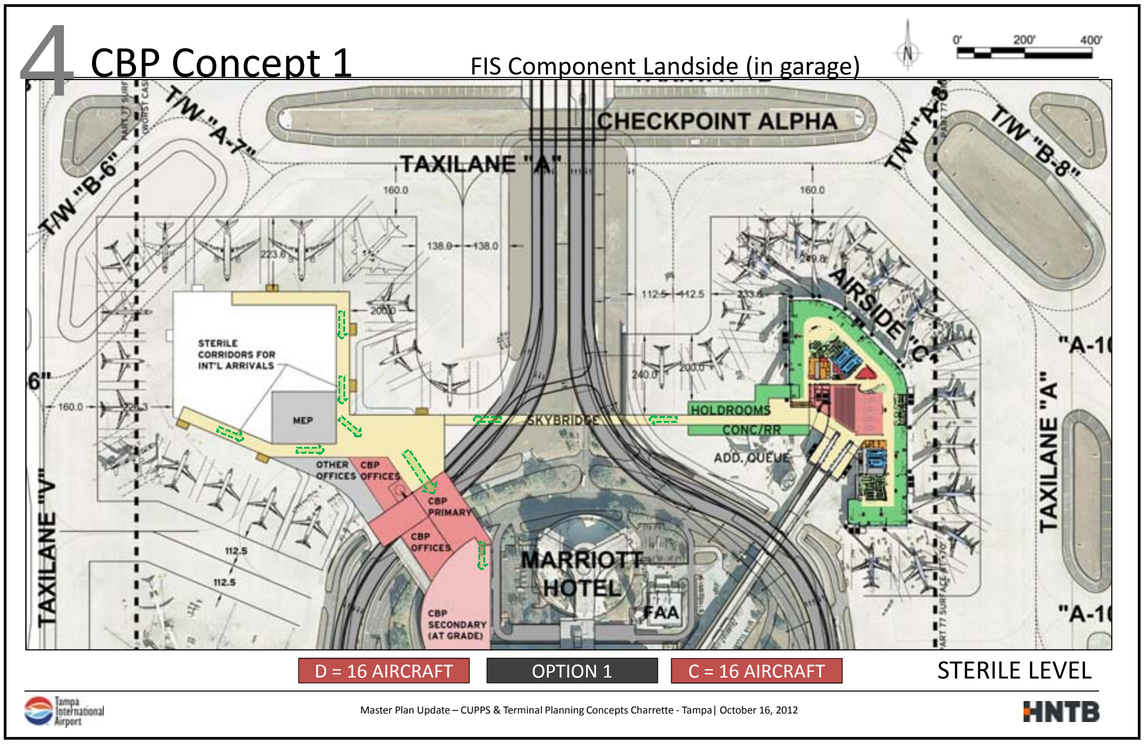
4 CBP Concept 1
FIS Component Landside (in garage)
0' 200' 400'
CHECKPOINT ALPHA
TAXILANE "A"
T/W "A-7"
T/W "B-6"
T/W "A-8"
T/W "B-8"
STERILE CORRIDORS FOR INT'L ARRIVALS
MEP
SKYBRIDGE
HOLDROOMS
CONC/RR
ADD. QUEUE
AIRSIDE "C"
OTHER OFFICES
CBP OFFICES
CBP PRIMARY
CBP OFFICES
CBP SECONDARY (AT GRADE)
MARRIOTT HOTEL
FAA
TAXILANE "V"
TAXILANE "A"
D = 16 AIRCRAFT
OPTION 1
C = 16 AIRCRAFT
STERILE LEVEL
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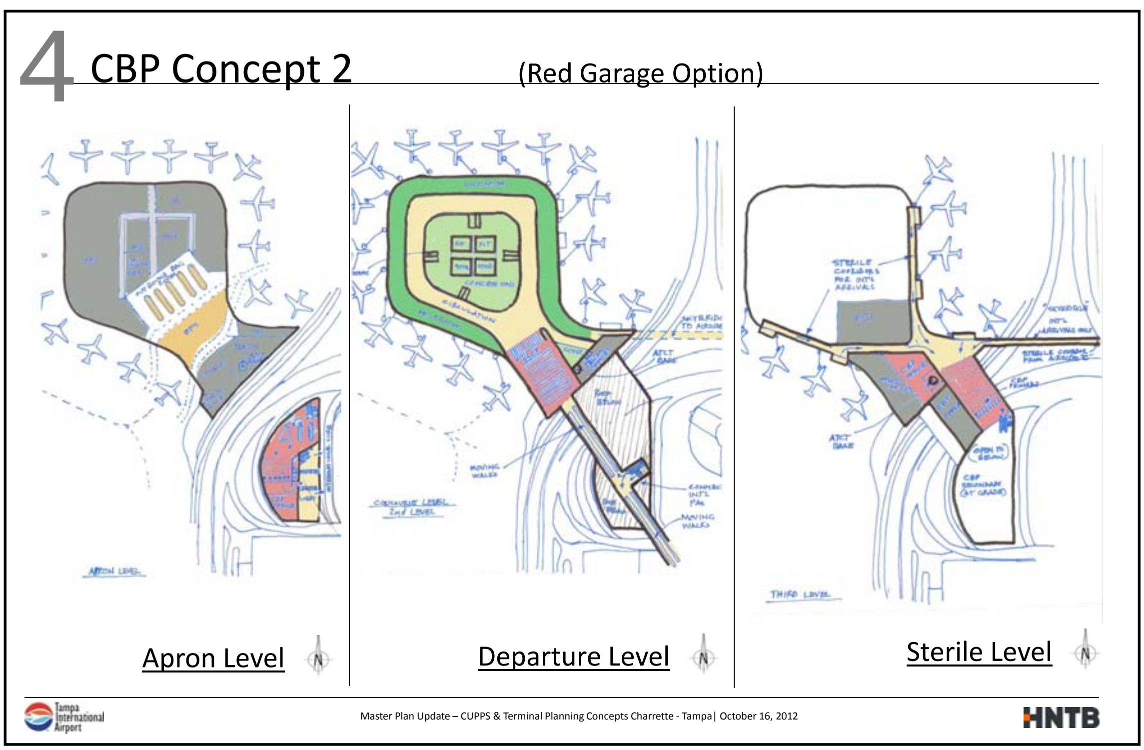
4 CBP Concept 2
(Red Garage Option)
Apron Level
Departure Level
Sterile Level
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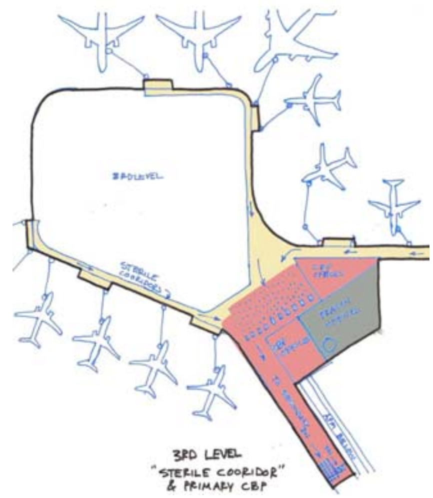
4 CBP Concept 3

(Transfer Level Connection)

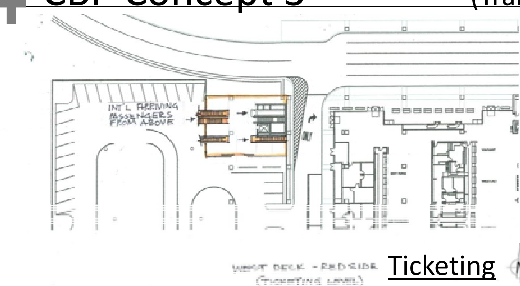
Departure Level



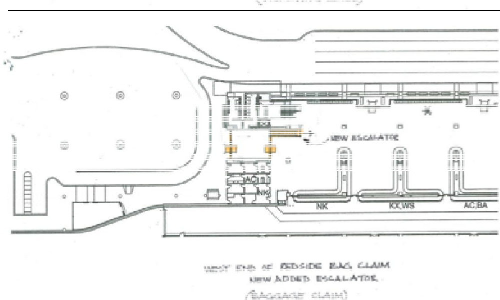
Sterile Level

4 CBP Concept 3

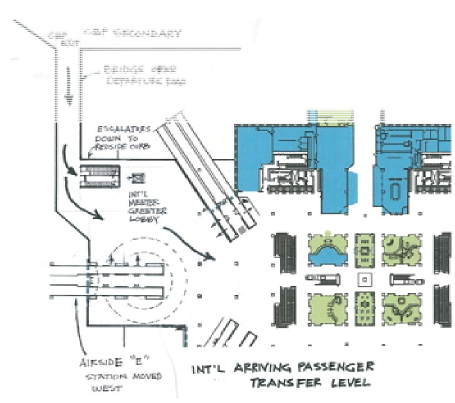
(Transfer Level Connection)



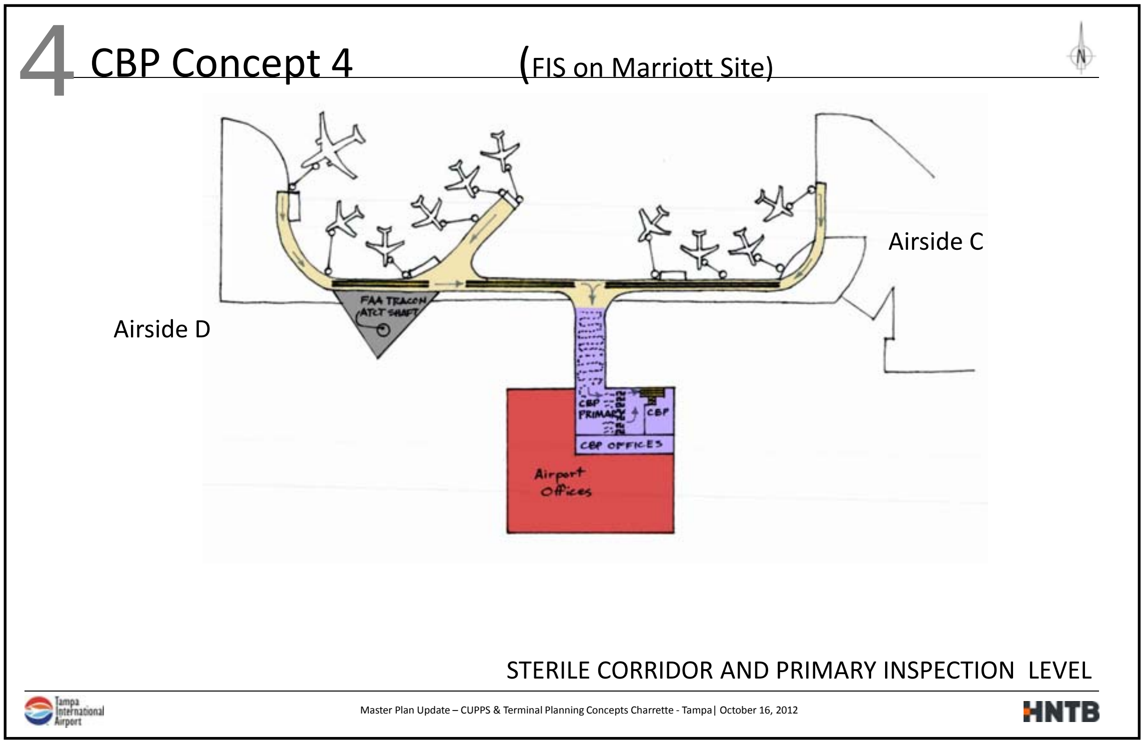
Ticketing



Baggage



Transfer


4 CBP Concept 4
(FIS on Marriott Site)
Airside C
Airside D
FAA TRACON ATCT SHAFT
CBP PRIMARY
CBP
CBP OFFICES
Airport Offices
STERILE CORRIDOR AND PRIMARY INSPECTION LEVEL
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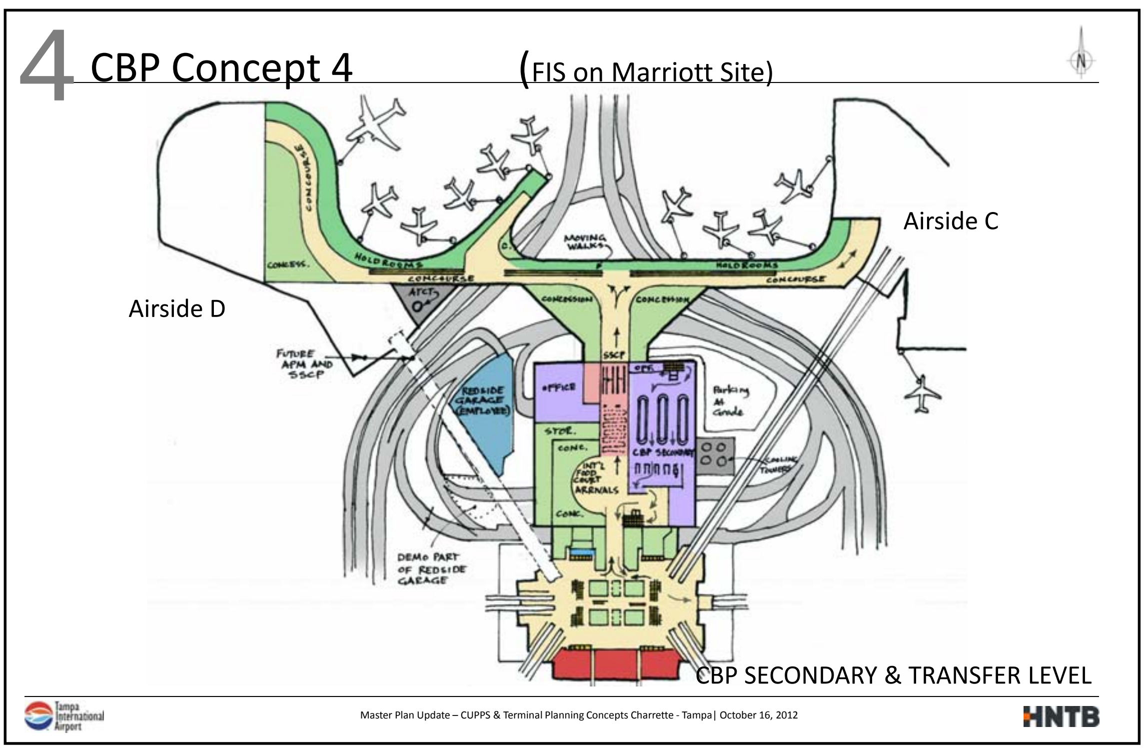
4 CBP Concept 4
(FIS on Marriott Site)
Airside C
Airside D
CONCOURSE
HOLDROOMS
MOVING WALKS
CONCESSION
SSCP
FUTURE APM AND SSCP
REDSIDE GARAGE (EMPLOYEE)
OFFICE
STOR.
CONC.
CBP SECONDARY
INT'L FOOD COURT ARRIVALS
Parking At Grade
DEMO PART OF REDSIDE GARAGE
CBP SECONDARY & TRANSFER LEVEL
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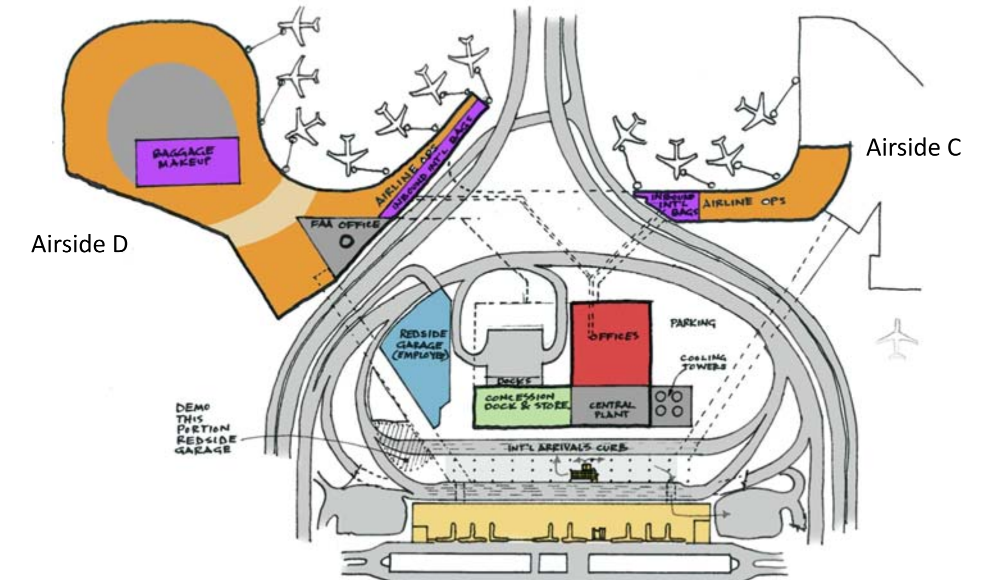
4 CBP Concept 4 (FIS on Marriott Site)



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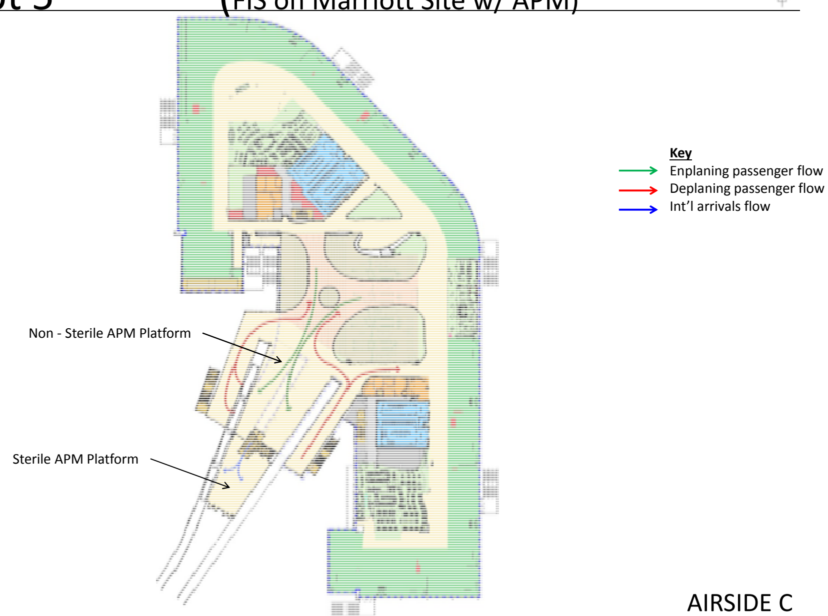
4 CBP Concept 5 (FIS on Marriott Site w/ APM)



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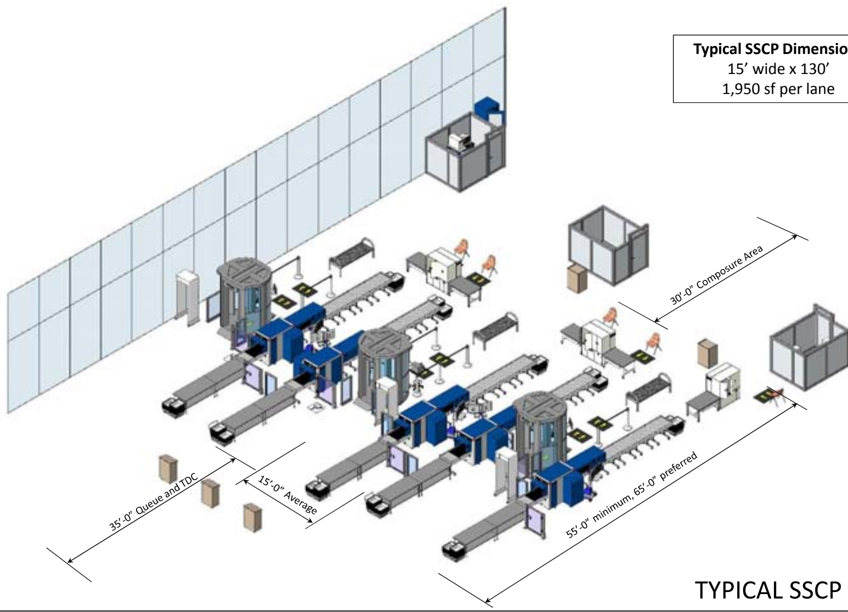
4 Transfer Level

Typical SSCP Dimensions
15’ wide x 130’
1,950 sf per lane



TYPICAL SSCP LAYOUT

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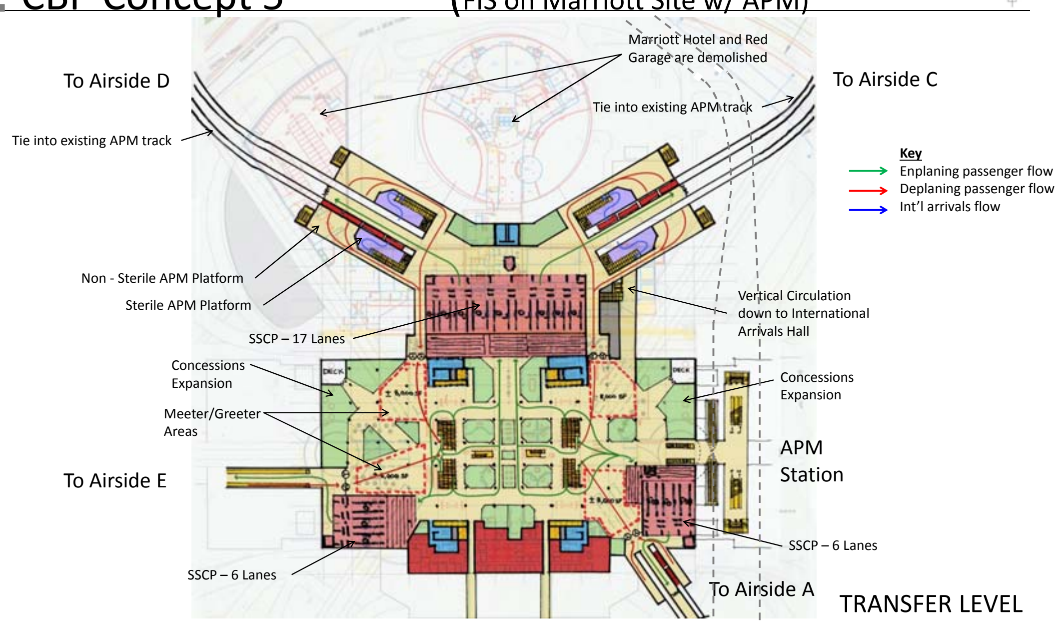
4 CBP Concept 5 (FIS on Marriott Site w/ APM)



TRANSFER LEVEL

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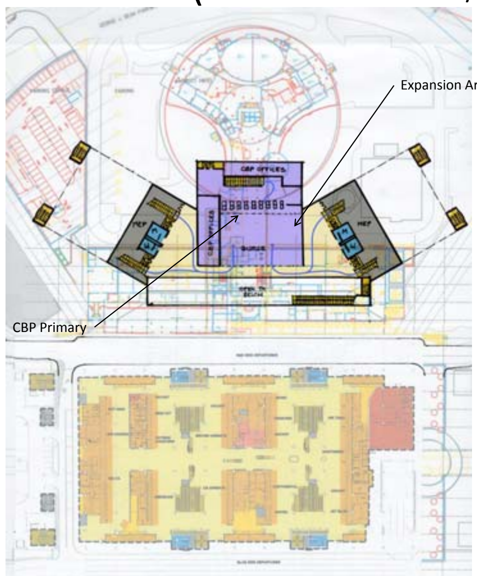
4 CBP Concept 5 (FIS on Marriott Site w/ APM)



Key
Int'l arrivals flow

TICKETING LEVEL

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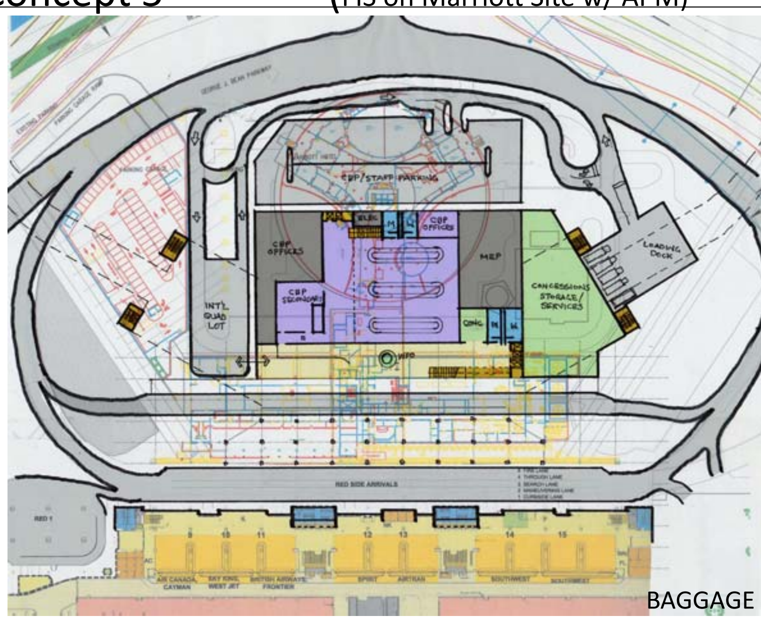
4 CBP Concept 5 (FIS on Marriott Site w/ APM)



BAGGAGE CLAIM LEVEL

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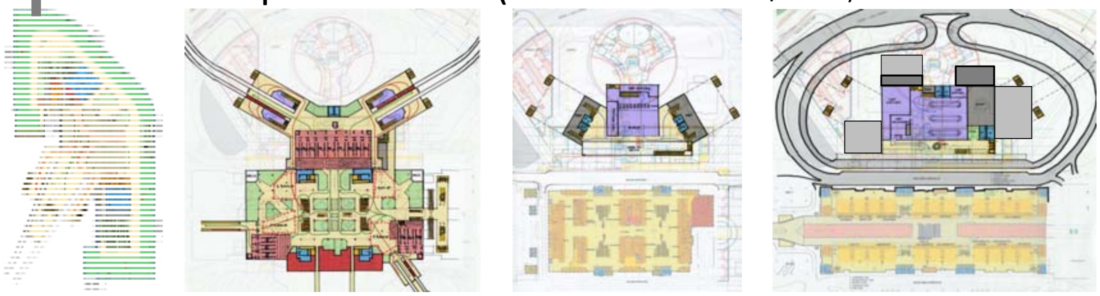
4 CBP Concept 5 (FIS on Marriott Site w/ APM)



Pros

1. Consolidated checkpoint reduces TSA staffing and overall security equipment requirements
2. With hotel gone and ATCT relocated near the new Airside D, there is a large site available to build a nice sized FIS with associated roadway and curbs.
3. International flights from a new Airside D and from select gates on Airside C (Southwest Airlines) are accommodated.
4. Passengers can connect between Airside C and Airside D without going through a security checkpoint.
5. By moving the SSCP to the terminal, significant space is made available to convert to badly needed concessions at each airside.
6. Opportunity to replace aging fleet of APM cars.
7. Additional study may determine only a single sterile APM car is required to shuttle passengers to CBP. Metered flow of passengers exiting aircraft and short headways may reduce sterile car requirement.
8. Impact to Rental Car APM extension to future north complex is minimal.
9. May explore swing space platforms for middle car to handle peak periods of international arrivals. Requires "magic doors" that may be locked or unlocked to create sterile section of platform out of normal platform area.

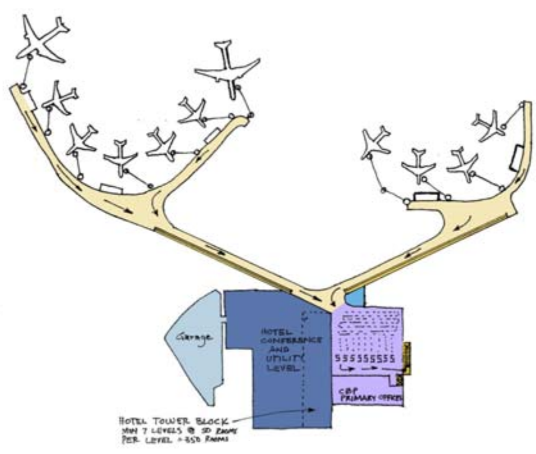
Cons

1. Twice as many APM train cars mean twice the capital cost, more maintenance space, more maintenance cost (spare parts, O&M personnel), and twice the operating cost on those routes.
2. Phasing the new track alignment with the existing track is expensive, disruptive, and the airside will be served by only one APM for up to 3 years during construction and testing. It is assumed one track remains running while the other is reconstructed. Once the new station is operational then the old station is decommissioned and the second track to the new station is cut in, tested and opened. Testing and commissioning typically takes 4 to 6 months.
3. The station at Airside C needs to be modified to add the sterile lobby/platform, which will reduce the APM operation to a single track for an extended period of time.
4. Sterile cars will be running empty all the time on the outbound leg and much of the day on the inbound leg, as there is not a constant (or heavy, for that matter) stream of arriving international passengers.
5. Requires standby contingency provisions for replacement shuttle bus service in event that single system fails.

Opportunity

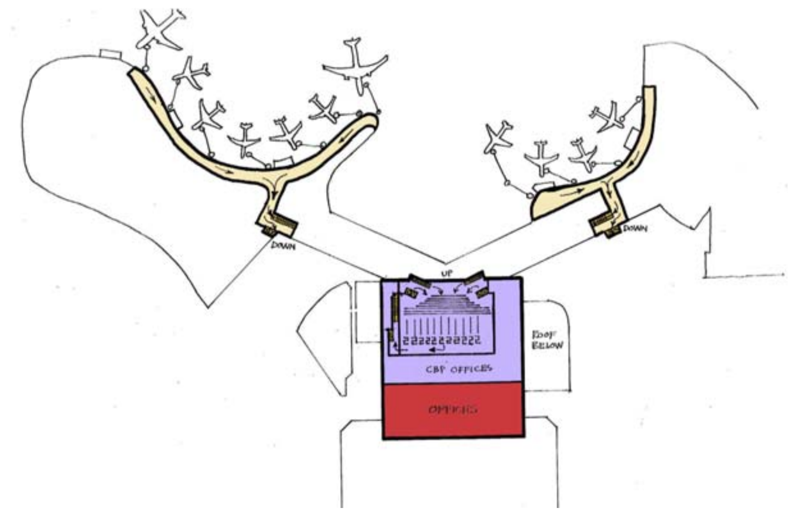
The creation of the IAB will further imbalance the peak hour demands on the Red Curb (will get smaller) vs. the Blue curb (will stay the same, heavier by 50% than Red side). This points out the golden opportunity for HCAA to rework allocations of airlines between the sides to help stave off or eliminate congestion and the expense of building physical plant to relieve the congestion.

4 CBP Concept 6 (FIS on Marriott Site w/ New Hotel)



CBP PRIMARY/STERILE CORRIDOR/HOTEL CONFERENCE LEVEL

4 CBP Concept 6a (FIS on Marriott Site w/ New Hotel)



CBP PRIMARY/STERILE CORRIDOR

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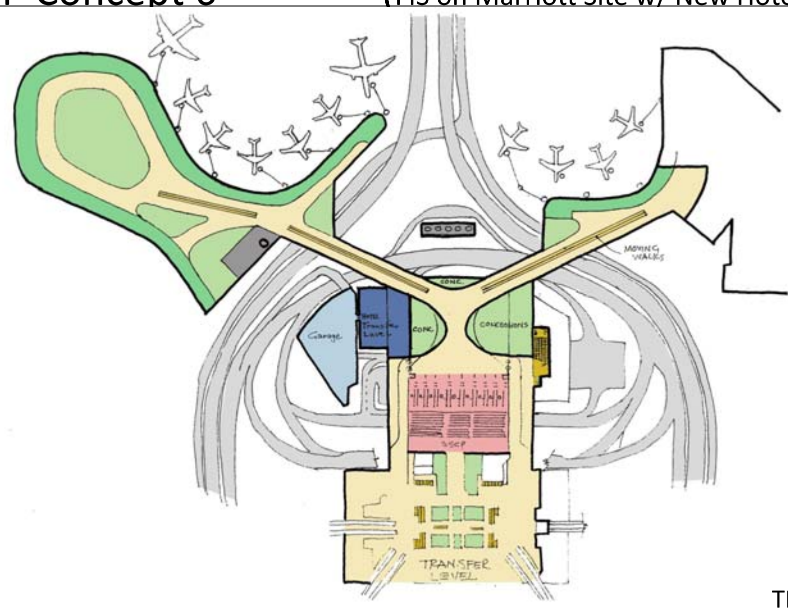
4 CBP Concept 6 (FIS on Marriott Site w/ New Hotel)



TRANSFER LEVEL

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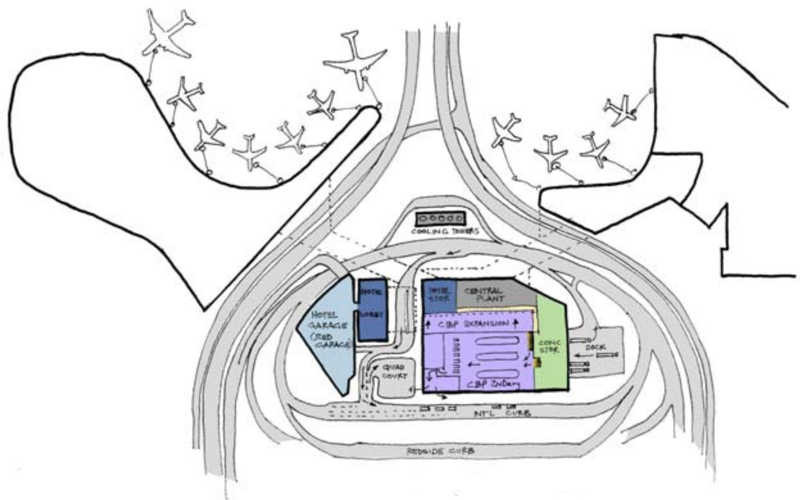
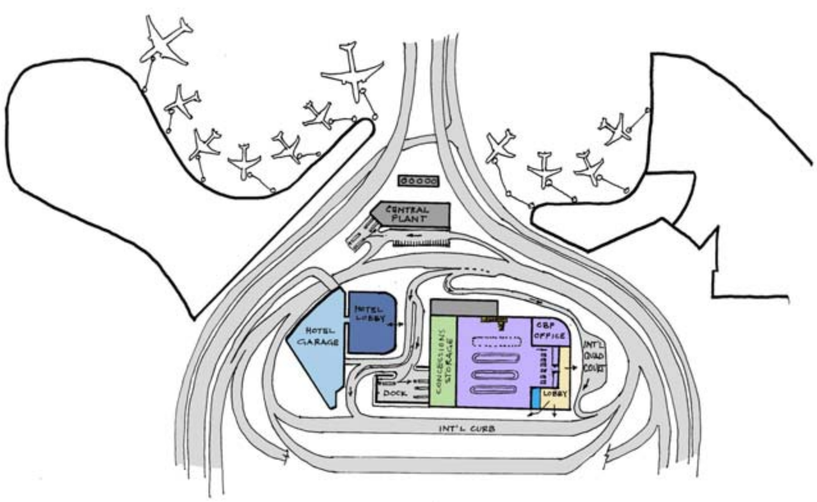
4 CBP Concept 6 (FIS on Marriott Site w/ New Hotel)



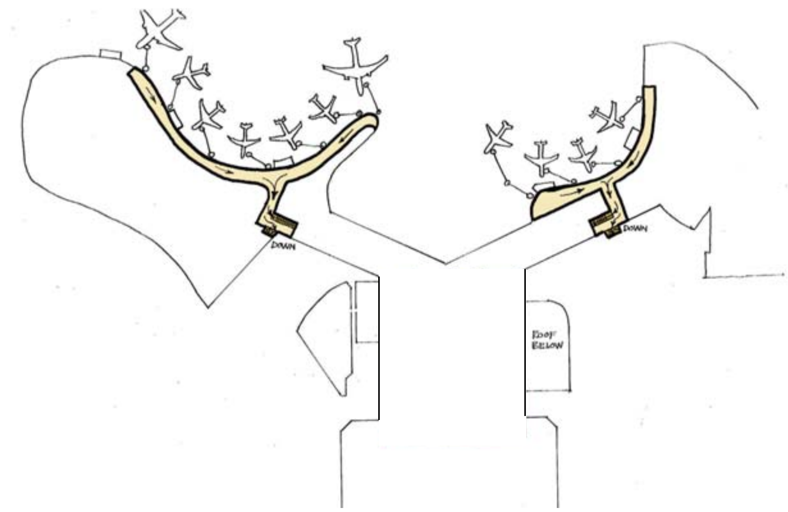
CBP BAGGAGE CLAIM/HOTEL LOBBY LEVEL

4 CBP Concept 6 (FIS on Marriott Site w/ New Hotel)



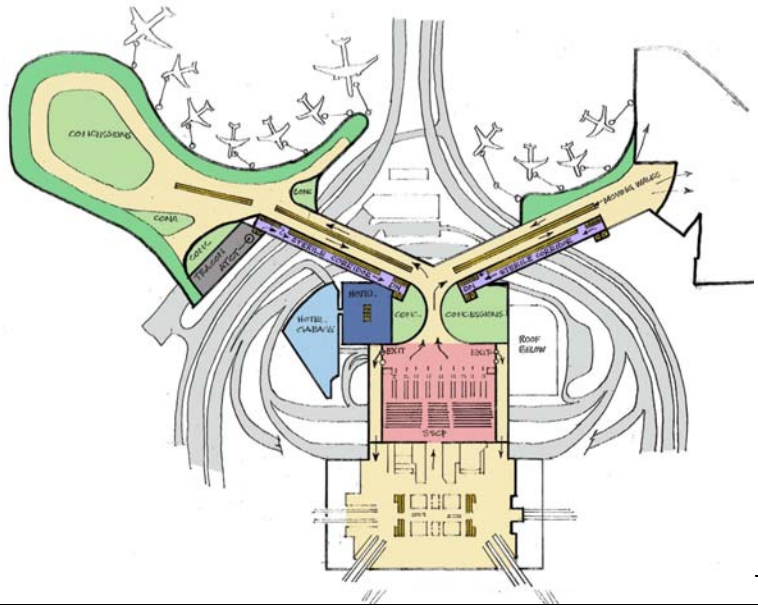
CBP BAGGAGE CLAIM/HOTEL LOBBY LEVEL

4 CBP Concept 6a (FIS on Marriott Site w/ New Hotel)



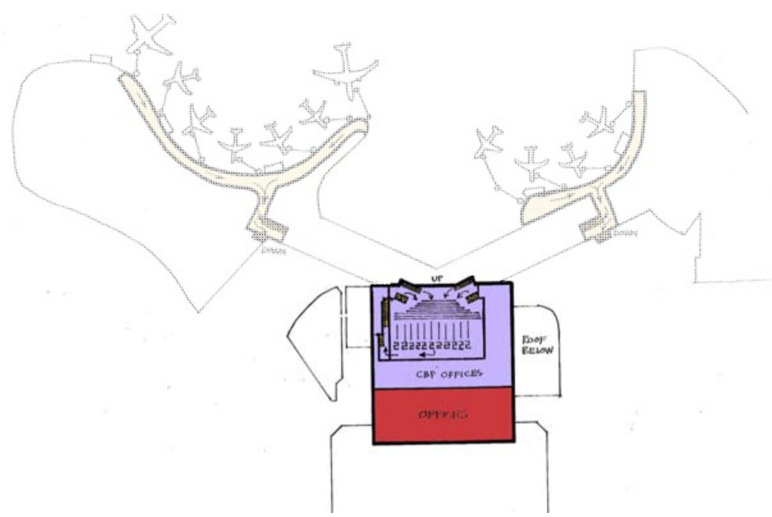
STERILE CORRIDOR

4 CBP Concept 6a (FIS on Marriott Site w/ New Hotel)



TRANSFER LEVEL

4 CBP Concept 6a (FIS on Marriott Site w/ New Hotel)



CBP PRIMARY

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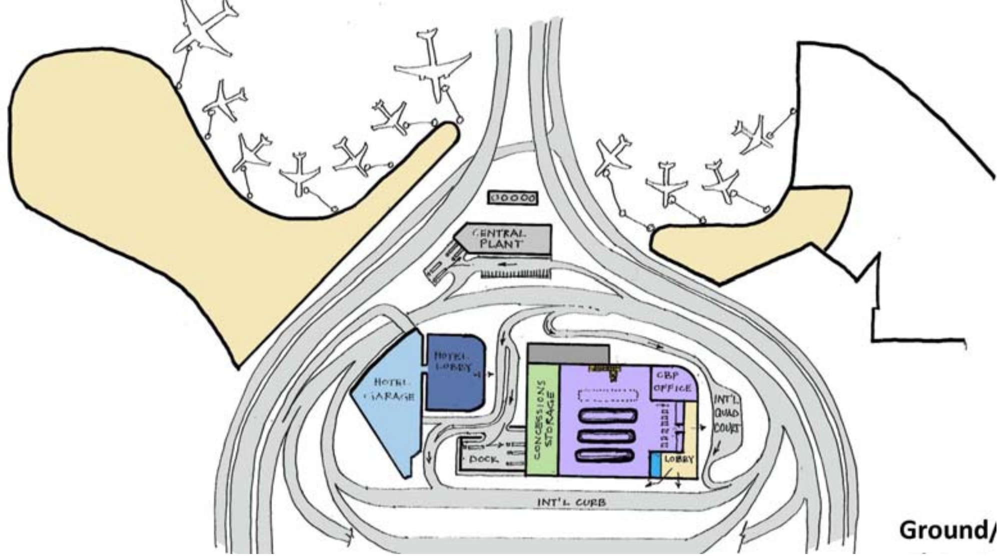
4 CBP Concept 6a (FIS on Marriott Site w/ New Hotel)



