NORTHWEST FLORIDA
BEACHES INTERNATIONAL AIRPORT

MASTER PLAN UPDATE

Working Paper #3 - Facility Requirements

JUNE 2020
DRAFT

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CHA

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4 FACILITY REQUIREMENTS

To ensure that Northwest Florida Beaches International Airport (ECP) is capable of supporting the forecasted increase in aviation activity, evaluations must be conducted to ensure that the recommendations of this Master Plan will adequately accommodate existing and anticipated activity levels. The purpose of this chapter is to identify the Airport's facility development needs over the 20-year planning horizon. Using the preferred aviation activity forecast presented in **Chapter 3**, the airport facility needs were determined, which will form the basis of the development concepts discussed in **Chapter 5**.

The airport demand, capacity, design standards, and the overall facility requirements at ECP were evaluated using guidance contained in several FAA publications, including:

- Advisory Circular (AC) 150/5060-5, *Airport Capacity and Delay*
- AC 150/5300-13A, *Airport Design*
- AC 150/5325-4B, *Runway Length Requirements for Airport Design*
- AC 150/5360-13A, *Airport Terminal Planning*
- Title 14 Code of Federal Regulations (CFR) Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*
- Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*

During the evaluation, additional publications served strictly as technical references (thus not substituting FAA policy), including:

- Airport Cooperative Research Program (ACRP), *Report 25: Airport Passenger Terminal Planning and Design*
- ACRP, *Report 130: Guidebook for Airport Terminal Restroom Planning and Design*
- ACRP, *Report 54*: *Resource Manual for In-Terminal Concessions 2011*
- International Air Transportation Association (IATA), *Airport Development Reference Manual (ADRM), 10th Edition*

The following elements of the Airport are addressed in this assessment:

- Airfield Capacity Requirements
- Airfield Facility Requirements
- Crosswind Runway Analysis
- Passenger Terminal Facility Building and Gate Requirements
- Support Facility Requirements (General Aviation, Cargo, aircraft fueling etc.)
- Surface Transportation & Parking Requirements

4.1 PLANNING FACTORS

Before the facility requirements for ECP could be determined, it was necessary to establish the Planning Activity Levels (PALs) based on the preferred forecasts from **Chapter 3**, the design aircraft family, and the appropriate airport, runway, and taxiway classifications that are associated with FAA design standards. These parameters are discussed in the following subsections.

4.1.1 Planning Activity Levels (PALs)

Since aviation activity is highly susceptible to fluctuations in economic conditions and industry trends, identifying recommended facility improvements based solely on specific years can be a challenge. The timeline associated with the preferred forecast is representative of the anticipated timing of demand (in 5-year increments – 2024 2029, 2034, and 2039). The actual timing of demand can vary; therefore, Planning Activity Levels (PALs), rather than calendar years, were established to identify infrastructure improvement trigger points based on activity levels to accommodate future demand. Disassociating the predetermined timeline from the recommended facility improvements provides the Panama City–Bay County Airport and Industrial District (the “Airport District”) with the flexibility to advance or slow the rate of development in response to actualized demand. If the preferred forecast proves conservative (i.e. the high growth forecast scenarios is realized because of successful airport marketing and route development initiatives, etc.), some recommended improvements may be advanced in schedule. In contrast, if demand occurs at a rate that is slower than the preferred forecast projects, the improvements should be deferred accordingly. As actual activity levels approach a PAL and trigger the need for a facility improvement, sufficient lead time for planning, design and construction must be also given to ensure that the facilities are available for the impending demand.

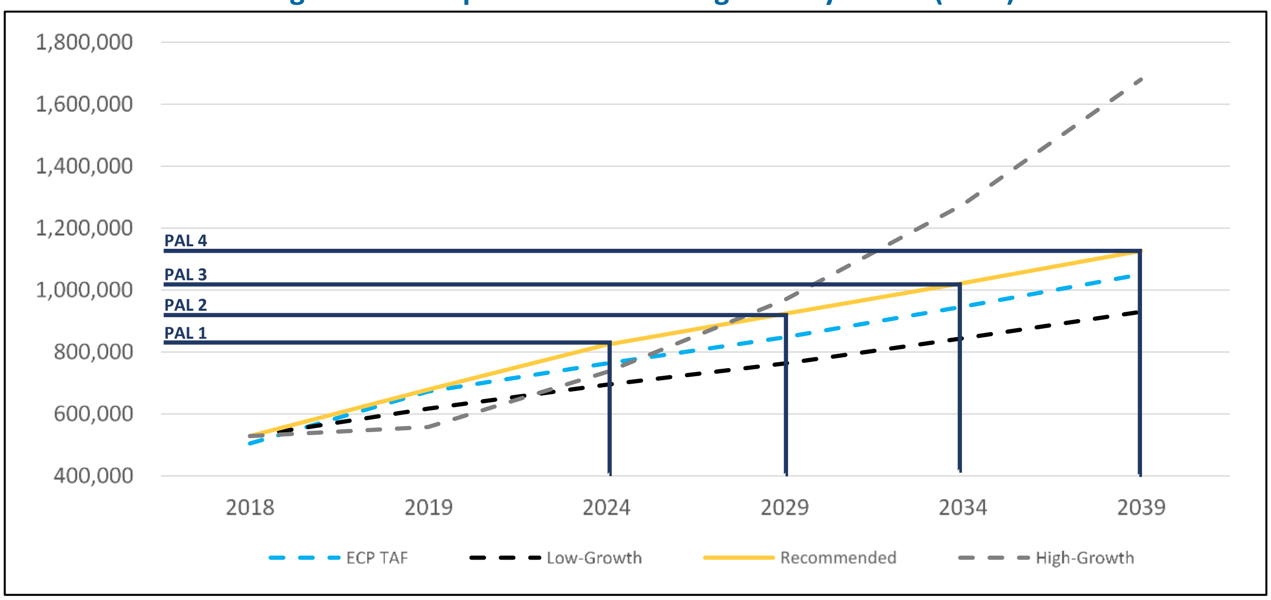
Table 4-1 identifies the PALs used for this Study, which correspond with the preferred aviation activity forecast for the base year of 2019 and the planning horizon years 2024, 2029, 2034, and 2039. **Figure 4-1** presents a graphical representation of how the PALs for passengers were established and relates them to the preferred and alternative forecast scenarios (discussed in **Chapter 3**). The graphic helps to depict the relative time range during which each PAL could be reached if one of these other forecast scenarios are actualized. For example, facilities capable of accommodating PAL 2 demands (i.e. ± 923,351 annual enplanements) could be needed as early as 2029, if the recommended-growth forecast scenario is experienced or as late as 2039 if the low-growth scenario is realized.

Table 4-1 – Planning Activity Levels (PALs)

Passenger Activity							
Enplanements		**2018**	**Base**	**PAL 1**	**PAL 2**	**PAL 3**	**PAL 4**
Annual		528,431	679,100	823,553	923,351	1,022,076	1,126,637
Peak Month		63,893	82,111	99,576	111,643	123,580	136,223
Average Day		2,061	2,649	3,212	3,601	3,986	4,394
Peak Hour*		644	829	1,004	1,126	1,246	1,374
Operations							
Category	**Activity**	**2018**	**Base**	**PAL 1**	**PAL 2**	**PAL 3**	**PAL 4**
Commercial Aviation	Annual	10,871	14,141	17,214	19,014	20,744	22,532
	Peak Month	1,221	1,588	1,933	2,126	2,330	2,531
	Average Day	39	51	62	69	75	82
	Peak Hour*	11	14	17	19	21	23
General Aviation	Annual	40,579	40,970	41,604	42,281	43,007	43,784
Military Aviation	Annual	12,473	12,473	12,473	12,473	12,473	12,473
Cargo	Annual	390	397	437	480	512	546
Total Operations	**Annual**	**64,313**	**67,982**	**71,727**	**74,249**	**76,736**	**79,334**
	Peak Month	**6,980**	**7,378**	**7,785**	**8,058**	**8,328**	**8,610**
	Average Day	**225**	**238**	**251**	**260**	**269**	**278**

*Note: The Peak Hour for Enplanements was determined to be between 4:40 pm and 6:10 pm.
Source: CHA, 2019.

Figure 4-1 – Enplanement Planning Activity Levels (PALs)



Source: CHA, 2019.

4.1.2 Aircraft Classification

The FAA has established aircraft classification systems that group aircraft types based on their performance and geometric characteristics. These classification systems are used to determine the appropriate airport design standards for specific runway, taxiway, taxilane, apron, or other facilities, as described in FAA AC 150/5300-13A, *Airport Design*.

As discussed in **Chapter 3**, the standard classifications are the Aircraft Approach Category (AAC), the Airplane Design Group (ADG), and Taxiway Design Group (TDG). **Table 4-2** presents the applicability of these classification systems to the FAA airport design standards for individual airport components (i.e., runways, taxiways, or aprons).

Table 4-2 – Applicability of Aircraft Classifications

Aircraft Classification	Related Design Components
Aircraft Approach Category (AAC)	Runway Safety Area (RSA), Runway Object Free Area (ROFA), Runway Protection Zone (RPZ), runway width, runway-to-taxiway separation, runway-to-fixed object
Airplane Design Group (ADG)	Runway, Taxiway, and apron Object Free Areas (OFAs), parking configuration, taxiway-to-taxiway separation, runway-to-taxiway separation
Taxiway Design Group (TDG)	Taxiway width, radius, fillet design, apron area, parking layout

Source: FAA AC 150/5300-13A, CHA, 2019.

4.1.3 Design Aircraft Family

The "critical aircraft" or "design aircraft family" represent the most demanding aircraft or grouping of aircraft with similar characteristics (relative to AAC, ADG, TDG) that are currently using or are anticipated to use an airport on a regular basis. The design aircraft family was identified for ECP (see **Table 4-3**) after review of the FAA's Traffic Flow Management System Counts (TFMSC) data, T100 data[1], airport-reported data, and forecast fleet mix assumptions (as described in **Chapter 3**). This grouping represents the typical commercial aircraft and cargo aircraft anticipated to operate at ECP over the planning horizon. These aircraft generally have higher AAC, ADG, and TDG classifications than the other regularly scheduled commercial aircraft. Determining the critical aircraft is important when planning airfield and landside facilities as they may require specific facility design accommodations within their designated areas of operation.

[1] The Bureau of Transportation Statistics (BTS) uses a form (Form T-100) to gather monthly traffic reports from certificated air carriers in the United States. These traffic reports provide information regarding domestic and international markets, as well as domestic and international segments. The data collected is then made available to the public via BTS's Air Carrier Statistics Database, also known as the T-100 data bank.

Table 4-3 – Fleet Mix and Design Aircraft Family

Aircraft	2018	2039	AAC	ADG	TDG
B737-700/700LR/MAX7	3,459	6,728	C	III	3
CRJ900	7	4,166	D	III	2
CRJ-700	1,565	3,451	C	II	2
A320-100/200	324	2,921	C	III	3
P8 - Boeing P-8 Poseidon	2,586	2,586	D	IV	3
ERJ-175	216	1,870	C	III	3
B737-900ER	118	1,088	D	III	3
B737-800	504	980	D	III	3
LJ45 - Bombardier Learjet 45	621	670	C	I	1B
A220	0	449	C	III	3
A319	1	370	C	III	3
GLF4 - Gulfstream IV/G400	212	229	D	II	2
K35R - Boeing KC-135 Stratotanker	229	229	D	IV	3
LJ60 - Bombardier Learjet 60	197	212	C	I	1B
LJ31 - Bombardier Learjet 31/A/B	162	175	C	I	1B
LJ40 - Learjet 40; Gates Learjet	152	164	C	I	1B
LJ35 - Bombardier Learjet 35/36	134	142	D	I	1B
GLF5 - Gulfstream V/G500	105	113	D	III	2
G280 - Gulfstream G280	94	102	C	II	1B
E545 - Embraer EMB-545 Legacy 450	99	99	C	II	1B
G150 - Gulfstream G150	84	90	C	II	1B
LJ75 - Learjet 75	84	90	C	II	1B
GLF2 - Gulfstream II/G200	63	68	C	II	1B
B703 - Boeing 707-300	60	60	C	IV	4
C130 - Lockheed 130 Hercules	60	60	C	IV	2
B752 - Boeing 757-200	50	50	C	IV	4
P3 - Lockheed P-3C Orion	50	50	D	III	5
CL60 - Bombardier Challenger 600/601/604	26	28	C	II	1B
GLF6 - Gulfstream	24	25	D	III	2
GLF3 - Gulfstream III/G300	21	23	C	II	2
C17 - Boeing Globemaster 3	20	20	D	IV	5
ERJ-135	22	20	C	II	2
H25B - BAe HS 125/700-800/Hawker 800	5	6	C	II	1B
B717-200	453	0	C	III	2
ERJ-145	1,360	0	C	II	2
MD-80	2,844	0	C	III	4
MD-90	18	0	C	III	4
Total	**16,028**	**27,333**	-	-	-

Source: TFMSC, ECP, CHA, 2019.

4.1.4 Airport & Runway Classification

The FAA classifies airports and runways based on their current and planned operational capabilities. These classifications (described below), along with the aircraft classifications defined previously, are used to determine the appropriate FAA standards (as per AC 150/5300-13A) for airfield facilities.

Airport Reference Code (ARC)

ARC is an airport designation that represents the AAC and ADG of the aircraft that the airfield is intended to accommodate on a regular basis. The ARC is used for planning and design only and does not limit the aircraft that may be able to operate safely on the airport. The Airport's previous 2015 Airport Layout Plan (ALP) identified the MD88 and Boeing 737-800 as the critical aircraft for airfield and pavement design, resulting in an ARC of D-III. Based on projections of the future fleet mix, the B737-800 will remain the critical aircraft as the MD88 will be phased out of use; therefore, ECP will retain the ARC of D-III[2]. The B737-800 is also the current and future taxiway design aircraft, resulting in a Taxiway Design Group (TDG) 3.

Table 4-4 – Fleet Mix and Design Aircraft Family by AAC and ADG

ACC/ADG		2018	2039
Operations by AAC	C	14,862	25,727
	D	1,166	1,606
Operations by ADG	I	5,209	14,536
	II	7,723	8,757
	III	2,380	3,291
	IV	716	749

Source: Airport District, CHA, 2019.

4.2 AIRFIELD CAPACITY REQUIREMENTS

Airfield capacity refers to the maximum number of aircraft operations (takeoffs or landings) an airfield can accommodate in a specified amount of time. Assessments of the airfield's current and future capacity were performed using common methods described in FAA AC 150/5060-5, *Airport Capacity and Delay*.

4.2.1 FAA AC 150/5060-5, Airport Capacity and Delay

FAA AC 150/5060-5, *Airport Capacity and Delay*, explains how to compute airfield capacity for the purposes of airport planning and design. This evaluation helps to determine any capacity-related improvements or expansions that may be needed to support flight activity levels. The evaluation provides two methods to determine airfield capacity: a comprehensive capacity analysis and a simplified capacity analysis for airports with known non-capacity issues. Based on FAA guidance, the simplified capacity analysis was applied at ECP. Furthermore, the estimated capacity of the airfield at ECP can be expressed in the following two measurements:

- Hourly Capacity – The maximum number of aircraft operations an airfield can safely accommodate under continuous demand in a one-hour period. This expression accounts for Visual Flight Rules (VFR) and Instrument Flight Rules (IFR) conditions and is used to identify any peak-period constraints on a given day.
- Annual Service Volume (ASV) – The maximum number of aircraft operations an airfield can accommodate in a one-year period without excessive delay. This calculation is typically used in long-range planning and referenced for capacity-related improvements.

[2] The critical aircraft for existing and future conditions were previously presented in **Chapter 3** and have been approved by the FAA.

Capacity Calculation Factors

To calculate these two measurements of capacity and annual service volume, two key factors and assumptions specific to ECP were defined. Consistent with the guidance provided in AC 150/5060-5, these include:

- Aircraft Fleet Mix Index – a ratio of the various classes of aircraft serving an airport
- Runway-Use Configuration – the number and orientation of the active runway(s)

<u>Aircraft Fleet Mix Index</u>

The airport's fleet mix index is determined by the size of typical aircraft and the frequency of their operations. To identify the aircraft mix index, AC 150/5060-5, *Airport Capacity and Delay*, has established four categories in classifying an aircraft by its maximum takeoff weight (MTOW), as depicted in **Table 4-5**.

Table 4-5 – Aircraft Capacity Classifications

Aircraft Class	MTOW (lbs)	Number of Engines	Wake Turbulence
A	<12,500	Single	Small (S)
B		Multi	
C	12,500 – 300,000	Multi	Large (L)
D	>300,000	Multi	Heavy (H)

Source: FAA AC 150/5060-5, CHA, 2019.

The aircraft mix index is calculated using the formula $\%(C + 3D)$, with the letters corresponding with the aircraft class. This product falls into one of the FAA-established mix index ranges, which are for use in the capacity assumptions and calculations, listed below:

• 0 to 20 • 21 to 50 • 51 to 80 • 81 to 120 • 121 to 180

The current facilities at the Airport can accommodate all four aircraft classes. The following operations percentages for aircraft categories C and D were gathered from a review of operations that occurred in 2018:

- Class C = 37.6 percent of the Airport's operations
- Class D = 0.5 percent of the Airport's operations

As such, the aircraft mix index in 2018 was 39.1 [37.6 + 3(0.5) = 39.1]. While the actual mix index for the Airport is subject to variations given changes in air traffic operations, the Airport's mix index is anticipated to grow beyond the mix index grouping of 21-50 to just inside grouping 51-80 by PAL 4. Based on the fleet mix changes described in **Chapter 3** for commercial, cargo, military, and general aviation operations, the aircraft fleet mix index is anticipated to increase from 39.1 in 2018 to 53.1 in PAL 4. See **Table 4-6** for each planning period's Aircraft Mix Index.

Table 4-6 – Aircraft Mix Index

Year	Aircraft Mix Index
2018	39.1
Base	42.1
PAL 1	45.9
PAL 2	48.5
PAL 3	50.9
PAL 4	53.1

Source: FAA AC 150/5060-5, CHA, 2019.

Runway-Use Configuration

The principal determinants of an airfield's layout or configuration are the number and orientation of runways. The efficiency and functionality of the runway system in conjunction with the taxiways and aprons during the various levels of aviation activity directly affects an airport's operational capacity.

ECP only has one runway in operation; therefore, a single runway-use configuration applies. Runway 16/34 has a north/south orientation and serves the entire range of aircraft activity that utilizes the Airport.

For the purposes of this Study, an airfield capacity analysis was also evaluated for a crosswind runway configuration showing dependent arrivals and departures.

Capacity and ASV Assumptions within AC 150/5060-5

The hourly capacity and ASV for the analyses herein were determined based on the aircraft mix index and runway-use configuration in conjunction with AC 150/5060-5, *Chapter 2, Capacity and Delay Calculations for Long Range Planning*. The information and calculations provided within the Advisory Circular's *Figure 2-1, Capacity and ASV for Long Range Planning*, was specifically used to represent the hourly capacity and ASV at ECP for each runway analysis herein. Prior to examining the *Figure* within the AC, it was important to understand what capacity and ASV assumptions were set forth by the FAA.

Capacity Assumptions

The hourly VFR and IFR capacities provided within FAA AC 150/5060-5 are consistent with air traffic control practices that the FAA determined produce the highest sustainable capacity and are based on several assumptions, as described below and shown in **Figure 4-2**; however, if the conditions at the airport being evaluated, in this case ECP, differ significantly from the assumptions described, additional calculations are necessary.

- Runway-Use Configuration – Within the AC are 19 runway-use configurations for which capacity is provided. For the purposes of this Study, and as previously discussed, two configurations were evaluated: a single-runway configuration and a crosswind runway configuration, represented by AC *Figure 2-1* Runway Configuration No. 1 and No. 14, respectively. The runway-use configurations from AC 150/5060-5 that were utilized in the evaluations herein can be found in **Appendix A**.
- Percent Arrivals – According to the AC, it is assumed that arrivals are equal to departures.

- Percent Touch and Go's – It is assumed that the percent of touch and go's is within the ranges within AC 150/5060-5 *Table 2-1* (shown in **Figure 4-2** herein).
- Taxiways – The calculations assume that a full-length parallel taxiway and ample runway entrance/exit taxiways are available and that no taxiway crossing issues are present. These assumptions are true for ECP's airfield.
- Airspace Limitations – This supposition assumes no airspace limitations are present to adversely impact flight operations or otherwise restrict aircraft which could operate at the airport. This assumptions accurately applies to ECP, as there are no limitations on the surrounding airspace at this time or in the foreseeable future.
- Runway Instrumentation[3] – It is assumed that the airport has at least one runway equipped with an ILS and that the airport has air traffic facilities and services, which is true for ECP.

Figure 4-2 – FAA AC 150/5060-5 (Assumptions)

Table 2-1. Assumptions incorporated in figure 2-1

Mix Index %(C+3D)	Percent Arrivals	Percent Touch & Go	Demand Ratios	
			Annual Demand / Av. Daily Demand*	Av. Daily Demand* / Av. Peak Hour Demand*
0-20	50	0-50	290	9
21-50	"	0-40	300	10
51-80	"	0-20	310	11
81-120	"	0	320	12
121-180	"	0	350	14

* In the peak month

Source: FAA AC 150/5060-5.

ASV Assumptions

The assumptions associated with ASV are based on the capacity assumptions previously described in addition to the following:

- Weather conditions occur roughly 10 percent of the time.
- Runway-use configuration – Roughly 80 percent of the time the airport is in operation with the runway-use configuration which produces the greatest hourly capacity. Given that ECP has a single-runway configuration, usage is equal to 100 percent.

[3] Additional assumptions pertaining to runway instrumentation are present when the airport being evaluated is not a single-runway configuration and has independent operations, or operations occurring simultaneously via separate runways. In the crosswind analysis, operations are assumed to be dependent, thus the assumptions are the same as those for the single-use configuration.

Based on the parameters of ECP, the previously described capacity and ASV assumptions and requirements were utilized in the analyses herein.

Current Airfield Capacity (Single Runway 16/34)

This analysis was based on the mix index identified in **Table 4-6** in conjunction with Runway Configuration No. 1 from FAA AC 150/5060 *Figure 2-1, Capacity and ASV for Long Range Planning*.

Hourly Capacity

Hourly capacity for the airfield is a measurement of the maximum number of aircraft operations (VFR and IFR) that an airfield can support in an hour based on the runway-use configuration.

Table 4-7 shows the results of the hourly capacity for 2018, the base year, and for PALs 1 through 4. Note that as the mix index increases from 39.1 (2018) to 53.1 (PAL 4), the operational capacities decrease.

Table 4-7 – Calculated Hourly Capacity (Single Runway Configuration)

Factors	2018	Base	PAL 1	PAL 2	PAL 3	PAL 4
	VFR / IFR	VFR / IFR	VFR / IFR	VFR / IFR	VFR / IFR	VFR / IFR
Hourly Capacity	74 / 57	74 / 57	74 / 57	74 / 57	63 / 56	63 / 56

Note: Hourly Capacity based on AC 150/5060-5 Figure 2-1 (Capacity and ASV for Long Range Planning)/Runway Configuration No. 1.
Source: FAA AC 150/5060-5, CHA, 2019.