GROUND LEVEL/BAGGAGE CLAIM LEVEL

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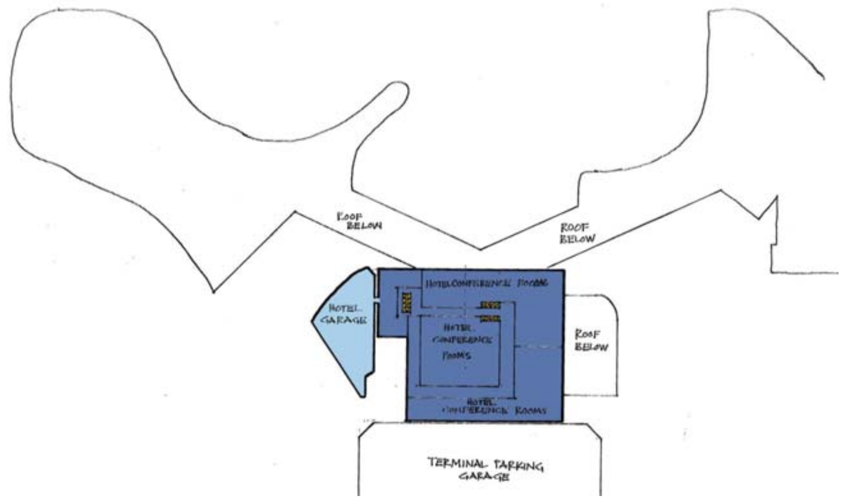
4 CBP Concept 6a (FIS on Marriott Site w/ New Hotel)



4TH LEVEL/HOTEL CONFERENCE LEVEL

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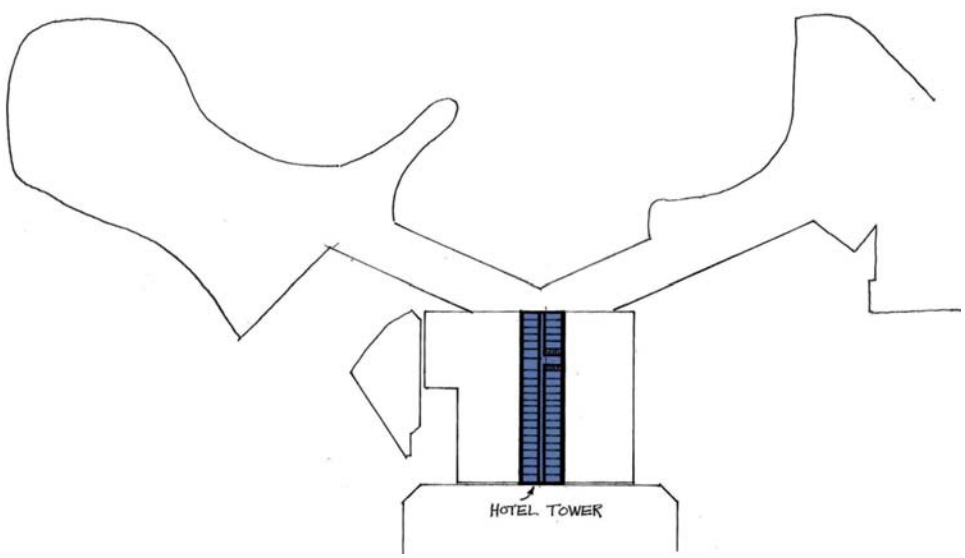
4 CBP Concept 6a (FIS on Marriott Site w/ New Hotel)



TYPICAL HOTEL TOWER LEVEL

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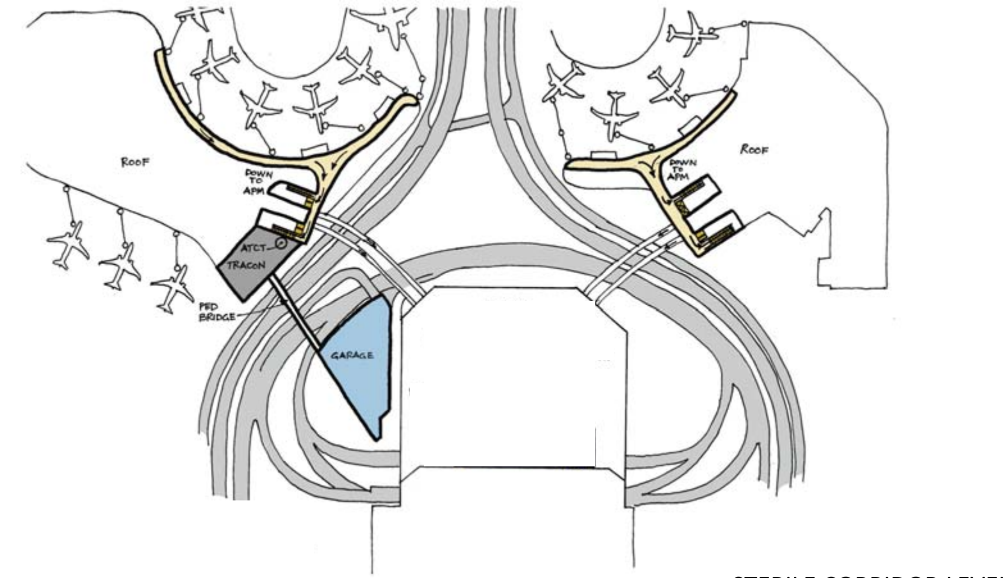
4 CBP Concept 7 (FIS on Marriott Site)



STERILE CORRIDOR LEVEL

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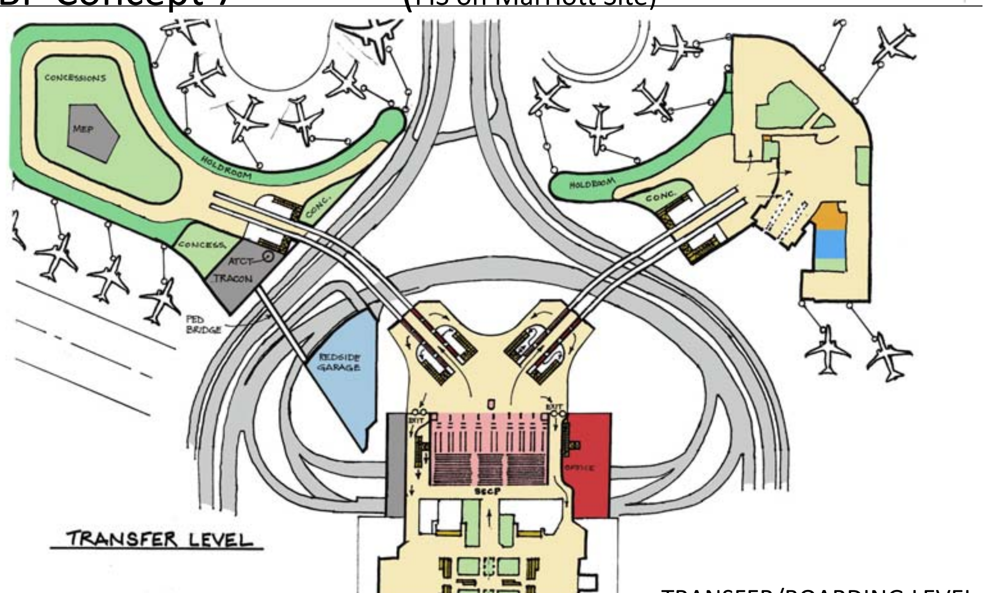
4 CBP Concept 7 (FIS on Marriott Site)



TRANSFER/BOARDING LEVEL

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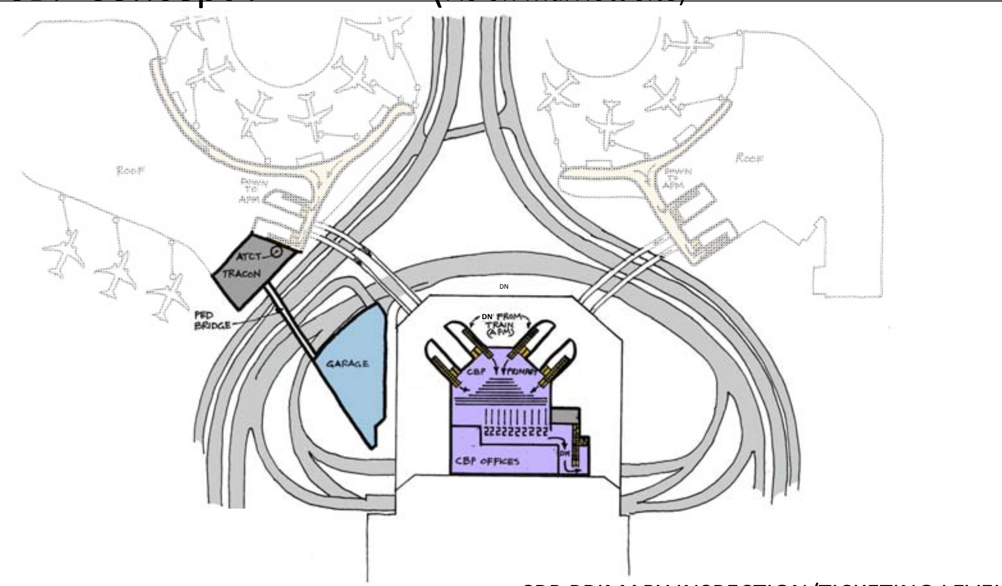
4 CBP Concept 7 (FIS on Marriott Site)



CBP PRIMARY INSPECTION/TICKETING LEVEL

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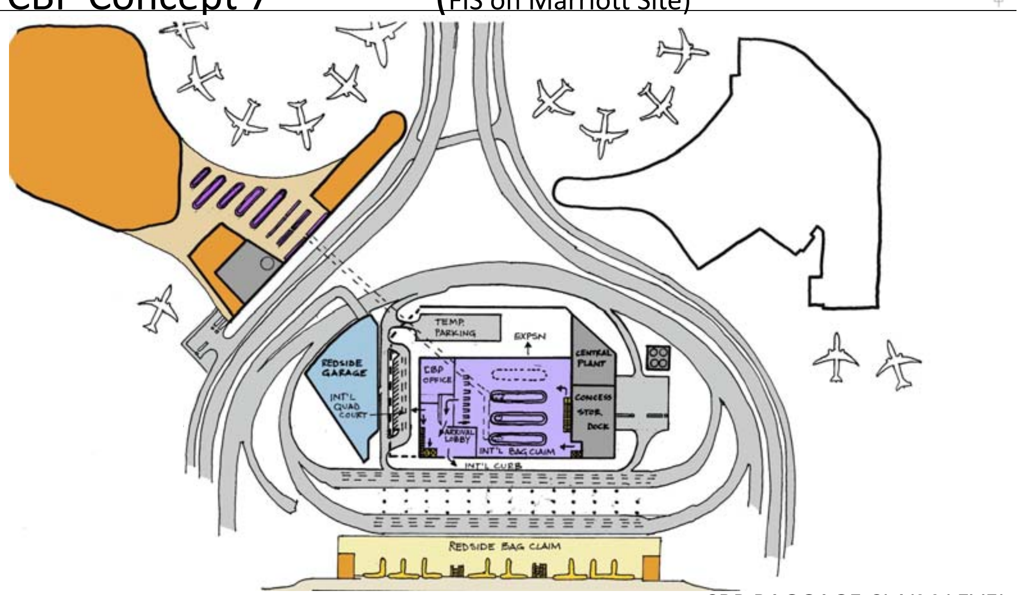
4 CBP Concept 7 (FIS on Marriott Site)



CBP BAGGAGE CLAIM LEVEL

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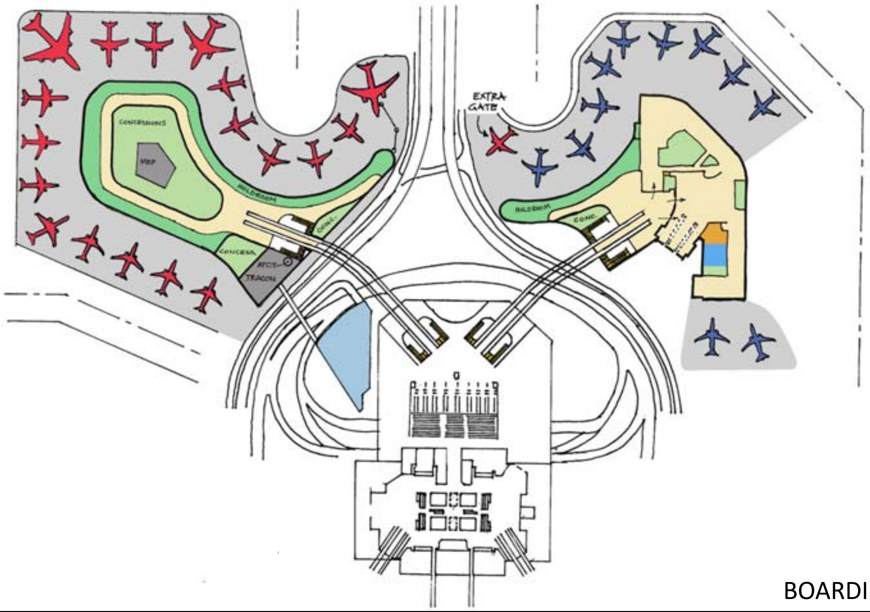
4 Airside C & D Aircraft Maximization



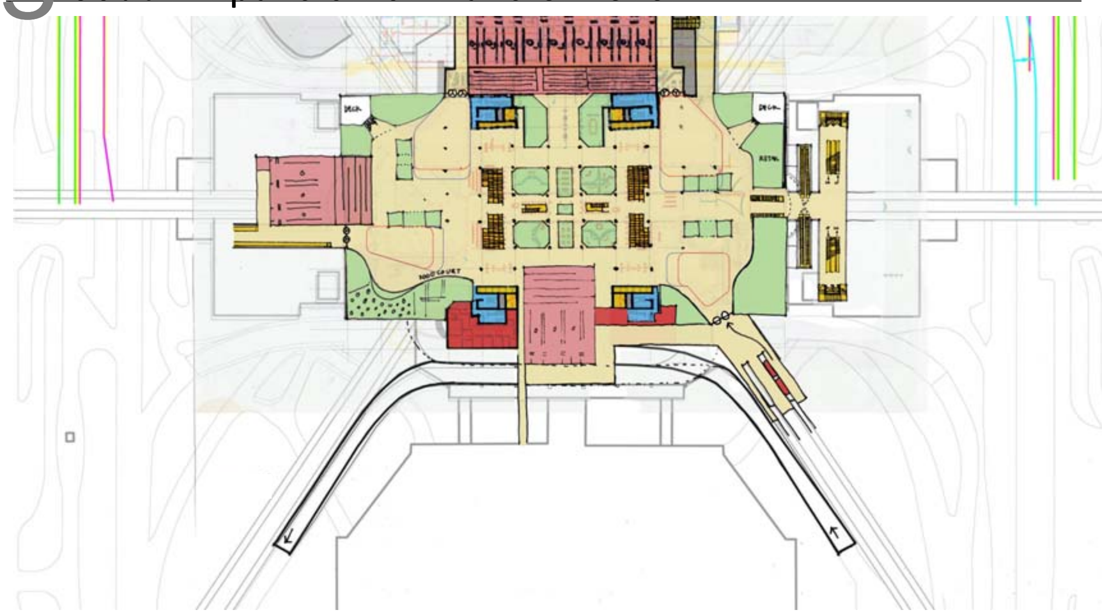
BOARDING LEVEL

Tampa International Airport

SOUTH EXPANSION OF TRANSFER LEVEL

5 South Expansion of Transfer Level

5 South Expansion of Transfer Level



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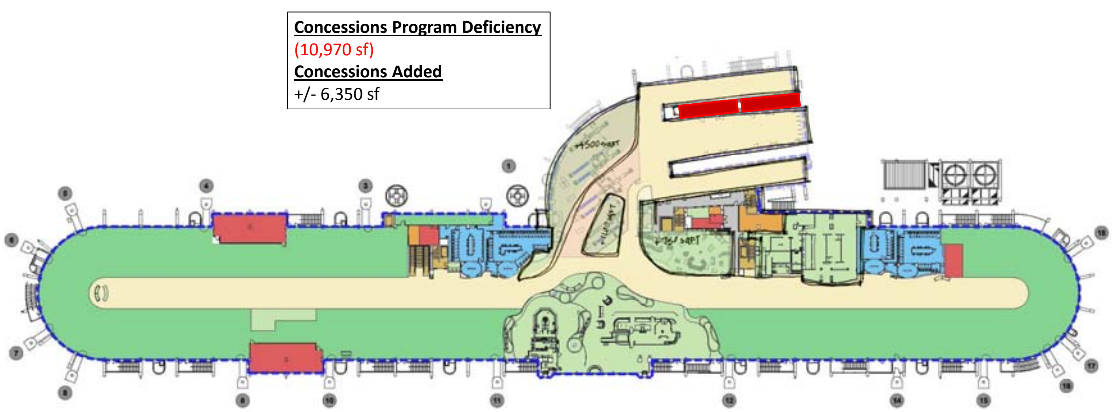
6 Airside Concessions Growth



AIRSIDE A

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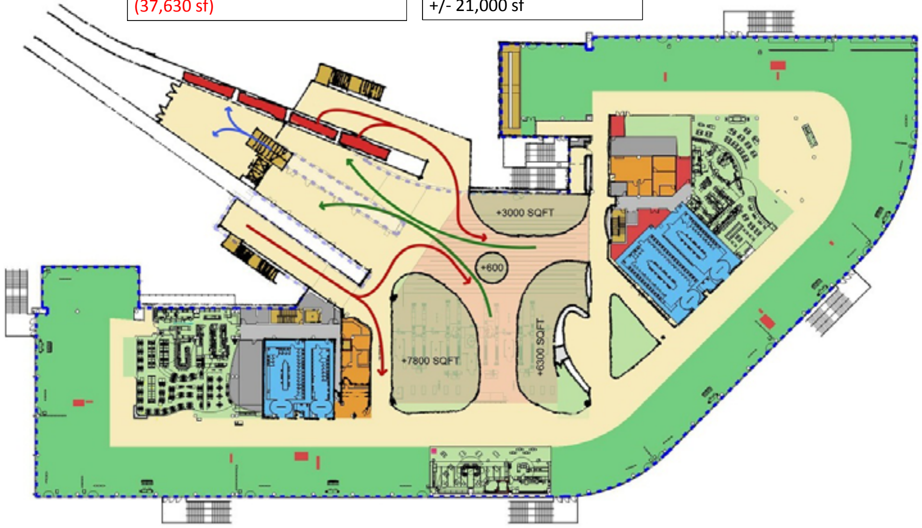
6 Airside Concessions Growth

Concessions Program Deficiency
(37,630 sf)

Concessions Added
+/- 21,000 sf



AIRSIDE C

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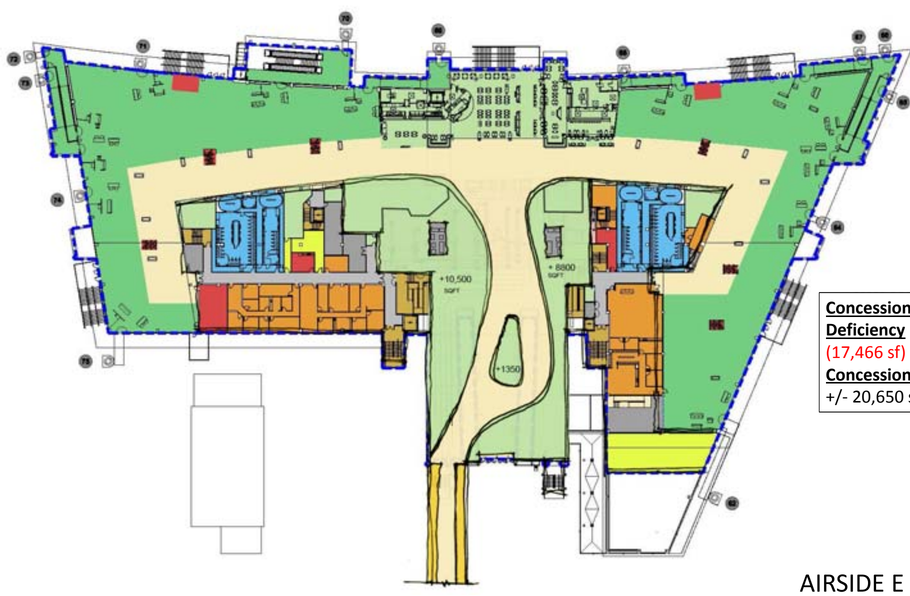
6 Airside Concessions Growth



Concessions Program Deficiency
(17,466 sf)
Concessions Added
+/- 20,650 sf

AIRSIDE E Option 1

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6 Airside Concessions Growth

Concessions Program Deficiency
(17,466 sf)
Concessions Added
+/- 21,700 sf

AIRSIDE E Option 2

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6 Airside Concessions Growth

Concessions Program Deficiency
(17,466 sf)
Concessions Added
+/- 5,040 sf

AIRSIDE E Option 3

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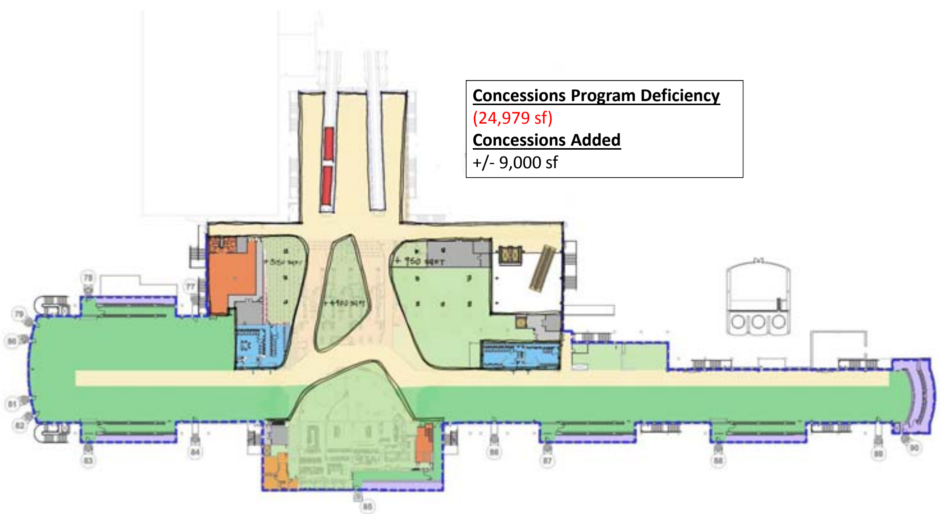
6 Airside Concessions Growth



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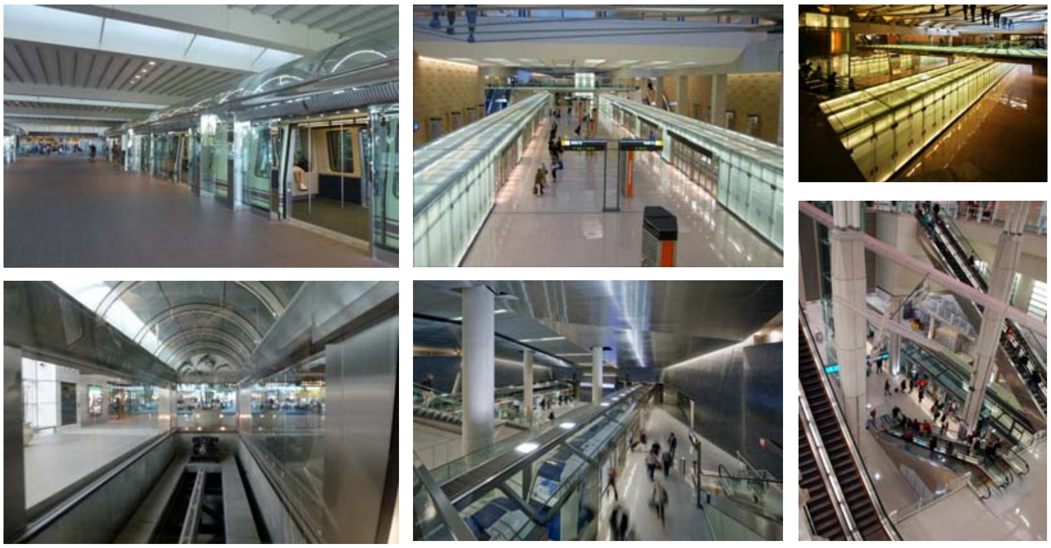
7 APM Stations – Glass Enclosed



ORLANDO AND DULLES INTERNATIONAL AIRPORTS

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Tampa International Airport

EAST APM

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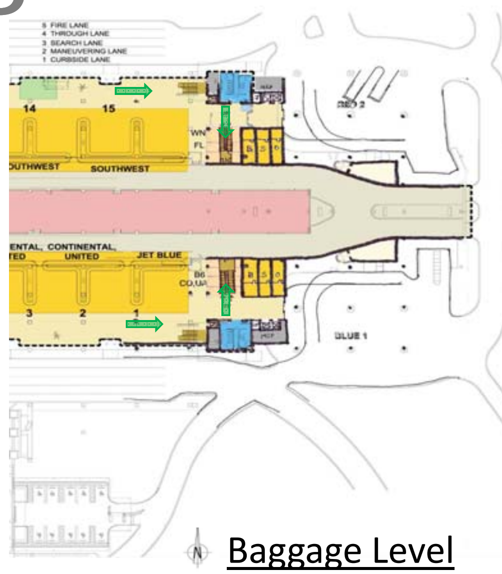
8 Future APM - EAST

Departures
Arrivals



Baggage Level

Ticketing Level

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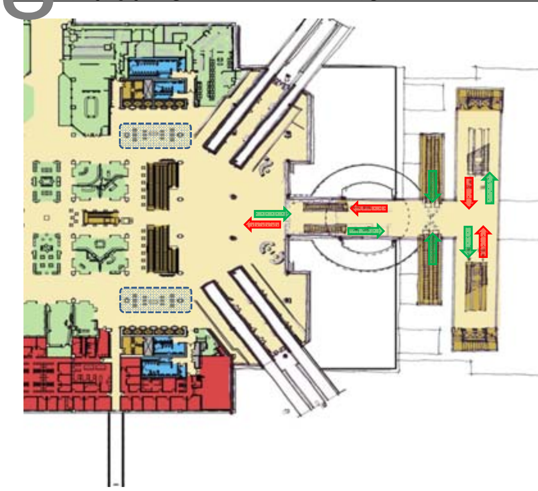
HNTB

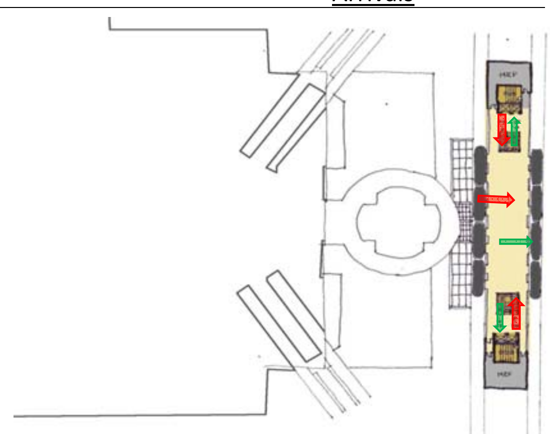
8 Future APM - EAST

Departures
Arrivals



= POTENTIAL KIOSK LOCATION

Transfer Level



APM Level

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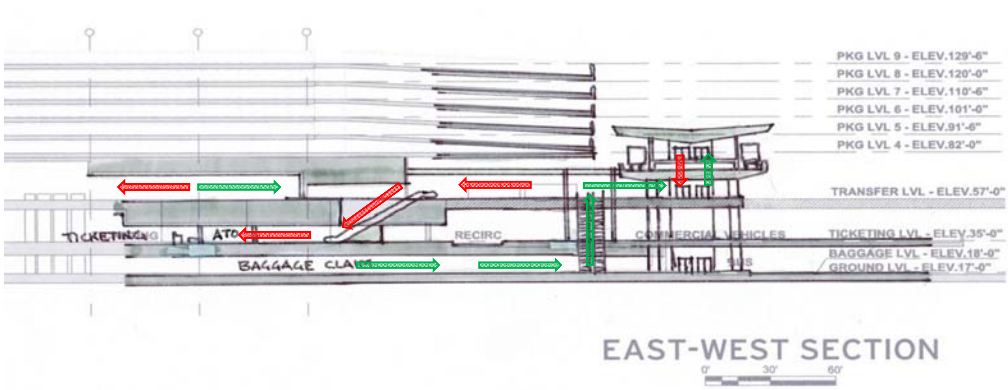
HNTB

8 Future APM - EAST

Departures
Arrivals



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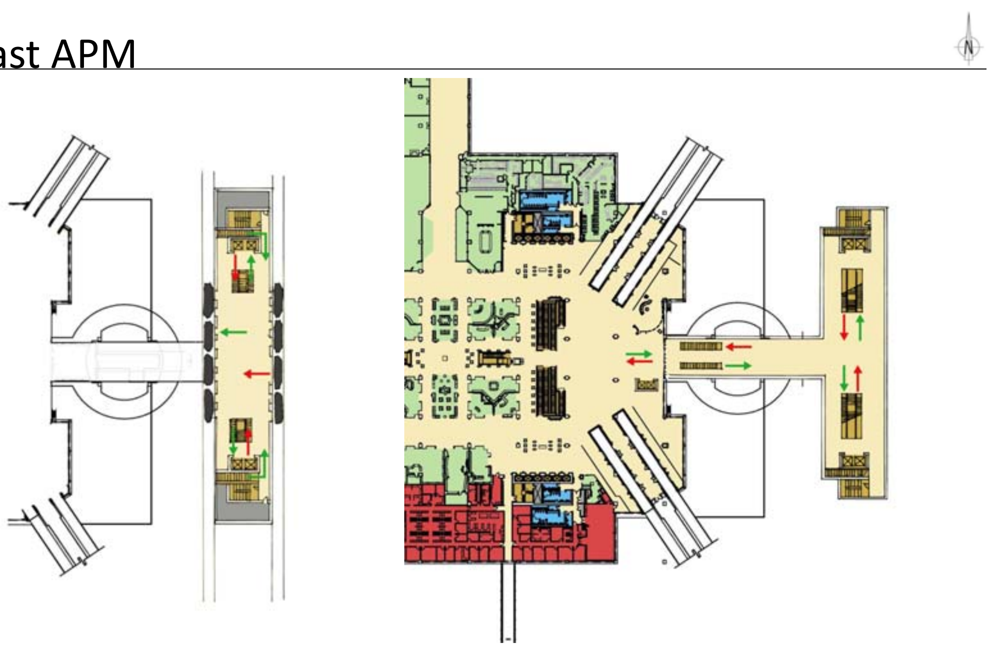
8 East APM



APM STATION LEVEL

TRANSFER LEVEL

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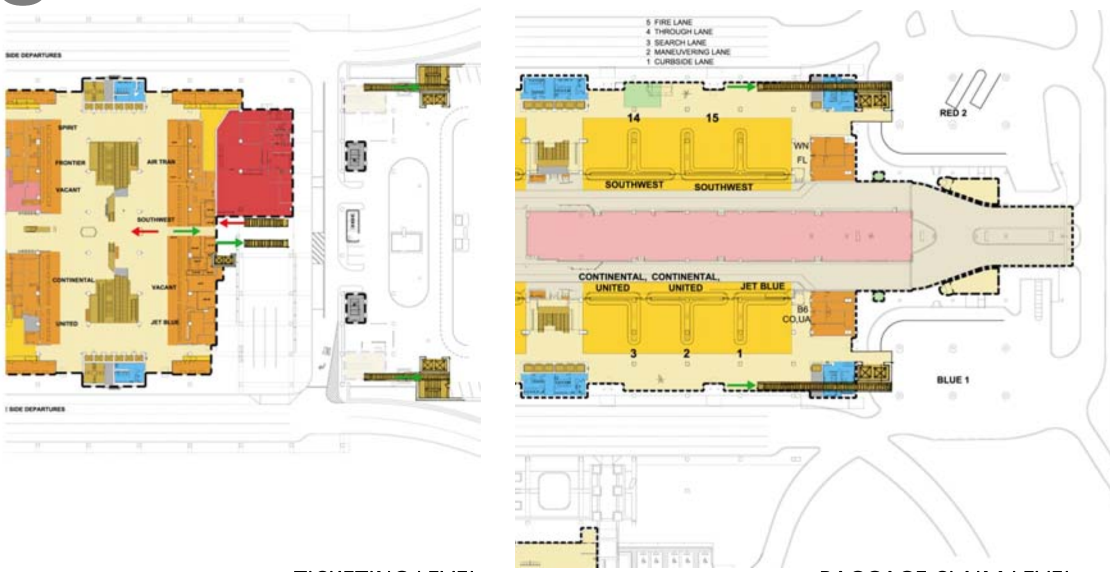
8 East APM



TICKETING LEVEL

BAGGAGE CLAIM LEVEL

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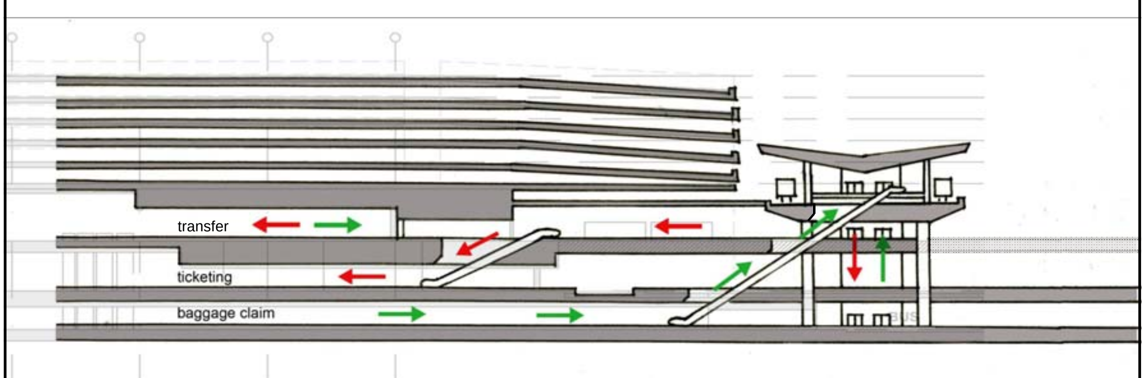
8 East APM



BAGGAGE CLAIM LEVEL

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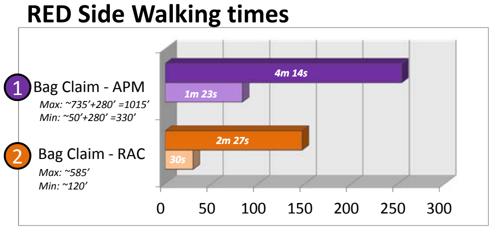
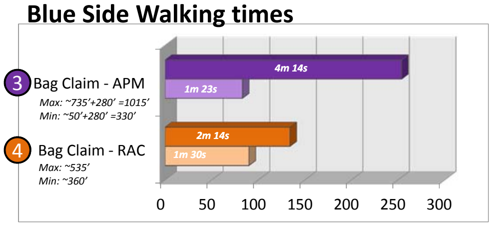
8 Future EAST APM –WALKING DISTANCES

= EXISTING RAC
= FUTURE EAST APM

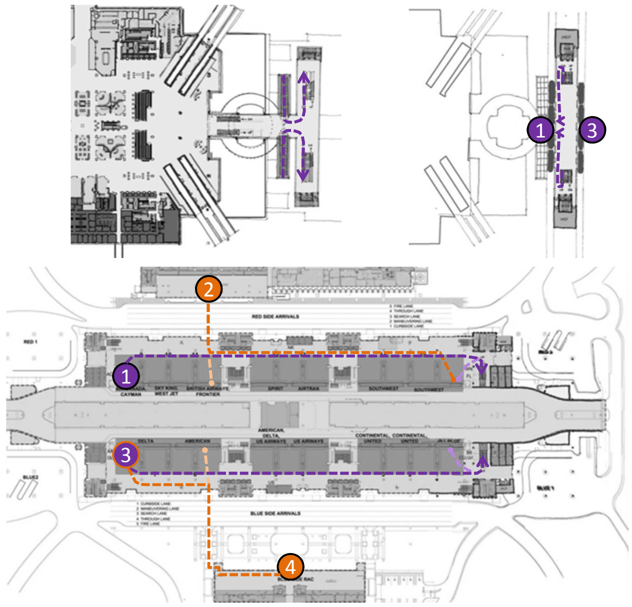
RED Side Walking times



Blue Side Walking times



***Walk Rate: 4 ft/sec



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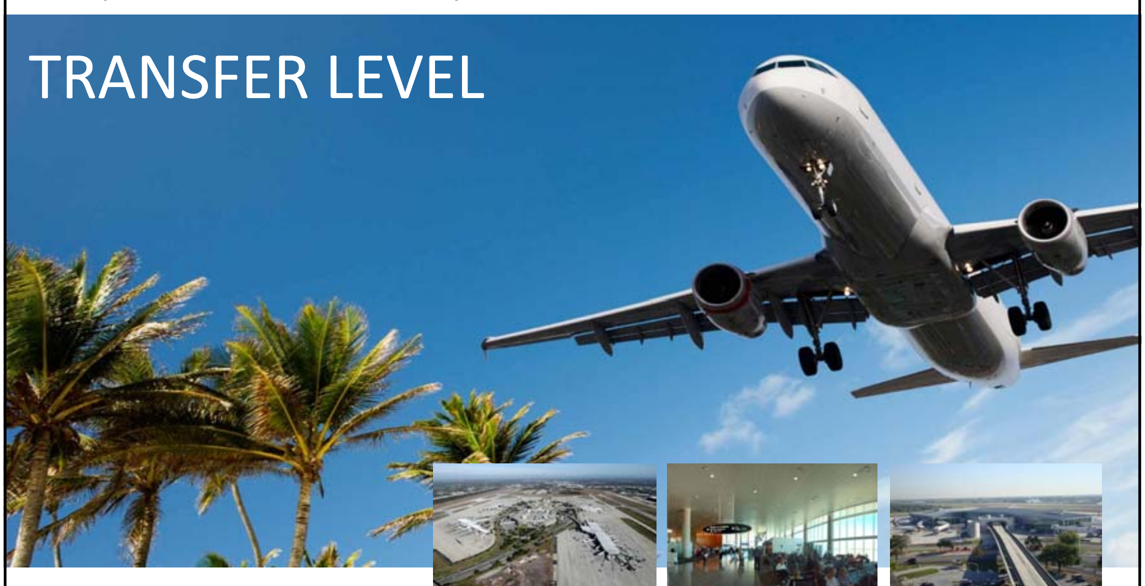

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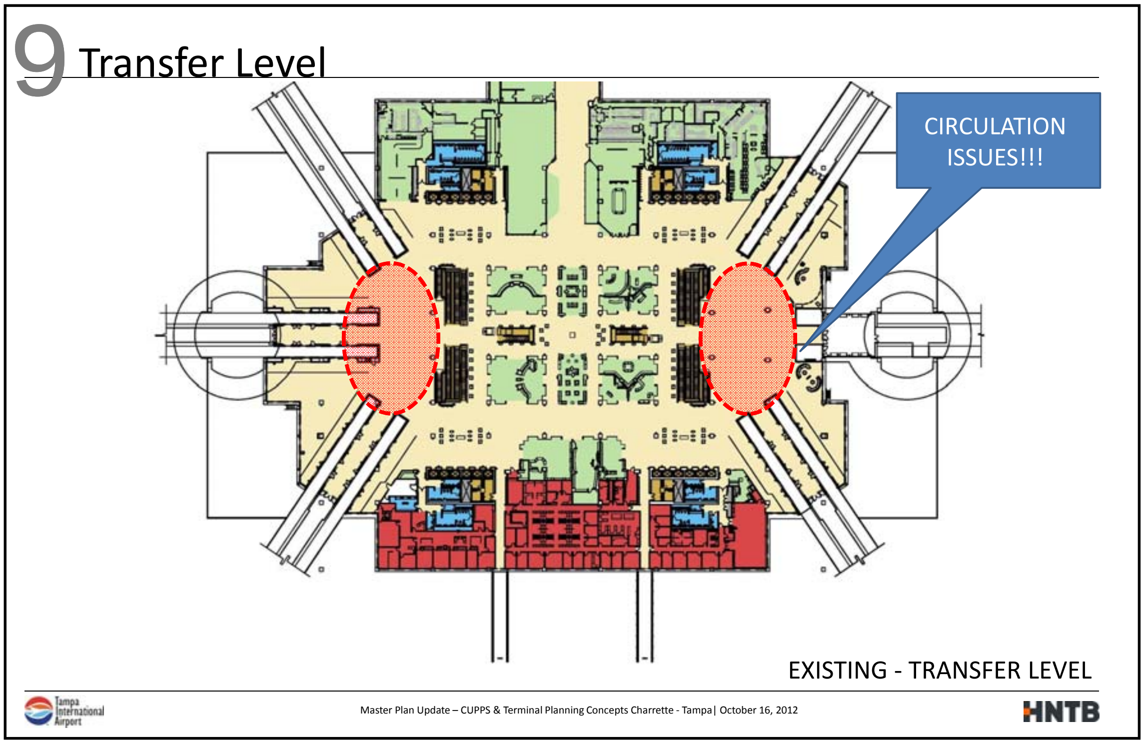
9 Transfer Level
CIRCULATION ISSUES!!!
EXISTING - TRANSFER LEVEL
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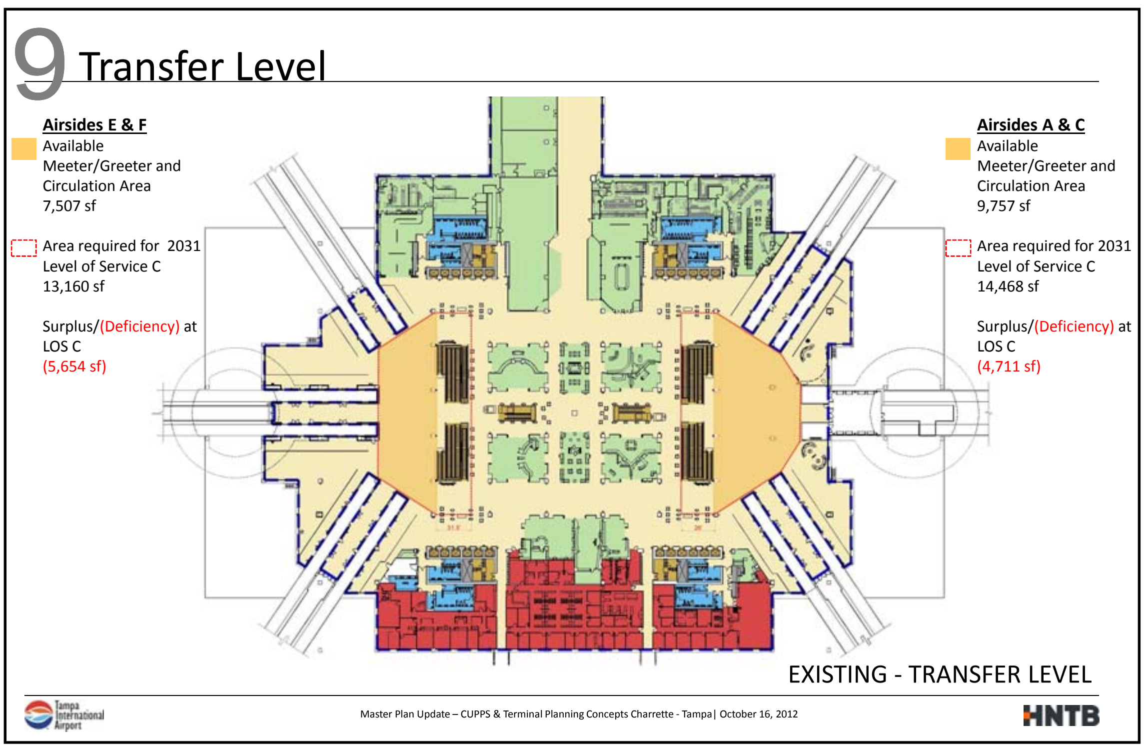
9 Transfer Level
Airsides E & F
Available Meeter/Greeter and Circulation Area
7,507 sf
Area required for 2031 Level of Service C
13,160 sf
Surplus/(Deficiency) at LOS C
(5,654 sf)
Airsides A & C
Available Meeter/Greeter and Circulation Area
9,757 sf
Area required for 2031 Level of Service C
14,468 sf
Surplus/(Deficiency) at LOS C
(4,711 sf)
EXISTING - TRANSFER LEVEL
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9 Transfer Level

Airside D
Available Meeter/ Greeter and Circulation Area = 9,180 sf

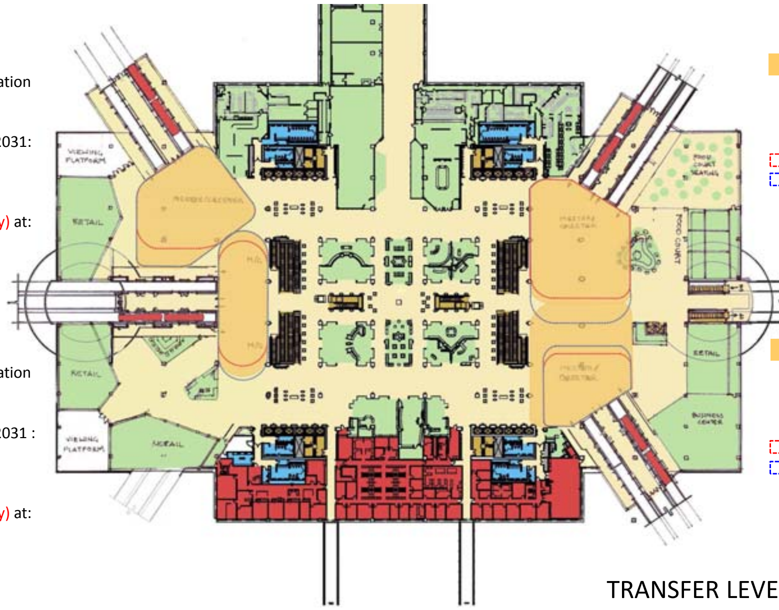
Area required for 2031:
LOS C = 7,965 sf
LOS B = 9,151 sf

Surplus/(Deficiency) at:
LOS C = 1,215 sf
LOS B = 29 sf

Airside E
Available Meeter/ Greeter and Circulation Area = 6,120 sf

Area required for 2031 :
LOS C = 5,196 sf
LOS B = 6,280 sf

Surplus/(Deficiency) at:
LOS C = 924 sf
LOS B = (160 sf)



Airside C
Available Meeter/ Greeter and Circulation Area = 10,250 sf

Area required for 2031:
LOS C = 9,855 sf
LOS B = 11,914 sf

Surplus/(Deficiency) at:
LOS C = 395 sf
LOS B = (1,164 sf)

Airside A
Available Meeter/ Greeter and Circulation Area = 10,250 sf

Area required for 2031:
LOS C = 4,608 sf
LOS B = 5,332 sf

Surplus/(Deficiency) at:
LOS C = 5,642 sf
LOS B = 4,918 sf

TRANSFER LEVEL – OPTION 1

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9 Transfer Level

Airside D
Available Meeter/ Greeter and Circulation Area = 8,350 sf

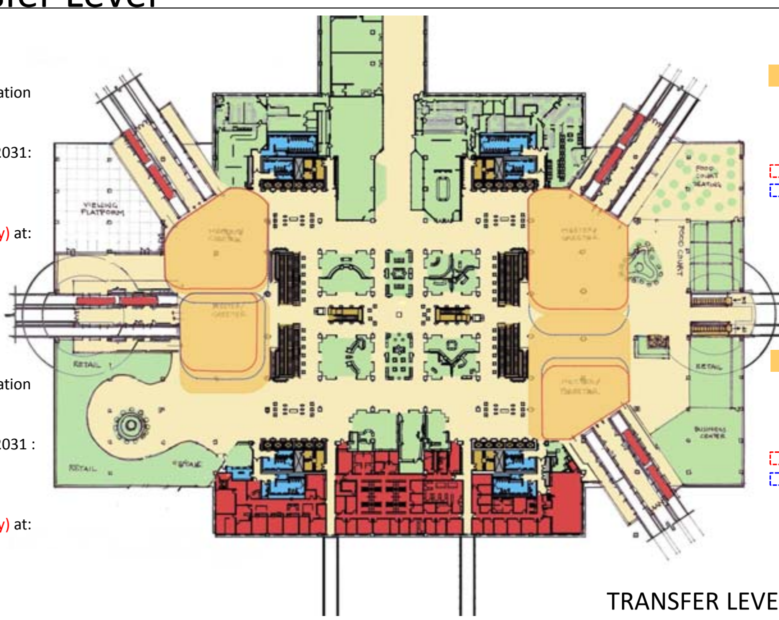
Area required for 2031:
LOS C = 7,965 sf
LOS B = 9,151 sf

Surplus/(Deficiency) at:
LOS C = 385 sf
LOS B = (801 sf)

Airside E
Available Meeter/ Greeter and Circulation Area = 8,360 sf

Area required for 2031 :
LOS C = 5,196 sf
LOS B = 6,280 sf

Surplus/(Deficiency) at:
LOS C = 3,164 sf
LOS B = 2080 sf



Airside C
Available Meeter/ Greeter and Circulation Area = 10,250 sf

Area required for 2031:
LOS C = 9,855 sf
LOS B = 11,914 sf

Surplus/(Deficiency) at:
LOS C = 395 sf
LOS B = (1,164 sf)

Airside A
Available Meeter/ Greeter and Circulation Area = 10,250 sf

Area required for 2031:
LOS C = 4,608 sf
LOS B = 5,332 sf

Surplus/(Deficiency) at:
LOS C = 5,642 sf
LOS B = 4,918 sf

TRANSFER LEVEL – OPTION 2

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9 Transfer Level

Airside D
Available Meeter/ Greeter and Circulation Area = 11,870 sf

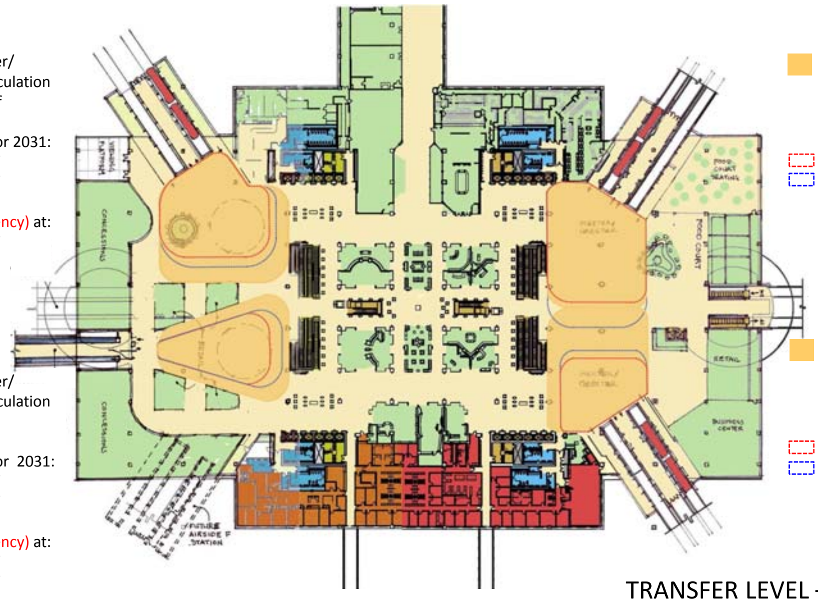
Area required for 2031:
LOS C = 7,965 sf
LOS B = 9,151 sf

Surplus/(Deficiency) at:
LOS C = 3,905 sf
LOS B = 2,719

Airside E
Available Meeter/ Greeter and Circulation Area = 9,880 sf

Area required for 2031:
LOS C = 5,196 sf
LOS B = 6,280 sf

Surplus/(Deficiency) at:
LOS C = 4,684 sf
LOS B = 3,600 sf



Airside C
Available Meeter/ Greeter and Circulation Area = 10,250 sf

Area required for 2031:
LOS C = 9,855 sf
LOS B = 11,914 sf

Surplus/(Deficiency) at:
LOS C = 395 sf
LOS B = (1,164 sf)

Airside A
Available Meeter/ Greeter and Circulation Area = 10,250 sf

Area required for 2031:
LOS C = 4,608 sf
LOS B = 5,332 sf

Surplus/(Deficiency) at:
LOS C = 5,642 sf
LOS B = 4,918 sf

TRANSFER LEVEL – OPTION 3

9 Transfer Level

Airside D
Available Meeter/ Greeter and Circulation Area = 9,190 sf

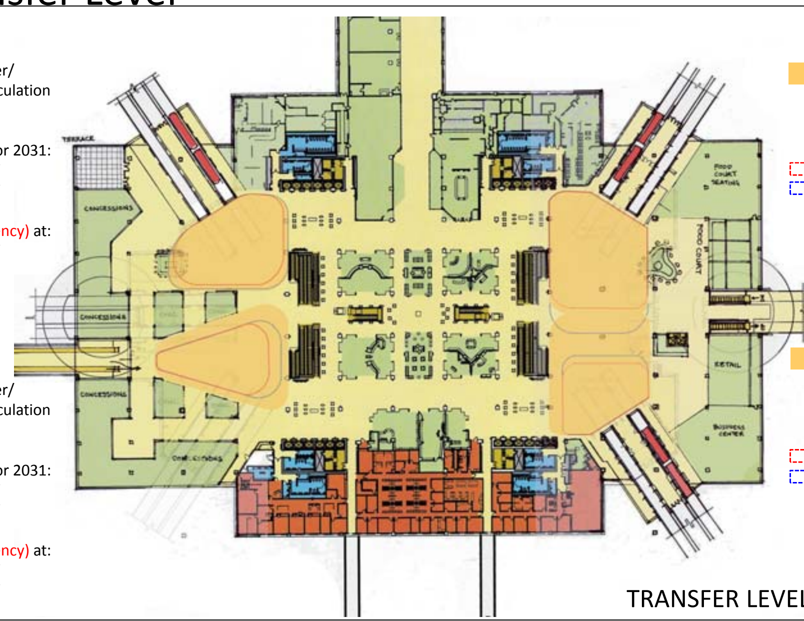
Area required for 2031:
LOS C = 7,965 sf
LOS B = 9,151 sf

Surplus/(Deficiency) at:
LOS C = 1,225 sf
LOS B = 39 sf

Airside E
Available Meeter/ Greeter and Circulation Area = 9,960 sf

Area required for 2031:
LOS C = 5,196 sf
LOS B = 6,280 sf

Surplus/(Deficiency) at:
LOS C = 4,764 sf
LOS B = 3,680 sf



Airside C
Available Meeter/ Greeter and Circulation Area = 10,250 sf

Area required for 2031:
LOS C = 9,855 sf
LOS B = 11,914 sf

Surplus/(Deficiency) at:
LOS C = 395 sf
LOS B = (1,164 sf)

Airside A
Available Meeter/ Greeter and Circulation Area = 10,250 sf

Area required for 2031:
LOS C = 4,608 sf
LOS B = 5,332 sf

Surplus/(Deficiency) at:
LOS C = 5,642 sf
LOS B = 4,918 sf

TRANSFER LEVEL – OPTION 4

9 Transfer Level

Airside D
Available Meeter/ Greeter and Circulation Area = 9,190 sf

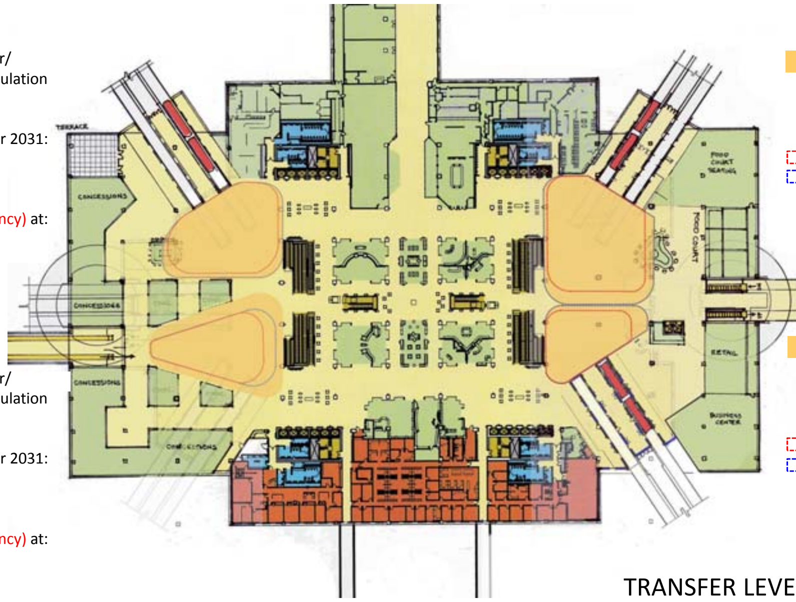
Area required for 2031:
LOS C = 7,965 sf
LOS B = 9,151 sf

Surplus/(Deficiency) at:
LOS C = 1,225 sf
LOS B = 39 sf

Airside E
Available Meeter/ Greeter and Circulation Area = 9,960 sf

Area required for 2031:
LOS C = 5,196 sf
LOS B = 6,280 sf

Surplus/(Deficiency) at:
LOS C = 4,764 sf
LOS B = 3,680 sf



Airside C
Available Meeter/ Greeter and Circulation Area = 11,980 sf

Area required for 2031:
LOS C = 9,855 sf
LOS B = 11,914 sf

Surplus/(Deficiency) at:
LOS C = 2,125 sf
LOS B = 66 sf

Airside A
Available Meeter/ Greeter and Circulation Area = 5,445 sf

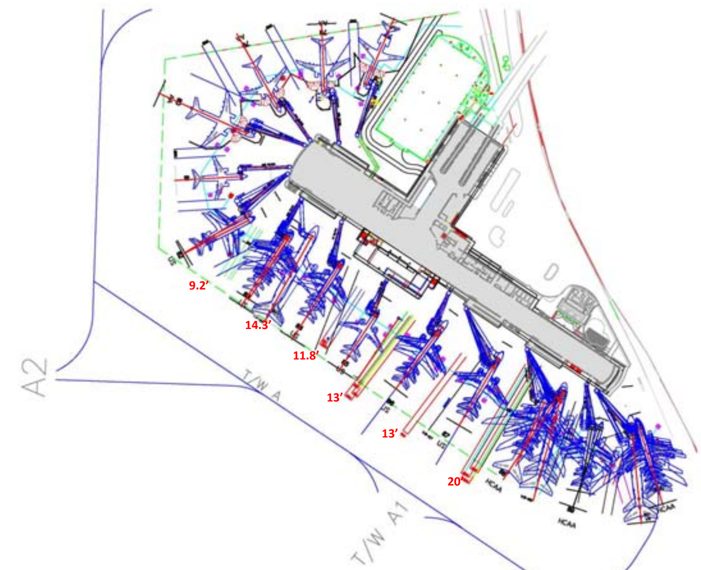
Area required for 2031:
LOS C = 4,608 sf
LOS B = 5,332 sf

Surplus/(Deficiency) at:
LOS C = 837 sf
LOS B = 113 sf

TRANSFER LEVEL – OPTION 5

Tampa International Airport

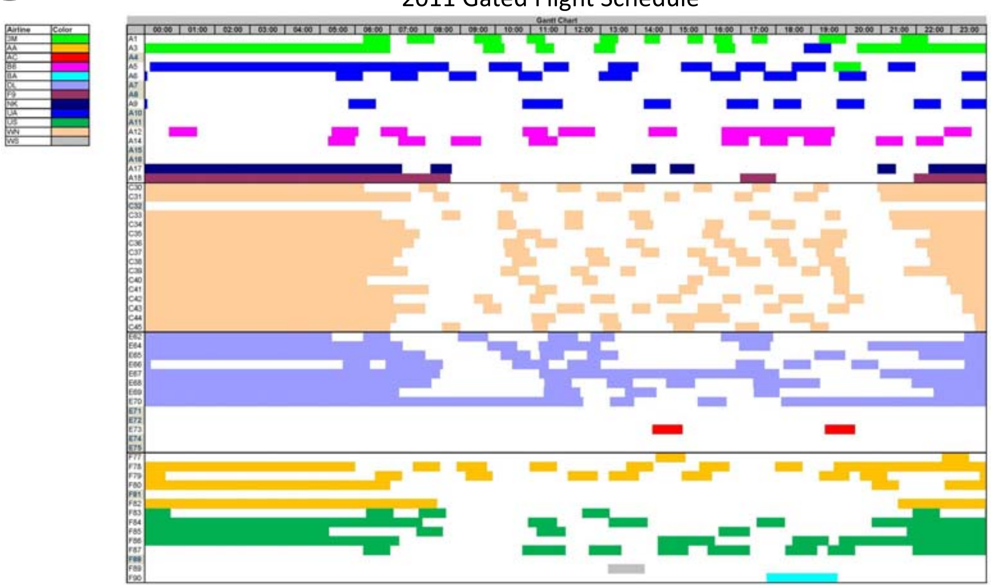
10 Re-gating Airside F



AIRSIDE F

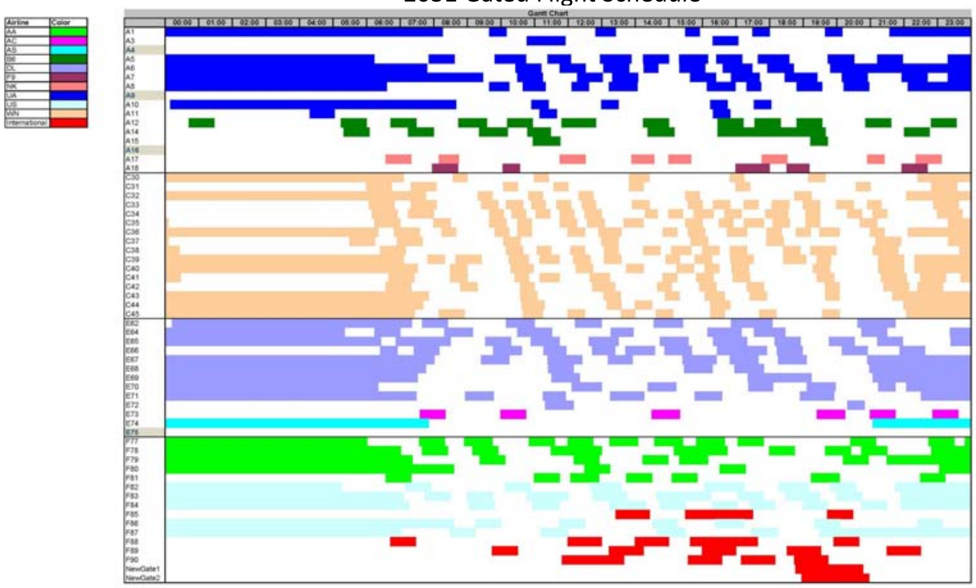
10 Re-gating Airside F

2011 Gated Flight Schedule



10 Re-gating Airside F

2031 Gated Flight Schedule



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Tampa International Airport

REFERENCE IMAGES

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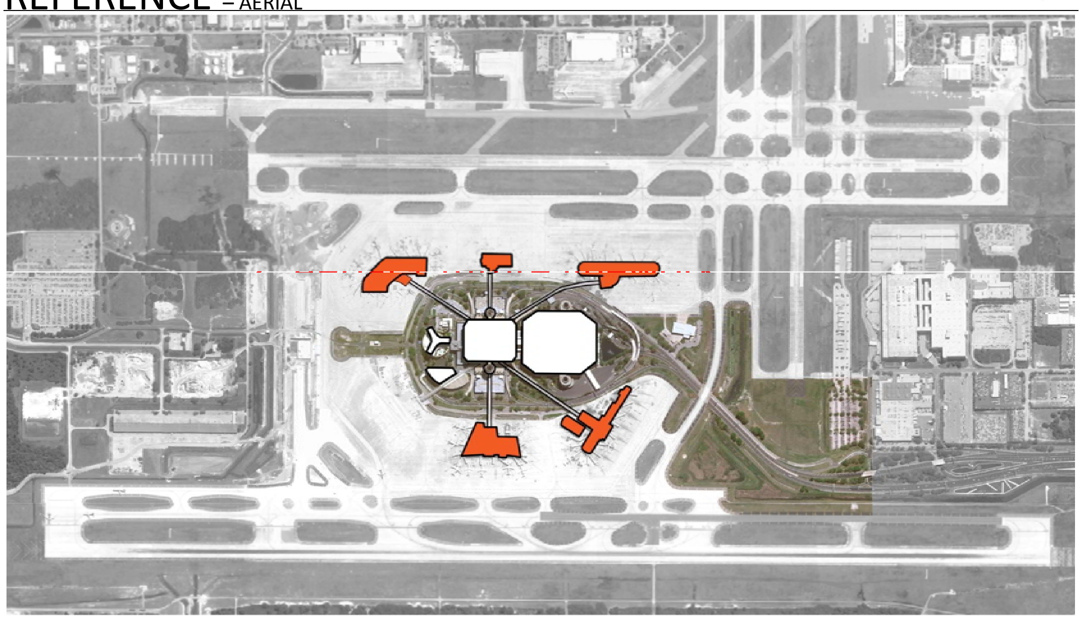
REFERENCE – AERIAL



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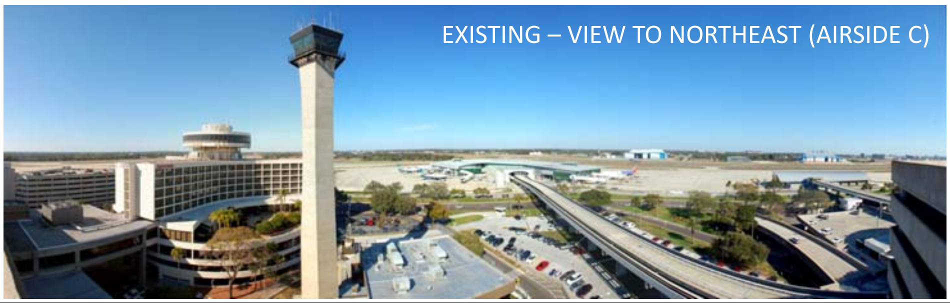
REFERENCE – EXISTING SITE PHOTOS



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REFERENCE – EXISTING SITE PHOTOS

Tampa International Airport

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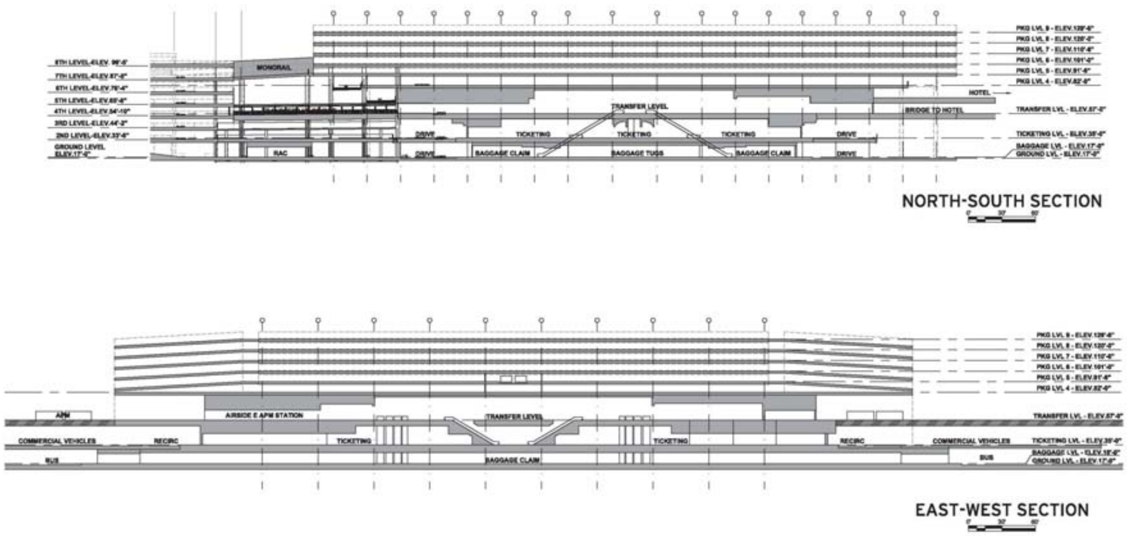
REFERENCE – SECTIONS



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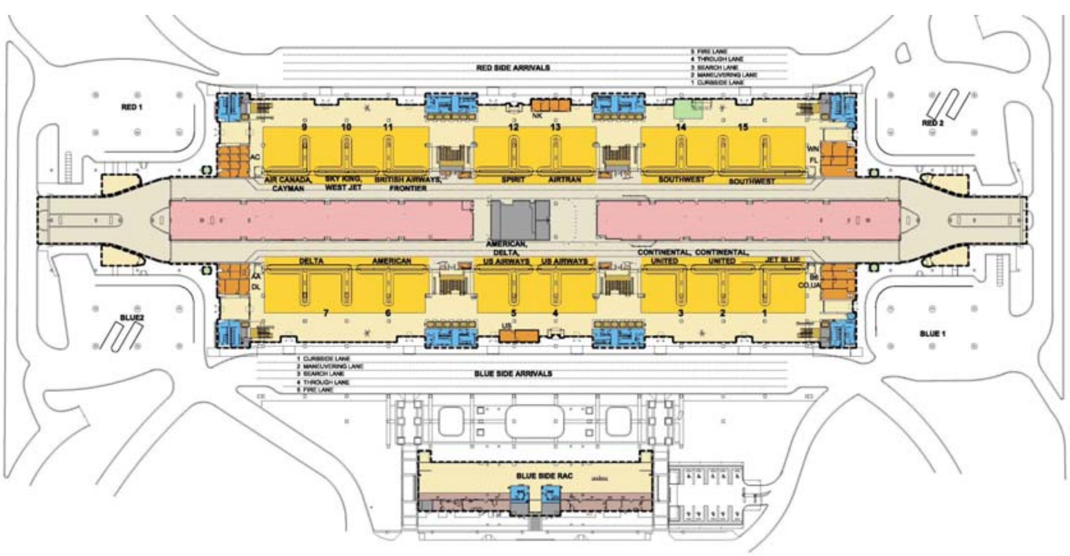
REFERENCE – BAGGAGE LEVEL



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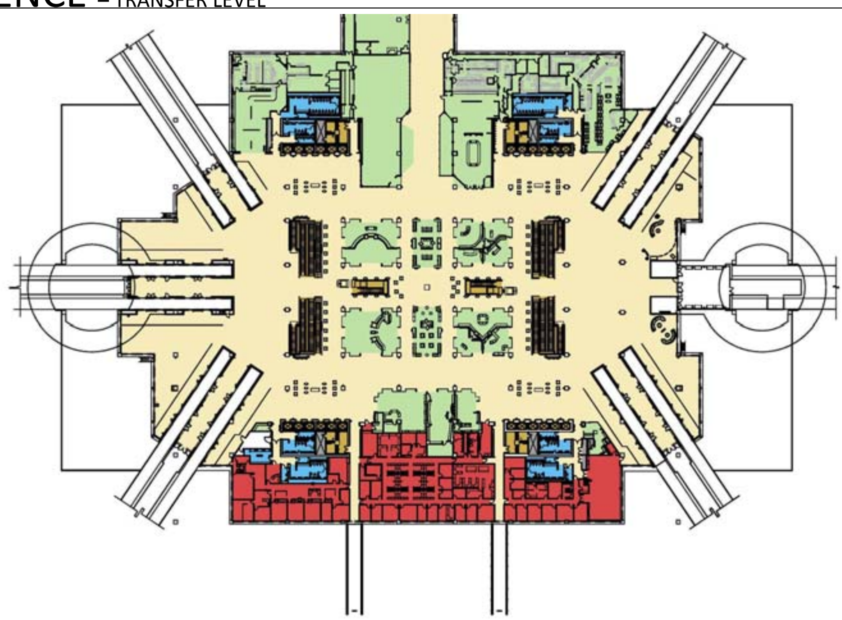
REFERENCE – TICKETING LEVEL

REFERENCE – TRANSFER LEVEL



REFERENCE – AIRSIDE C

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REFERENCE – AIRSIDE C

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Tampa International Airport

Outline

1 ***CUSTOMS AND BORDER PROTECTION CONCEPT ALTERNATIVES***
- CONCEPT 3
- CONCEPT 7
  - APM THROUGH RED GARAGE
  - APM AROUND RED GARAGE
  - MOVING SIDEWALKS

2 ***TERMINAL IMPROVEMENTS***
- TRANSFER LEVEL EXPANSION
- TICKETING LEVEL ESCALATORS
- RECIRCULATION DRIVES

3 ***AIRSIDE C & D IMPROVEMENTS***
- AIRSIDE D
- AIRSIDE C

4 ***AIRSIDE E***
- PREFERRED CONCEPT ALTERNATIVE

5 ***FUTURE AIRSIDE F***
- 15-GATE CONCEPT

6 ***EAST APM***
- PREFERRED CONCEPT

7 ***SOUTH TERMINAL CAPACITY***
- STRESS POINTS
- CURBS
- DISCUSSION

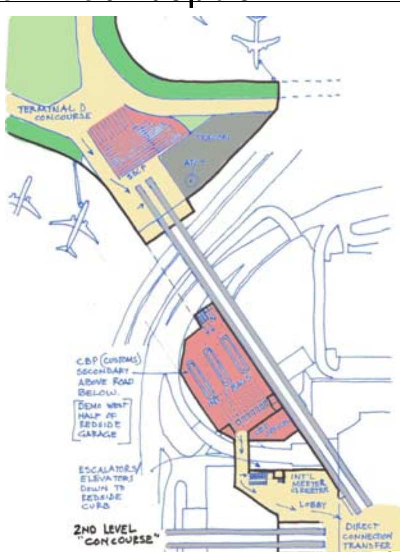
8 ***PHASING AND COST ANALYSIS***
- DISCUSSION