Annual Service Volume

Annual Service Volume (ASV) is an expression of the total number of aircraft operations that an airfield can support per annum. **Table 4-8** shows the results of the ASV for 2018, the base year, and for PALs 1 through 4. The capacity levels are depicted in **Figure 4-3**.

Table 4-8 also includes the annual operations which often correlates to delays. If the annual operations exceed the ASV, the airport is likely to see significant delays. It should be understood that an airport can still experience delays before capacity is reached. Activity levels that may trigger capacity planning and development are discussed in FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*, which indicates (via *Table 4-4 of Order 5090.3C*) that 60 percent ASV is the trigger for planning a new runway or extended runway to increase hourly capacity and that 80 percent is the trigger for development. This allows an airport to make necessary improvements and avoid delays before they are anticipated to occur.

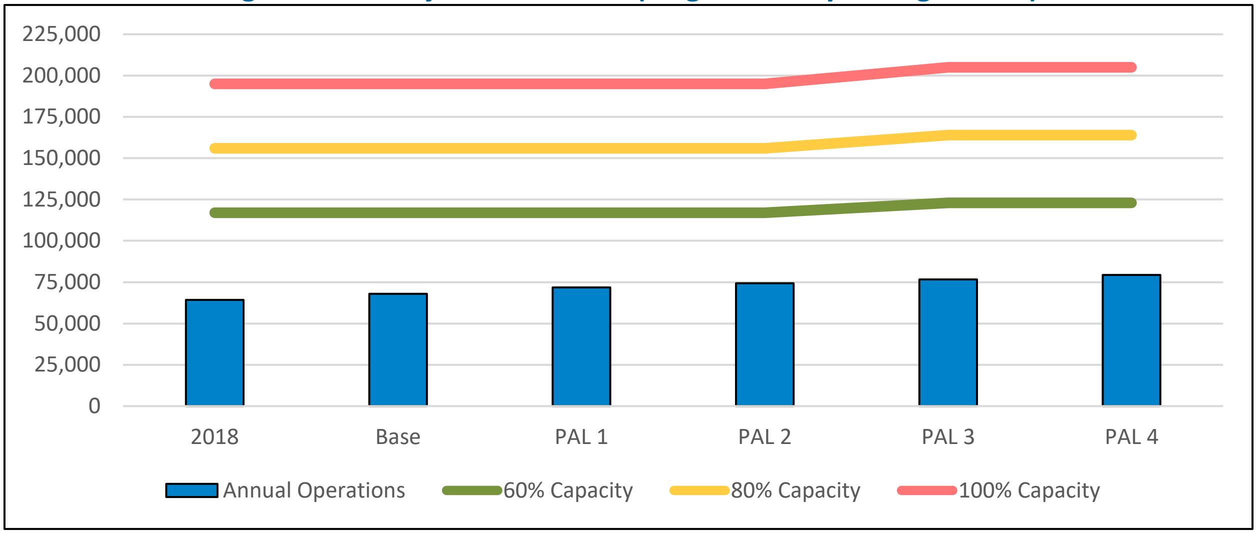
The ASV for 2018 shows ECP at approximately 33 percent capacity.

Table 4-8 – Annual Service Volume (Single Runway Configuration)

Factors	2018	Base	PAL 1	PAL 2	PAL 3	PAL 4
Annual Operations	64,313	67,982	71,727	74,249	76,736	79,334
Annual Service Volume	195,000	195,000	195,000	195,000	205,000	205,000
Capacity Level	**33.0%**	**34.9%**	**36.8%**	**38.1%**	**37.4%**	**38.7%**

Source: FAA AC 150/5060-5, CHA, 2019.

Figure 4-3 – Projected Demand (Single Runway Configuration)



Source: Airport District, CHA, 2019.

Daily Demand Ratio

Although they are not required to determine the ASV in the simplified airfield capacity analysis method applied to ECP, demand ratios can illustrate an Airport's operational efficiency during the peak month, as shown in **Table 4-9**. The demand ratios were solely based on average daily demand during the peak month and average hourly demand during the peak month as they relate to operations; thus, they were not based on peak daily or peak hourly activity at the Airport and do not correspond with the peak activity levels presented in **Chapter 3**. The peak activity demand forecasts in **Chapter 3** were derived based on peak enplanement data and peak operating periods as they related to the enplanements, whereas the activity demand presented herein were based on aircraft operations and not enplanements. Data derived via FAA TFMSC Distributed OPSNET was used when determining the month with the most operations, the average daily operations during the peak month, and the average hourly operations during the peak month. Reference **Appendix B**.

Table 4-9 identifies the daily and hourly demand ratios throughout the planning period.

Table 4-9 – Demand Ratios

Factors	2018	Base	PAL 1	PAL 2	PAL 3	PAL 4
Annual Operations	64,313	67,982	71,727	74,249	76,736	79,334
Av. Daily Operations (in Peak Month)	228	241	254	263	272	281
Av. Peak Hour (in Peak Month)	11	12	12	13	13	14
Daily Demand Ratio (D)	**282.5**	**282.5**	**282.5**	**282.5**	**282.5**	**282.5**
Hourly Demand Ratio (H)	**20.4**	**20.4**	**20.4**	**20.4**	**20.4**	**20.4**

Source: FAA AC 150/5060-5, FAA TFMSC Distributed OPSNET, CHA, 2019.

Airfield Capacity Conclusion

Based on the airfield capacity calculations for a single runway configuration, the Airport would currently be at approximately 33 percent of capacity and would reach 38.7 percent capacity by PAL 4; therefore, a single runway configuration is adequate at ECP.

Runway Configuration Alternative: Crosswind Runway (Runway 16/34 and Runway 3/21)

An airfield capacity analysis was also evaluated for a crosswind runway configuration showing dependent arrivals and departures. In other words, aircraft must wait for operations to be completed on another runway before resuming.

The following conditions and assumptions were applied:

- A crosswind runway (Runway 3/21) will be built to the east at an angle of 50 degrees of Runway 16/34, enabling dependent IFR operations.
- The aircraft mix indexes do not change from the current use analysis (See **Table 4-6**)

This analysis was based on Runway Configuration No. 14 from FAA AC 150/5060 *Figure 2-1, Capacity and ASV for Long Range Planning*.

Hourly Capacity

Using *Figure 2-1* provided in AC 150/5060-5, **Table 4-10** shows the results of the hourly capacity for the crosswind runway configuration after applying the mix index previously determined in **Table 4-6**.

Table 4-10 – Calculated Hourly Capacity (Crosswind Runway Configuration)

Factors	2018	Base	PAL 1	PAL 2	PAL 3	PAL 4
	VFR / IFR	VFR / IFR	VFR / IFR	VFR / IFR	VFR / IFR	VFR / IFR
Calculated Hourly Capacity	108 / 57	108 / 57	108 / 57	108 / 57	85 / 56	85 / 56

Source: FAA AC 150/5060-5, CHA, 2019.

Annual Service Volume

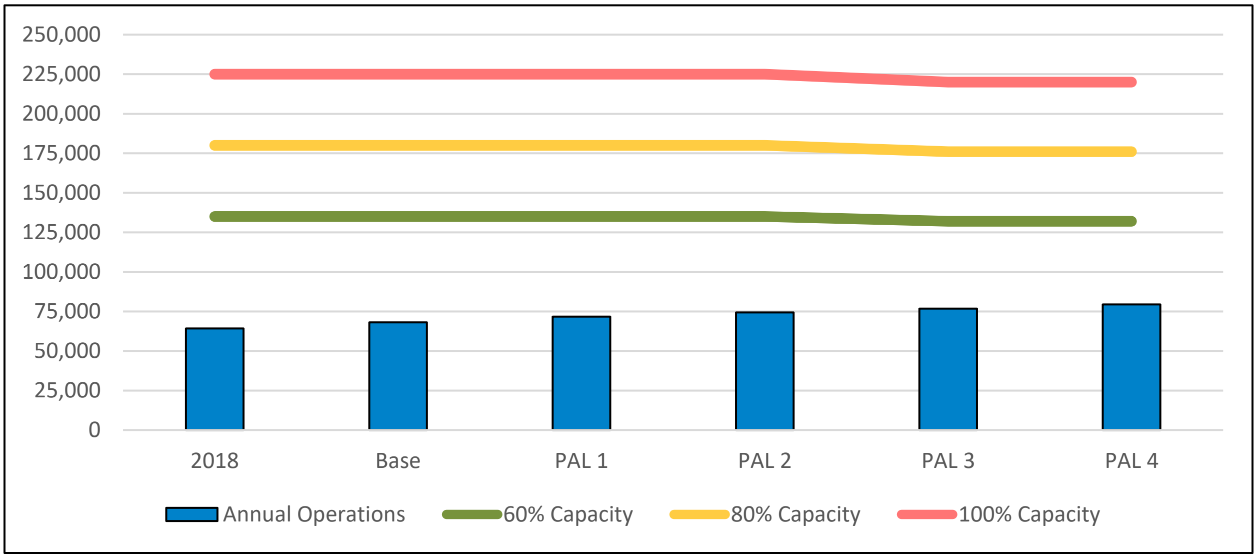
Using *Figure 2-1* AC 150/5060-5, **Table 4-11** shows the results of the ASV for the crosswind runway configuration after applying the mix index used in the single runway configuration. Annual operations are also included for comparative purposes. Further, the capacity levels are depicted in **Figure 4-4**.

Table 4-11 – Annual Service Volume (Crosswind Runway Configuration)

Factors	2018	Base	PAL 1	PAL 2	PAL 3	PAL 4
Annual Operations	64,313	67,982	71,727	74,249	76,736	79,334
Annual Service Volume	225,000	225,000	225,000	225,000	220,000	220,000
Capacity Level	**28.6%**	**30.2%**	**31.9%**	**33.0%**	**34.9%**	**36.1%**

Source: FAA AC 150/5060-5, CHA, 2019.

Figure 4-4 – Projected Demand (Crosswind Runway Configuration)



Source: Airport District, CHA, 2019.

Airfield Capacity Summary

Based on the airfield capacity calculations for a crosswind runway configuration, ECP would currently be at 28.6 percent of capacity and would reach 36.1 percent capacity by PAL 4 if Runway 3/21 were in operation in addition to Runway 16/34; therefore, capacity issues do not justify any airfield improvements at ECP.

Airfield Capacity Conclusion

As previously mentioned, FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*, indicates that 60 percent ASV is the trigger for planning a new runway or runway extension for the purposes of increasing hourly capacity and that 80 percent is the trigger for development. According to FAA AC 150/5060-5, the current airfield capacity will not reach 60 percent until after PAL 4.

4.3 AIRFIELD FACILITY REQUIREMENTS

Airfield improvements are planned and developed according to the established ARC, ADG, and TDG for an airport. The associated design criteria are applied when planning upgrades or improvements for a runway or taxiway. An airport's ARC is determined by the critical aircraft (aircraft with the longest wingspan, highest tail, and fastest approach speeds) that makes "regular use" of the airport or a specific runway. FAA AC 150/5000-17, defines "regular use" as 500 annual operations, including both itinerant and local operations but excluding touch-and-go operations (an operation is either an arrival or departure). As stated in **Section 4.1.4**, ECP has an existing ARC of D-III and, based on future projections of aircraft fleet mix transitions, is forecast to remain a D-III airport in the five- to ten-year range, and to become a D-V airport in the ultimate scenario. This does not affect the Airport's design standards (per FAA AC 150/5300-13A).

4.3.1 Runway Requirements

Airfield Configuration

The general configuration of the airfield, including the number of runways along with their location/orientation, should allow the airport to meet anticipated air traffic demands and maximize wind coverage and operational utility for all types of aircraft. As stated in **Chapter 2**, it is the FAA's recommendation that the runway system at an airport be oriented to provide at least 95 percent wind coverage. This means that 95 percent of the time in a given year, the crosswind coverage at an airport is within acceptable limits for the types of aircraft operating on the runways.