9 ***LAND USE***

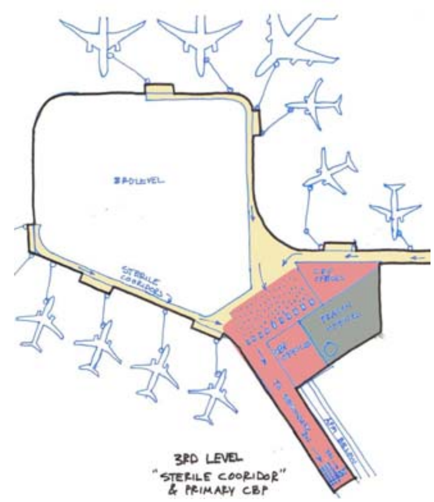
Tampa International Airport

CUSTOMS AND BORDER PROTECTION CONCEPT ALTERNATIVES

1 CBP Concept 3 (Transfer Level Connection)

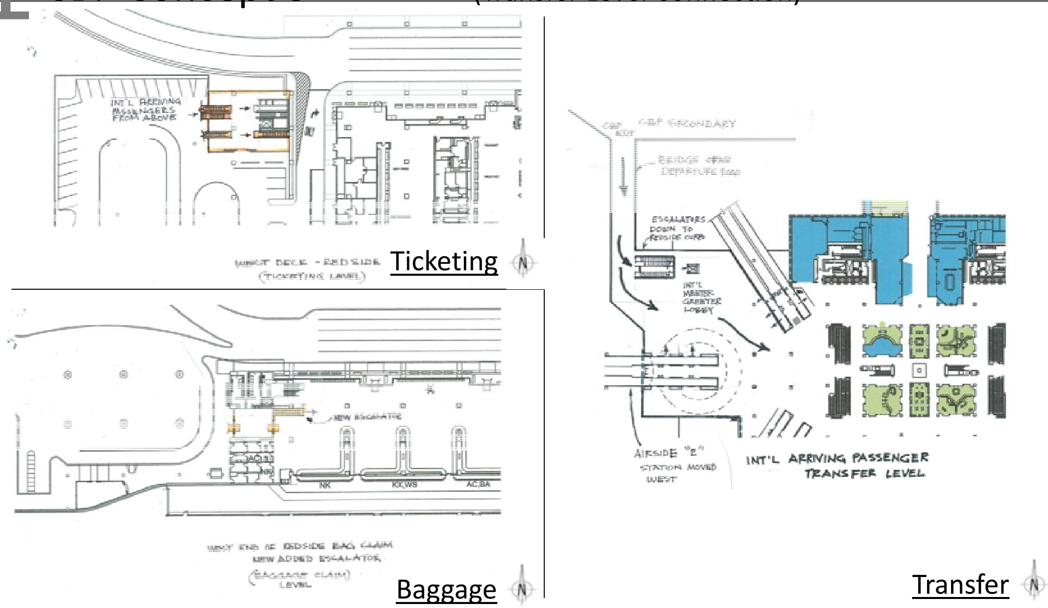


Departure Level



Sterile Level

1 CBP Concept 3 (Transfer Level Connection)



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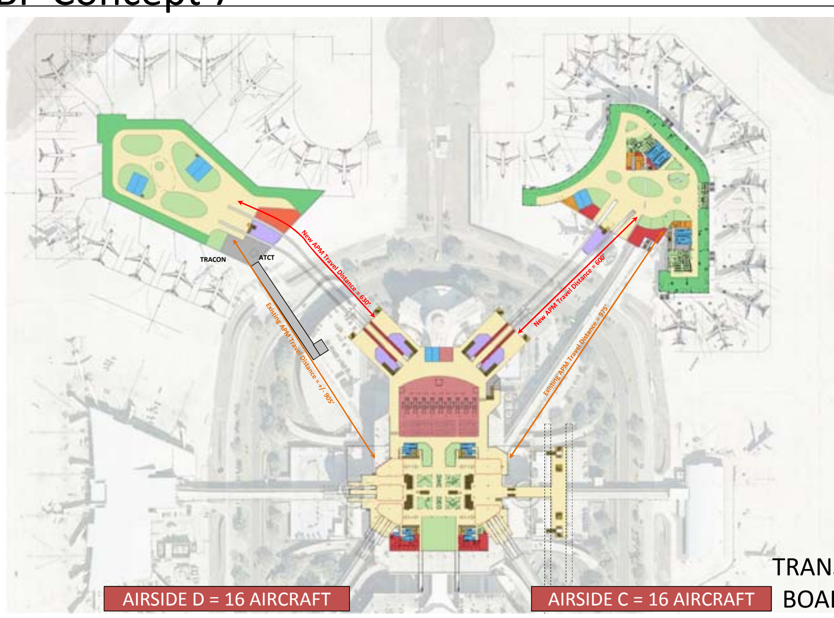
1 CBP Concept 7



TRANSFER LEVEL /
BOARDING LEVEL

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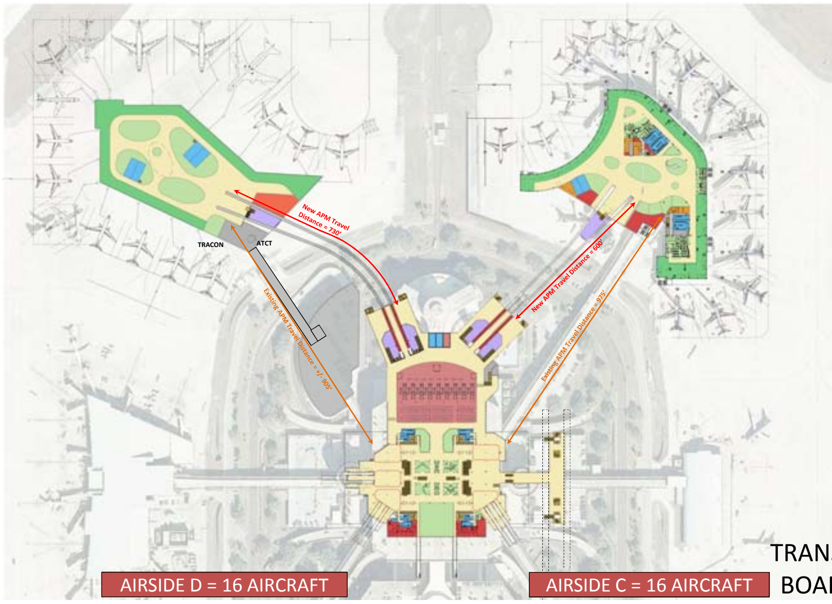
CBP Concept 7a



AIRSIDE D = 16 AIRCRAFT

AIRSIDE C = 16 AIRCRAFT

TRANSFER LEVEL / BOARDING LEVEL

Tampa International Airport

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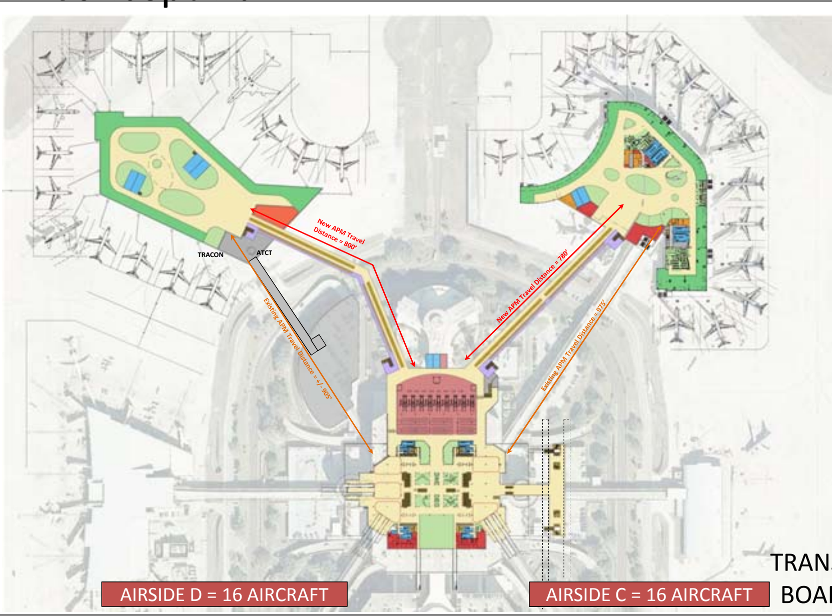
CBP Concept 7b



AIRSIDE D = 16 AIRCRAFT

AIRSIDE C = 16 AIRCRAFT

TRANSFER LEVEL / BOARDING LEVEL

Tampa International Airport

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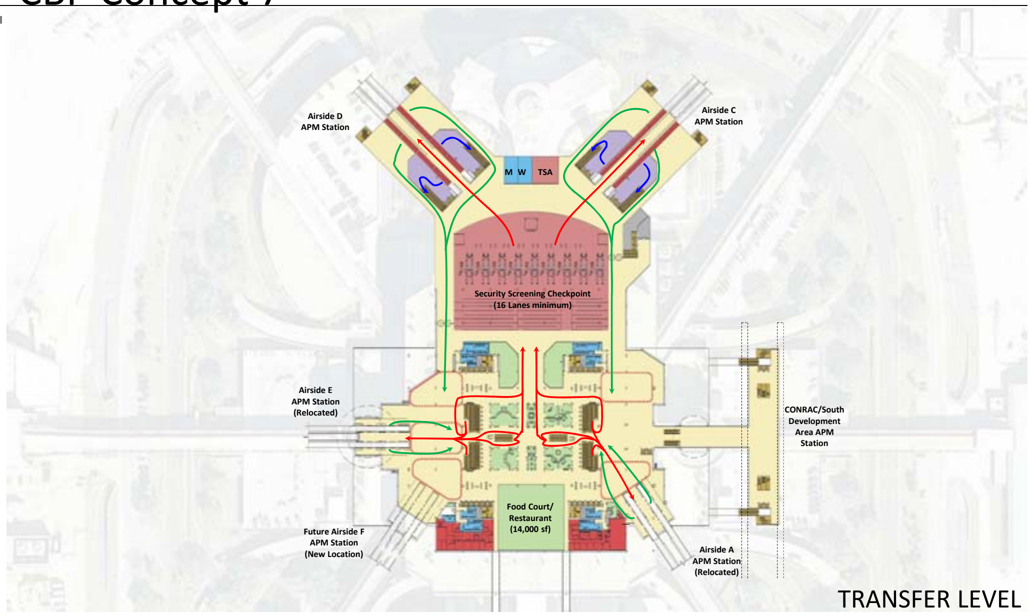
1 CBP Concept 7



TRANSFER LEVEL

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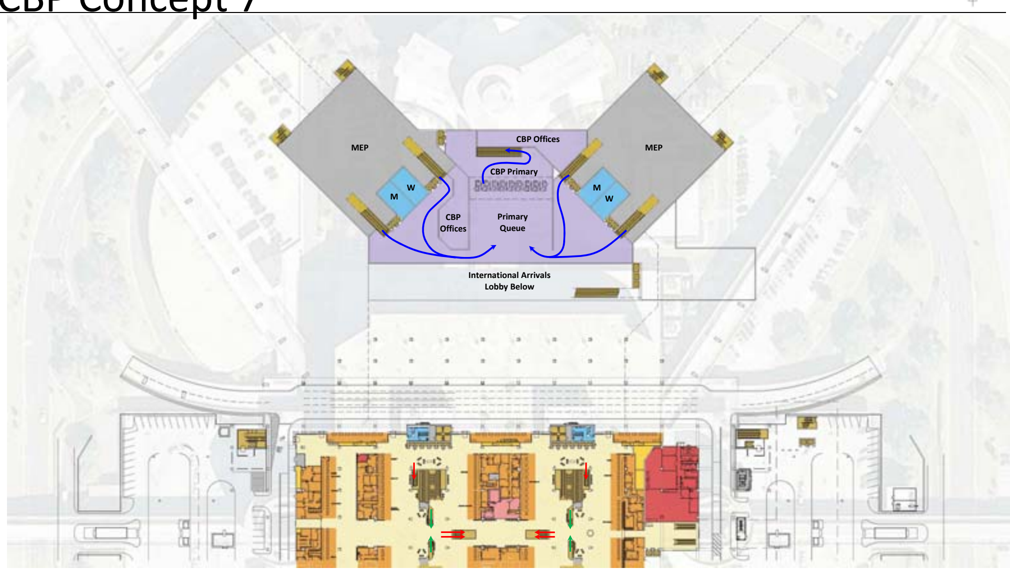
1 CBP Concept 7



TICKETING LEVEL

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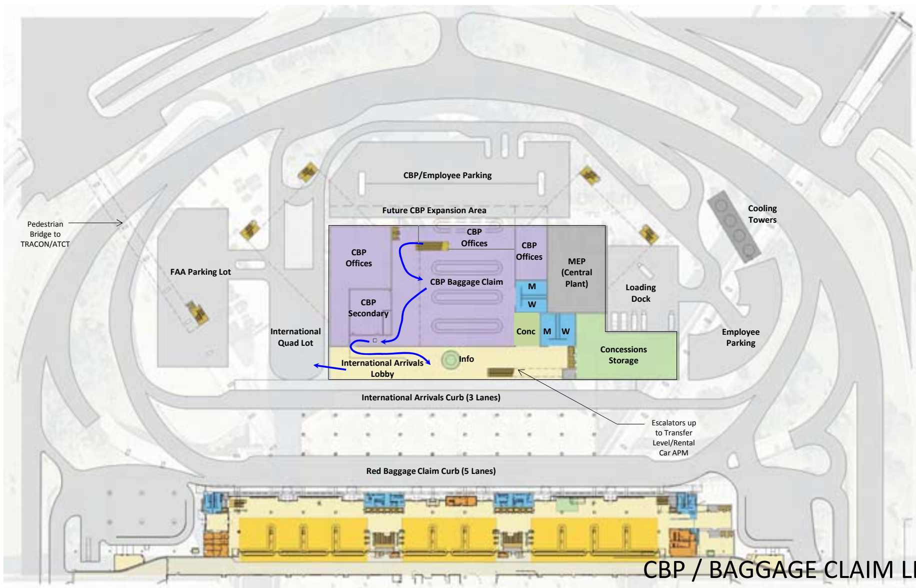
1 CBP Concept 7



CBP / BAGGAGE CLAIM LEVEL

Tampa International Airport

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Tampa International Airport

Tampa International Airport

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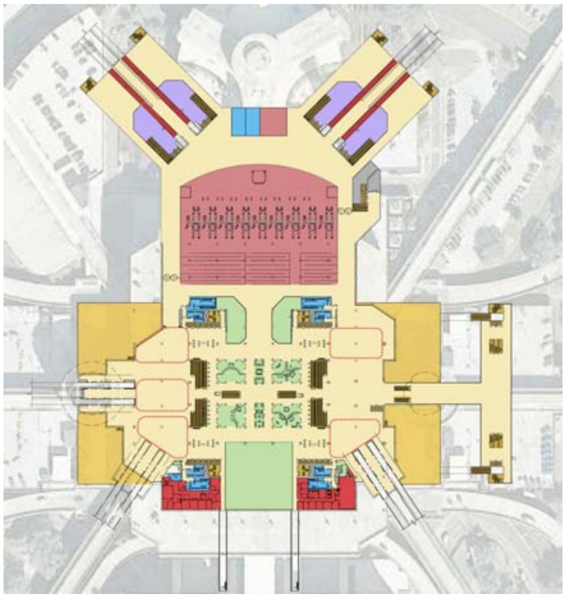
2 TRANSFER LEVEL

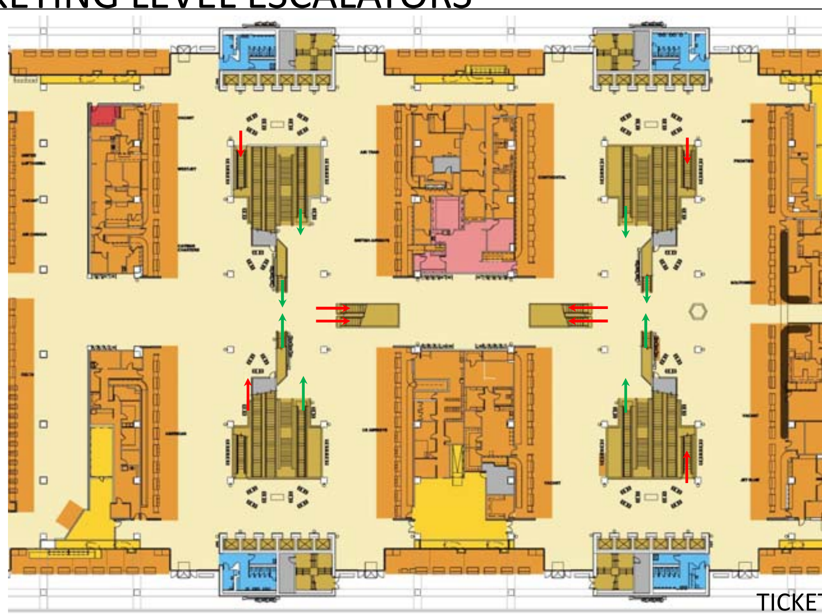


Plaza Deck Expansion Opportunities

- Roof Garden
- Business Center
- Play Areas
- Spa
- Airport Lounge
- Conference Center
- Seating Areas
- Sit-down Restaurant
- Food Court
- Other Concessions

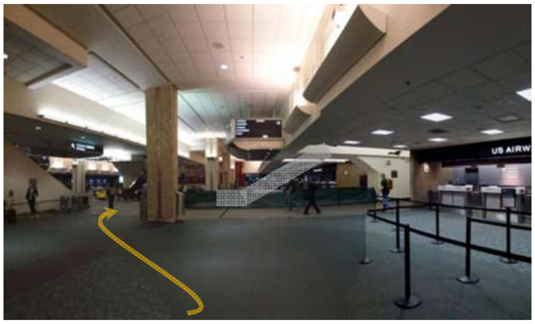
TRANSFER LEVEL

2 TICKETING LEVEL ESCALATORS



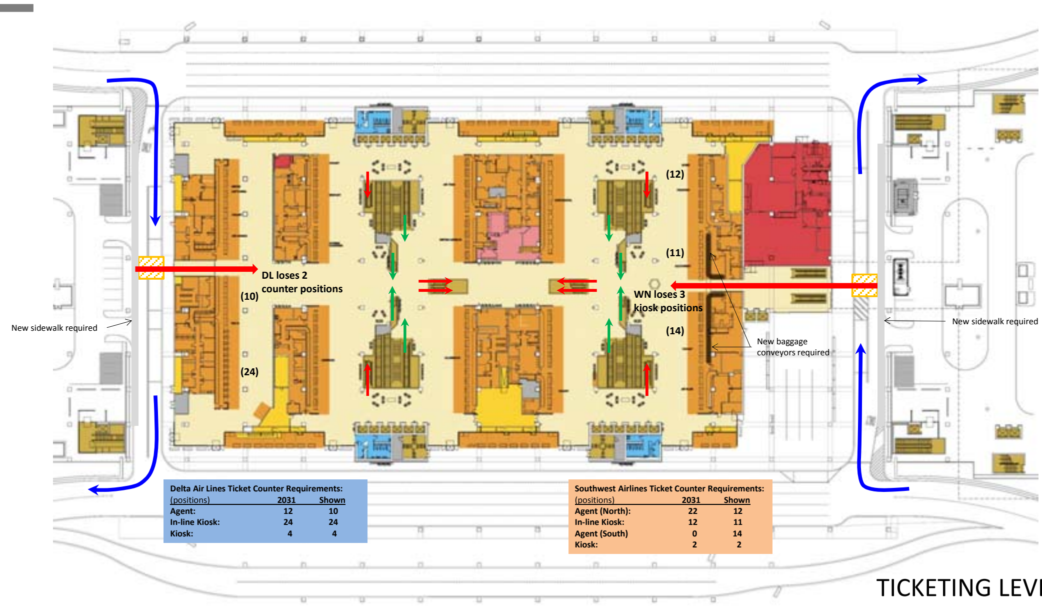
TICKETING LEVEL

2 Central Escalators



TICKETING LEVEL

2 Recirculation Drives



Delta Air Lines Ticket Counter Requirements:

(positions)	2031	Shown
Agent:	12	10
In-line Kiosk:	24	24
Kiosk:	4	4

Southwest Airlines Ticket Counter Requirements:

(positions)	2031	Shown
Agent (North):	22	12
In-line Kiosk:	12	11
Agent (South)	0	14
Kiosk:	2	2

TICKETING LEVEL

2 Recirculation Drives

Recirculation Drives for Departures Curb Relief

- Recirculation drives can add capacity to departures level by assigning commercial modes to drop off there
- Capacity relief needed:
  - Blue side after 2016; 40% increase required by 2031
  - Red side needs no capacity through 2031

2 Recirculation Drives

Options for Departures Curb Relief

- First choice: Blue Departures peak 18% higher than Red peak; airline reallocation a potential ~ 10% improvement
- Second choice: elimination of Blue Departures pedestrian crossings would provide ~ 10% improvement
- Third choice:
  - Recirculation drives for CV drop-off **or**
  - Create fifth lane on Blue departures curb

2 Recirculation Drives

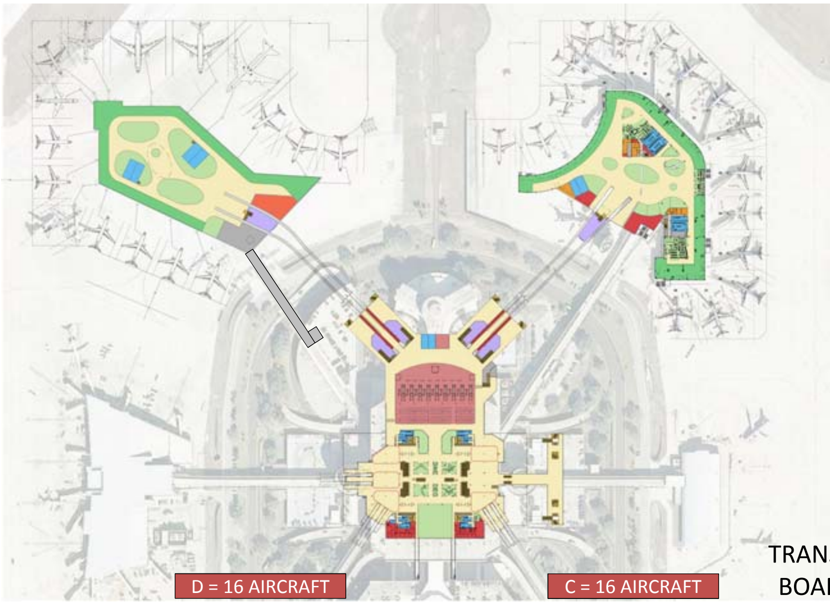
Review of Third Choices

- Recirculation drives:
  - Off-airport RAC and all parking shuttles to go away with South Development Area APM
  - Hotel shuttles and shared-ride van to crossovers will add ~ 8% improvement
  - Adding good passenger access to ticketing from crossover drives may be costly and disruptive
- Fifth lane:
  - Provides ~ 20% improvement
  - Adversely impacts police/security vehicle parking

Tampa International Airport

AIRSIDE C & D IMPROVEMENTS

3 Airside C & D Improvements



TRANSFER LEVEL /
BOARDING LEVEL

3 Airside C & D Improvements

	Southwest Airlines	Existing Terminal to Airside C Distance (ft)	Time (min)
1	Curb to Ticket Counter	130	0.54
2	Ticket Counter to Escalator	95	0.40
3	Escalator Ride		0.33
4	Escalator to APM	140	0.58
5	Waiting for APM		1.68
6	APM ride to Airside C		1.06
7	Airside C to Checkpoint	120	0.50
8	Checkpoint Processing Time		10
	Totals	**485**	**15.09**

	Southwest Airlines	Proposed Terminal to Airside C Distance (ft)	Time (min)
1	Curb to Ticket Counter	130	0.54
2	Ticket Counter to Escalator	140	0.58
3	Escalator Ride		0.33
4	Escalator to SSCP	200	0.83
5	Checkpoint Processing Time		10
6	SSCP to APM	150	0.63
7	Waiting for APM		1.05
8	APM ride to Airside C		0.67
9	APM to edge of APM station	30	0.13
	Totals	**650**	**14.76**

Average Walking Speed = 240 Feet per minute, or 4 feet per second

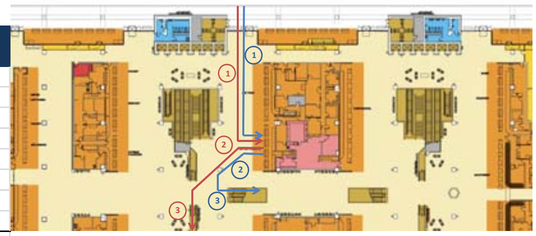
WALKING DISTANCE AND SPEED CALCULATIONS

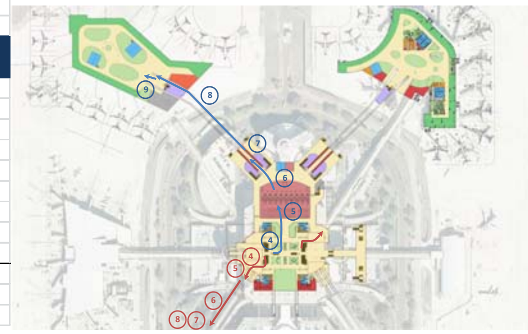
3 Airside C & D Improvements

British Airways	Existing Terminal to Airside F Distance (ft)	Time (min)
1 Curb to Ticket Counter	120	0.50
2 Ticket Counter to Escalator	90	0.38
3 Escalator Ride		0.33
4 Escalator to APM	160	0.67
5 Waiting for APM		1.54
6 APM ride to Airside F		0.93
7 Airside F to Checkpoint	90	0.38
8 Checkpoint Processing Time		10
Totals	**460**	**14.72**

British Airways	Proposed Terminal to Proposed Airside D Distance (ft)	Time (min)
1 Curb to Ticket Counter	120	0.50
2 Ticket Counter to Escalator	70	0.29
3 Escalator Ride		0.33
4 Escalator to SSCP	200	0.83
5 Checkpoint Processing Time		10
6 SSCP to APM	250	1.04
7 Waiting for APM		1.14
8 APM ride to Airside C		0.73
9 APM to edge of APM station	30	0.13
Totals	**670**	**14.98**

Average Walking Speed = 240 Feet per minute, or 4 feet per second





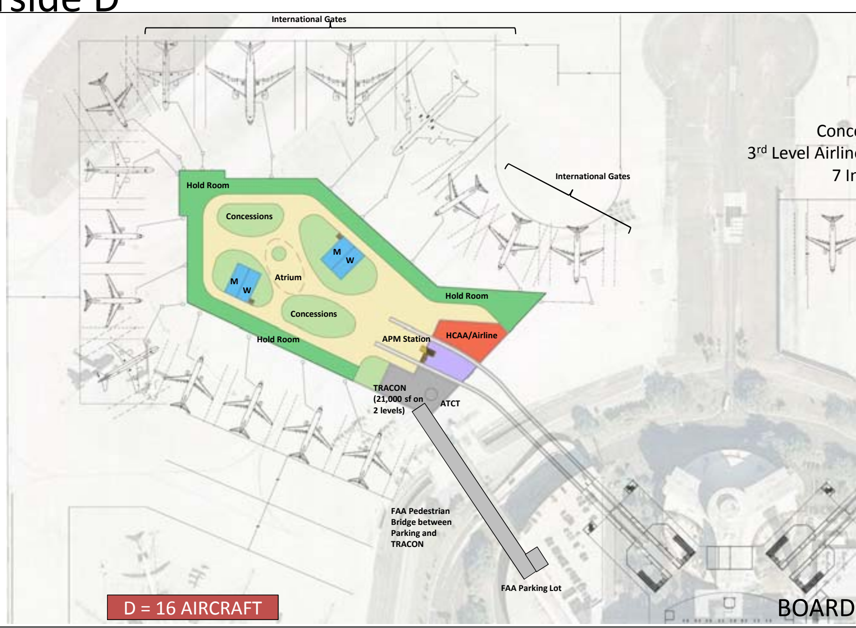
WALKING DISTANCE AND SPEED CALCULATIONS

3 Airside D

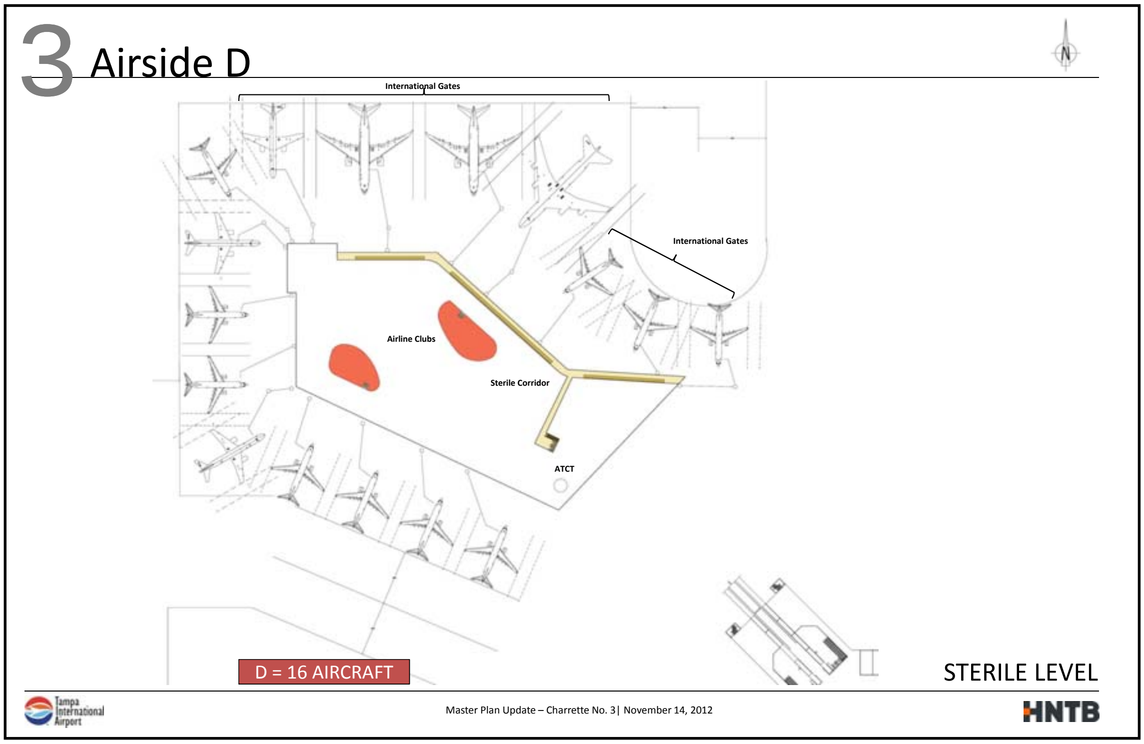
Concessions: 39,400 sf

3rd Level Airline Clubs: 14,500 sf

7 International Gates



BOARDING LEVEL


3 Airside D
International Gates
International Gates
Airline Clubs
Sterile Corridor
ATCT
D = 16 AIRCRAFT
STERILE LEVEL
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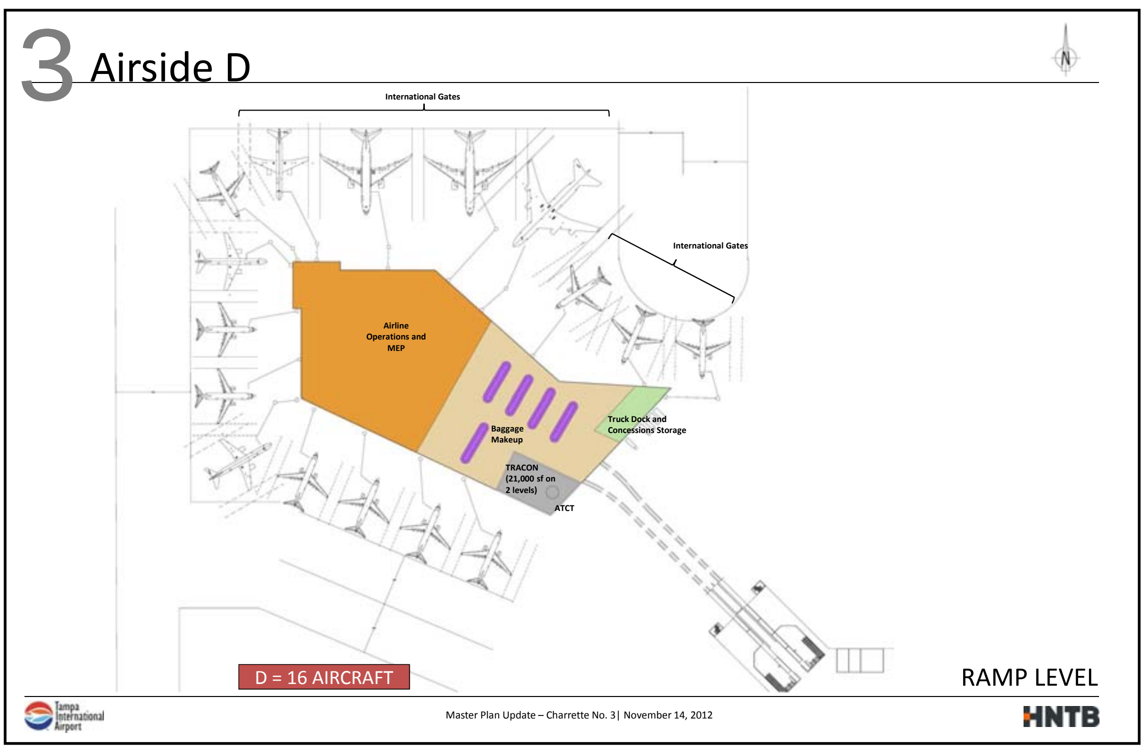
3 Airside D
International Gates
International Gates
Airline Operations and MEP
Baggage Makeup
Truck Dock and Concessions Storage
TRACON (21,000 sf on 2 levels)
ATCT
D = 16 AIRCRAFT
RAMP LEVEL
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3 Airside C Improvements

Concessions: 58,400 sf
3 International Gates

C = 16 AIRCRAFT

BOARDING LEVEL

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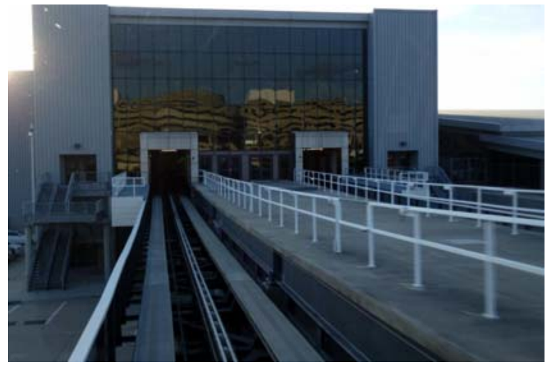
4 Airside E



APM TRACK ELEVATION CHANGE

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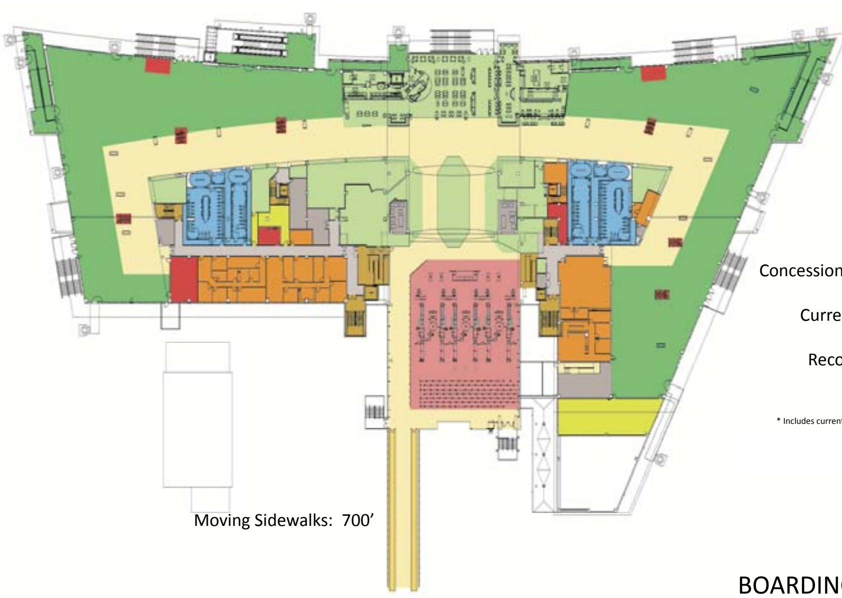
4 Airside E



Concessions Requirement: 30,400 sf
Current Concessions: 12,934 sf
Recommended Plan Concessions: +/- 25,000*

* Includes current additions proposed by Unison

BOARDING LEVEL

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AIRSIDE F

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5 Future Airside F

N

0' 200' 400'

C = 15 AIRCRAFT

BOARDING LEVEL

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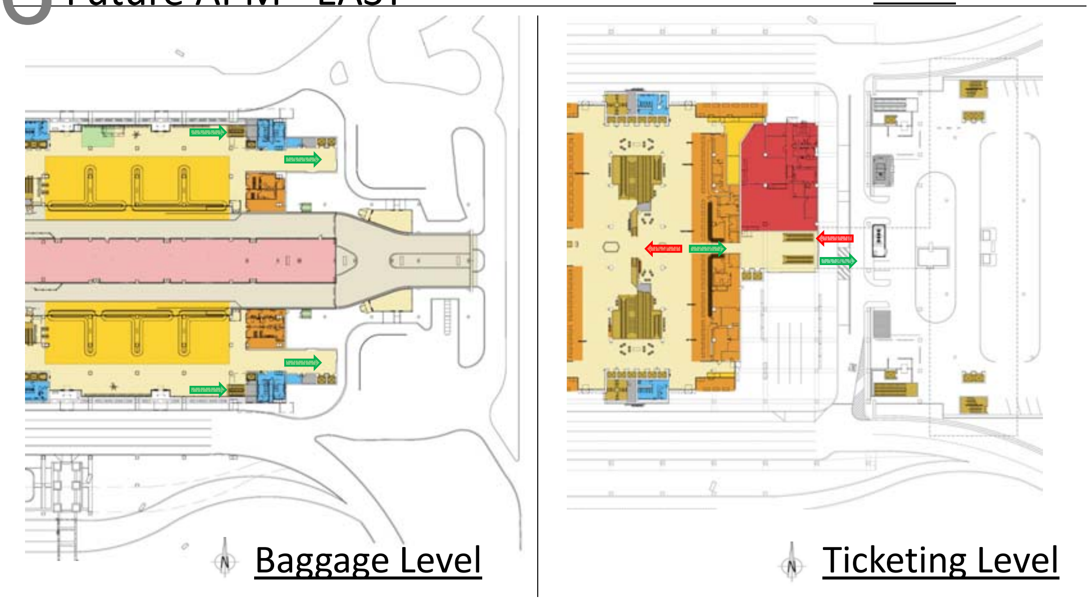
6 Future APM - EAST

Departures
Arrivals



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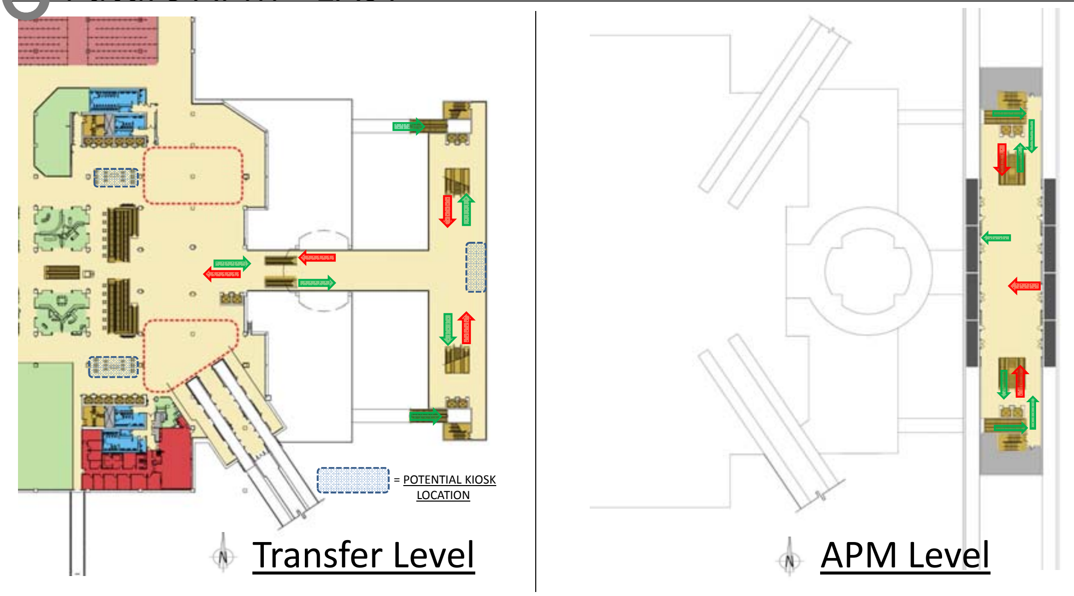
6 Future APM - EAST

Departures
Arrivals



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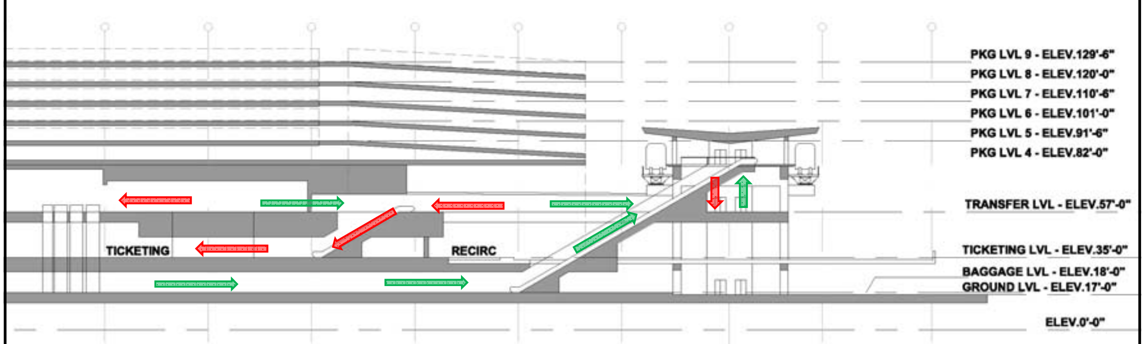
6 Future APM - EAST

Departures
Arrivals



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Tampa International Airport

SOUTH TERMINAL CAPACITY

7 South Terminal Capacity

Gates	Gates Available	2011 Occupied Gates	2031 Occupied Gates	2011 Peak Hour Originating Passengers	2031 Peak Hour Originating Passengers	2011 Annual Passengers	2031 Annual Passengers
Airside A	16	9	13	505	706	3,434,911	5,155,785
Airside C	16	15	16	842	1,473	6,718,340	11,076,457
Future Airside D	16	12	16	593	930	3,494,618	6,835,442
Airside E	13	9	12	577	923	3,084,182	5,636,380
Subtotal	**61**	**45**	**57**	**2,250**	**3,458**	**16,732,051**	**28,704,064**
Future Airside F	15				900		6,000,000
Total	**76**			**2,250**	**4,223**		**34,704,064**

- Future Airside F peak hour and annual numbers estimated
- Subtotals for Peak Hour Originating Passengers do total numbers above. They represent a combined peak hour for all airsides. Not all airsides peak at the same time.

7 South Terminal Capacity

- **Ticket Counters –** Depends on future check-in technology and airline consolidation. Only 16 counter positions are assumed available after 2031
- **ATO Offices –** No additional capacity on ticketing level after 2031
- **Baggage Claim –** Some excess capacity exists in 2031, but depends on airline consolidation, number of carriers. Expansion of baggage claim area is difficult
- **Baggage Service Offices –** There is a surplus of BSO space in 2031
- **TSA Checkpoint –** Assume constructed at new Airside
- **TSA Checked Baggage Inspection System –** Inadequate capacity in existing system, may be able to construct at new Airside on ramp level
- **Transfer Level Circulation –** Appears to be adequate if Airside E APM station is relocated one train length to west and new Airside F APM station is built two train lengths further from the circulation core

7 Curb Expansion Requirements

Curb	2011			2016			2021			2026			2031		
	Vol	Cap	V/C	Vol	Cap	V/C	Vol	Cap	V/C	Vol	Cap	V/C	Vol	Cap	V/C
Current Dwell Times															
Blue Dep	692	1086	0.64	769	1082	0.71	881	1083	0.81	982	1084	0.91	1083	1084	1.00
Red Dep	587	1242	0.47	653	1257	0.52	746	1259	0.59	830	1260	0.66	914	1261	0.72
Blue Arr	595	660	0.90	565	594	0.95	650	594	1.09	727	594	1.22	804	594	1.35
Red Arr	380	464	0.82	395	432	0.91	454	432	1.05	508	432	1.18	561	432	1.30
Adjusted Dwell Times															
Blue Arr	595	997	0.60	565	917	0.62	650	917	0.71	727	917	0.79	804	917	0.88
Red Arr	380	966	0.39	395	916	0.43	454	917	0.50	508	917	0.55	561	917	0.61

Levels of service color code:
Green = acceptable level of service
Yellow = moderate congestion
Orange = significant congestion
Red = massive congestion

7 Benefits of Curb Improvements

Curb	Baseline			2016			2021			2026			2031		
	Vol	Cap	V/C	Vol	Cap	V/C	Vol	Cap	V/C	Vol	Cap	V/C	Vol	Cap	V/C
Proposed Improvements to Capacity: Enforced "No Waiting", Balance Blue and Red Demand, No Pedestrian Crossings Permitted, APM to SDA, Use of Crossover Lanes, Add 5th Lane to Curb Roadway															
Blue Dep	692	1086	0.64	747	1116	0.67	802	1187	0.69	853	1188	0.72	953	1545	0.65
Red Dep	587	1242	0.47	701	1180	0.59	758	1184	0.64	807	1186	0.68	892	1543	0.58
Blue Arr	595	997	0.60	531	917	0.58	619	917	0.67	698	971	0.72	776	1131	0.69
Red Arr	380	966	0.39	460	916	0.50	535	916	0.58	602	917	0.66	671	1132	0.59
Changes Assumed	Enforced "no waiting" on arrivals			Baseline plus Balance Blue / Red Demand			2016 plus No Ped Crossings on Blue Departures & APM to SDA			2021 plus Use of Crossover Lanes, No Ped Crossings of Blue Arrivals			2026 plus Add 5th Lane to all curbs		

Levels of service color code:
Green = acceptable level of service
Yellow = moderate congestion
Orange = significant congestion
Red = massive congestion

7 Curb Operations with 15 Additional Gates (Airside F)

Curb	2031			2041		
	Volume	Capacity	V/C	Volume	Capacity	V/C
Blue Departures	953	1545	0.65	1160	1545	0.75
Red Departures	892	1543	0.58	1080	1544	0.70
Blue Arrivals	776	1131	0.69	924	1131	0.82
Red Arrivals	671	1132	0.59	793	1132	0.70
Changes Assumed from Today	Enforced "No Waiting", Balance Blue and Red Demand, No Pedestrian Crossings Permitted, APM to SDA, Use of Crossover Lanes, Add 5th Lane to Curb Roadways			• Same as 2031 plus International Arrivals Curb. • Blue Departures V/C is tolerable; no improvements recommended. • To improve Blue Arrivals, construct outer 3-lane curb		

Levels of service color code:
Green = acceptable level of service
Yellow = moderate congestion
Orange = significant congestion
Red = massive congestion

Tampa International Airport

PHASING AND COST ANALYSIS DISCUSSION

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Phasing Items – Concept 7

I) Enabling Projects

1. Relocate Post Office
   Begin Design:
   Begin Construction:
   Complete Construction:

2. Relocate Hotel
   Begin Design:
   Begin Construction:
   Complete Construction:

3. Relocate Service Building/Central Plant
   Begin Design:
   Begin Construction:
   Complete Construction:

4. Relocate ATCT
   Begin Design:
   Begin Construction:
   Complete Construction:

5. Demolish Red Side Garage
   Begin Design:
   Begin Construction:
   Complete Construction:

II) Airside D
Begin Design
Begin Construction
Construction Complete:

III) Airside C Modifications
Begin Design:
Begin Construction:
Construction Complete:

I) Transfer Level Expansion
Begin Design:
Begin Construction:
Construction Complete:

II) Demolish Airside F
Begin Design:
Begin Construction:
Complete Construction:

Airside D Development Program – Option 7
Prepared By: Jeff Siddle
Date: November 13, 2012

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Phasing Items – Concept 7

I) Enabling Projects

1. T/W J bridge and Service Road Relocation (FY 14)
   Begin Design: 10/1/13
   Begin Construction: 8/1/14
   Complete Construction: 8/1/15

2. Temporary facilities for Hertz and Enterprise (FY 14)
   Begin Design: 10/1/13
   Begin Construction: 7/1/14
   Complete Construction: 4/1/15

3. FAA Environmental Permitting (FY 14)
   Begin:
   Complete:

4. Modify Conceptual Permit (FY 13)
   Begin: 2/1/13
   Complete: 2/1/14

II) CONRAC (Design Build Selection FY 13)
Begin Design: 6/1/13
Begin Construction: 6/1/14
Construction Complete: 10/1/16

III) Automated People Mover (Design Build Selection FY 14)
Begin Design: 1/2/14
Begin Construction: 10/1/14
Construction Complete: 10/1/16

IV) Roadway Improvements (Design Build Selection FY 14)
Begin Design: 2/1/14
Begin Construction Roadways: 2/1/15
Construction Complete: 10/1/16

I) Reclaim Long Term Parking (FY 16)
Begin Design: 1/2/16
Begin Construction: 1/2/17
Complete Construction: 11/1/17

II) Hire CIP advisor (FY13)

III) Hire Program Manager (FY13)

IV) Hire consultant to prepare CONRAC funding strategy (FY13)

Airside D Development Program – Option 7
Prepared By: Jeff Siddle
Date: November 13, 2012

Tampa International Airport

THANK YOU!

Tampa International Airport Master Plan Update

Airline Presentation – Terminal Facilities

November 26, 2012

1

Master Plan Update

Main Discussion Topics

- Background
- Guiding Principles and Primary Objectives
- 2005 Master Plan North Terminal Initiative
- Master Plan New Vision
- Master Plan Timeline
- Passenger Forecast
- Terminal Area Facility Requirements
- Terminal Area Concepts
- Shared Use Passenger Processing Systems
- Land Use
- Discussion and Questions

2

Master Plan Update

Tampa International Airport HNTB

Master Plan: Guiding Principles

- Consider economic and airline business industry conditions
- Grow efficiently, thoughtfully and affordably
  - Flexible and Scalable - build only when needed
- Maximize capacity of existing facilities to reduce need for north terminal past 25 MAP
- Maintain a high level of customer service
- Adhere to core aspects of the original terminal design
  - Maintain passenger convenience and comfort
  - Keep walking distances under 700 ft
  - Expandable
  - Maintain automated people mover concepts
- Grow business and create new revenue opportunities

3

Master Plan Update

Tampa International Airport HNTB

Master Plan: Primary Objectives

- Efficient scalable growth strategy
- Curbside congestion
- Roadway congestion
- Rental car facilities
- Main terminal and curbside capacity
- Capacity needs for international processing
- Real estate use
- Intra-modal and inter-modal connectivity

4

Master Plan Update

2005 Master Plan – North Terminal Planning

- North terminal required at 25 MAP
  - Scheduled opening for October 2015
  - Initial cost of $1 billion for one 14-gate airside, main terminal, parking and roadways
  - Major impetus was capacity enhancements for curbside, rental car, international travel and transfer level meeter/greeter space
- High risk of building too much capacity
  - Low utilization of roadways and terminal facilities for one airside
  - Relatively high O&M costs due to low utilization
  - Two main terminals confusing for customers
  - Three rental car locations would be inefficient and confusing for customers
  - High initial cost with no ability to downsize if needed

5

Master Plan Update

Master Plan – New Vision

- Enable non-airline revenue growth:
  - Provide land use revenue opportunities
  - Expand concessions program
  - Increase long term parking capacity
  - Increase rental car capacity
- Extend life expectancy of the main terminal
- Decongest main terminal, curbside and roadways
- Just in time development program that is scalable
- Sustainable development that improves the environment
- Integrate mass transit

6

Master Plan Update

Master Plan Timeline

Nov. 2011: HNTB begins work on master plan

March 2012: Draft aviation activity forecasts submitted to FAA

April 2012: FAA approves passenger forecasts

April 2012: First stakeholder/public meetings

Oct. 2012: HNTB submits east and south development area concepts

Oct. 2012: Second stakeholder/public meetings

Dec. 2012: HNTB to submit terminal concepts

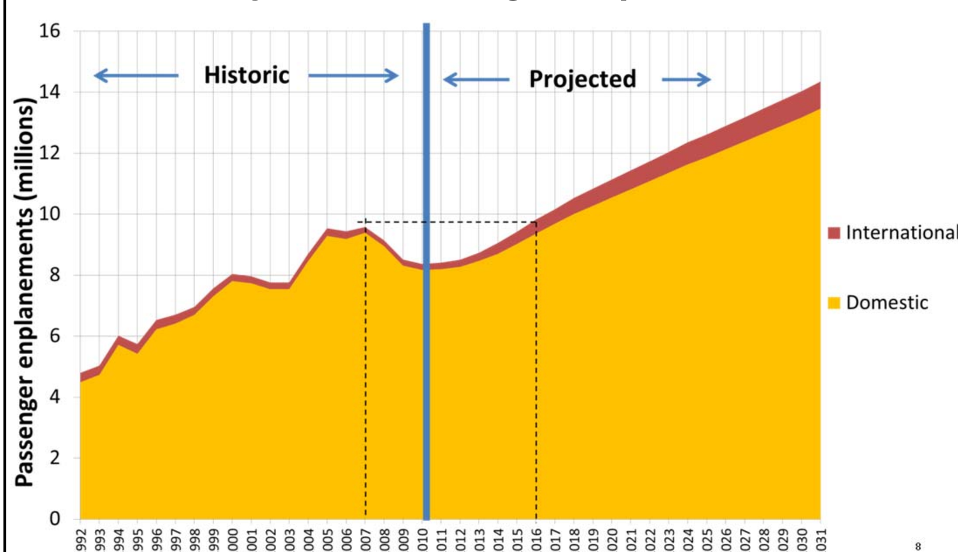
Dec. 2012: Third stakeholder/public meetings

March 2013: HNTB to deliver final Master Plan Document

7

Master Plan Update

Historic/Projected Passenger Enplanement Trend



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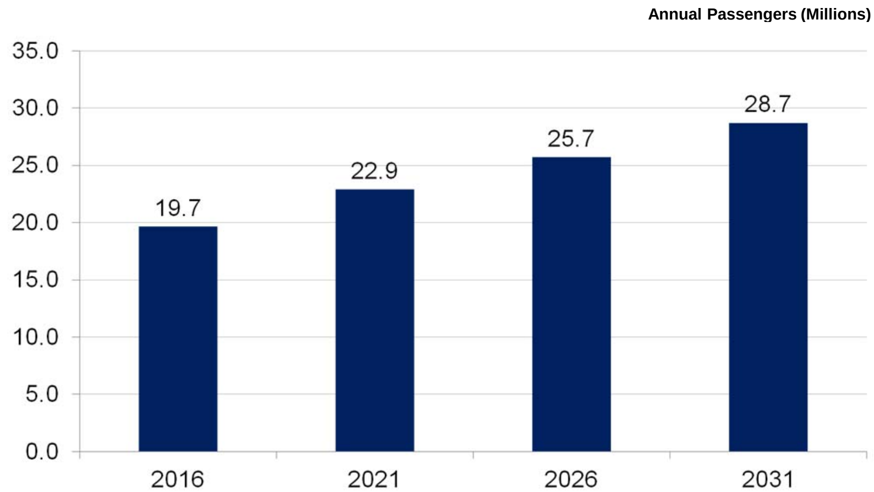
Master Plan Update

Baseline Total Passenger Projections



Average Growth Rate:	3.2%	3.1%	2.9%	2.7%

•2005 master plan - North terminal trigger at 25 to 28 MAP

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Master Plan Update

Terminal Area Facility Requirements

- Facility and passenger surveys conducted in December 2011
- Gated flight schedules prepared for forecast years 2011 and 2031
- Detailed facility requirements developed for all major airline and airport processors and functions:
  - Ticketing/check-in
  - Curbside check-in
  - ATO Areas
  - Baggage Claim
  - Baggage Makeup
  - Baggage Service Offices
  - Airline/Common-use Clubs
  - Holdrooms
  - Tug Drives
  - Customs and Border Protection
  - TSA Security Screening
  - Concessions
  - HCAA Spaces
  - Loading Docks
  - Restrooms
  - Mechanical/Electrical Plumbing
  - Circulation

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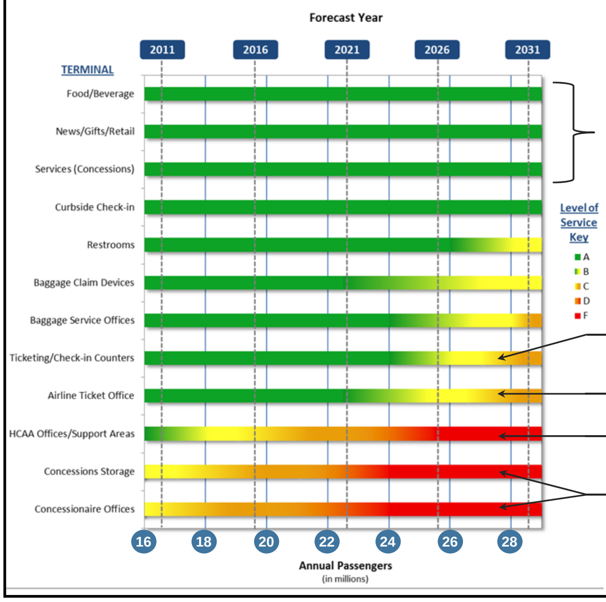
Master Plan Update

Tampa International Airport HNTB

Main Terminal Facility Requirements



Notes:

Terminal area concessions are adequately sized for planning period

Ticket counters accommodate demand through 2031 utilizing common-use facilities for new entrants

ATO space will reach capacity around 2031

HCAA Offices are at capacity and will require expansion in the intermediate-term

Additional concessions storage areas and concessionaire offices are required in the short term

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Master Plan Update

Tampa International Airport HNTB

Airside A Facility Requirements

Notes:

Airside A Sort Facility accommodates Airside A baggage make-up demand through 2031

Airside A concessions should be expanded

2031 Deficiencies:

- Food & Beverage – 1,200 sf
- Services - 200 sf
- News/Gifts/Retail - 9,600 sf

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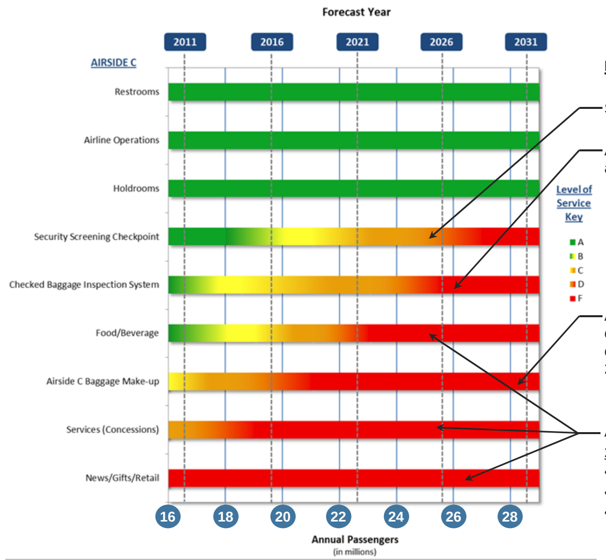
Master Plan Update

Airside C Facility Requirements



Notes:

SSCP grows from 8 to 12 lanes by 2031

Airside C CBIS requires modifications to accommodate anticipated baggage demand

Airside C baggage make-up area was nearing capacity in 2011 and is projected to require a carousel supporting 21 additional cart positions by 2031

Airside C concessions should be expanded

2031 Deficiencies:

- Food & Beverage – 14,000 sf
- Services - 500 sf
- News/Gifts/Retail - 23,100 sf

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Master Plan Update

Airside E Facility Requirements

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 - 80 sf

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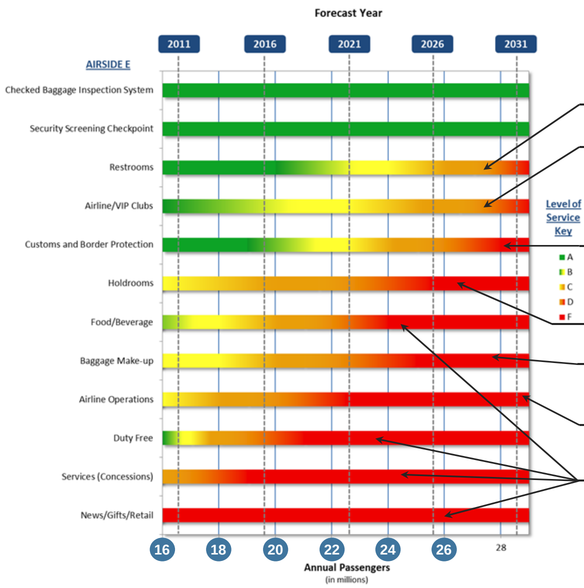
Master Plan Update

Airside F Facility Requirements



Notes:

Restrooms reach capacity by 2031

Additional common-use club area will be required to accommodate forecasted growth of international traffic

Customs and Border Protection projected to reach capacity between 2026 and 2031. Deficiency - 2 primary immigration counters

An additional 4,600 sf of holdroom area is required by 2031

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

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Master Plan Update

Airsides C & D Aircraft Requirements

- Criteria/Program
- Connectivity with Airside C (WN)
- FIS/CBP
- Integration with ATCT/TRACON

Aircraft Requirements:

		C	D
III	737-800w	14	10
IV	757-200w/300	2	3
V	787-900	0	2
V	747-400	0	1
		16	16

Master Plan Update

Terminal Area Support Facility Requirements

- Total number of airport parking spaces are adequate for 20-year demand.
  - Long Term Parking at Terminal is deficient
  - Economy Parking has considerable available capacity
- Ability to meet 2016 rental car demand at terminal not viable;
  - Two in-terminal concepts and three remote concepts options evaluated;
  - CONRAC facility recommended in area south of terminal.
  - Automated People Mover to serve CONRAC and Economy Garages to minimize traffic on Terminal roadways and curbs
- Roadways determined to have significant capacity issues, CONRAC option significantly mitigates this issue;
  - Some limited lane additions are required around the 2026 time frame

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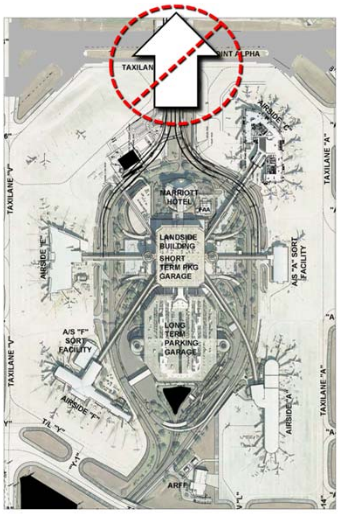
Terminal Area Concepts

18

Master Plan Update



✓ *Does it defer building a billion dollar North Terminal?*

Master Plan Update

Terminal Alternatives Analysis

- 7 Terminal Area Alternatives
  - Replacement of Airside F at Airside D
  - New CBP serving Airsides C and D
  - Address Main Terminal Requirements
    - Meeter/Greeter and circulation issues on Transfer Level
    - APM access to CONRAC
    - Curbside capacity
- Evaluation Criteria
  - Short-term scalability providing long-term capability
  - Expandability
  - Implementation requirements
  - Passenger level of service
  - Efficiency
  - Meets goal to defer move to North Terminal concept

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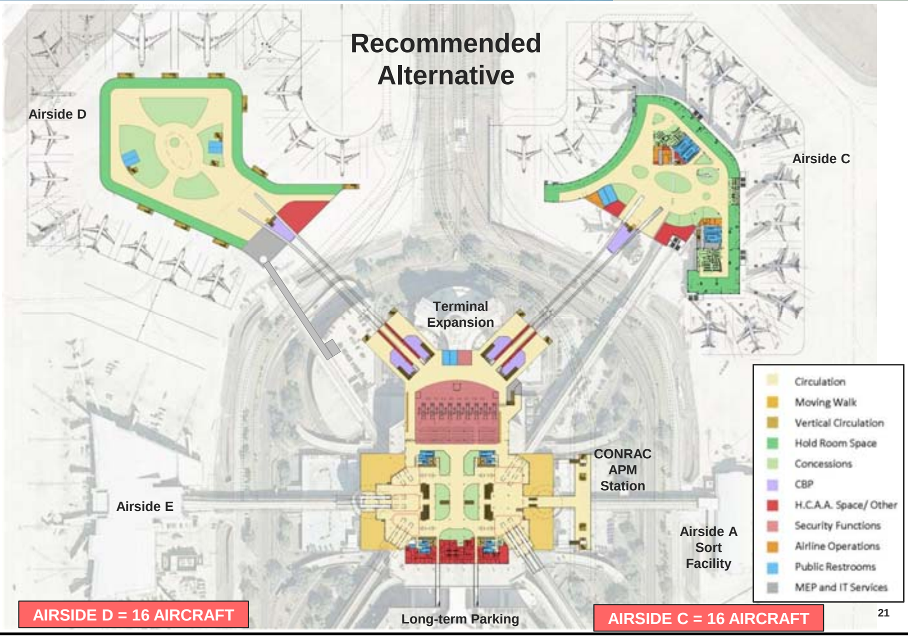
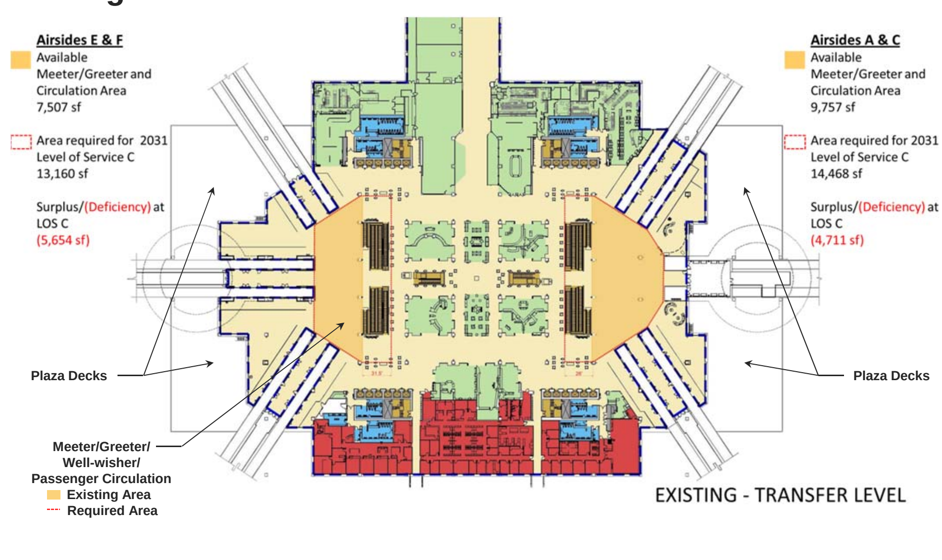
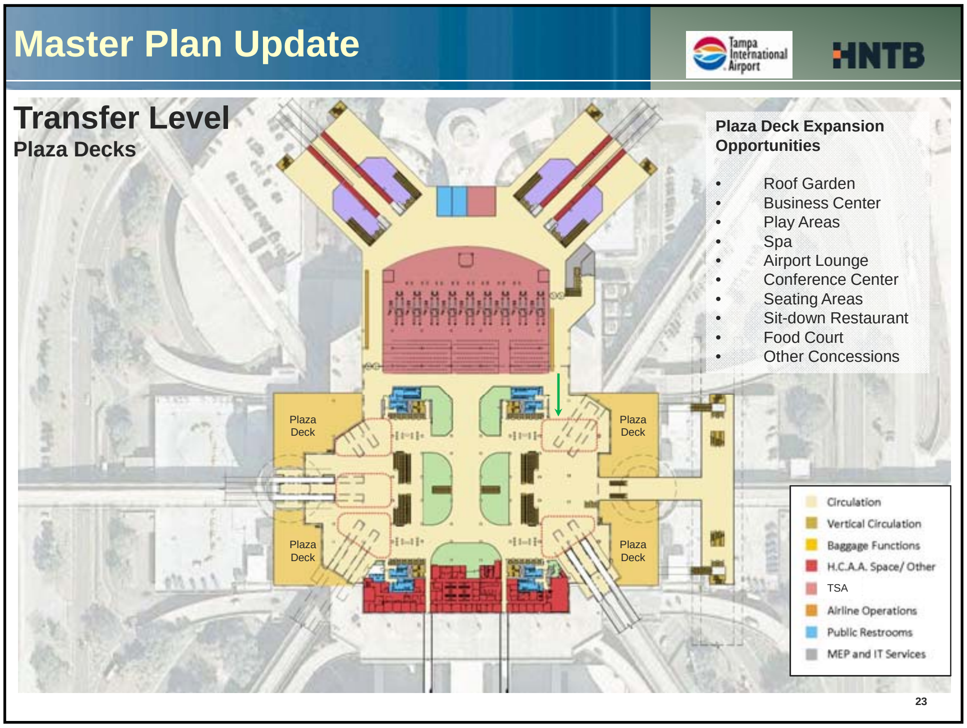
Master Plan Update

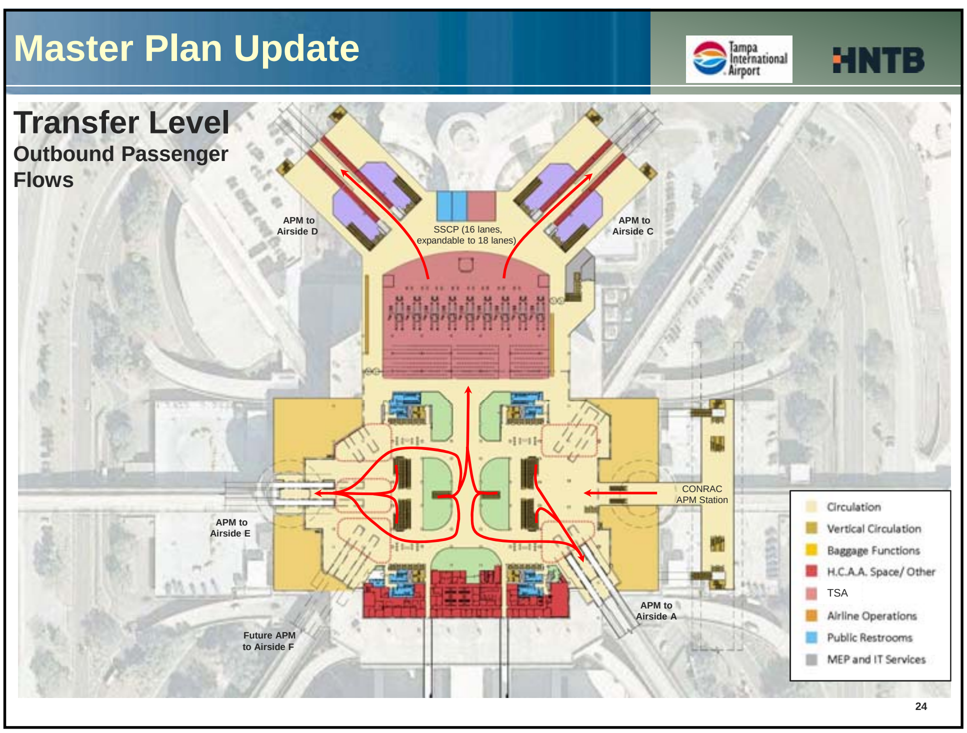


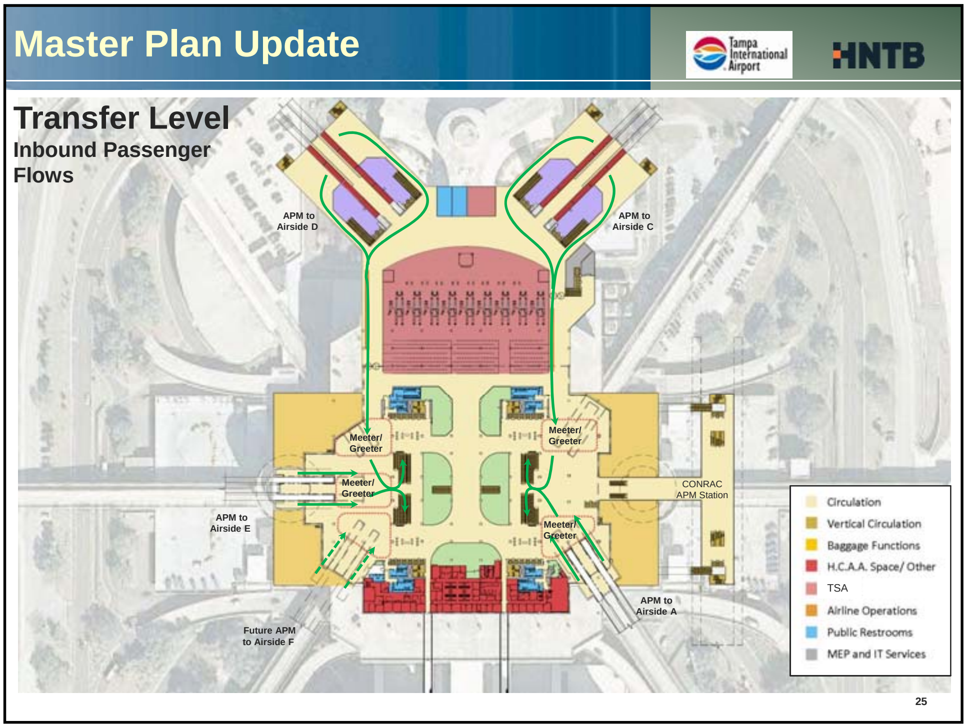
Master Plan Update

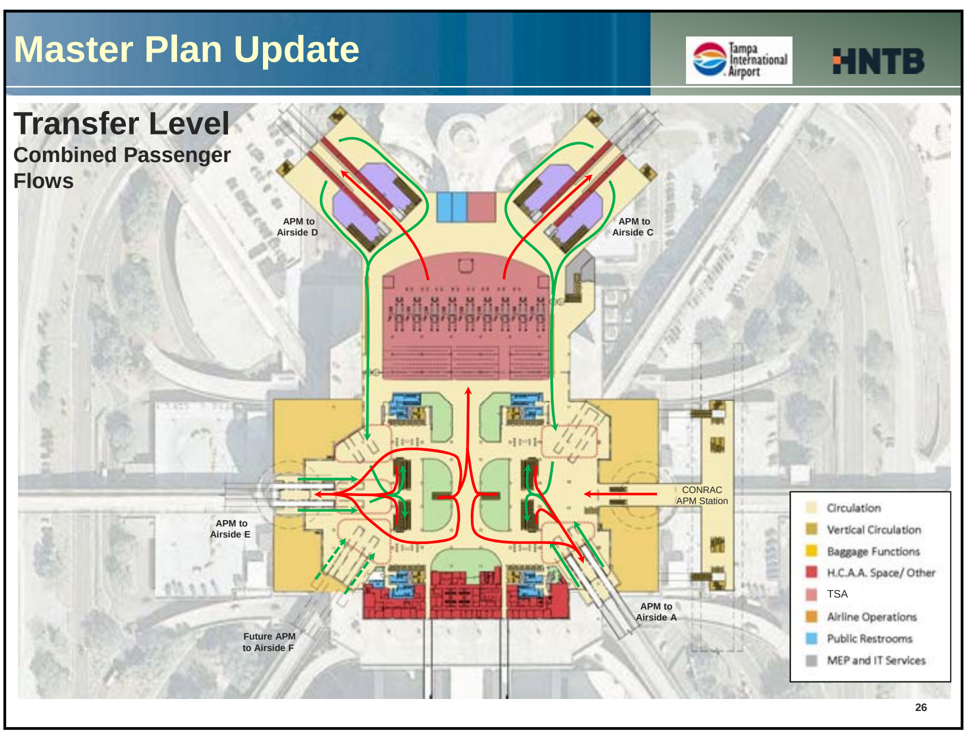
Existing Transfer Level




Master Plan Update
Tampa International Airport
HNTB
Transfer Level
Plaza Decks
Plaza Deck Expansion Opportunities
• Roof Garden
• Business Center
• Play Areas
• Spa
• Airport Lounge
• Conference Center
• Seating Areas
• Sit-down Restaurant
• Food Court
• Other Concessions
Plaza Deck
Plaza Deck
Plaza Deck
Plaza Deck
Circulation
Vertical Circulation
Baggage Functions
H.C.A.A. Space/ Other
TSA
Airline Operations
Public Restrooms
MEP and IT Services
23


Master Plan Update
Tampa International Airport
HNTB
Transfer Level
Outbound Passenger Flows
APM to Airside D
SSCP (16 lanes, expandable to 18 lanes)
APM to Airside C
CONRAC APM Station
APM to Airside E
APM to Airside A
Future APM to Airside F
Circulation
Vertical Circulation
Baggage Functions
H.C.A.A. Space/ Other
TSA
Airline Operations
Public Restrooms
MEP and IT Services
24