Runway Designations

Due to the changes in the earth's magnetic declination over time, the compass heading of a runway and its associated end number can change. Current magnetic declination information was derived from the National Oceanic and Atmosphere Administration (NOAA). The current headings and declinations of the runway ends at ECP are as follows:

- Runway 16
  - Current headings: 162° magnetic, 159° true
  - Declination: 3° 50' W ± 0° 20' changing by 0° 5' W per year
- Runway 34
  - Current headings: 342° magnetic, 339° true
  - Declination: 3° 50' W ± 0° 20' changing by 0° 5' W per year

Currently, no changes in the runway designations are needed; however, since magnetic declination changes slowly over time, the runway numbers may need to be reevaluated by PAL 4, at which time the magnetic declination may have changed more significantly.

Runway Design Standards

During this master planning effort, FAA design and safety standards related to the airfield facilities were identified so that the Airport may review and work to achieve compliance where needed. The design standards evaluated include dimensions, separation distances, protection zones, clearances requirements, etc., which vary according to design aircraft.

Runway 16/34 is assigned a Runway Design Code (RDC), which signifies the design standards that the runway is to meet. The runway is currently categorized as runway design group C-III; however, based on future projections and industry trends, the runway is expected to increase to a runway design group D-III.

The key FAA design and safety standards related to the runway at ECP (as defined in AC 150/5300-13A, *Airport Design*) are described below.

Runway Width – Runway width requirements are based on the critical aircraft associated with the runway. For ARC C-III and ARC D-III, the required runway width is 150 feet. Another significant design standard for safety is distance of the runway centerline to the parallel taxiway centerline. Currently, Runway 16/34 meets the runway width and separation requirements.

Runway Shoulders – Shoulders provide resistance to blast erosion and accommodate the passage of maintenance and emergency equipment, as well as the occasional passage of an aircraft veering from the runway. Although paved shoulders are only required for runways accommodating aircraft designated ADG-VI and higher, they are recommended for runways accommodating ADG-III aircraft. Although Runway 16/34 is a Group III runway, it does not have shoulders; therefore, it is recommended that 25-foot wide paved shoulders be added to both sides of the runway to adhere to FAA design standards.

Runway Safety Area (RSA) – The RSA is a rectangular area bordering a runway that is intended to reduce the risk of damage to an aircraft in the event of an undershoot, overrun, or excursion from the runway. The RSA is required to be cleared and graded such that it is void of potentially hazardous ruts, depressions, or other surface variations. Additionally, the RSA must be drained by grading or via storm sewers to prevent water accumulation, be able to support snow removal and firefighting equipment, and be free of objects excepts those required because of their function.

The RSA for a Group III runway is required to be 500 feet wide and must extend 1,000 feet beyond the runway end. The longitudinal grade from the end of the runway should be between 0.0 percent and -3.0 percent for the first 200 feet and no more than -5.0 percent for the remaining 800 feet of the RSA. Traverse grades should be -1.5 percent to -3.0 percent away from the runway shoulder edge and beyond the runaway ends.

The Runway 16/34 RSA adheres to the previously described RSA design standards.

Runway Object Free Area (ROFA) – The ROFA is a rectangular area bordering a runway that is intended to provide enhanced safety for aircraft operations by ensuring the area remains clear of parked aircraft or other equipment not required to support air navigation or the ground maneuvering of aircraft. The ROFA design standard for Group III runways is 800 feet wide, centered about the runway centerline, and extends 1,000 feet beyond each runway end. Currently, ECP's runway meets the ROFA criteria.

Runway Object Free Zone (ROFZ) – The ROFZ is a volume of airspace centered above the runway that is required to be clear of all objects, except for frangible navigational aids that need to be in the ROFZ because of their function. The ROFZ provides clearance protection for aircraft landing or taking off from the runway. The ROFZ is the airspace above a surface whose elevation at any point extends 200 feet beyond each end of the runway, and its width is based on visibility minimums and aircraft size. Since Runway 16/34 is a Group III runway, the ROFZ is required to be 400 feet wide. The ROFZ length and width for Runway 16/34 at ECP are 200 feet and 400 feet, respectively, thus meeting FAA standards.

Runway Protection Zone (RPZ) – The RPZs for Runway 16 and Runway 34 are trapezoidal areas, each with an inner width of 500 feet, outer width of 1,010 feet, and length of 1,700 feet. The RPZ is primarily a land use control that is meant to enhance the protection of people and property near the airport through airport control. Such control includes clearing of RPZ areas of incompatible objects and activities. Currently, land owned and maintained by the Airport District within ECP's two RPZs comply with comply with FAA design standards.

Runway Blast Pads – Similar to runway shoulders, blast pads are intended to provide erosion protection at the runway end. Conformance to FAA design criteria requires that 200-foot wide by 200-foot length blast pads be placed symmetrically at the ends of a Group III runway. At present, Runway 16/34 has two blast pads, each of which adhere to FAA design criteria.

Building Restriction Line (BRL) – Though not a specific FAA design standard, the BRL is a reference line which provides generalized guidance on building location and height restrictions. The BRL is typically established with consideration to OFAs and RPZs, as well to airspace protection, by identifying areas of allowable building heights such as 35 feet above ground level. It should be noted that site-specific terrain considerations (i.e. grade/elevation changes) may allow buildings taller than indicated by the generalized BRL to be developed within the limits of the BRL. These height restrictions are based on CFR Part 77 standards and will be evaluated in **Chapter 5** for each specific site development plan.

Table 4-12 – Runway Design Standards

Design Standard	Existing Conditions 16/34 C-III (1 mi.)	Runway Design Code (RDC) (w/visibility minimums ≥ ½-mile)	
		C-III	D-III
Runway Width	150’	150’	
RSA Width	500’	500’	
RSA Length Past Runway End	1,000’	1,000’	
ROFA Width	800’	800’	
ROFA Length Past Runway End	1’000’	1,000’	
Runway OFZ Width	400’	400’	
Separation Between:			
Runway Centerline to Parallel Taxiway Centerline	600’	400’	
Runway Centerline to Edge of Aircraft Parking	>500’	500’	
Runway Centerline to Hold line	250’	250’	
Runway Protection Zone (RPZ):			
Length	1,700	1,700'	
Inner Width	500’	500'	
Outer Width	1,010’	1,010'	

Source: FAA AC 150/5300-13A, Airport District, CHA, 2020.

Modification to FAA Design Standards

Currently, Runway 16/34 at ECP meets all required FAA design criteria; therefore, the Airport does not require Modification to Standards (MOS).

Runway Length

To ensure that ECP can support existing and anticipated aircraft and airline operational demands, a detailed runway length analysis was performed based on specific aircraft performance characteristics as documented in the manufacturer’s Aircraft Planning Manuals (APMs). Inadequate runway length can limit the operational capability of an airport, including the aircraft that can operate and the destinations that the airport serves. Runway lengths can place restrictions on the allowable takeoff weight of the aircraft, which then reduces the amount of fuel, passengers, or cargo that can be carried. Per the guidance provided in AC 150/5325-4B, *Runway Length Requirements for Airport Design*, the following factors were used in the runway length calculations for ECP:

Aircraft Specifics

- Model and Engine Type – the aircraft version and engine type. The most common and demanding aircraft specific to ECP were used.
- Payload – represents the carrying capacity of the aircraft, including passengers, baggage, and cargo. For this analysis, 90 percent was chosen as the payload for planning purposes.
- Estimated Takeoff Weight – the estimated weight at takeoff, which includes the payload and the fuel required to reach the intended destination (with reserve fuel); The estimated takeoff weight varies by aircraft, payload, and destination.
- Estimated Landing Weight – the estimated weight at landing. For this analysis, maximum landing weight (MLW) was used to determine runway landing requirements.

Airport Specifics

- Temperature – the atmospheric temperature at the airport. Warmer air requires longer runway lengths because the air is less dense, thus generating less lift on the aircraft. The average temperature (89.1°F) of the hottest month (July) at ECP was used in the calculations.
- Elevation – the elevation above sea level at the airport. As elevation increases, air density decreases, making takeoffs longer and landings faster. The elevation at ECP is established at 68.8 feet mean sea level (MSL).
- Runway Gradient – the average slope of the runway, expressed as a percentage. The runway gradients at ECP are not significant enough to impact runway length requirements.
- Stage Length (flight distance) – the length in nautical miles (nm) to the intended destination. The stage length determines the amount of fuel an aircraft will require on takeoff to complete its flight, thus impacting aircraft weight and runway length requirements.

Existing Aircraft and Destinations
In addition to the design aircraft of the Boeing 737-800, three other types of passenger aircraft were evaluated: the Bombardier CRJ-900, the Boeing 787-9, and the Airbus A320-200. The runway length requirements for the design aircraft family (passenger airline aircraft only) to this destination, with standard day plus 27 degree temperatures and dry surfaces, were calculated and presented in **Table 4-13**.

Currently, Denver International Airport (DEN) is the farthest destination served by scheduled airline service, at 1,068 nautical miles (nm). The three potential destinations evaluated were Los Angeles International Airport (LAX) at 1,668 nm, Toronto Pearson International Airport (YYZ) at 851 nm, and London Heathrow Airport (LHR) at 3,848 nm. These destinations were evaluated for potential scheduled airline and charter service.

Table 4-13 – Existing Takeoff (TO) Length Requirements – 90% Payload

Aircraft	Stage Length (nm)	Estimated Takeoff Weight (lbs)	Takeoff Length Required (ft)
Boeing 787-9	851 (YYZ)	415,592	6,500
	3,848 (LHR)	511,356	9,500
	1,668 (LAX)	441,698	7,500
Boeing 737-800	851 (YYZ)	148,753	7,000
	3,848 (LHR)	185,567	*Exceeds Range*
	1,668 (LAX)	158,789	8,500
CRJ-900	851 (YYZ)	77,534	7,500
	3,848 (LHR)	112,079	*Exceeds Range*
	1,668 (LAX)	86,951	*Exceeds Range*
Airbus A320-200	851 (YYZ)	143,223	5,000
	3,848 (LHR)	187,418	*Exceeds Range*
	1,668 (LAX)	155,271	6,250

Note: Runway lengths are calculated at standard day temperature + 27 degrees Fahrenheit, dry surfaces, at approx. 50 feet above sea level.
Source: FAA AC 150/5325-4B, CHA, 2019.

4.3.2 Taxiway Requirements

The overall goal of airfield planning and design is to enhance efficiency and the margin of safety for operational activities. After reviewing FAA guidance, as well as after discussions with the airport operations and air traffic control personnel, the following specific goals were identified for the taxiway system at ECP:

- Accommodate all existing and projected users
  - The existing and forecasted fleet mix (for commercial, cargo, and general aviation activity) should be considered when evaluating the taxiway system
- Reduce risk of pilot confusion
  - Complexity of the taxiway system can lead to pilot confusion, which can lead to human error and the increased potential for runway incursions. Reducing the risk for pilot confusion includes:
    - Reducing the number of taxiways intersecting at a single location
    - Increasing the pilot's situational awareness (i.e, through proper signage and marking)
    - Avoiding wide expanses of pavement
    - Avoid potential "hot spots"
    - Increasing visibility
- Allow for expandability of all Airport facilities
  - The taxiway system should be designed to enable the long-term expansion of other aviation facilities and the ability to provide efficient airside access to developable parcels of the airport.

- Adhere to all FAA design standards (based on ADG and TDG).
  - Taxiways should be developed to the appropriate FAA standards associated with the ADG and TDG of the design aircraft

Many of these objectives will be addressed in the Development Concepts of the Master Plan (**Chapter 5**). The design standards are addressed below.