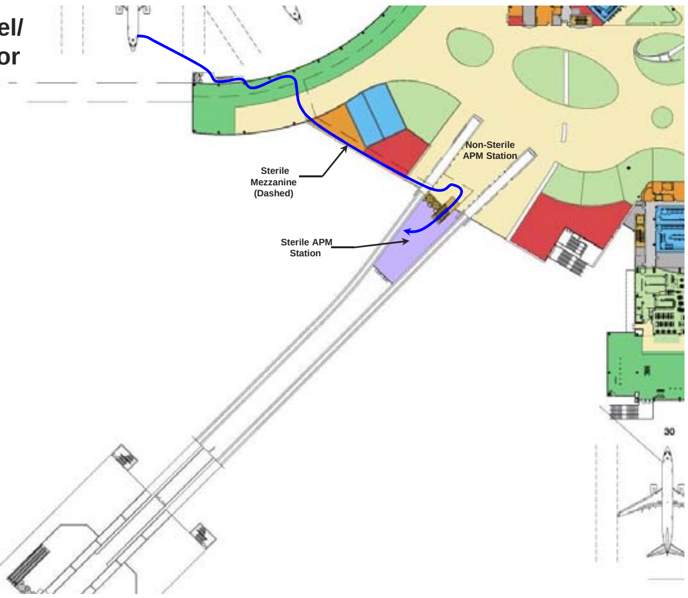

Master Plan Update
Tampa International Airport
HNTB
Transfer Level
Inbound Passenger Flows
APM to Airside D
APM to Airside C
Meeter/ Greeter
Meeter/ Greeter
Meeter/ Greeter
Meeter/ Greeter
CONRAC APM Station
APM to Airside E
APM to Airside A
Future APM to Airside F
Circulation
Vertical Circulation
Baggage Functions
H.C.A.A. Space/ Other
TSA
Airline Operations
Public Restrooms
MEP and IT Services
25


Master Plan Update
Tampa International Airport
HNTB
Transfer Level
Combined Passenger Flows
APM to Airside D
APM to Airside C
CONRAC APM Station
APM to Airside E
APM to Airside A
Future APM to Airside F
Circulation
Vertical Circulation
Baggage Functions
H.C.A.A. Space/ Other
TSA
Airline Operations
Public Restrooms
MEP and IT Services
26

Master Plan Update

Tampa International Airport HNTB

Airside C
Boarding Level/ Sterile Corridor Level



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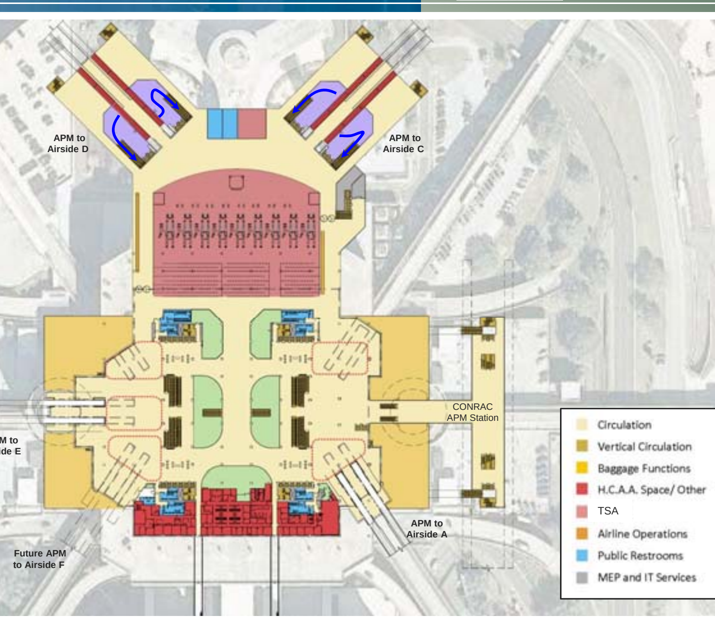
Master Plan Update

Tampa International Airport HNTB

Transfer Level
CBP Passenger Flows



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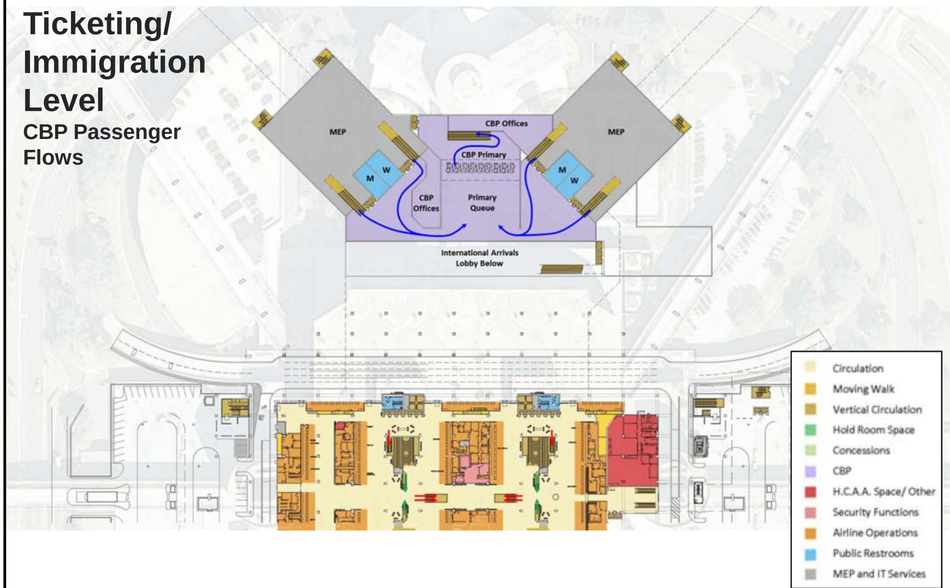
Master Plan Update

Tampa International Airport HNTB

Ticketing/ Immigration Level

CBP Passenger Flows



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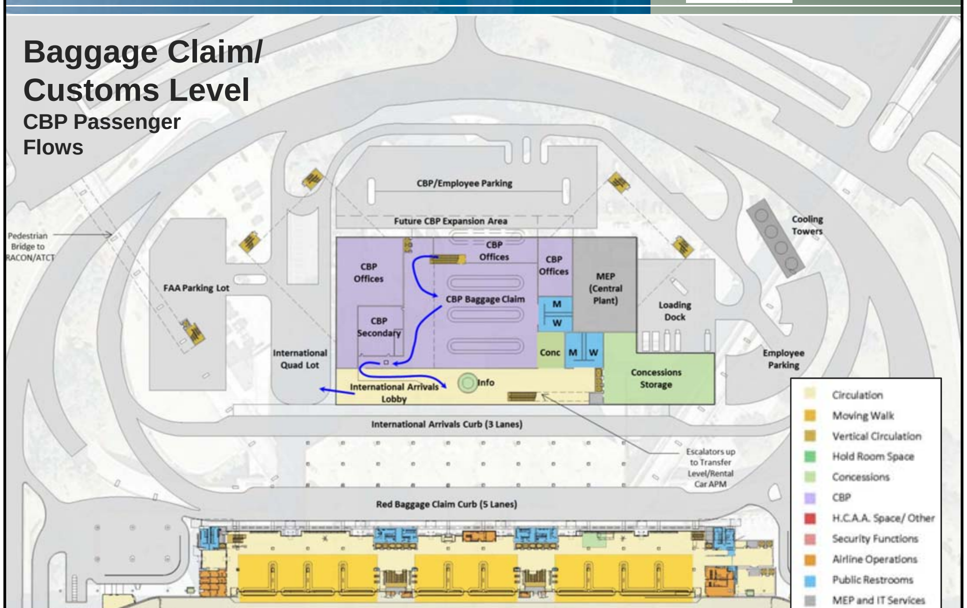
Master Plan Update

Tampa International Airport HNTB

Baggage Claim/ Customs Level

CBP Passenger Flows



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Airside Concepts

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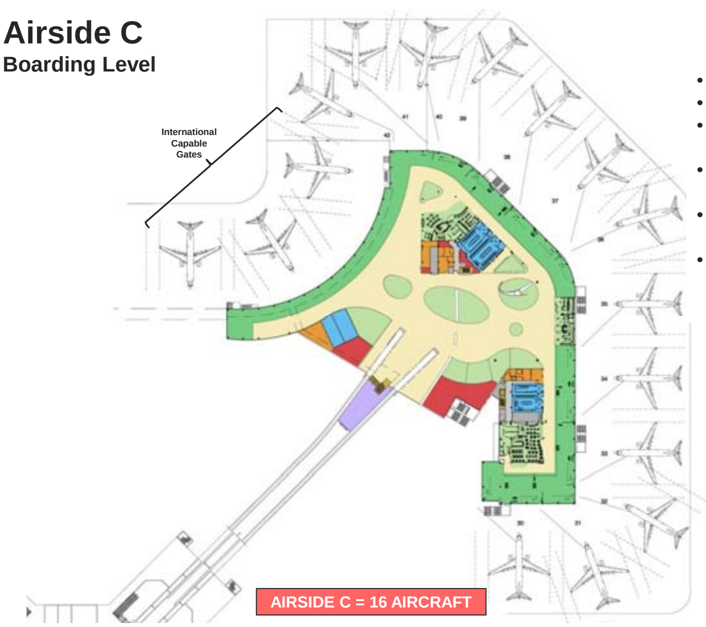
Master Plan Update

Airside C

Boarding Level



- New APM Station
- Concessions: 58,400 sf
- 3 International Capable Gates (expandable to 5)
- Sterile Corridor at 3rd Level
- Sterile APM Station (2 cars)
- Additional Baggage Makeup Carousel

Circulation
Moving Walk
Vertical Circulation
Hold Room Space
Concessions
CBP
H.C.A.A. Space/ Other
Security Functions
Airline Operations
Public Restrooms
MEP and IT Services

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Master Plan Update

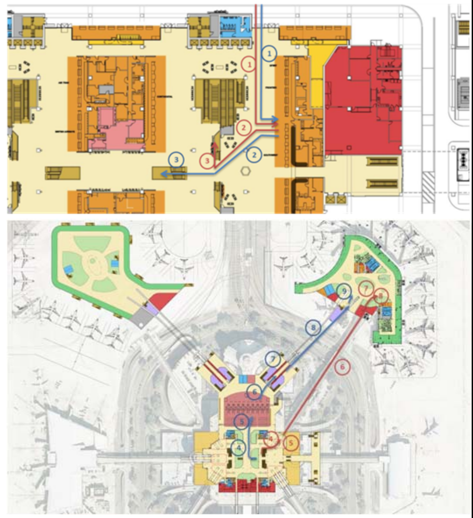
Tampa International Airport HNTB

Airside C Walking Distance Analysis

	Southwest Airlines	Existing Terminal to Airside C Distance (ft)	Time (min)
1	Curb to Ticket Counter	130	0.54
2	Ticket Counter to Escalator	95	0.40
3	Escalator Ride		0.33
4	Escalator to APM	140	0.58
5	Waiting for APM		1.68
6	APM ride to Airside C		1.06
7	Airside C to Checkpoint	120	0.50
8	Checkpoint Processing Time		10
	Totals	**485**	**15.09**
	No wait at APM Station		13.41

	Southwest Airlines	Proposed Terminal to Airside C Distance (ft)	Time (min)
1	Curb to Ticket Counter	130	0.54
2	Ticket Counter to Escalator	140	0.58
3	Escalator Ride		0.33
4	Escalator to SSCP	200	0.83
5	Checkpoint Processing Time		10
6	SSCP to APM	150	0.63
7	Waiting for APM		1.05
8	APM ride to Airside C		0.67
9	APM to edge of APM station	30	0.13
	Totals	**650**	**14.76**
	No wait at APM Station		13.71

Average Walking Speed = 240 Feet per minute, or 4 feet per second



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Master Plan Update

Tampa International Airport HNTB

- Concessions: 39,400 sf
- Up to 10 International Capable Gates
- Sterile Corridor at 3rd Level
- Sterile APM Station (2 cars)

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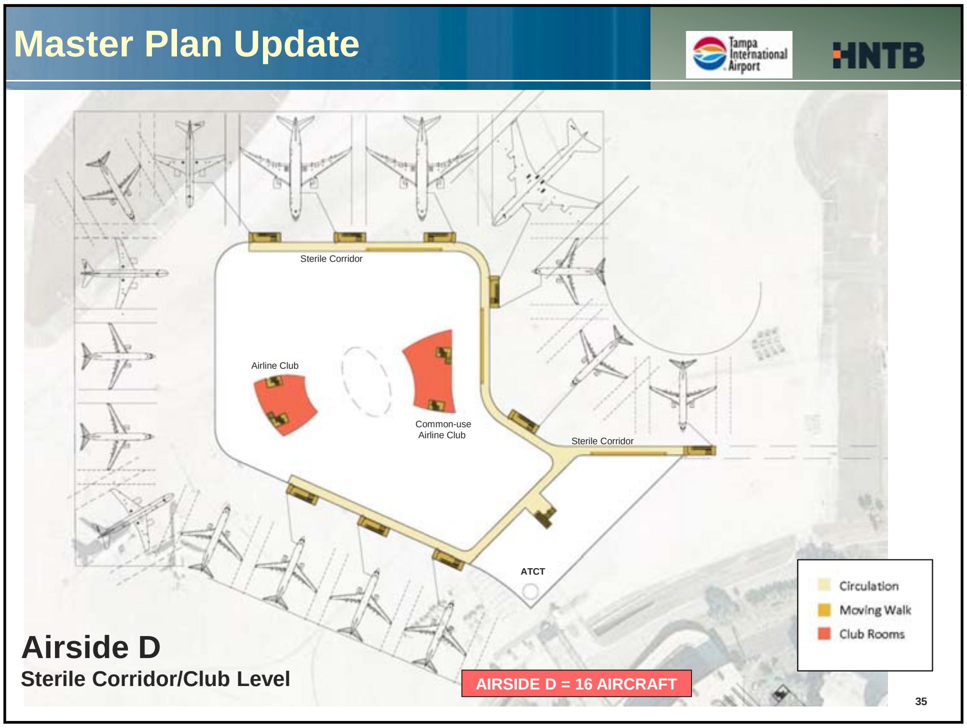
Master Plan Update
Tampa International Airport
HNTB
Sterile Corridor
Airline Club
Common-use Airline Club
Sterile Corridor
ATCT
Circulation
Moving Walk
Club Rooms
Airside D
Sterile Corridor/Club Level
AIRSIDE D = 16 AIRCRAFT
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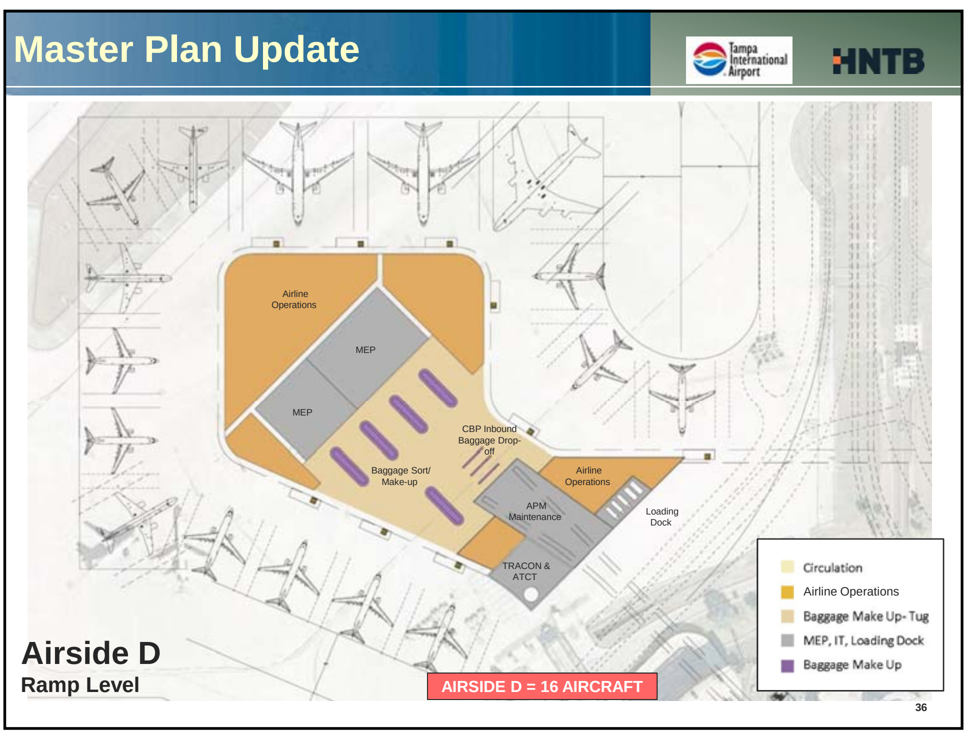
Master Plan Update
Tampa International Airport
HNTB
Airline Operations
MEP
MEP
CBP Inbound Baggage Drop-off
Baggage Sort/ Make-up
Airline Operations
APM Maintenance
Loading Dock
TRACON & ATCT
Circulation
Airline Operations
Baggage Make Up- Tug
MEP, IT, Loading Dock
Baggage Make Up
Airside D
Ramp Level
AIRSIDE D = 16 AIRCRAFT
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Master Plan Update

Airside D Walking Distance Analysis

British Airways	Existing Terminal to Airside F Distance (ft)	Time (min)
1 Curb to Ticket Counter	120	0.50
2 Ticket Counter to Escalator	90	0.38
3 Escalator Ride		0.33
4 Escalator to APM	160	0.67
5 Waiting for APM		1.54
6 APM ride to Airside F		0.93
7 Airside F to Checkpoint	90	0.38
8 Checkpoint Processing Time		10
Totals	**460**	**14.72**
No wait at APM Station		13.18

British Airways	Proposed Terminal to Proposed Airside D Distance (ft)	Time (min)
1 Curb to Ticket Counter	120	0.50
2 Ticket Counter to Escalator	70	0.29
3 Escalator Ride		0.33
4 Escalator to SSCP	200	0.83
5 Checkpoint Processing Time		10
6 SSCP to APM	150	0.63
7 Waiting for APM		1.14
8 APM ride to Airside C		0.73
9 APM to edge of APM station	30	0.13
Totals	**570**	**14.57**
No wait at APM Station		13.43
Average Walking Speed = 240	Feet per minute, or 4 feet per second	

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Master Plan Update

South Complex Capacity Analysis

Gates	Gates Available	2011 Occupied Gates	2031 Occupied Gates	2011 Peak Hour Originating Passengers	2031 Peak Hour Originating Passengers	2011 Annual Passengers	2031 Annual Passengers
Airside A	16	9	13	505	706	3,434,911	5,155,785
Airside C	16	15	16	842	1,473	6,718,340	11,076,457
Future Airside D	16	12	16	593	930	3,494,618	6,835,442
Airside E	13	9	12	577	923	3,084,182	5,636,380
Subtotal	**61**	**45**	**57**	**2,250**	**3,458**	**16,732,051**	**28,704,064**
Future Airside F	15				900		6,000,000
Total	**76**			**2,250**	**4,223**		**34,704,064**

- Future Airside F peak hour and annual numbers estimated
- Subtotals for Peak Hour Originating Passengers do total numbers above. They represent a combined peak hour for all airsides. Not all airsides peak at the same time.

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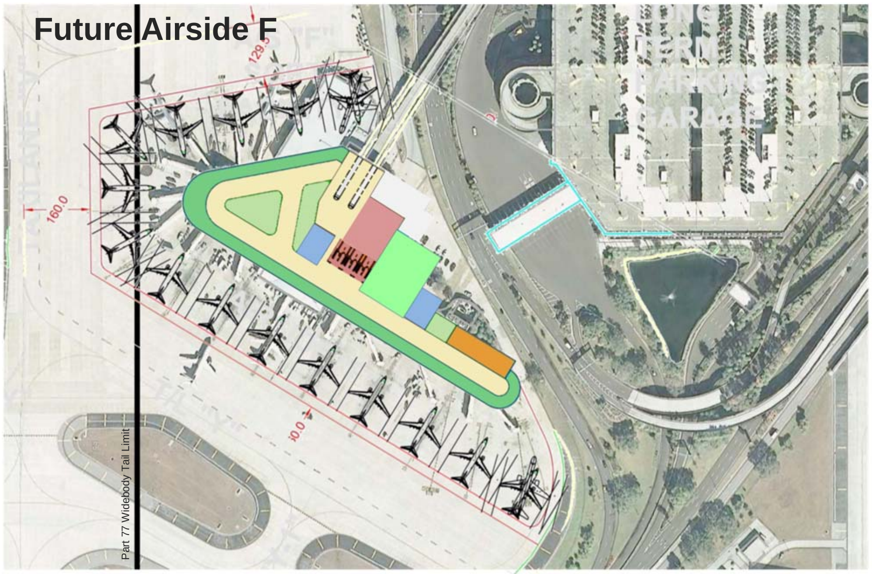
Master Plan Update

Tampa International Airport HNTB



C = 15 AIRCRAFT

BOARDING LEVEL

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Master Plan Update

Tampa International Airport HNTB

South Complex Capacity Analysis

- **Ticket Counters –** Depends on future check-in technology and airline consolidation. Only 16 counter positions are assumed available after 2031
- **ATO Offices –** No additional capacity on ticketing level after 2031
- **Baggage Claim –** Some excess capacity exists in 2031, but depends on airline consolidation, number of carriers. Expansion of baggage claim area is difficult
- **Baggage Service Offices –** There is a surplus of BSO space in 2031
- **TSA Checkpoint –** Assume constructed at new Airside F
- **TSA Checked Baggage Inspection System –** Inadequate capacity in existing system, may be able to construct at new Airside F on ramp level
- **Transfer Level Circulation –** Appears to be adequate if Airside E APM station is relocated one train length to west and new Airside F APM station is built two train lengths further from the circulation core
- **Curbs –** See analysis (next slides)

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Master Plan Update

Curb Expansion Requirements

Curb	2011			2016			2021			2026			2031		
	Vol	Cap	V/C	Vol	Cap	V/C	Vol	Cap	V/C	Vol	Cap	V/C	Vol	Cap	V/C
Current Dwell Times															
Blue Dep	692	1086	0.64	769	1082	0.71	881	1083	0.81	982	1084	0.91	1083	1084	1.00
Red Dep	587	1242	0.47	653	1257	0.52	746	1259	0.59	830	1260	0.66	914	1261	0.72
Blue Arr	595	660	0.90	565	594	0.95	650	594	1.09	727	594	1.22	804	594	1.35
Red Arr	380	464	0.82	395	432	0.91	454	432	1.05	508	432	1.18	561	432	1.30
Adjusted Dwell Times															
Blue Arr	595	997	0.60	565	917	0.62	650	917	0.71	727	917	0.79	804	917	0.88
Red Arr	380	966	0.39	395	916	0.43	454	917	0.50	508	917	0.55	561	917	0.61

Levels of service color code: **Green = acceptable level of service**
Yellow = moderate congestion
Orange = significant congestion
Red = massive congestion

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Master Plan Update

Benefits of Curb Expansion Improvements

Curb	Baseline			2016			2021			2026			2031		
	Vol	Cap	V/C	Vol	Cap	V/C	Vol	Cap	V/C	Vol	Cap	V/C	Vol	Cap	V/C
Proposed Improvements to Capacity: Enforced "No Waiting", Balance Blue and Red Demand, No Pedestrian Crossings Permitted, APM to SDA, Use of Crossover Lanes, Add 5th Lane to Curb Roadway															
Blue Dep	692	1086	0.64	747	1116	0.67	802	1187	0.69	853	1188	0.72	953	1545	0.65
Red Dep	587	1242	0.47	701	1180	0.59	758	1184	0.64	807	1186	0.68	892	1543	0.58
Blue Arr	595	997	0.60	531	917	0.58	619	917	0.67	698	971	0.72	776	1131	0.69
Red Arr	380	966	0.39	460	916	0.50	535	916	0.58	602	917	0.66	671	1132	0.59
Changes Assumed	Enforced "no waiting" on arrivals			Baseline plus Balance Blue / Red Demand			2016 plus No Ped Crossings on Blue Departures & APM to SDA			2021 plus Use of Crossover Lanes, No Ped Crossings of Blue Arrivals			2026 plus Add 5th Lane to all curbs		

Levels of service color code: **Green = acceptable level of service**
Yellow = moderate congestion
Orange = significant congestion
Red = massive congestion

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Master Plan Update

Tampa International Airport HNTB

Curb Operations with 15 Additional Gates (Airside F)

Curb	2031			2041		
	Volume	Capacity	V/C	Volume	Capacity	V/C
Blue Departures	953	1545	0.65	1160	1545	0.75
Red Departures	892	1543	0.58	1080	1544	0.70
Blue Arrivals	776	1131	0.69	924	1131	0.82
Red Arrivals	671	1132	0.59	793	1132	0.70
Changes Assumed from Today	Enforced "No Waiting", Balance Blue and Red Demand, No Pedestrian Crossings Permitted, APM to SDA, Use of Crossover Lanes, Add 5th Lane to Curb Roadways			• Same as 2031 plus International Arrivals Curb. • Blue Departures V/C is tolerable; no improvements recommended. • To improve Blue Arrivals, construct outer 3-lane curb		

Levels of service color code:

Green = acceptable level of service
Yellow = moderate congestion
Orange = significant congestion
Red = massive congestion

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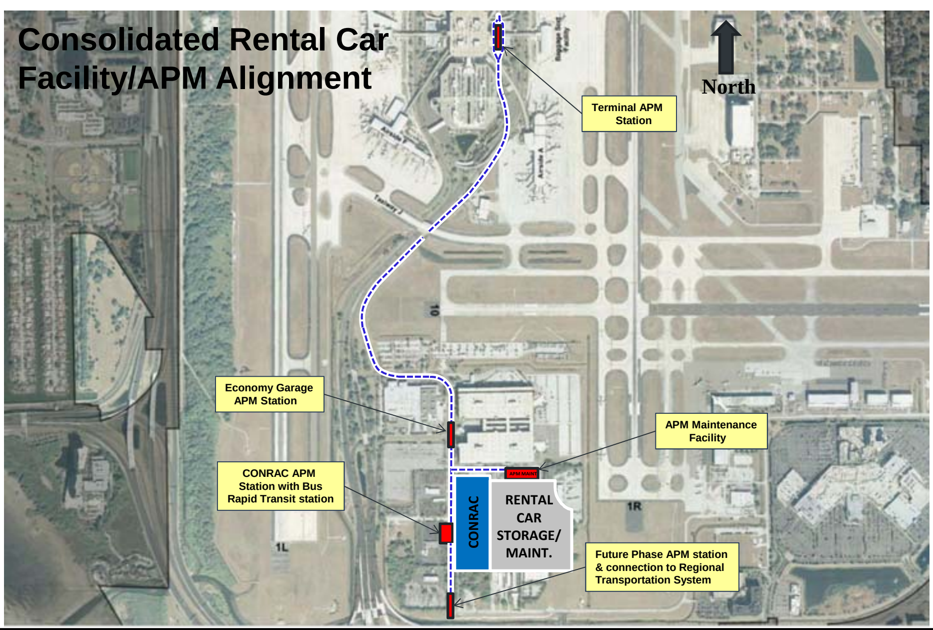
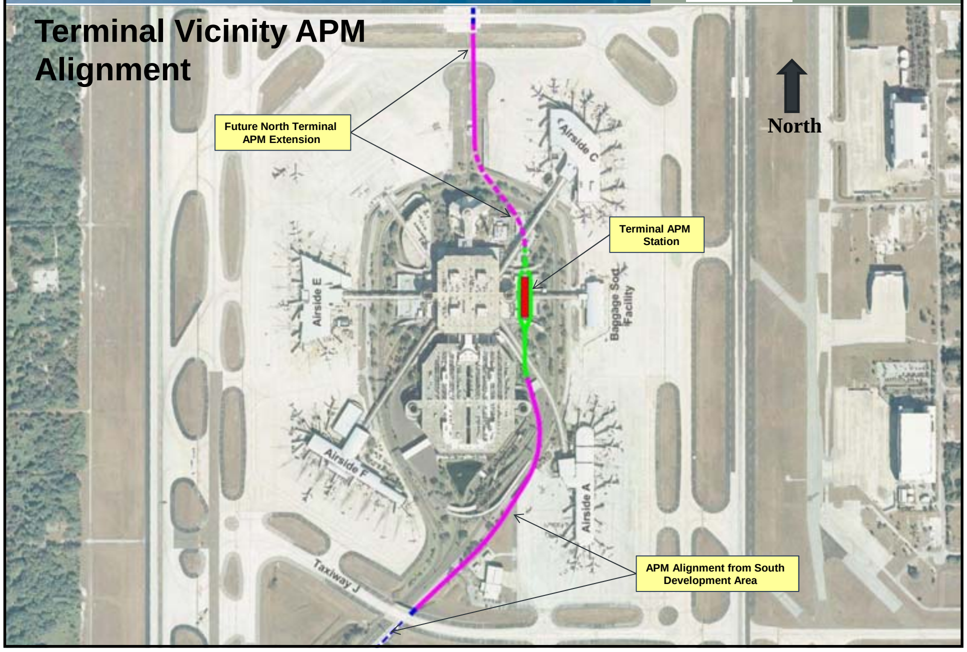
Master Plan Update

Tampa International Airport HNTB



Master Plan Update

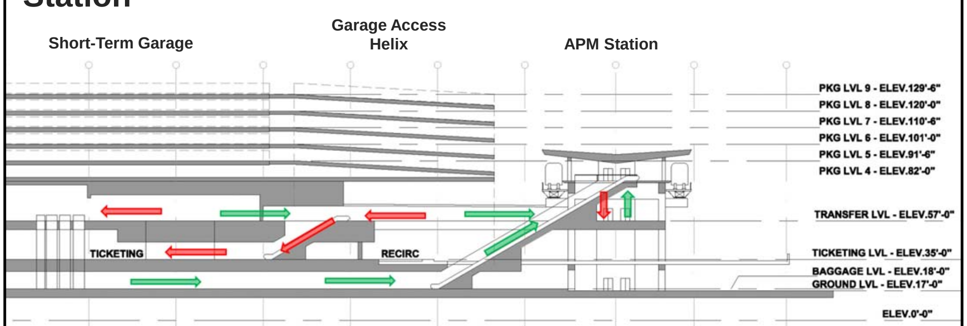
Tampa International Airport HNTB



Master Plan Update

Tampa International Airport HNTB

Terminal APM Station



Section

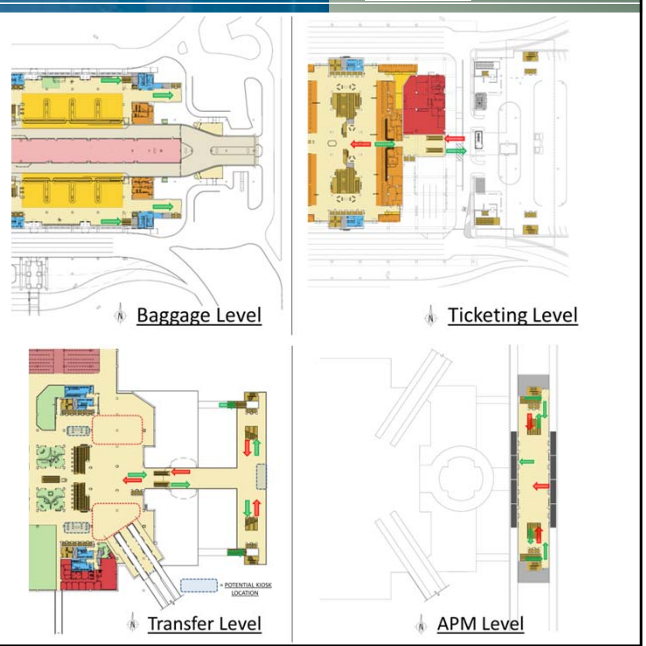
Departures

Arrivals

Master Plan Update

Tampa International Airport HNTB

Terminal APM Station

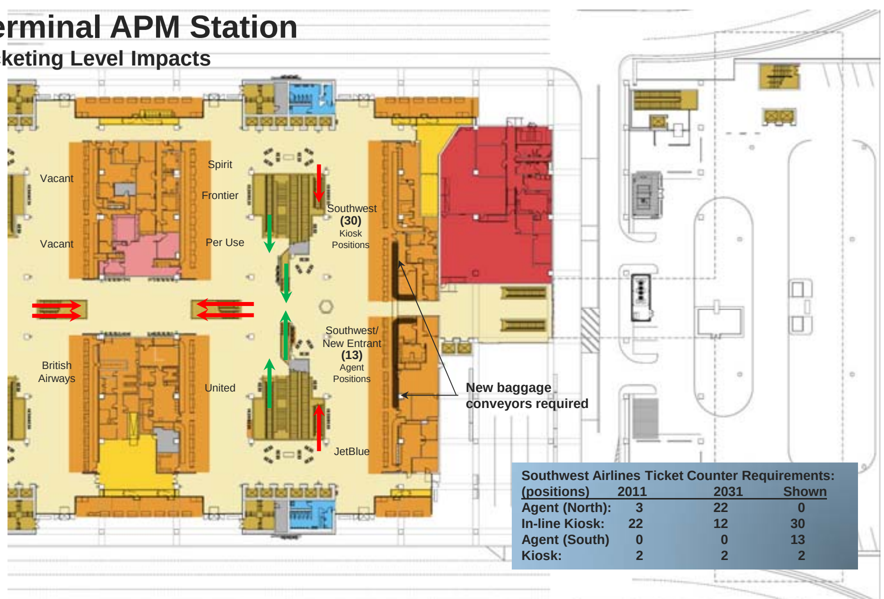


Master Plan Update

Tampa International Airport HNTB

Terminal APM Station

Ticketing Level Impacts



Southwest Airlines Ticket Counter Requirements:

(positions)	2011	2031	Shown
Agent (North):	3	22	0
In-line Kiosk:	22	12	30
Agent (South)	0	0	13
Kiosk:	2	2	2

Shared Use Passenger Processing Systems

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SUPPS Master Plan Summary

Shared Use Passenger Processing Systems

Goals

- Understand airline perspectives and preferences on shared use technologies
- Determine Feasibility of Shared Use Processing at TPA
- Identify Supporting Infrastructure Requirements
- Identify Policy, Procedural, and Pricing Requirements
- Identify Recommended Approach for a Phased Implementation

Two - Phase Approach Employed

- Feasibility: Does SUPPS make incremental sense at TPA?
- Define phased implementation strategy

SUPPS Master Plan Summary

SUPPS Planning Process Focus

- Surveyed Airlines with follow-up discussions to start the planning process;
- Maximize the longevity of the Main Terminal Complex to meet long-term demand;
  - Delay the need to initiate development of North Terminal to the extent viable;
- Maintain the high level of service consistent with TPA's high customer service ratings;
- Define technology trends and the state of the technologies in the U.S. domestic market and internationally;
- Assess the feasibility of deploying additional SUPPs technologies at TPA on an incremental basis;

SUPPS Master Plan Summary

Initial Feasibility Report Findings

- There are immediate requirements that SUPPs provides distinct benefit:
  - Airside E and F Ticket Counters to support E & F gates
  - Gate podiums for Airside A and Airside F
  - To meet identified needs of existing carriers
- Supporting infrastructure (cabling and network) currently in place
- Shared / Common use will provide benefits
  - Relieve ticket counter constraints in ticket lobby
  - Facilitate efficient utilization of airport resources
  - Offset need/reduce area of building expansion, reduce capital investments
- Further analysis required to identify a recommended approach and specific target areas for implementation.