Taxiway Design Standards

Similar to runways, taxiways are subject to FAA design requirements such as pavement width, edge safety margins, shoulder width, and safety and object free area dimensions. The FAA standards in relation to taxiways (as defined in AC 150/5300-13A, *Airport Design*) are described below and shown in **Table 4-14** and **Table 4-15**.

Table 4-14 –Taxiway Design Standards Based on Airplane Design Group (ADG)

Design Standard	ADG III
Protection Standards	
Taxiway Safety Area (TSA) Width	118 feet
Taxiway Object Free Area (TOFA) Width	186 feet
Taxiway Wingtip Clearance	34 feet
Separation Standards	
Taxiway Centerline to Parallel Taxiway/Taxilane Centerline	152 feet
Taxiway Centerline to Fixed or Moveable Object	93 feet

Source: FAA AC 150/5300-13A, CHA, 2019.

Table 4-15 – Taxiway Design Standards Based on Taxiway Design Group (TDG)

Design Standard	TDG 3
Protection Standards	
Taxiway Width	50 feet
Taxiway Edge Safety Margin	10 feet
Taxiway Shoulder Width	20 feet

Source: FAA AC 150/5300-13A, CHA, 2019.

Taxiway Width and Shoulders – Taxiway widths and standards are based on the airport's Taxiway Design Group (TDG), which is currently a 3 based on the B737-800 critical aircraft at ECP. The recommended taxiway width for TDG 3 is 50 feet. Currently, only taxiways D, P, Q, S, T, U, and part of J, K, and M meet the required width standards. Taxiways E1, E2, F, and part of J, K, and M are only 35 feet wide and should be widened to meet the 50-foot width requirement. Similar to runways, paved shoulders are recommended by FAA for taxiways accommodating ADG-III aircraft but are not required. The recommended taxiway paved shoulder width for TDG 3 is 20 feet. Currently, none of the taxiways at ECP have paved shoulders; therefore, 20-foot paved shoulders should be added to all taxiways in order to meet FAA design recommendations.

Like runways, the distance of taxiway centerlines from fixed and/or movable objects is also critical. All taxiways meet this design standard, with the exception of Taxilane F, which has a set of corporate and ECP-owned T-hangars impeding the object free area and meets taxilane separation standards.

Taxiway Safety Area (TSA) and Taxiway Object Free Area (TOFA) – Like runway safety area and object free area standards, for taxiways these are based on the prescribed TDG of 3 at ECP.

Presently, all taxiways at the Airport follow the proper TSA dimensions. All taxiways meet TOFA dimension standards.

Taxiway Fillets – For taxiway turns onto runways, aprons, or additional taxiways, there are FAA design standards for the geometry of the fillets, based on the angle of the turn. Due to ECP being constructed in 2010, all taxiways comply to the current fillet dimensions and standards.

4.3.3 Airfield Lighting and Navigational Systems

Airfield Lighting and Marking

Airfield lighting allows for the safe operation of aircraft during nighttime hours and low visibility conditions. Lighting on the airfield includes runway and taxiway edge lighting, runway centerline lighting, Precision Approach Path Indicator (PAPI) lights, Runway End Identifier Lights (REILs), runway threshold lighting, runway guard lights, runway touchdown zone lighting (TDZL), apron lighting, and the marker beacon.

Runway and Taxiway Edge Lighting

Runway 16/34 is equipped with a HIRL system and all the Airport's taxiways are equipped with MITL systems, with all systems being FAA compliant.

Runway Centerline Lighting

Runway 16/34 is equipped with FAA compliant centerline lighting.

PAPIs

A PAPI system with a four-light unit (PAPI-4) is located at each end of Runway 16/34. Each are FAA compliant.

REILs

REILs are positioned on Runway 34 only to provide rapid and positive identification of the end of the runway. The REILs are FAA compliant.

Threshold Lighting

Runway 16/34 has standard FAA-compliant runway threshold lighting at each runway end.

Touchdown Zone Lighting

The TDZLs indicate the touchdown zone when landing under adverse visibility conditions. FAA compliant TDZLs are equipped on Runway 16 only.

Runway Guard Lights

Runway guard lights, also known as wigwags, are not required but, when used, are located on each side of a taxiway in conjunction with the runway holding position marking. ECP does not currently have runway guard lights.

Rotating Beacon

The rotating beacon at ECP is located on top of the Air Traffic Control Tower, south of the terminal building. It functions as the indicator for locating the Airport at night. ECP's beacon meets FAA standards.

Apron Lighting
FAA compliant apron floodlight systems illuminate the Terminal and FBO apron areas.

Based on the above findings, airfield lighting systems at ECP are adequate.

Navigational and Landing Aid Requirements
Pilots utilize a variety of navigational aids (NAVAIDs) and instrument procedures, including Very High Frequency (VHF) Omni Direction Range (VORs), instrument approach procedures (IAPs) and NAVAIDs, and approach lighting systems (ALS). By providing point-to-point guidance information or position data, NAVAIDs assist pilots to safely and efficiently locate airports, land aircraft, taxi aircraft, and depart from airports during nearly all meteorological conditions.

En-route NAVAIDs
Currently, there are no ground-based en-route NAVAIDs providing guidance to and from ECP.

Instrument Approach Procedures and NAVAIDs
At ECP, none of the runways operate strictly as a visual approach category. Runway 16 has a precision approach that includes an ILS with distance measuring equipment (DME) and localizer (LOC). Runway 16 has a Category I ILS and a Special Authorization Category II (SA CAT I/CAT II) ILS, and utilizes Global Positioning Systems (GPS) and Runway Visual Range (RVR). A Special Authorization ILS allows certain exceptions to be made for standards such as visibility minimums and airfield navigational aids when approaching aircraft and pilots meet specific criteria (i.e. instruments, training). In the case of ECP, this allows certain aircraft to have lower approach visibility minimums than standard for a typical Category I ILS. Runway 34 has a non-precision approach that utilizes GPS and RVR. Instrument approach procedures for each runway are presented in **Table 4-16**.

Table 4-16 – NAVAIDs

Runway	Navigational Aids	Instrument Approach Type	Minimum Ceiling (AGL)/Visibility
16	ILS/DME, GPS, RVR, SA CAT I & II	ILS, RNAV (GPS)	200 ft. / ½ mile 150 ft. / 1400 RVR (CAT I) 100 ft. / 1200 RVR (SA CAT II)
34	GPS, RVR	RNAV (GPS)	200 ft. / ¼ mile

Source: FAA Airport Master Record (Form 5010), Accessed 2019, CHA, 2019.

Instrument Approach Lighting Systems
As previously mentioned, the Airport operates an ILS for approaches to Runway 16, consisting of a LOC, DME, and the approach lighting system (ALS). A Medium Intensity Approach Lighting Systems (MALS), along with Runway Alignment Indicator Lights (RAILS), together form Medium Intensity Approach Lighting Systems with Runway Alignment Indicator Lights (MALSR) that are utilized for approaches on Runway 16 at ECP.

Based on the findings above, the NAVAIDs and landing aids at ECP are adequate.

NextGen
The FAA's Next Generation Air Transportation System (NextGen) is an ongoing and comprehensive transformation of the current National Airspace System. The conversion to NextGen includes a complete overhaul of current and outdated ground-based technology systems associated with air traffic control and navigation technology in an effort to integrate new

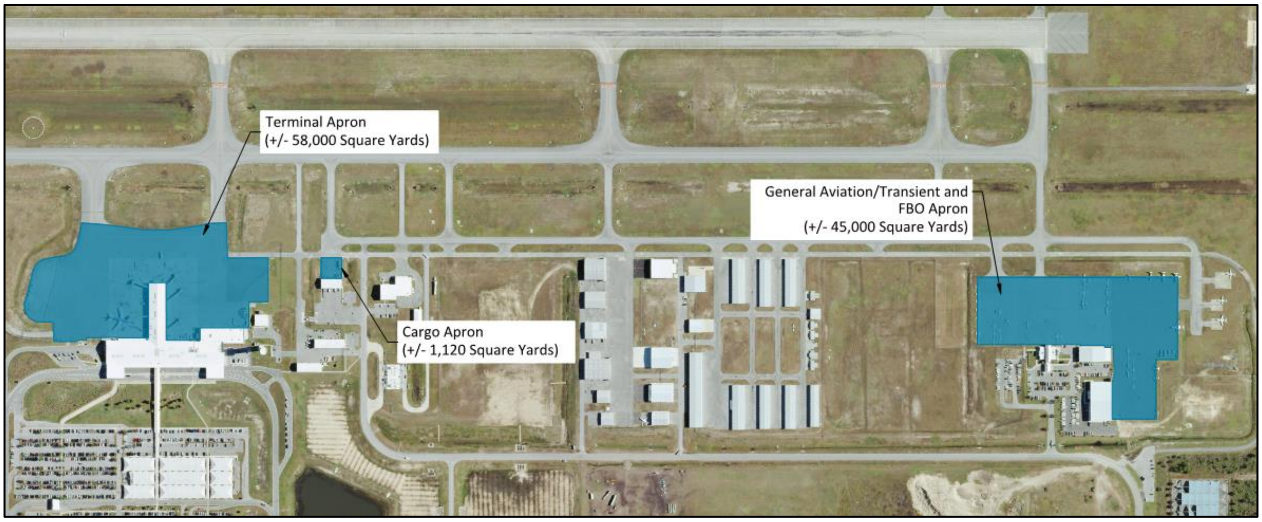
satellite-based technologies and enhance the airspace system across multiple fronts. The NextGen system will also update and enhance GPS technology, reduce congestion, increase airspace capacity, minimize (or reduce) delays, reduce fuel consumption, and increase the operational safety of flight.

4.3.4 Aprons

Aircraft parking aprons are intended to accommodate a variety of functions, including the loading and unloading of passengers or cargo; the refueling, servicing, maintenance, and parking of aircraft; and any movements of aircraft, vehicles, and pedestrian's necessary for such purposes.

As depicted in **Figure 4-5**, there are four distinct apron types at ECP that serve various functions: terminal apron, general aviation/transient, FBO apron, and cargo apron. In addition, helicopter parking pads are also available at the Airport.

Figure 4-5 – Apron Areas



Source: CHA, 2019.

Terminal Apron

The terminal apron is comprised of the facilities used for commercial aircraft gate parking as well as airline support and servicing operations. The terminal apron and its facilities must be able to accommodate the current and future fleet mix of commercial aircraft. Currently, the terminal apron is utilized by commercial aircraft as large as the Boeing 737-800 and a combination of regional jets. ECP has seven gate positions, each of which can accommodate the B737-800. The terminal apron is approximately 58,000 square yards, of which approximately 3,750 square yards is designated for Remain Overnight (RON) parking. The remaining square yardage is utilized for aircraft gate parking and passenger loading and unloading at ECP's single commercial concourse, as well as de-icing operations, Ground Service Equipment (GSE) storage, taxilanes, and general circulation areas. The apron is capable of accommodating current and projected activity levels.

<u>Remain Overnight (RON) Parking</u>

On a typical day, approximately six aircraft utilize remain overnight (RON) parking at the seven gate positions. Approximately 3,750 square yards of additional remote RON parking is located just north of the terminal and approximately 4,800 square yards just south of the terminal;

however, RON parking is primarily used on an as-needed basis only and subsequently used for other activities.

General Aviation and FBO Apron

GA activity at ECP represents approximately 54.6 percent of total annual airport operations and includes various types of private, corporate, and business aircraft flights. For this analysis, a peak month-average day (PMAD) methodology was used to gauge the approximate number of GA aircraft that park on the GA aprons during an average day of the peak month. The following is a description of the PMAD aircraft parking evaluation shown in **Table 4-17.**

- GA Itinerant Operations – According to the ECP activity data for 2018 (described in **Section 4.1**), itinerant GA operations accounted for approximately 69.8 percent of total GA operations.
- GA Peak Month Itinerant Operations – After analyzing data obtained from the Air Traffic Control Tower at ECP, the month of July was determined as the peak month. In July 2018, ECP received approximately 10.5 percent of its total Itinerant GA operations.
- GA PMAD Operations – The GA peak month itinerant operations were divided by the number of days in July (31).
- GA Itinerant Arrivals – The number of PMAD operations was reduced by half to derive the approximate number of GA itinerant arrivals requiring parking.
- GA Itinerant Aircraft Parked on the Apron – According to the FBO, GA itinerant arrivals typically remain parked on the apron for an extended period during the day; therefore, parking space should be provided for the number of aircraft anticipated to use the apron during an average day of the peak month. For the purposes of this evaluation, it was assumed that 80 percent of itinerant GA operations utilize the FBO aprons and, in turn, will be used in the subsequent analysis for apron space.

Table 4-17 – GA Itinerant Aircraft Parked on the Apron

Activity	2018	Base	PAL 1	PAL 2	PAL 3	PAL 4
GA Operations	40,579	40,970	41,604	42,281	43,007	43,784
GA Itinerant Operations	28,315	28,587	29,029	29,502	30,009	30,551
Peak Month GA Itinerant Operations	2,980	3,009	3,055	3,105	3,158	3,216
PMAD Itinerant Arrivals	48	49	49	50	51	52
GA Itinerant Arrivals Parked on Apron	38	39	39	40	41	41

Source: Airport District, CHA, 2019.

FBO Itinerant Operations Apron

The GA area consists of approximately 45,000 square yards (SY) of apron space; however, approximately 15,000 SY of this is exclusively used for aircraft maneuvering purposes, reducing the total available GA apron parking area to approximately 30,000 SY that can be utilized solely by general aviation operators, including the multiple tie-down spaces provided for Group-I and Group-II aircraft. Additionally, three rotorcraft parking pads are provided, totaling approximately 1,100 SY, located off the southern end of the FBO apron space. As of 2018, ECP has approximately 104 based aircraft, as shown in **Table 4-18**.

Table 4-18 – Based Aircraft (As of 2018)

Single Engine	Multi-Engine Piston	Jet	Total
76	11	17	104

Source: Airport District, CHA, 2019.

Sheltair primarily handles single-engine piston aircraft, and on standard to busy days, has 33 to 39 itinerant aircraft, with the assumption that approximately 50 percent remain overnight. These aircraft operations are comprised of the following breakdown: 72.4 percent single-engine piston, 10.5 percent multi-engine piston, and 17.1 percent jet.

Applying these percentages to the number of GA itinerant aircraft parked on the apron at peak periods produced the number of each type of aircraft that will need space for parking. General planning assumptions and professional experience were used to determine the following apron space requirements for the different aircraft types (which include clearance and safety areas):

- Single/Multi-Engine Piston ≈ 400 SY per aircraft
- Jet ≈ 1,600 SY per aircraft

As discussed in **Chapter 3**, with anticipated growth in GA, there will be a likelihood of an increased number of transient aircraft to require short-term storage space at ECP. Anticipated and recommended apron space is presented in **Table 4-19**.

Table 4-19 – Anticipated Apron Space

Activity	Base	PAL 1	PAL 2	PAL 3	PAL 4
Annual Operations	40,970	41,604	42,281	43,007	43,784
Total Apron Parking Space Requirements (SY)	50,526	51,308	52,143	53,038	53,997
Apron Space Available for Parking (SY)	30,000	30,000	30,000	30,000	30,000
Surplus/(Deficit)	**(20,526)**	**(21,308)**	**(22,143)**	**(23,038)**	**(23,997)**

Source: FAA AC 150/5300-13A: *Appendix 5*, CHA, 2019.

FBO Apron Storage Summary

According to the ECP activity data for 2018, and as previously discussed, itinerant GA operations accounted for approximately 69.8 percent of total GA operations at the Airport. Many of these operations utilize itinerant parking aprons and tie-down areas, as well as hangar space in the GA area. Itinerant aprons are typically utilized for transient aircraft that are only visiting or remaining at the airport for a short period of time (i.e., a few hours to overnight). Should an aircraft be at the airport for longer, tie-down parking is typically used to clear the itinerant apron for additional aircraft.

Given the transient nature of the small jets in the forecast period, it is important to note that most of these aircraft will likely utilize itinerant parking aprons, tie-down areas, and apron storage space, opposed to hangar space. Aircraft aprons provide parking and tie-down positions for based and itinerant aircraft, as well as staging areas for aircraft stored in conventional hangars; however, hangar space is typically reserved for aircraft based at the FBO.

In the GA area, the apron area can provide 40 to 46 asphalt/concrete tie-down positions for single-engine transient aircraft. Tie-down space requirements differ from itinerant apron parking space due to the clearance requirements per FAA AC 150/5300-13A, *Airport Design*. Essentially, aircraft parked in tie-down spaces must be provided adequate clearance from wingtip to wingtip (a minimum of 10 feet) but may park up to the Object Free Area (OFA) of adjacent movement areas.

Table 4-20 – Apron and Tie-Down Space

Tie-Downs	Surface Type	Approximate Size per Tie-Down (SY)
Up to 46	Asphalt/Concrete	265

Note: Approximate sizing requirement based on dimensions of a King Air 200 (a single-engine aircraft), which has an overall length of 43.77 feet and a 54.49-foot wingspan.
Source: Aircraft Data Viewer (3.0), Airport District, CHA, 2019/2020.

The FBO advised that additional apron space will be needed to accommodate transient and itinerant aircraft. Areas capable of accommodating these aircraft will be further evaluated in **Chapter 5**.

Cargo Apron
In addition to the terminal apron utilized by the airlines and the GA apron area utilized by the FBO, this Study identified apron requirements to support cargo operations at ECP. As discussed in **Chapter 3**, ECP does not receive scheduled cargo service via cargo integrators; however, one daily flight (two operations) is performed five days a week seasonally through UPS's contract feeder carrier (Martin Aviation, LLC) via a Cessna 208 Caravan.

The dedicated cargo apron is located on the west side of the airfield, south of the terminal. The cargo apron measures approximately 1,130 SY; however, 150 SY is used for parking ground equipment, thus leaving about 970 SY for aircraft parking and maneuvering. Annual cargo operations utilized cargo aircraft (Cessna 208 Caravan), and peak month average day departures were analyzed to determine if the current cargo apron can support future growth. Based on the cargo forecast identified in **Chapter 3**, **Table 4-21** shows the projected demand for cargo operations throughout the forecast period.

Table 4-21 – Annual Cargo Operations Forecast

PMAD Cargo Operations	2018	Base	PAL 1	PAL 2	PAL 3	PAL 4
Annual Operations	390	397	437	480	512	546
Annual Departures	195	199	218	240	256	273
Peak Month Departures	22	23	25	27	29	31
PMAD Departures	1	1	1	1	1	1

Note 1: Units are in Square Yards (SY).
Source: FAA Aerospace Forecast (FY 2019-2039), Boeing World Air Cargo Forecast (2018-2037), Airbus Global Market Forecast (2018-2037), CHA, 2019/2020.

The apron footprint, or the area of space the aircraft fleet occupies, for the fleet mix operating at ECP was calculated by multiplying the aircraft wingspan by the length of the aircraft. To determine the apron requirement, a safety area of 25 feet was added to the wingspan and to the length prior to determining the area required for the operation of ground support equipment associated with loading and unloading the aircraft. At ECP, cargo operations are currently flown via Cessna 208 Caravans. It was assumed that the Cessna 208 Caravan, or an aircraft of similar size, will be the primary cargo aircraft utilized at ECP throughout the planning horizon.

Table 4-22 – Cargo Fleet Mix Apron Sizing

Aircraft Type	Wingspan (Ft.)	Length (Ft.)	Footprint (SF)	Apron Requirement (SF)	Apron Requirement (SY)
Cessna 208 Caravan	52.09	41.66	2,170	5,139	571

Source: Aircraft Data Viewer (Version 3.0), CHA, 2020.

Since the Cessna 208 Caravan, or an aircraft of similar size, is the only aircraft type to use the apron now and in the foreseeable future, the Cessna 208 Caravan was assumed as the most demanding aircraft for this evaluation. Total apron space, shown in **Table 4-23**, was determined by taking the most demanding aircraft utilizing the air cargo apron and multiplying it by the PMAD departures.

Table 4-23 – PMAD Air Cargo Apron Space

Activity	2018	Base	PAL 1	PAL 2	PAL 3	PAL 4
Cessna 208 Caravan Apron Requirement (SY)	571	571	571	571	571	571
PMAD Departures	1	1	1	1	1	1
PMAD Aprons Space Requirement (SY)	571	571	571	571	571	571
Supply	970	970	970	970	970	970
Surplus/(Deficit)	**399**	**399**	**399**	**399**	**399**	**399**

Source: Aircraft Data Viewer (Version 3.0), CHA, 2020.

Upon evaluation, the cargo apron has capacity in the base year of approximately 399 SY, which is projected to stay stagnate through PAL 4; therefore, the cargo apron is able to support the current operations, as well as projected operations.

It is important to note that if the Airport's actual cargo operations were to exceed those projected, the apron will not be able to handle aircraft simultaneously, as the apron would have a deficit of 172 SY for one additional aircraft; therefore, the Airport District should continue monitoring cargo activity throughout the forecast horizon.

4.4 CROSSWIND RUNWAY ANALYSIS

As discussed in previous sections, a crosswind runway has been analyzed for ECP. Consistent with the national and local forecast growth of general aviation aircraft use, previous planning, design and construction for ECP included this future crosswind runway. The runway is intended to be 3,600 feet long by 100 feet wide, accommodating up to ARC B-II aircraft with precision approach capability and visibility minimums of less than ¾ mile. As noted in **Table 4-25**, this runway is needed to supplement the primary Runway 16/34 by providing greater crosswind coverage, specifically for the smaller A/B-I and -II aircraft operating at the Airport.

Considering the immediate operator needs, the desire to accommodate commercial aircraft, and the limits of the previous environmental approvals and site preparation, it is recommended that the exiting site footprint be utilized for construction of a runway capable of accommodating up to B-II corporate aircraft and with infrastructure capable of readily extending the runway to accommodate C/D-III commercial aircraft in the future.

4.4.1 Crosswind Coverage

A wind coverage analysis was performed on the existing Runway 16/34 to determine if a crosswind runway was still necessary, now that the Airport's AWOS has been operational and collecting wind data for more than 10 years. As stated in **Section 4.3.1**, it is a FAA recommendation that the runway system at an airport be oriented to provide at least 95 percent wind coverage. This means that 95 percent of the time in a given year, the crosswind coverage at an airport is within acceptable limits for the types of aircraft operating on the runways.

Two different wind analyses were conducted. The first method utilized conventional FAA-reported data (obtained through the NOAA Integrated Surface Database) to determine All-Weather, VFR, and IFR wind conditions on the existing Runway 16/34, the planned crosswind runway (Runway 3/21), and combined coverage. Discrepancies found in this data yielded a second analysis that used raw data reported directly from the AWOS, still obtained through the NOAA Integrated Surface Database. This method analyzed the AWOS wind observations directly and yielded different results. A future analysis of this raw data was manipulated to only show observations during the Airport's typical operational period of 6:00 am to 10:00 pm. Despite the discrepancies, the FAA-provided data analysis is shown in **Table 4-24**, as it also presents VFR and IFR coverage (unable to be determined with the raw data method). **Table 4-25** shows the adjusted wind analysis coverage.