SUPPS Master Plan Summary

Preliminary SUPPS Recommendations

- Address current known deficiencies/needs where appropriate
  - Deficient ticket counter to meet available Airside E and F gates and others previously noted.
- Support airline systems and future airline initiatives, to include:
  - Self bag tagging deployment
  - Potential for self boarding technologies
- Phased implementation process recommended
  - Select implementation at check-in counters
  - Multiple user gate podiums as need to meet demand
  - Common use self-service kiosks in strategic locations
  - In-queue self-service bag tagging at airline's request

Land Use

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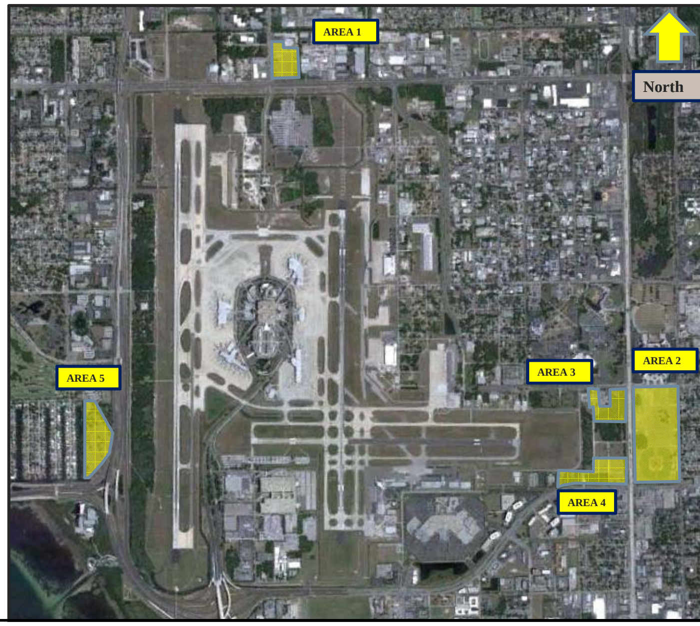
Master Plan Update

Ancillary Parcel Evaluation



Conclusion

- **Project Meeting Schedule:**
  - HCAA Board Briefing: December 12, 2012
  - 3rd public workshop and stakeholder meetings: December 12, 2012 Seminole Heights Garden Club: 6:00pm to 7:30pm
  - Present final plan including cost and financing strategies: March 2013
- **Questions**
- **Comments**

Tampa International Airport Master Plan Update

Airline Presentation – Terminal Facilities

November 26, 2012

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Tampa International Airport Master Plan Update

HCAA Board Presentation – Terminal Facilities and Land Use

December 6, 2012

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Master Plan Update

Prior Presentation

- Consolidated rental car and people mover
  - Decongest curbsides and roadways
  - Enable rental car growth
  - Gain long term parking capacity
- South development opportunities and regional transit connectivity
- East side development opportunities

Today's Presentation

- Main terminal and airside requirements and concepts
- Maximize capacity of existing terminal complex and defer need for multi-billion dollar north terminal development
- Scalable approach – build when demand dictates
- Potential land use opportunities to maximize non-airline revenue

2

Master Plan Update

Master Plan: Terminal Concepts Guiding Principles

- Consider economic and airline business industry conditions
- Grow efficiently, thoughtfully and affordably
  - Flexible and Scalable - build only when needed
- Maximize capacity of existing facilities to reduce need for north terminal past 25 MAP
- Maintain a high level of customer service
- Adhere to core aspects of the original terminal design
  - Maintain passenger convenience and comfort
  - Keep walking distances under 700 ft.
  - Expandable
  - Maintain automated people mover concepts
- Grow business and create new revenue opportunities

3

Master Plan Update

2005 Master Plan – North Terminal Planning

- North terminal required at 25 MAP
  - Scheduled opening for October 2015
  - Initial cost of $1 billion for one 14-gate airside, main terminal, parking and roadways
  - Major impetus was capacity enhancements for curbside, rental car, international travel and transfer level meeter/greeter space
- High risk of building too much capacity
  - Low utilization of roadways and terminal facilities for one airside
  - Relatively high O&M costs due to low utilization
  - Two main terminals confusing for customers
  - Three rental car locations would be inefficient and confusing for customers
  - High initial cost with no ability to downsize if needed

4

Master Plan Update

Master Plan – New Vision

- Enable non-airline revenue growth:
  - Provide land use revenue opportunities
  - Expand concessions program
  - Increase long term parking capacity
  - Increase rental car capacity
- Extend life expectancy of the main terminal
- Decongest main terminal, curbside and roadways
- Scalable approach – build when demand dictates
- Sustainable development that improves the environment
- Integrate mass transit

5

Master Plan Update

Master Plan Timeline

Nov. 2011: HNTB begins work on master plan

March 2012: Draft aviation activity forecasts submitted to FAA

April 2012: FAA approves passenger forecasts

April 2012: First stakeholder/public meetings

October 2012: HNTB submits east and south development area concepts

October 2012: Second stakeholder/public meetings

December 2012: HNTB to submit terminal concepts

December 2012: Third stakeholder/public meetings

March 2013: HNTB to deliver final Master Plan Document

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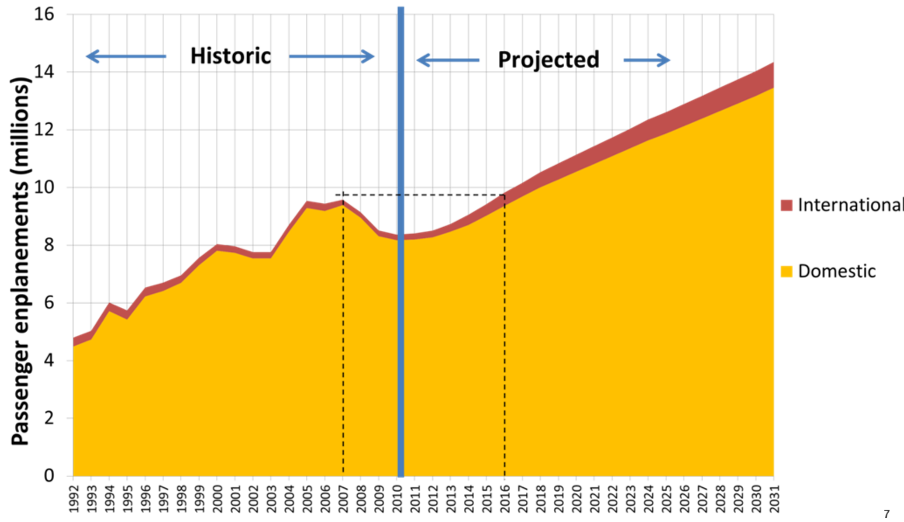
Master Plan Update

Historic/Projected Passenger Enplanement Trend



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Terminal Facility Requirements

8

Master Plan Update

Tampa International Airport · HNTB

Terminal Area Facility Requirements

- Conducted facility inventory and passenger surveys in December 2011
- Prepared gated flight schedules for forecast years 2011 and 2031
- Developed passenger simulation model to size terminal facilities for passenger circulation, check-in, security screening and baggage systems
- Coordinated with Authority's consultant to develop future concessions requirements

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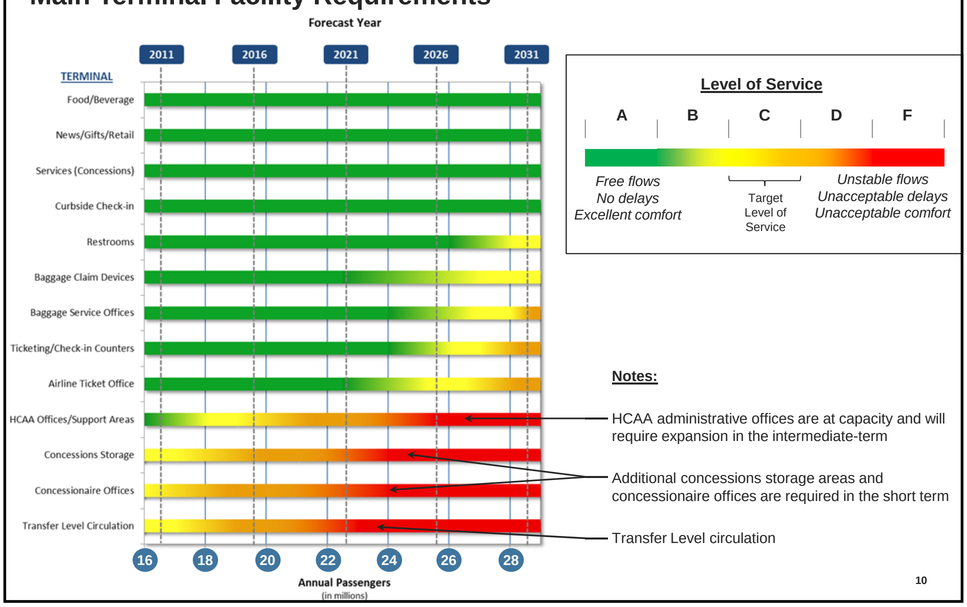
Master Plan Update

Tampa International Airport · HNTB

Main Terminal Facility Requirements



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Master Plan Update

Tampa International Airport | HNTB

Airside A Facility Requirements

Notes:

Airside A concessions should be expanded:

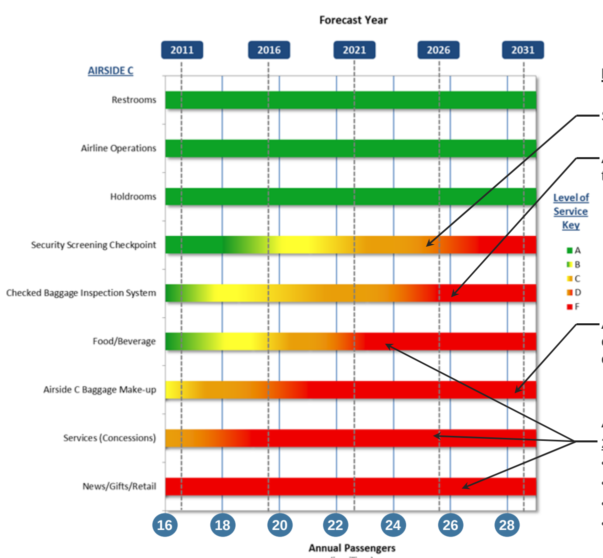
2031 Deficiencies:

- Food & Beverage – 1,200 sf
- Services - 200 sf
- News/Gifts/Retail - 9,600 sf
- TOTAL 11,000 sf

Master Plan Update

Tampa International Airport | HNTB

Airside C Facility Requirements



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

Master Plan Update

Tampa International Airport HNTB

Airside E Facility Requirements

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

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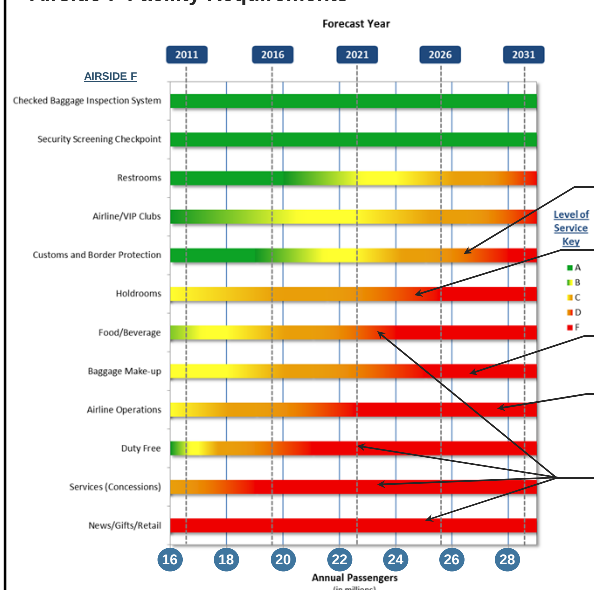
Master Plan Update

Tampa International Airport HNTB

Airside F Facility Requirements



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

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Terminal Area Concepts

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Master Plan Update

Summary of Major Objectives

- Mandate: Extend the longevity of Main Terminal at a high level of customer service
- Achieve your potential of non-aeronautical revenue on airsides
- Increase efficiency of security checkpoints
- Flexibility to meet anticipated international demand on multiple airsides with a single FIS
- Accommodate the new generation of aircraft
- Create additional space for passengers and meeter/greeters on the Transfer Level
- Allow connectivity between concourses without passengers rescreening at a security checkpoint (e.g. domestic to international connections)

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Master Plan Update

Tampa International Airport HNTB

Terminal Concepts Evaluation Criteria

- Scalability – build as demand dictates
- Flexible/expandable solutions
- Meets facility requirements
- Passenger level of service
- Operational efficiency
- Meets goal to defer move to North Terminal concept

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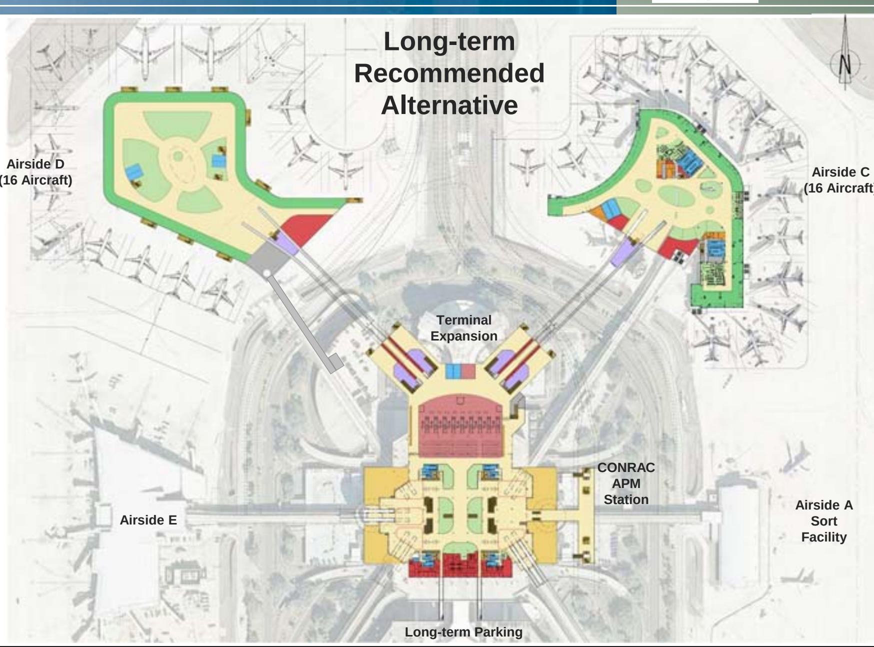
Master Plan Update

Tampa International Airport HNTB



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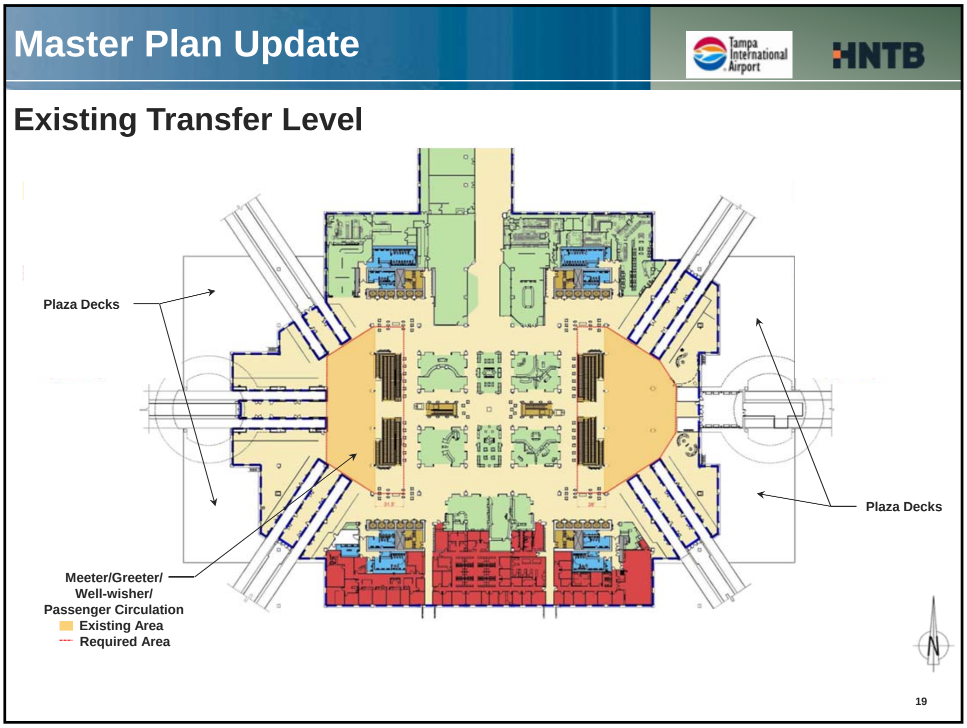
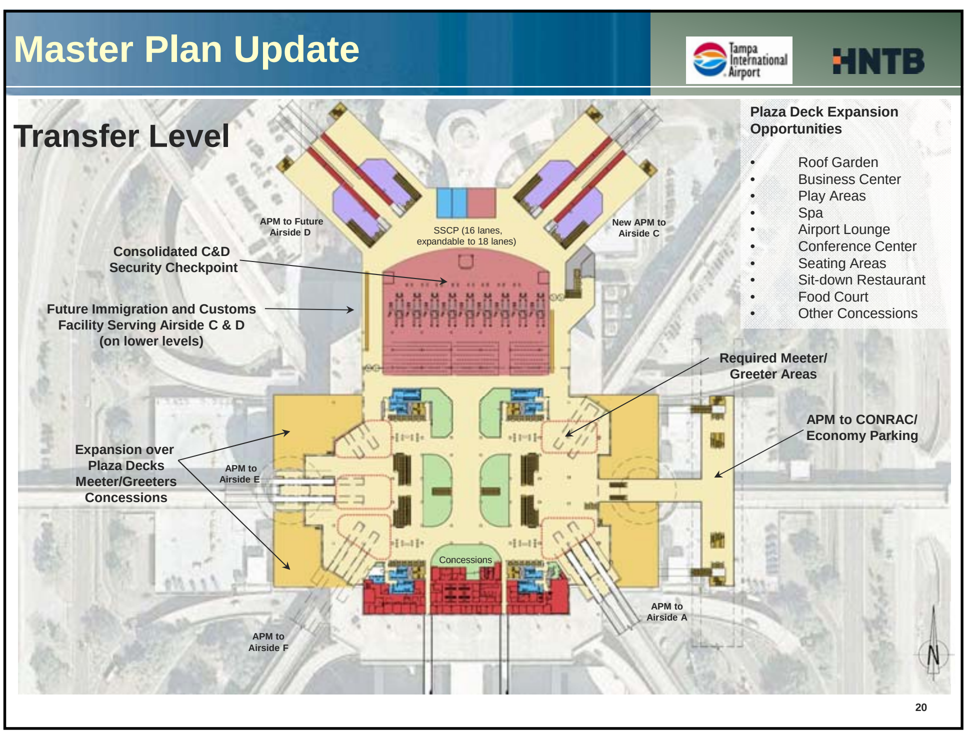

Master Plan Update
HNTB
Existing Transfer Level
Plaza Decks
Plaza Decks
Meeter/Greeter/
Well-wisher/
Passenger Circulation
Existing Area
Required Area
19


Master Plan Update
HNTB
Transfer Level
Plaza Deck Expansion Opportunities
• Roof Garden
• Business Center
• Play Areas
• Spa
• Airport Lounge
• Conference Center
• Seating Areas
• Sit-down Restaurant
• Food Court
• Other Concessions
APM to Future Airside D
SSCP (16 lanes, expandable to 18 lanes)
New APM to Airside C
Consolidated C&D Security Checkpoint
Future Immigration and Customs Facility Serving Airside C & D (on lower levels)
Required Meeter/ Greeter Areas
APM to CONRAC/ Economy Parking
Expansion over Plaza Decks Meeter/Greeters Concessions
APM to Airside E
Concessions
APM to Airside A
APM to Airside F
20

Master Plan Update

Tampa International Airport HNTB

Ticketing/ Immigration Level

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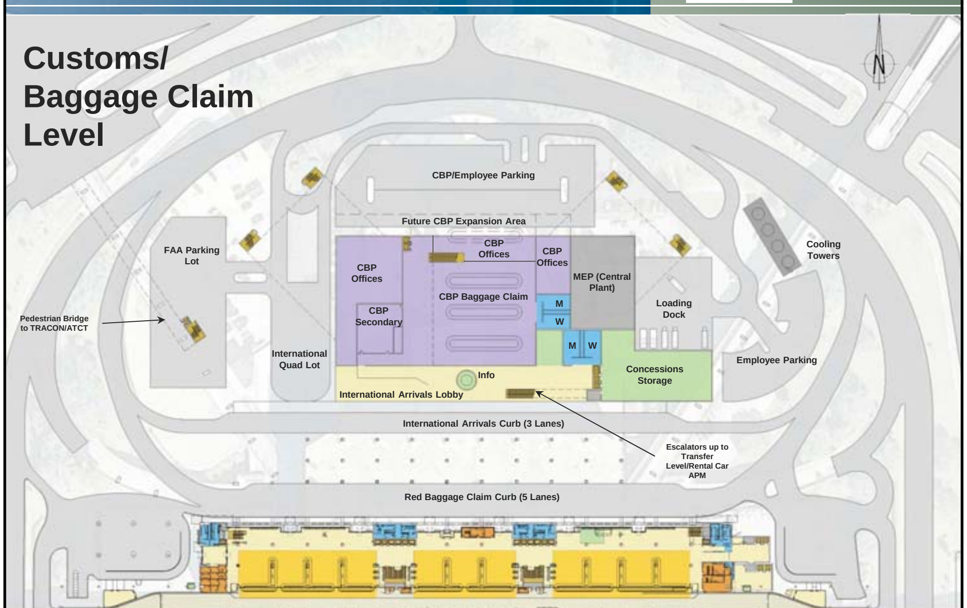
Master Plan Update

Tampa International Airport HNTB

Customs/ Baggage Claim Level



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Tampa International Airport HNTB

Airside Concepts

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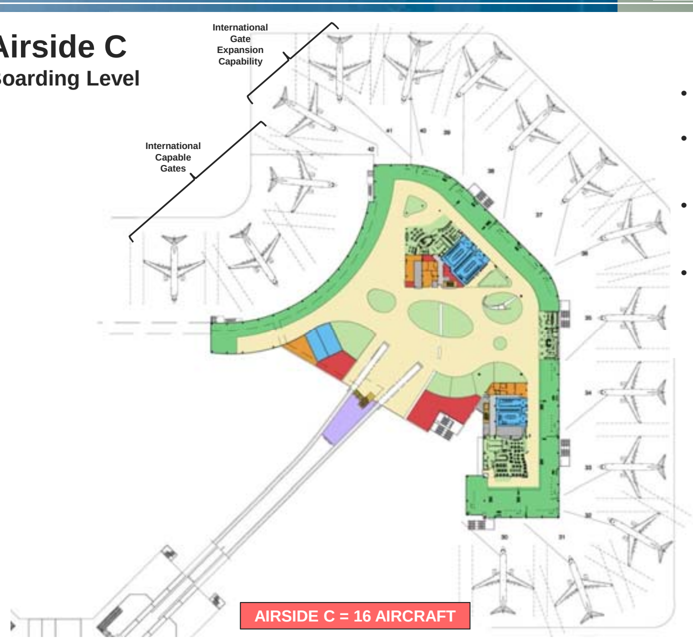
Master Plan Update

Tampa International Airport HNTB

Airside C
Boarding Level



- New APM Station
- Concessions: 58,400 sf (37,600 sf increase)
- 3 International Capable Gates (expandable to 5)
- Additional Baggage Makeup Carousel at Ramp Level

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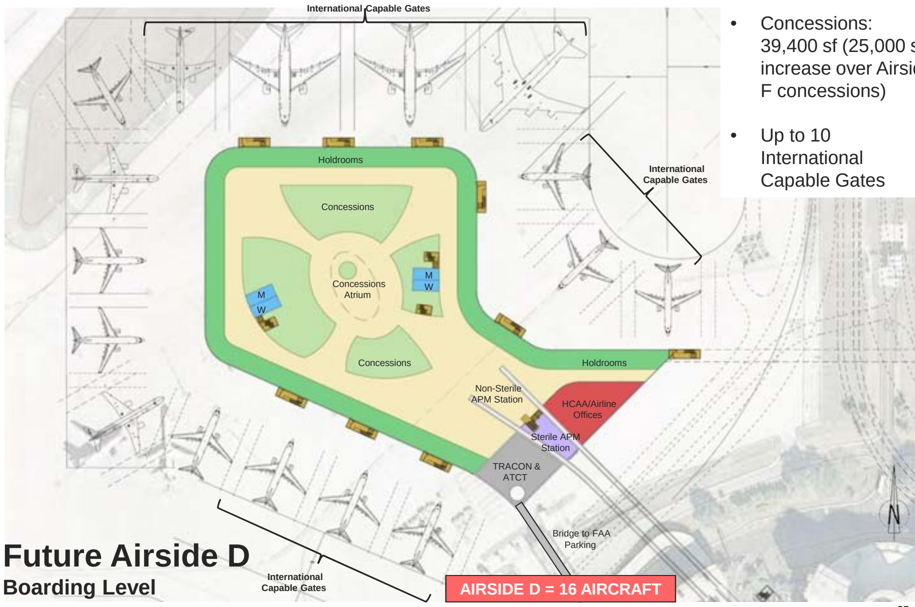
Master Plan Update



- Concessions: 39,400 sf (25,000 sf increase over Airside F concessions)
- Up to 10 International Capable Gates

Future Airside D
Boarding Level

AIRSIDE D = 16 AIRCRAFT

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Shared Use Passenger Processing Systems

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SUPPS Master Plan Summary

Initial Feasibility Report Findings

- SUPPs provides distinct and immediate benefits:
  - Increases capacity of Airside E and F Ticket Counters
  - Gate podiums for Airside A and Airside F
  - To meet identified needs expressed by existing carriers
- Shared / Common use will provide benefits:
  - Relieve ticket counter constraints in ticket lobby
  - Strategically placed common use self-service kiosks
  - Facilitate efficient utilization of airport resources/space

Master Plan Update

Main Terminal Complex Capacity Analysis

- **Existing Main Terminal (2011)**
  - Gates = 59
  - Annual Passengers = 16,732,051
- **2031 Main Terminal**
  - Gates = 61
  - Annual Passengers = 28,700,000
- **2041 Main Terminal**
  - Gates = 76
  - Annual Passengers = 34,700,000
- **Major terminal services are capable of handling passengers through 2041 with:**
  - Proposed improvements
  - Technological advancements
  - Modification of existing facilities

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Tampa International Airport HNTB

Airport Perimeter Parcel Review

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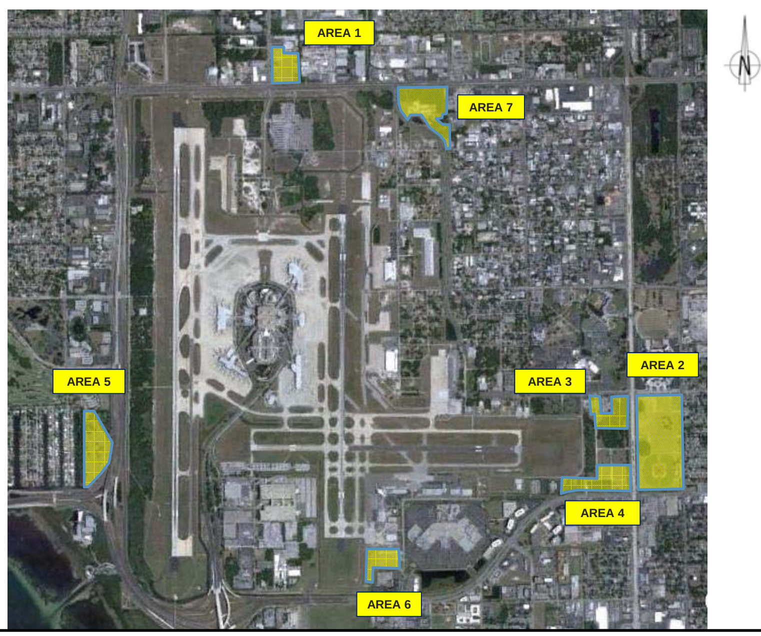
Tampa International Airport HNTB

Perimeter Airport Parcels Review



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Tampa International Airport Master Plan Update

HCAA Board Presentation – Terminal Facilities and Land Use

December 6, 2012

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Tampa International Airport Master Plan Update

FAA Status Briefing

October 15, 2012

HNTB

1

Airport Master Plan Status Briefing

HNTB

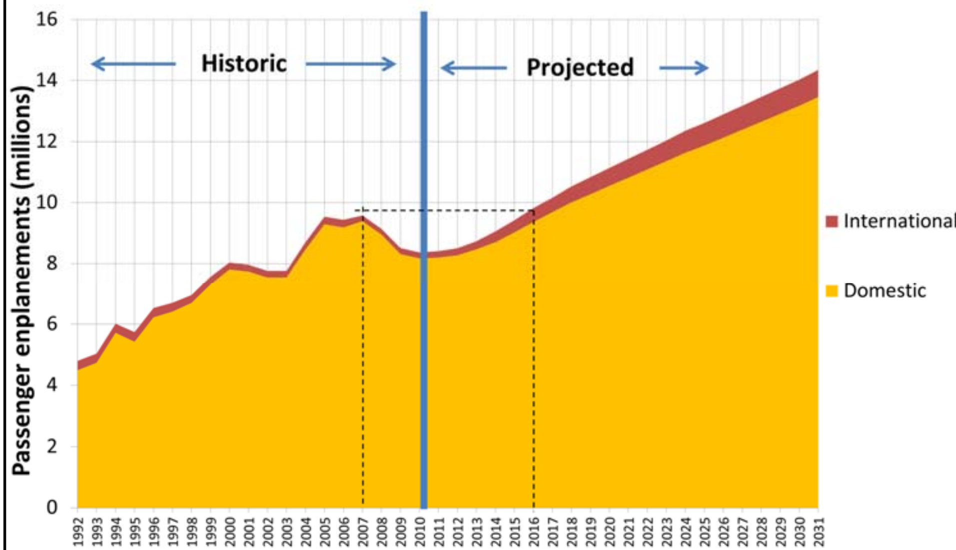
Main Discussion Topics

- Background
- Passenger Forecast
- Parking, Curbside and Roadway Requirements
- Rental Car Facilities
- Automated People Mover System
- South Development Area Concept Planning and Connectivity to Main Terminal
- Eastside Development Area Concept Planning
- Board Discussion and Questions

2

Historic/Projected Passenger Enplanement Trend

HNTB



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Baseline Passenger Projections

HNTB

Tampa International Airport					
Category of Activity	**2011**	**2016**	**2021**	**2026**	**2031**
International Passenger Volume					
Total International Passengers	426,491	924,546	1,241,541	1,433,578	1,778,674
U.S. Domestic: Passenger Volume					
Total Domestic Passengers	16,305,560	18,721,094	21,631,749	24,254,661	26,925,389
Total All Passenger Activity:					
Total All Passengers	16,732,051	19,645,640	22,873,290	25,788,239	28,704,063
Growth Rate for horizon year	0.52%	4.25%	2.70%	2.26%	2.29%

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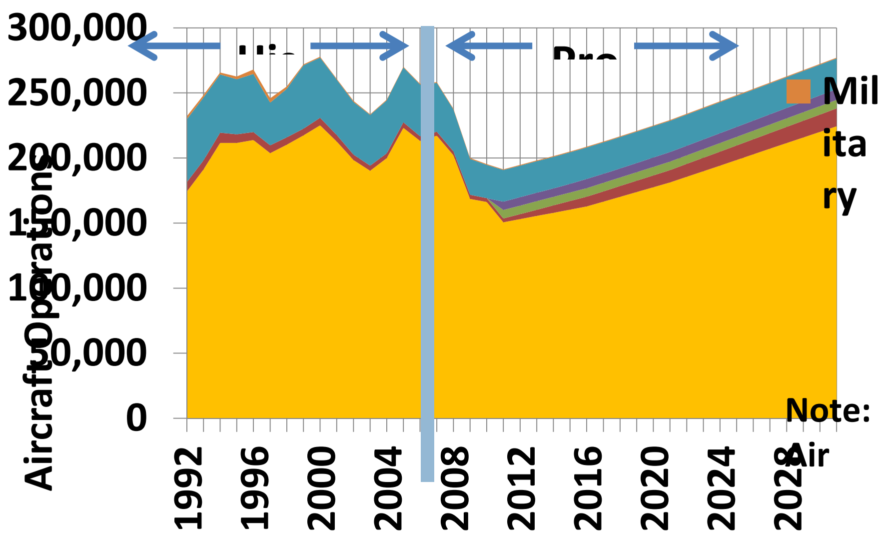
AIRCRAFT OPERATIONS FORECAST

HNTB



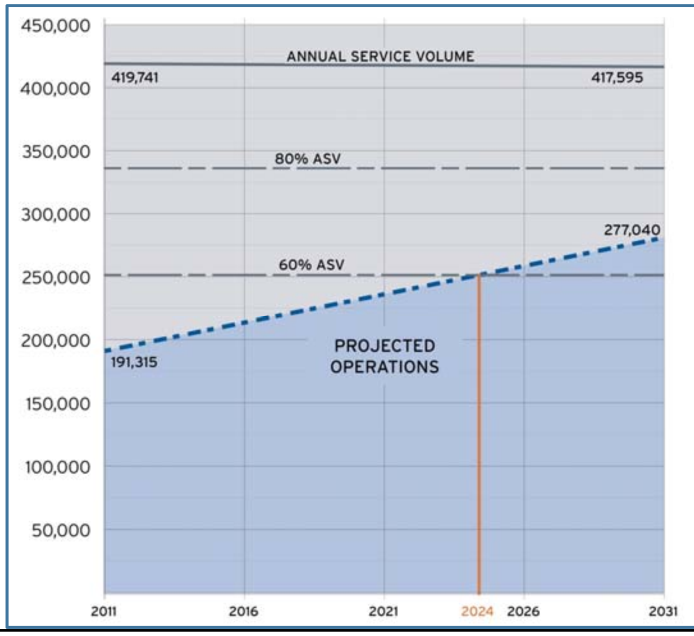
Aircraft Operations Projections

HNTB

Tampa International Airport					
Category of Activity	**2011**	**2016**	**2021**	**2026**	**2031**
International Air Carrier Operations	2,976	7,490	9,508	11,619	13,730
U.S. Domestic Carrier Operations	150,562	162,804	181,209	202,785	224,362
Air Taxi Operations	6,529	6,529	6,529	6,529	6,529
Dedicated Air Cargo Operations	6,340	6,798	7,269	7,793	8,317
General Aviation Operations	24,337	24,283	24,082	23,807	23,531
Military Operations	571	571	571	571	571
Total All Operations Categories	191,315	208,475	229,167	253,104	277,040

Airfield Demand **Capacity**

HNTB



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Main Terminal Facility Needs

HNTB

- Defined terminal facility planning criteria
- Applied Level of Service criteria (Level A-E)
- Areas of concern consist of:
    - Concessions Space throughout the terminal
    - Transfer Level Meeter/Greeter Lobbies
    - Airside C – Security, baggage screening, baggage make-up space
    - Airside F – Airline Ops, Holdrooms, long-term CBP, airline club space

8

Parking Requirements

HNTB

- Total parking space inventory sufficient to meet 28.7 Million Annual Passenger (MAP) estimated to be 2031 demand.
- Short-term parking garage adequate capacity to 28.7 MAP (2031).
- Long Term Parking Garage has a 3,500 space deficiency by 28.7 MAP (2031).
- Economy parking has excess capacity to meet needs through 28.7 MAP (2031).

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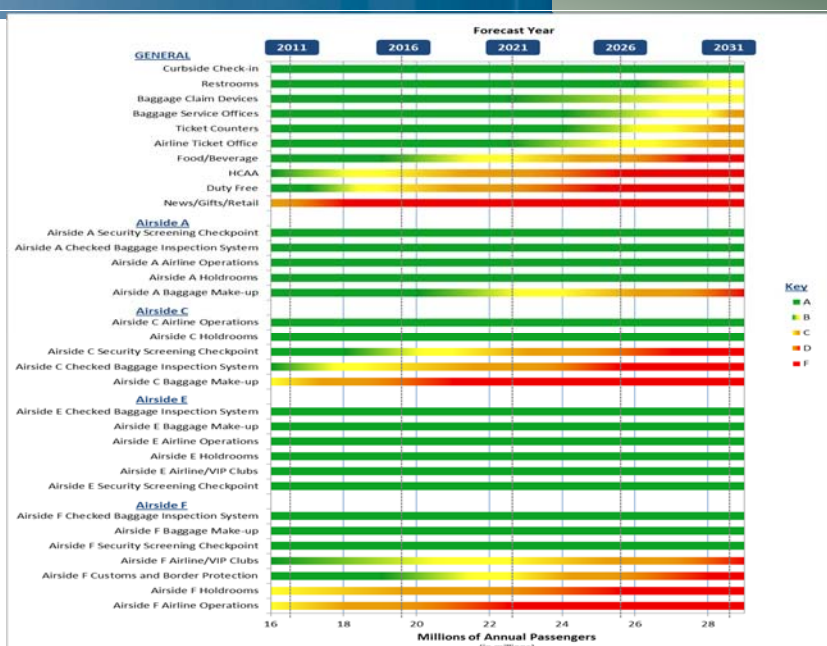
Terminal Facilities Requirements

HNTB



Public Parking Requirements

HNTB

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

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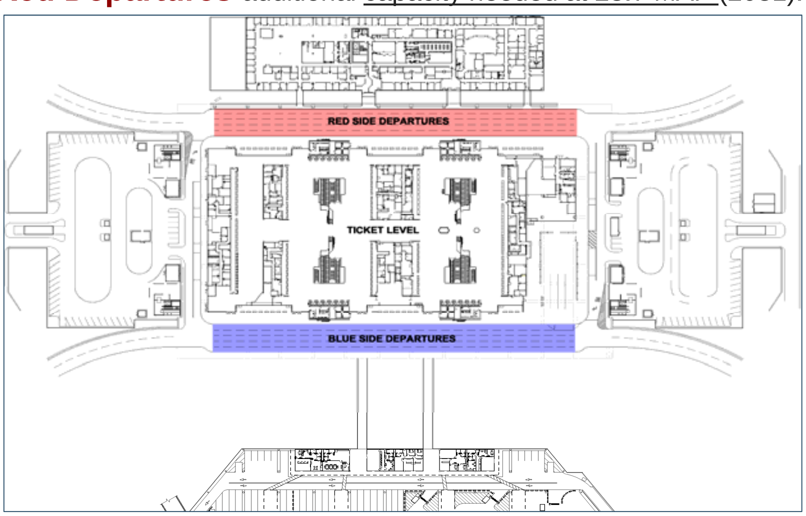
Curbside Requirements

HNTB

Red Departures additional capacity needed at 28.7 MAP (2031).



Blue Departures additional capacity needed at 19.6 MAP (2016).

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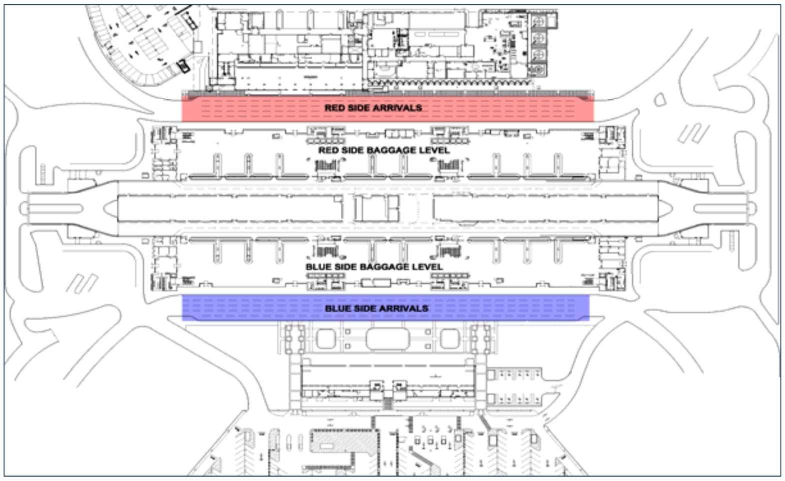
Curbside Requirements

HNTB

Red Arrivals additional capacity needed at current 16.8 MAP (2012).



Blue Arrivals additional capacity needed at current 16.8 MAP (2012).

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Curb Requirements (feet)

HNTB

Curb	Eff. Length	2011	2016	2021	2026	2031
Based on Current Observed Dwell Times						
Blue Dep	500	420	520	670	860	1150
Red Dep	560	280	320	400	490	600
Blue Arr	590	860	920	1140	1380	1670
Red Arr	590	720	830	1000	1180	1350
Based on Adjusted Dwell Times						
Blue Arr	590	450	480	600	730	880
Red Arr	590	255	290	350	410	480

Note: Analysis assumes current four-lane cross-sections.

Levels of service color code: **Green = acceptable level of service**
Yellow = moderate congestion
Orange = significant congestion
Red = massive congestion

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HNTB

Roadway Level of Service Standards

- **LOS A** = Free flow, Motorists have a high level of physical and psychological comfort.
- **LOS B** = Reasonably free flow, Motorist still have a high level of physical and psychological comfort.
- **LOS C** = Stable flow, At LOS C most experienced drivers are comfortable, roads remain safely below but efficiently close to capacity, and posted speed is maintained.
- **LOS D** = Nearing unstable flow, decreasing free-flow levels. Freedom to maneuver in traffic stream is more limited and driver comfort levels decrease.
- **LOS E** = Unstable flow, operations at capacity. Flow becomes irregular, speed varies rapidly and rarely reach the posted limit.
- **LOS F** = Forced or breakdown flow, a road in a constant traffic jam would be at LOS F.