Table 4-24 – ECP Wind Coverage (FAA Reported Data)

Condition	Runway	10.5 Knots	13 Knots	16 Knots	20 Knots
All Weather	Runway 16/34	96.70%	98.42%	99.61%	99.91%
	Runway 3/21 (Future)	93.77%	96.67%	99.12%	99.82%
	Combined	98.94%	99.65%	99.91%	99.98%
VFR	Runway 16/34	96.73%	98.50%	99.68%	99.95%
	Runway 3/21 (Future)	93.99%	96.82%	99.19%	99.86%
	Combined	99.00%	99.70%	99.94%	99.99%
IFR	Runway 16/34	96.45%	98.03%	99.32%	99.78%
	Runway 3/21 (Future)	92.58%	95.92%	98.80%	99.64%
	Combined	98.63%	99.44%	99.78%	99.90%

Source: FAA Wind Rose Generator/NOAA ISD, CHA, 2019.

Table 4-25 – ECP Runway 16/34 Wind Coverage (Raw AWOS Data)

All-Weather	10.5 Knots	13 Knots	16 Knots	20 Knots
24 Hour Period	94.83%	97.30%	99.18%	99.76%
6:00 AM – 10:00 PM	91.04%	95.52%	98.89%	99.67%

Source: ECP AWOS/NOAA ISD, CHA, 2019.

As shown in **Table 4-25**, the current single -runway configuration (Runway 16/34) at ECP provides wind coverage greater than the FAA recommended 95 percent for the Airport's design aircraft. Given that the crosswind runway would be initially designed only for Group A and B aircraft, attention was given only to the lower crosswind components (10.5-knots and 13-knots).

The existing runway had sufficient coverage at 10.5-knots in fewer than 95 percent of the observations. In instances where there was a crosswind at this level, it would create issues for the smallest Group A aircraft attempting to takeoff or land in this direction. In these cases, the crosswind runway layout would provide a safe alternative direction for these aircraft to land. During the Airport's typical operational period of 6:00 am to 10:00 pm, the 10.5-knot crosswind component was significantly lower, and the 13-knot component drops to just over 95 percent. In these cases, the Group B aircraft are impacted as well.

4.4.2 Future Crosswind Runway Length and Design Aircraft

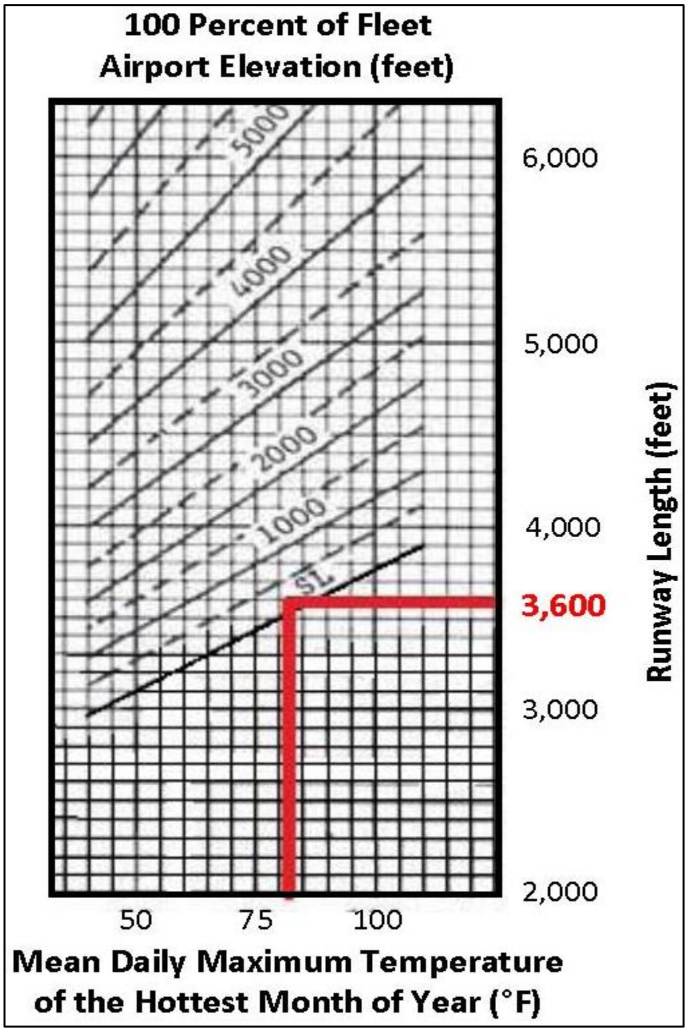
The original planning, design, environmental approval and construction of the Airport accounted for the development of a 5,001-foot long by 100-foot wide crosswind runway in the 3/21 orientation (validated by wind coverage analyses). As discussed, those affected most by the wind coverage deficiency identified earlier are the smaller GA aircraft. AC 150/5325-4B states that the runway length for a crosswind runway serving non-scheduled operations should be at least equal to 100 percent of the recommended runway length determined for the lower crosswind airplanes using the primary runway. For ECP, this grouping includes the large number of based and transient, ARC A/B-I aircraft operating at the Airport. The activity forecasts presented in **Chapter 3** indicate there were 104 based GA aircraft and 40,579 GA operations at ECP in 2018, with a large majority of these being comprised of A/B-I recreational and training aircraft.

AC 150/5300-13A provides a listing of common A/B-I aircraft to be used for facility planning purposes, all of which are categorized with a maximum certificated takeoff weight (MTOW) of 12,500 pounds or less, approach speeds of 50 knots or more, and less than 10 passenger seats. Following FAA methodology, other parameters specific to ECP include the mean daily maximum temperature of the hottest month of the year (90.6° F - *NOAA*), the Airport's elevation (68.8 feet MSL), and the percentage of the GA fleet to be accommodated. The two fleet options are:

- 95 percent – For airports that are primarily intended to serve medium size population communities with a diversity of usage and a greater potential for increased aviation activities.
- 100 percent – For airports that are primarily intended to serve communities located on the fringe of a metropolitan area or a relatively large population remote from a metropolitan area.

Given that ECP is located in the Panama City metropolitan area and serves a large population of the Northwest Florida region, the percentage of 100 was selected for the evaluation. Using these parameters, and the performance curves provided in AC 150/5325-4B (presented in **Figure 4-6**) an estimated bare minimum crosswind runway length of 3,600 feet is needed to accommodate these types of aircraft.

Figure 4-6 – Runway Length for Small Airplanes with Fewer than Ten Seats



Source: AC 150/5325-4B, *Runway Length Requirements for Airport Design*

Based on these standards and the amount of operations reported in the 2018 TFMSC, the small GA aircraft with the most operations at ECP are shown in **Table 4-26**.

Table 4-26 – Group A and B Operations at ECP (2018 TFMSC)

Aircraft	Design Group	Total 2018 TFMSC Operations
Cirrus SR 22	A-I	1,024
Cessna Citation I	B-I	1,088
Cessna Citation II	B-II	468
Beechcraft King Air 200	B-II	959
Beechcraft King Air 350	B-II	923

Source: 2018 FAA Traffic Flow Management System Count, CHA, 2019.

Given that it is the most demanding (B-II) aircraft with the highest number of operations, the King Air 200 has been established as the design aircraft for the planned crosswind runway.

4.4.3 Ultimate Crosswind Runway Length

AC 150/5325-4B also recommends that potential future airport and operator needs be considered when evaluating runway development. If a runway were constructed to the bare minimum requirements/standards, it could result in operational limitations to larger aircraft in need of that runway at any given time. With the current site already prepared for a 5,000-foot long by 100-foot wide (ADG II) runway, and with the FAA forecasted growth in corporate traffic, it may prove prudent, in the long-run, to construct a runway that is at least capable of accommodating business aircraft (up to ARC B-II).

Due to their varying performance characteristics, the FAA also recommends that runway length requirements be evaluated for the individual aircraft (up to B-II) the runway is intended to serve. Based on flight data collected from the Airport, **Table 4-27** identifies some of the more demanding B-II business jet aircraft that operate at ECP and their required runway lengths.

Table 4-27 – Runway Length Requirements for Business Aircraft

Aircraft	Max Takeoff Weight	Takeoff Distance ISO (Dry)	Landing Distance ISO (Dry)	Landing Distance ISO (Wet)
Cessna 550 Citation II	13,300 lbs.	3,450 feet	2,078 feet	2,390 feet
Cessna 550 Citation Bravo	14,800 lbs.	3,600 feet	2,517 feet	2,895 feet
Cessna 560 Citation Excel	20,000 lbs.	4,060 feet	4,995 feet	5,744 feet
Dassault Falcon 50	38,800 lbs.	4,700 feet	2,150 feet	2,473 feet
Embraer Phenom 300	17,526 lbs.	3,707 feet	2,953 feet	3,396 feet

Takeoff distance is based on maximum takeoff weight and no effective gradient.
Landing Distance is based on maximum landing weight and no wind.
Wet Landing Distance is calculated using the guidance in AC 91-79 “Runway Overrun Prevention.”
ISO = Sea Level at 59 Degrees Fahrenheit.
Source: Aircraft performance manuals, CHA, 2019.

This evaluation affirms that in most conditions a runway would need to be at least 5,000 feet in length to meet the requirements of most B-II corporate jet aircraft currently serving ECP. An evaluation was performed to determine the minimum length needed to effectively accommodate the current and future critical design aircraft during times when Runway 16/34 may be closed due to maintenance/repair activities or in the unfortunate event of an incident or accident. Airline and ATC staff have also indicated that, along with the regional jets, there are currently occasions when narrowbody aircraft such as the Boeing MD-88 (ARC D-III) could utilize the runway during a strong crosswind. As the fleet transitions commensurate with recent airline trends and the forecasts presented in **Chapter 3**, there would be more occasions when the B737-800 may also prefer to utilize the crosswind runway.

Based on the landing length requirements previously determined for the primary runway (**Section 4.3.1**), a 6,700-foot runway is needed accommodate the landing of a B737-800/BBJ-2 in wet conditions. A 6,800-foot runway would provide access to the markets of Washington, DC, Chicago, Denver, Mexico, the Caribbean, Canada, and possibly Puerto Rico. A 7,500-foot runway could provide access as far west as Las Vegas and to additional markets in Mexico and the Caribbean. Approximately 8,500 feet would be needed to service the west coast markets and the critical design aircraft would need 8,700 feet to operate at maximum takeoff weight particularly during the hotter summer months.

To accommodate the full range of aircraft utilizing ECP, it is recommended that the ultimate runway length be 7,500 feet.