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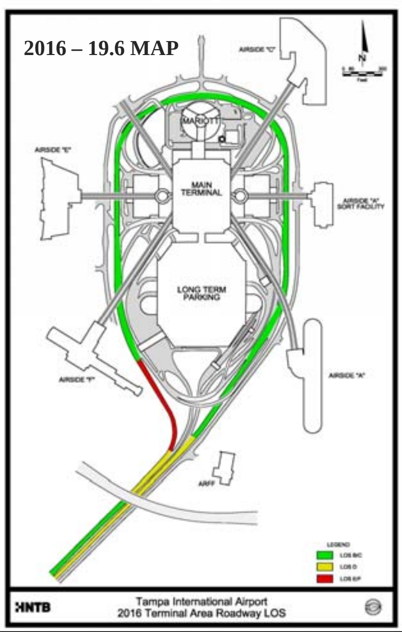
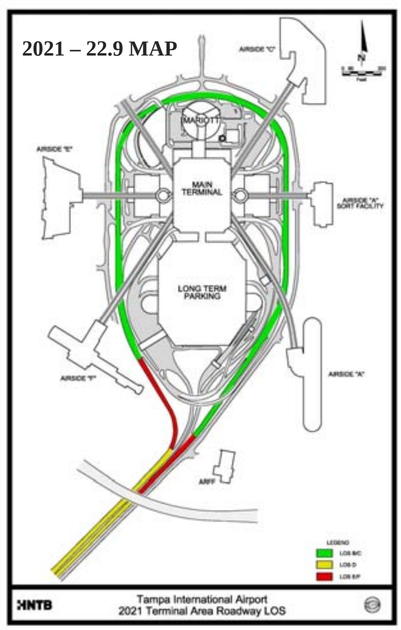
Roadway Requirements - 2016/2021

HNTB





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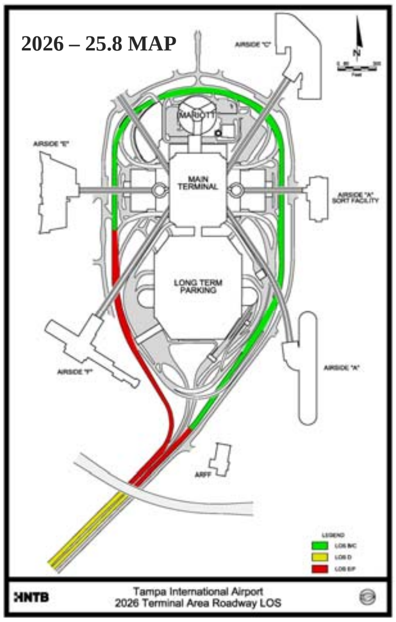
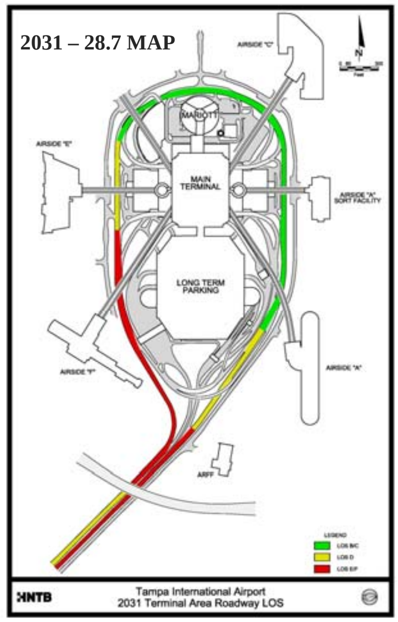
Roadway Requirements - 2026/2031

HNTB





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Rental Car Facilities

HNTB

Present Deficiencies

- Safety concerns/ pedestrian vehicle conflicts.
- Constrains ability to provide Premium Service Availability.
- No Quick Turn Around (QTA) or ready car expansion capability.
- Inefficient QTA with limited queuing, stacking, storage and constrained access.
- Costly to operate & cannot accommodate new entrants.
- Key pick-up stop required due to configuration.
  - Adds time for customers.
  - “Keys Out” for Security Reasons.
- Peak period vehicle waits.
- Split operation for storage, maintenance and service facilities.
- Inefficient vehicle service travel times.
- In-terminal rental car expansion absorbs significant public parking.
- Congestion on roadways and curbside.
- Current facilities cannot meet 2016 demand.

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Rental Car Facilities

HNTB

Tampa International Airport Rental Car Requirements

YEAR	Full Rental Stalls (10x18)	Regular Counter Positions	Premium Counter Positions	QTA Fuel Positions	QTA Wash Bays	QTA Light Maintenance Bays	Maintenance & Storage Area (acres)
Existing Conditions*							
2011	1,900	84	4	114	13	0	53
Future Requirements**							
2016	2,200	60	11	78	12	20	35
2021	2,500	70	13	92	14	24	38
2026	2,900	78	15	100	16	28	42
2031	3,200	90	20	116	18	32	45

***Existing In-Terminal operations with current added south rental car facilities.**
Existing Condit do not account for configuration constraints that impact utilization
****Future Requirements based on efficiency of the consolidation of facilities.**

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Rental Car Facilities

HNTB

Rental Car Alternatives

- **Alternative One - In Terminal Split Operation Similar to Existing**
  - The blue garage first level is at capacity for QTA and rental car ready stalls.
  - Requires taking one additional level in the long term parking garage and converting to rental car just to meet 2016 demand.
  - Long term parking is constrained without conversion to rental car use.
  - Moving vehicles to and from the south service area and from QTA to the red garage further congests roadways, is inefficient and increases cost.
- **Alternative Two - In Terminal Consolidated Facility on Blue Side**
  - Rental car counter and ready stalls require taking two floors of short term parking garage.
  - Significantly impacts short term parking capacity.
  - Requires extensive and costly expansion of the short term garage to replace lost parking and access.
  - Not a viable option due to parking requirements and construction complexity.

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Rental Car Requirements

HNTB

Rental Car Alternatives (cont.)

- **Alternative Three – North Terminal Area Facility**
  - Impacts only viable location for future significant terminal expansion.
  - Accessibility to north area is less desirable and less direct.
  - Requires relocation of other facilities – employee parking and or ARFF training facility.
- **Alternative Four – Economy Garage Conversion**
  - Garage not configured for rental car operations, extensive retro-fitting required.
  - Long term parking demand will generate need for full-time use of garage.
  - Garage presently needed for peak periods.
  - Development of new QTA facilities required.

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Rental Car Facilities

HNTB

Rental Car Alternatives (cont.)

- Alternative Five – Consolidated Rental Car Facility – South Development Area
  - All rental car activities consolidated in a specifically designed facility.
  - Meets long-term demand and is expandable.
  - Increases capacity of curbside.
  - Significantly enhances efficiency of rental operations.
  - Significantly reduces terminal roadway congestion.
  - Returns approximately 1,200 parking spaces in Long Term Garage.
  - Connection via Automated People.

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Automated People Mover (APM) –

HNTB

The APM will ensure efficient connectivity to the Main Terminal, focusing on providing ease of passenger movements, a high level of customer service and a means of interfacing with regional transit

- Bringing APM into terminal building analyzed, but not viable.
- Main Terminal Station adjacent to east side of building.
- Alignment avoids impacts to other APM's and roadways.
- Maximum grade is 4%.
- Sized to meet 28.7 MAP demand and is expandable.
- Enhances access to Economy Parking, future CONRAC and future uses in South Development Area.
- Accommodates future northerly extension of APM.

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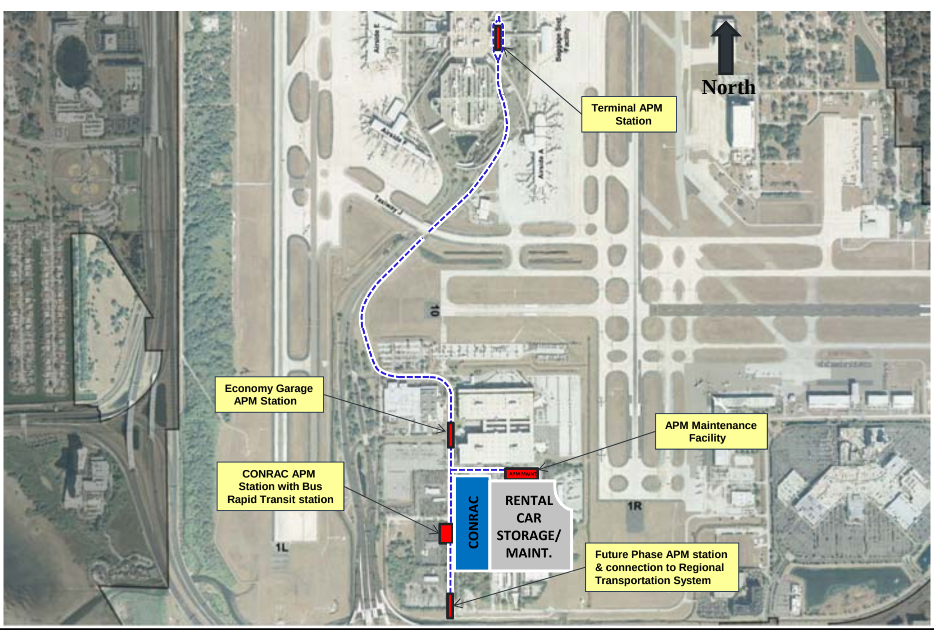
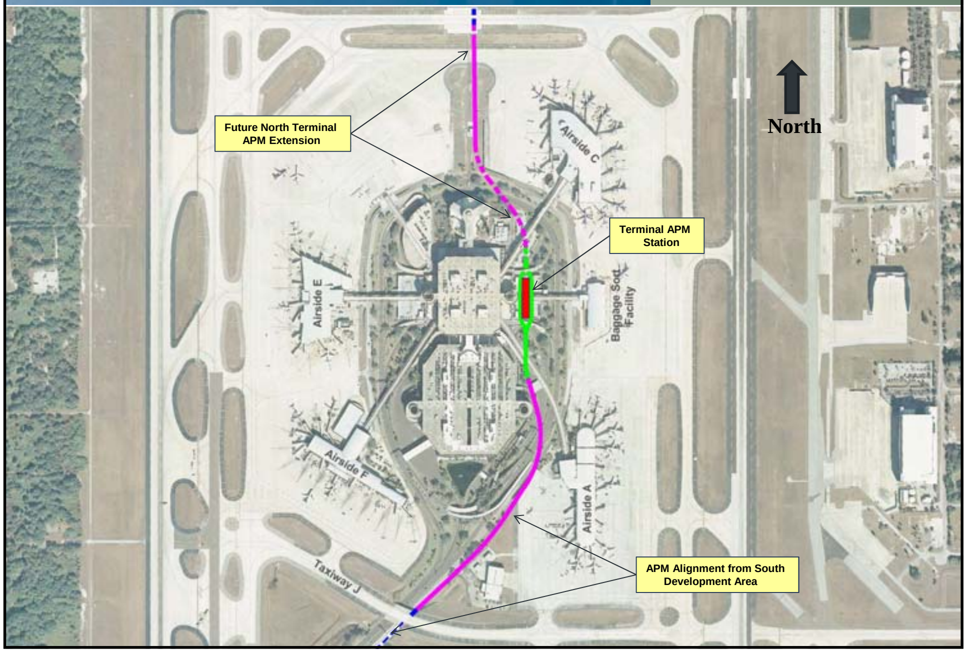
APM Alignment

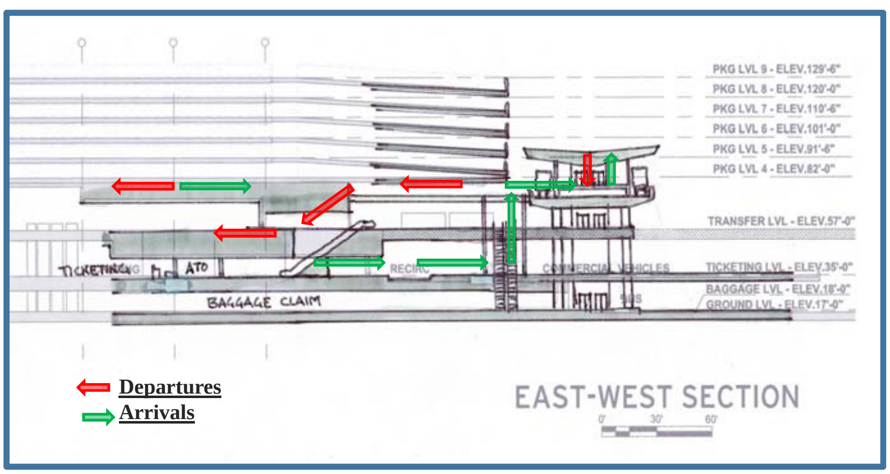
HNTB



Terminal Vicinity APM Alignment



Terminal APM Station



Support Facility Requirements

Existing		Existing Available	2016	2021	2031
All Cargo					
	All Cargo Building	72,500 SF	Meets Demand	Meets Demand	2,200 SF Req.
	All Cargo Apron	7 ADG-IV	Meets Demand	Meets Demand	Meets Demand
Belly Haul Cargo					
	Belly Cargo Building	56,805 SF	Meets Demand	Meets Demand	Meets Demand
	Belly Cargo Apron	175,000 SF	Meets Demand	Meets Demand	Meets Demand
GSE Storage/Maintenance Area					
	GSE Building	36,000 SF	Meets Demand	Meets Demand	Meets Demand
	GSE Apron	66,000 SF	2,500 SF Req.	Meets Demand	Meets Demand
MRO Facilities					
	MRO Hangar/Admin	273,000 SF	5,000 SF Admin	Meets Demand	Meets Demand
	MRO Apron	730,000 SF	Meets Demand	Meets Demand	Meets Demand
	MRO POV Parking	450 Spaces	150 Spaces	Meets Demand	Meets Demand

Support Facility Requirements (Cont'd)

Existing		Existing Available	2016	2021	2031
Airport Maintenance					
	Vehicle Storage Facilities	15,500 SF	18,400 SF Req.	Meets Demand	Meets Demand
RON Parking					
	Apron Positions	22 Positions	Meets Demand	Meets Demand	Meets Demand
ARFF Facilities					
	Central ARFF Station	26,000 SF	Meets Demand	Meets Demand	Meets Demand
	ARFF Training Facility	Mock Fuselage	Meets Demand	Meets Demand	Facility Relocation
Airport Fuel Farm					
	Fuel Storage Tanks	3,486,000 Gallons	Meets Demand	Meets Demand	Meets Demand

Support Facility Requirements (Cont'd)

Existing		Existing Available	2016	2021	2031
Airport Security/Police					
	**Training Facilities**	**3,600 SF + Range**	**+7,500 SF Req.**	**Meets Demand**	**Meets Demand**
FBO Facilities					
	**Hangar/Office Space**	**313,125 SF**	**Meets Demand**	**Meets Demand**	**Meets Demand**
	Transient/Based Apron	**892,000 SF**	**Meets Demand**	**Meets Demand**	**Meets Demand**
	POV parking	**499 Spaces**	**Meets Demand**	**Meets Demand**	**Meets Demand**
	Jet A Fuel Storage	**100,000 Gallons**	**Meets Demand**	**Meets Demand**	**Meets Demand**
	AvGas Fuel Storage	**32,000 Gallons**	**Meets Demand**	**Meets Demand**	**Meets Demand**

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South Development Area Planning

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South Development Area

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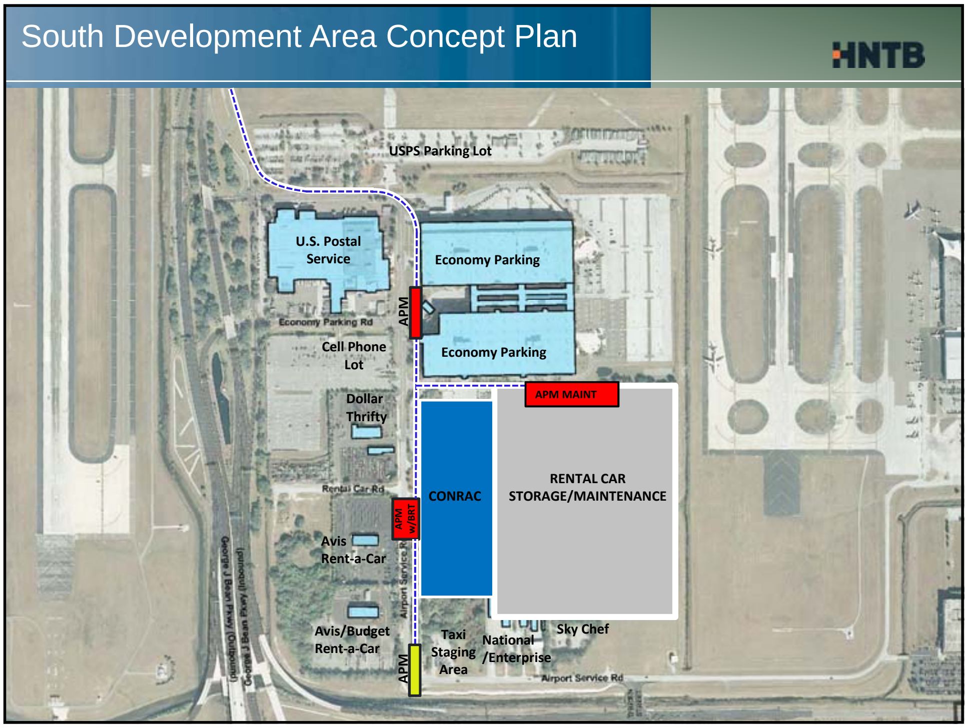
Targeted Uses and Guiding Principles

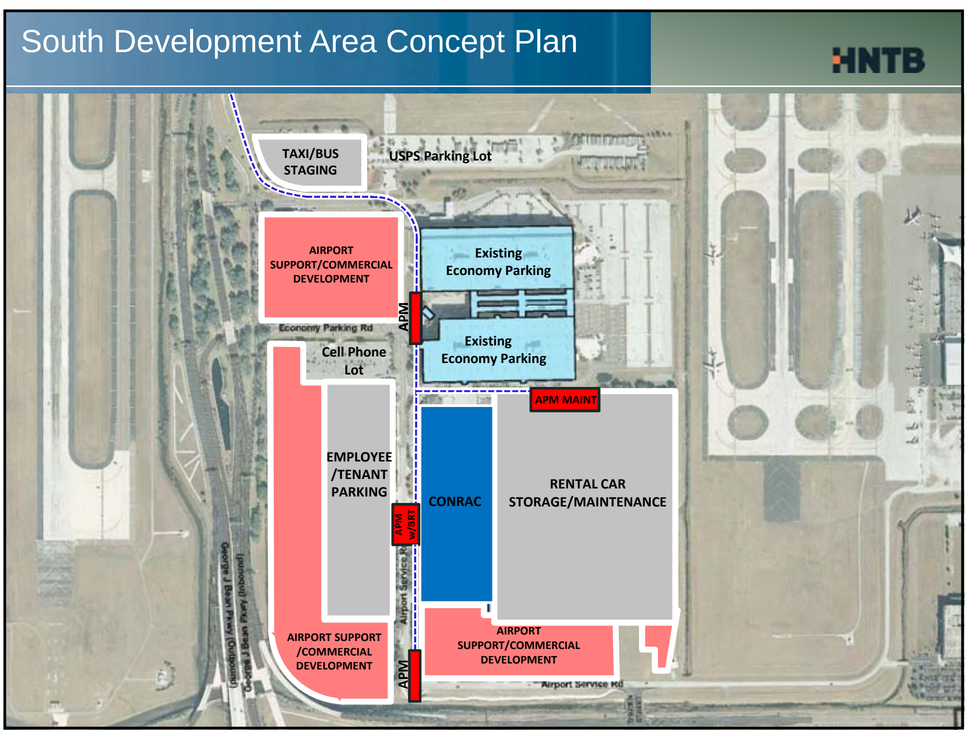
- Focus on Terminal Support Related Development as Priority!
- Enhance long-term viability of the Main Terminal Complex.
- Provide services and amenities for airport tenants and users.
- Regional accessibility to the airport thru South Development Area.
- Improve Intra-Site and Inter-Site accessibility.
- Economic value for the community and diversifies revenues to support airport operations.

Potential Uses and Middle-of-the-market Metrics

HNTB

USE	ACREAGE	TYPICAL BUILDING SQ. FT.	FLOOR AREA RATIO	AIRSIDE/ RAMP ACCESS	TYPICAL EMPLOYMENT RATES
Just in Time/ Fulfillment Center	15 - 30	200,000-350,000	.25-.30	Yes	500-550
MRO – commercial	25 - 30	250,000-350,000	.30-.35	Yes	450-500
MRO – regional/business jet	10 - 15	75,000-125,000	.15-.20	Yes	150-200
MRO – components	2 - 5	30,000-80,000	.30-.80	No	100-150


South Development Area Concept Plan
HNTB
USPS Parking Lot
U.S. Postal Service
Economy Parking
APM
Economy Parking Rd
Cell Phone Lot
Economy Parking
APM MAINT
Dollar Thrifty
CONRAC
RENTAL CAR STORAGE/MAINTENANCE
Rental Car Rd
APM w/BRT
Avis Rent-a-Car
Airport Service Rd
George J Bean Pkwy (Outbound)
George J Bean Pkwy (Inbound)
Avis/Budget Rent-a-Car
Taxi Staging Area
National /Enterprise
Sky Chef
APM
Airport Service Rd


South Development Area Concept Plan
HNTB
TAXI/BUS STAGING
USPS Parking Lot
AIRPORT SUPPORT/COMMERCIAL DEVELOPMENT
Existing Economy Parking
APM
Economy Parking Rd
Cell Phone Lot
Existing Economy Parking
APM MAINT
EMPLOYEE /TENANT PARKING
CONRAC
RENTAL CAR STORAGE/MAINTENANCE
APM w/BRT
Airport Service Rd
George J Bean Pkwy (Outbound)
George J Bean Pkwy (Inbound)
AIRPORT SUPPORT /COMMERCIAL DEVELOPMENT
AIRPORT SUPPORT/COMMERCIAL DEVELOPMENT
APM
Airport Service Rd

East Development Area Planning

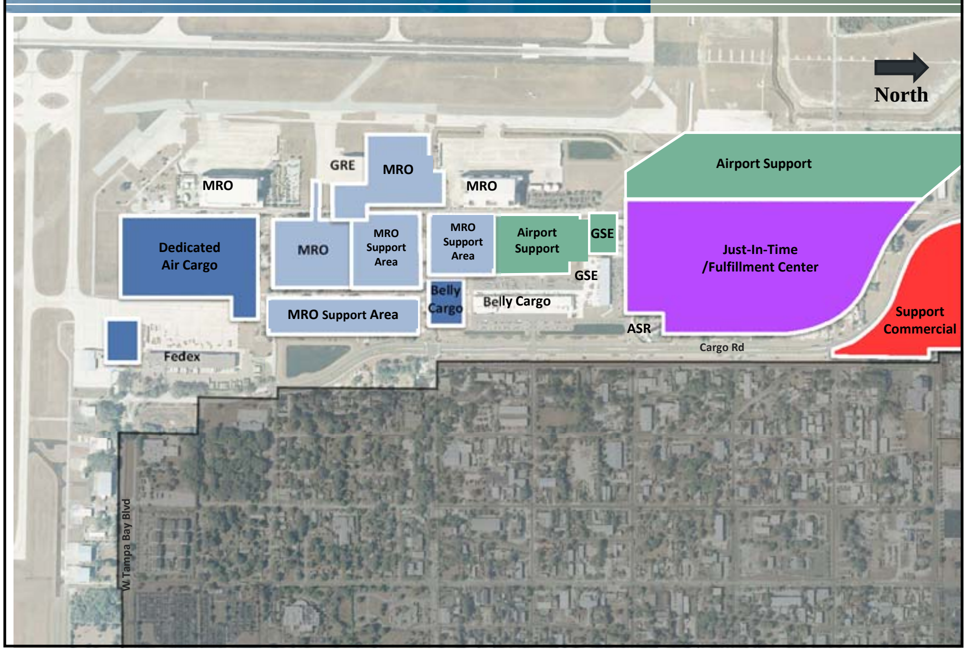
Business and Market Principles

Targeted Markets and Guiding Principles

- Focus on Aviation Related Development!
- Benchmarking process defined uses.
- Identified Market MRO center of excellence concept.
- Provide for future Air Cargo demand and possible induced demand.
- Distribution/Just-in-Time fulfillment center use, (direct benefits to regional economy and workforce).
- Generate economic value to adjacent land.

East Side Development Area Concept

East Side Development Area Concept



Conclusion

HNTB

- **Project Meeting Schedule**:
  - 2nd public workshop and stakeholder meetings: October 25, 2012

    St. Petersburg Marriott Clearwater Hotel
    12600 Roosevelt Boulevard North in St. Petersburg
  - Briefing to HCAA Board: December 6, 2012
  - Final public workshop and stakeholder meetings: December 12, 2012 Meeting Location TBD
  - Complete master plan: February 2013
- **Questions**
- **Comments**

HNTB

Tampa International Airport Master Plan Update

HCAA Board Briefing

October 4, 2012

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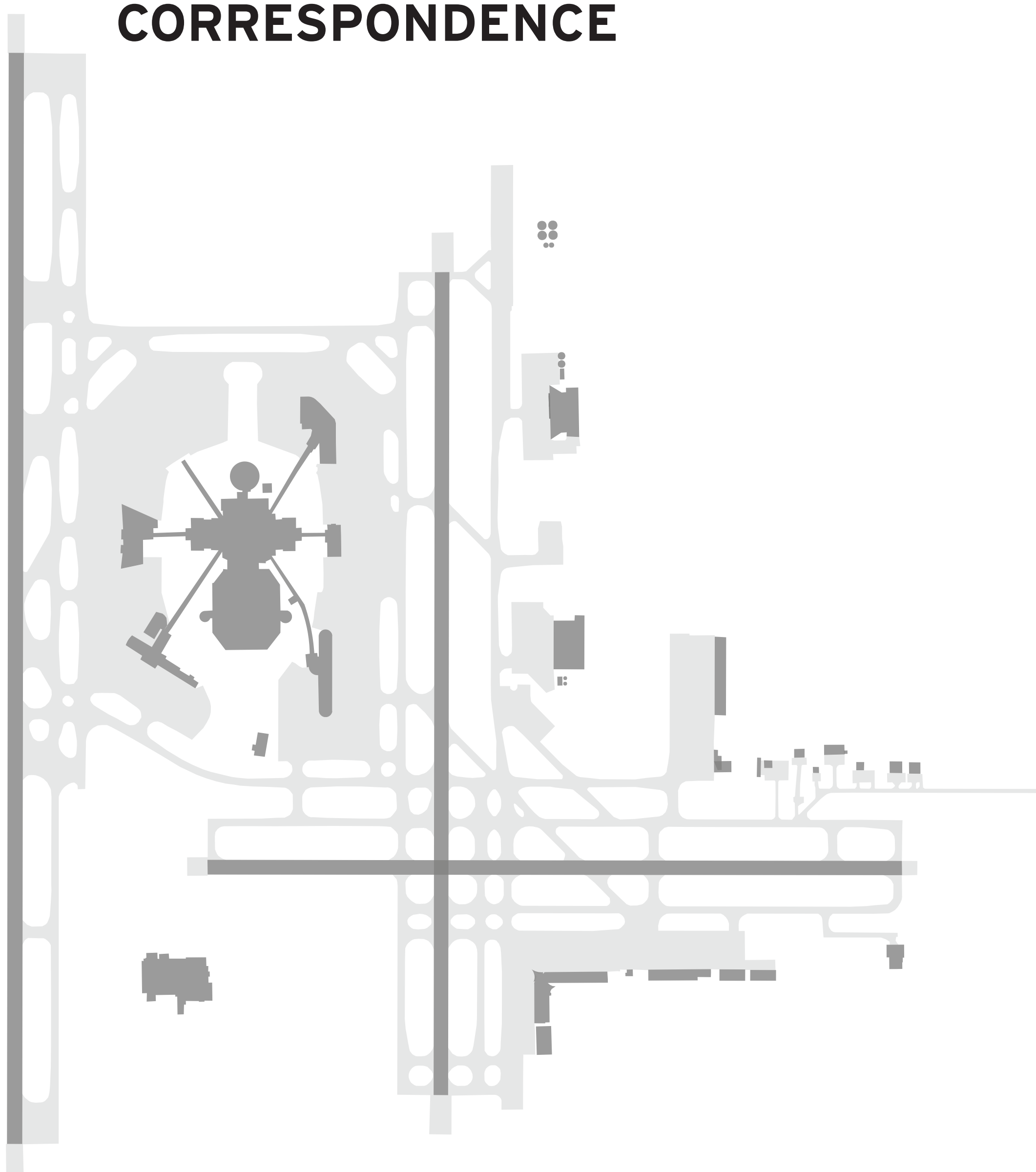
APPENDIX N - FAA CORRESPONDENCE



U.S. Department
of Transportation
**Federal Aviation
Administration**

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2012 OCT -9 A 9 53

HCAA

ORLANDO AIRPORTS DISTRICT OFFICE
5950 Hazeltine National Dr., Suite 400
Orlando, Florida 32822-5003
Phone: (407) 812-6331 Fax: (407) 812-6978

October 3, 2012

Mr. Jeff Siddle
Director of Planning and Development
Tampa International Airport
Hillsborough County Aviation Authority
P.O. Box 22287
Tampa, Florida 33622

Dear Mr. Siddle,

RE: Tampa International Airport (TPA;) Tampa, Florida
RPZ Land Use and Automated People Mover Proposal
Airport Master Plan Update

This responds to your September 5, 2012 letter about the Runway Protection Zones (RPZs) at Tampa International Airport.

As discussed in our August 8, 2012 meeting, the Federal Aviation Administration (FAA) is willing to review and consider your proposal for an Automated People Mover (APM) alignment in the RPZ of Runway 10. However, in order to do so, we would like for you to explore ways to minimize the impact of this incompatible land use. After reviewing your letter, we do not feel the alternatives presented consider any modifications to your plan for minimizing incompatible land use impacts.

In an effort to strengthen your documentation, we offer the following comments:

Day #

- When discussing the risks associated with this incompatible land use, please detail how many people, on average, will be exposed to this new risk. This information should include how many people (in the APM) for how long (minutes) per day (frequency).

New Data

- In addition to discussing the air carrier jet operations served by Runway 10-28, please provide information on the type and frequency of air carrier turboprop and general aviation aircraft using this runway.

SAAB 340B

- RPZs enhance the protection of people and property on the ground in the event an aircraft lands or crashes beyond the runway end. In this context, include a discussion on how may operations land on Runway 10 and depart on Runway 28, giving a better assessment of the risks associated with people and property beyond the end of Runway 10. new data

- We believe the sponsor should at least consider the viability of displacing or relocating the threshold of Runway 10. Could Runway 10-28 be shortened (by either relocating the threshold or displacing the threshold and using declared distances) with minimal impacts to users? Further, would it be appropriate to reduce the Airport Reference Code for this runway, thereby reducing the size of the RPZ? addition

- For Alternative II, the air carrier aircraft in question appear to be the Embraer 120 and the Beech 1900. Both the EMB 120 and the Beech 1900 are B-II aircraft. The all-weather wind rose on the ALP indicates that for A-II/B-II aircraft, weather conditions are suitable for this aircraft 99.1% of the time. What are the runway length requirements of these aircraft, and how many operations would be impacted if the threshold of Runway 10 were relocated? Also are there other users, such as corporate jets, that would require additional runway lengths than these commuter-type aircraft?

- On the current ALP, Runway 10 depicts an RPZ for approaches that are "visual and not lower than 1-mile, approach categories C & D." This RPZ is 1,700' long. If the sponsor considered downgrading the runway to Category A/B, and to "visual and not lower than 1-mile", the RPZ length would decrease the length to 1,000 feet, reducing the required displacement. To determine the feasibility of this, the sponsor should investigate the true critical aircraft of this runway, and how many category C and D aircraft actually use this runway. No Not changing Cat.

- Would it be possible to control the APM movement through the RPZ though the use of a light system or by other direction from the Airport Traffic Control Tower or other ground control means? The possibility should at least be investigated. Can't Do

- If available, please detail locations of any proposed utility stations (electrical switch cabinets, junction boxes, power substations, etc.) that may be needed for the APM. Please be advised these also would be considered incompatible land uses and are not allowed within the RPZ. Too early to tell

Please consider the above comments and revise your proposal for our review. In addition to the above, we have enclosed the FAA's September 27, 2012 "Interim Guidance on Land Uses Within a Runway Protection Zone" for your use in preparation for your next submittal. Once the document appears to have all of the necessary documentation, we will forward it to our

Washington, D.C. Headquarters for their review. If you have any questions, please feel free to contact me at (407) 812-6331, ext. 122.

Sincerely,

Rebecca R. Henry

Rebecca R. Henry
Planning Specialist

Enclosure

Federal Aviation Administration

Memorandum

Date: SEP 27 2012

To: Regional Airports Division Managers
610 Branch Managers
620 Branch Managers
ADO Managers

From: Benito De Leon, Director
Office of Airport Planning and Programming (APP-1)

Michael J. O'Donnell, Director
Office of Airport Safety and Standards (AAS-1)

Subject: Interim Guidance on Land Uses Within a Runway Protection Zone

Background

The FAA Office of Airports (ARP) has identified the need to clarify our policy on land uses within the Runway Protection Zone (RPZ). This memorandum presents interim policy guidance on compatible land uses within Runway Protection Zones (RPZ) to address recurrent questions about what constitutes a compatible land use and how to evaluate proposed land uses that would reside in an RPZ. While Advisory Circular 150/5300-Change 17(Airport Design) notes that "it is desirable to clear all objects from the RPZ," it also acknowledges that "some uses are permitted" with conditions and other "land uses are prohibited."

RPZ land use compatibility also is often complicated by ownership considerations. Airport owner control over the RPZ land is emphasized to achieve the desired protection of people and property on the ground. Although the FAA recognizes that in certain situations the airport sponsor may not fully control land within the RPZ, the FAA expects airport sponsors to take all possible measures to protect against and remove or mitigate incompatible land uses.

ARP is developing a new guidance document for the Regional Office (RO) and Airport District Office (ADO) staff that clarifies our policy regarding land uses in the RPZ. This new guidance document will outline a comprehensive review process for existing and proposed land uses within an RPZ and is slated for publication in 2013. We also intend to incorporate RPZ land use considerations into the ongoing update to the Land Use Compatibility Advisory Circular (AC) which is slated for publication in 2014.

This memorandum outlines interim guidance for ARP RO and ADO staff to follow until the comprehensive RPZ land use guidance is published.

Interim Guidance

New or Modified Land Uses in the RPZ

Regional and ADO staff must consult with the National Airport Planning and Environmental Division, APP-400 (who will coordinate with the Airport Engineering Division, AAS-100), when any of the land uses described in **Table 1** would enter the limits of the RPZ as the result of:

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

Table 1: Land Uses Requiring Coordination with APP-400
• Buildings and structures (Examples include, but are not limited to: residences, schools, churches, hospitals or other medical care facilities, commercial/industrial buildings, etc.) • Recreational land use (Examples include, but are not limited to: golf courses, sports fields, amusement parks, other places of public assembly, etc.) • Transportation facilities. Examples include, but are not limited to: o Rail facilities – light or heavy, passenger or freight o Public roads/highways o Vehicular parking facilities • Fuel storage facilities (above and below ground) • Hazardous material storage (above and below ground) • Wastewater treatment facilities • Above-ground utility infrastructure (i.e. electrical substations), including any type of solar panel installations.

Land uses that may create a safety hazard to air transportation resulting from wildlife hazard attractants such as retention ponds or municipal landfills are not subject to RPZ standards since these types of land uses do not create a hazard to people and property on the ground. Rather, these land uses are controlled by other FAA policies and standards. In accordance with the relevant Advisory Circulars, the Region/ADO must coordinate land use proposals that create wildlife hazards with AAS-300, regardless of whether the proposed land use occurs within the limits of an RPZ.

Alternatives Analysis

Prior to contacting APP-400, the RO and ADO staff must work with the airport sponsor to identify and document the full range of alternatives that could:

1. Avoid introducing the land use issue within the RPZ
2. Minimize the impact of the land use in the RPZ (i.e., routing a new roadway through the controlled activity area, move farther away from the runway end, etc.)

3. Mitigate risk to people and property on the ground (i.e., tunneling, depressing and/or protecting a roadway through the RPZ, implement operational measures to mitigate any risks, etc.)

Documentation of the alternatives should include:

- A description of each alternative including a narrative discussion and exhibits or figures depicting the alternative
- Full cost estimates associated with each alternative regardless of potential funding sources.
- A practicability assessment based on the feasibility of the alternative in terms of cost, constructability and other factors.
- Identification of the preferred alternative that would meet the project purpose and need while minimizing risk associated with the location within the RPZ.
- Identification of all Federal, State and local transportation agencies involved or interested in the issue.
- Analysis of the specific portion(s) and percentages of the RPZ affected, drawing a clear distinction between the Central Portion of the RPZ versus the Controlled Activity Area, and clearly delineating the distance from the runway end and runway landing threshold.
- Analysis of (and issues affecting) sponsor control of the land within the RPZ.
- Any other relevant factors for HQ consideration.

APP-400 will consult with AAS-100 when reviewing the project documents provided by the RO/ADO. APP-400 and AAS-100 will work with the Region/ADO to make a joint determination regarding Airport Layout Plan (ALP) approval after considering the proposed land use, location within the RPZ and documentation of the alternatives analysis.

In addition, APP-400 and AAS-100 will work with the Region/ADO to craft language for inclusion in the airspace determination letter regarding any violations to ensure that all stakeholders (including tenants, operators, and insurers) are fully apprised of the issues and potential risks and liabilities associated with permitting such facilities within the RPZ.

Existing Land Uses in the RPZ

This interim policy only addresses the introduction of new or modified land uses to an RPZ and proposed changes to the RPZ size or location. Therefore, at this time, the RO and ADO staff shall continue to work with sponsors to remove or mitigate the risk of any existing incompatible land uses in the RPZ as practical.

For additional information or questions regarding this interim guidance, please contact either Ralph Thompson, APP-400, at ralph.thompson@faa.gov or (202) 267-8772 or Danielle Rinsler, APP-401, at danielle.rinsler@faa.gov or (202) 267-8784.

Prepared by:

HNTB Corporation

- C&S Companies
- Cost Management Inc.
- Curtis Transportation Consulting
- Lea+Elliott
- TransSystems
- Quest Corporation of America
- TransSolutions