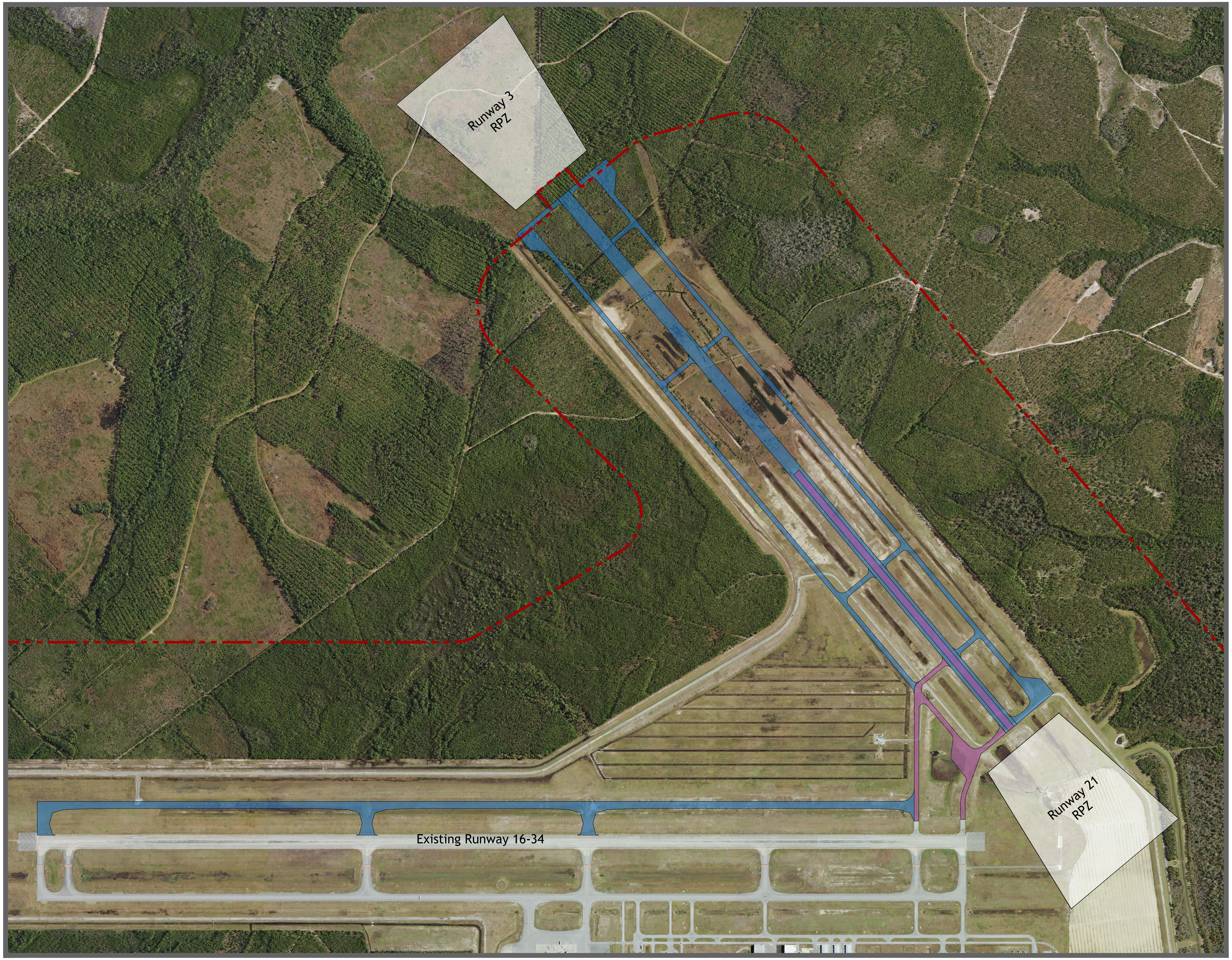
4.4.4 Approach NAVAIDs and Procedures

Both ends of the crosswind runway are portrayed on the Airport's previous ALP as eventually being equipped with CAT-I ILS. While having precision instrument approach capability would be ideal, it may not be viable upon initial construction of the runway. Because of this, a phasing plan could be implemented to initiate the runway with visual approach capability, and as it becomes warranted or feasible, improve to a non-precision (RNAV/GPS) or precision approach system (LPV or CAT-I ILS). Further obstruction analysis and coordination with the FAA would be needed before precision approaches could be implemented.

In planning for an ultimate approach scenario, an evaluation of the potential precision approach RPZs was necessary. Occupying approximately 79 acres, a precision approach RPZ would fall within the Airport's bounds on the Runway 3 end; however, the property on the north end would need to be acquired in order to envelope the RPZ for Runway 21.

4.4.5 Crosswind Runway Recommendation

With these considerations in mind, and with respect to financial prudence, a phased development of the crosswind runway is recommended. To serve the broadest range of users, and to provide the needed utility to air traffic control and the airlines, the first phase of development should be no less than 3,600 feet long and 150 feet wide. Continued planning and ongoing airport development should also preserve adequate space to extend Runway 3/21 to at least 7,500 feet as market conditions and traveler needs develop. The airlines have also indicated that 7,500 feet is a common minimum operating preference. This strategy will also assist the region in capitalizing on the investment and development potential of this new airport facility. **Figure 4-7** depicts the phased runway development, the needed ±160 acres of land acquisition, and the major C/D-III design standards.



NORTHWEST FLORIDA
BEACHES INTERNATIONAL AIRPORT

MASTER PLAN UPDATE

GRAPHIC SCALE (FEET)
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LEGEND

- Initial Phase (3,600' x 75')
- Ultimate Phase (7,500' x 150')
- Runway Protection Zone (RPZ)
- Airport Property Line

Figure 4-7
Crosswind Runway 3/21 - Recommended Configuration

4.5 PASSENGER TERMINAL BUILDING FACILITY REQUIREMENTS

The Airport's terminal facility requirements were developed for the functional spaces within the terminal building. Industry standards and best practice guidelines were used to develop the facility requirements using a series of assumptions discussed later in this section. These assumptions were used as inputs into formulas from the International Air Transport Association (IATA) Airport Reference Development Manual (ADRM). Other reference material used in developing requirements includes:

- Input from ECP
- Transportation Security Administration (TSA), *Recommended Security Guidelines for Airport Planning, Design and Construction* and *Checkpoint Design Guide (CDG)*
- ACRP, *Report 25: Airport Passenger Terminal Planning and Design Guidebook*
- ACRP, *Report 130: Guidebook for Airport Terminal Restroom Planning and Design*
- Time-Saver Standards for Interior Design and Space Planning

This section summarizes the terminal facility requirements for the functional areas analyzed.

4.5.1 Existing Facilities

As part of the development of terminal facility requirements, an analysis of the existing terminal functional areas is required. Functional areas equate to net floor space needed to accommodate a specific function such as ticketing, circulation, baggage make-up, bag cart circulation, etc. The existing terminal spaces are categorized into the following main functional areas:

- Ticketing/Check-in Lobby
- Checked Baggage Inspection System (CBIS) and Baggage Make-up (BMU)
- Passengers Security Screening Checkpoint (SSCP)
- Holdrooms
- Baggage Claim Lobby and Inbound Baggage Handling
- Concessions
- Rental Car Facilities
- Other Areas

Functional area take-offs were done from plans provided by ECP and are represented in the following sections. The existing lower level and upper level plans are shown in **Figure 4-8** and **Figure 4-9**.

NORTHWEST FLORIDA BEACHES INTERNATIONAL AIRPORT

MASTER PLAN UPDATE

ROOM SCHEDULE LEVEL 1

Rm #	Name	Area
1238	CONFERENCE	855 SF
1152	BREAK ROOM	269 SF
1238-1	COFFEE	79 SF
1101	GOODWILL JANITORIAL SERVICES SPACE	915 SF
1135	ELEC RM	81 SF
1136	COMM RM	73 SF
1130	CORRIDOR	457 SF
1139	MACHINE RM	71 SF
1114-2	RENTAL CAR	174 SF
1114-1	RENTAL CAR COUNTER	154 SF
1115-2	RENTAL CAR	201 SF
1116-2	RENTAL CAR	201 SF
1117-2	RENTAL CAR	201 SF
1118-2	RENTAL CAR	191 SF
1119	MEN	329 SF
1120	WOMEN	322 SF
1121	BUSINESS CENTER	500 SF
1121-1	STORAGE	46 SF
1121-2	SLEEPING AREA	79 SF
1115-1	RENTAL CAR COUNTER	154 SF
1116-1	RENTAL CAR COUNTER	154 SF
1117-1	RENTAL CAR COUNTER	154 SF
1118-1	RENTAL CAR COUNTER	146 SF
1121-3	OFFICE	54 SF
1123	INFO	140 SF
#1	ELEV	78 SF
1111	BAGGAGE SERVICE	120 SF
1111A	BAGGAGE STOR.	115 SF
1110	BAGGAGE STOR.	169 SF
1109	MACH. RM.	49 SF
1132	VESTIBULE	223 SF
1126	KITCHEN	462 SF
1200-1	NAVY TEST BED EVALUATION CENTER	213 SF
#2	ELEV	75 SF
1200	SCREENING	2500 SF
1202	BREAK ROOM	372 SF
1203	TRAINING	372 SF
1204	SCREEN MGRS	187 SF
1205	SECURITY INSP.	162 SF
1206	DRSD/ARSD	199 SF

ROOM SCHEDULE LEVEL 1

Rm #	Name	Area
1208	PRIVATE SCREEN	114 SF
1210	M-LOCKER	70 SF
1212	MACH. RM.	37 SF
1213	W-LOCKER	49 SF
#5	ELEV.	58 SF
1215	ELEV. LOBBY	144 SF
1216	AIRPORT POLICE	395 SF
1219	ELEC. RM.	52 SF
1218	BREAKROOM	78 SF
1217	RESTROOM	70 SF
1220-1	STORAGE	149 SF
1220-2	SECURE STOR.	100 SF
1220	TSA OPERATION	263 SF
1221	COMM. RM.	77 SF
1222	FILE ROOM	172 SF
1225	SHOWER RM	92 SF
1224	WOMEN	285 SF
1223	MEN	284 SF
1226	JAN SUPPLY RM	69 SF
1240	FAMILY RESTROOM	72 SF
1227	CORRIDOR	298 SF
1228	OPERATION	263 SF
1228-4	TEL./ SERVER CLOSET	144 SF
1228-5	ELEC. RM.	111 SF
1228-6	CORRIDOR	204 SF
1228-10	AIR TRAFFIC CONTROL OFFICE	143 SF
1228-1	BREAK ROOM	214 SF
1228-3	LOCKERS	159 SF
1228-7	OFFICE	139 SF
1228-9	LEAD OFF	212 SF
1229	BREAK ROOM	335 SF
1229-1	FAA TECH OPERATIONS	80 SF
1229-2	OFFICE	110 SF
1229-4	OPERATION	171 SF
1211	CORR.	58 SF
1209	PROPERTY RM.	43 SF
1231	AMERICAN AIRLINES / ATO OFFICES	758 SF
1231-D	STORAGE	117 SF
1231-E	CONFERENCE / TRAINING RM.	149 SF
1231-H	ADMIN. OFFICE	145 SF

ROOM SCHEDULE LEVEL 1

Rm #	Name	Area
1231-J	CHECK OUT	137 SF
1231-C	COMM. RM.	102 SF
1231-F	STATION MANAGER OFFICE	151 SF
1231-G	CSA SUPERVISOR OFFICE	135 SF
1231-B	BREAK ROOM	426 SF
1231-L	COPY RM.	88 SF

ROOM SCHEDULE LEVEL 1

Rm #	Name	Area
1305	BREAK RM.	163 SF
1304	TLT.	67 SF
1231-A	CORR.	845 SF
1311	SUPERVISOR OFFICE & SERVER	121 SF
1303A	SERVER RM.	85 SF
1303	TSA SUPERVISOR OFFICE	181 SF
1207	CORRIDOR	281 SF
1201A	CORR.	230 SF
1230	CORRIDOR	991 SF
1310	TENANT COMM. ROOM	140 SF
1309	BAGGAGE HANDLING SYSTEM SERVICE PROVIDER	246 SF
1308	COMM. RM.	264 SF
1307	POWER	197 SF
1312	RAMP	195 SF
1302	ETD	1266 SF
1301	BHS	6657 SF
1306	BAGGAGE MAKE-UP AREA	5862 SF
1127	RESTAURANT	332 SF
1108	DOM. BAGGAGE CLAIM	9576 SF
1114	CORRIDOR	433 SF
1239	CONCESSION	516 SF
1128	VESTIBULE	101 SF
1234	VESTIBULE	101 SF
1235	VESTIBULE	101 SF
1113	VESTIBULE	100 SF
1155	ARRIVAL HALL	4452 SF
1131	INTERIOR COURT	4374 SF
1201	QUEING AREA	4961 SF
1237	DEPARTURE LOBBY	6562 SF
1124	CONNECTOR HALL	1873 SF
1406	SECURITY	316 SF

ROOM SCHEDULE LEVEL 1

Rm #	Name	Area
1408	COMM. ROOM	164 SF
1407	COMM. ROOM	140 SF
1400	ELEVATOR LOBBY	116 SF
1401	FIRE PUMP RM.	163 SF
1402	ELEC. RM.	154 SF
1404	CONCESSION STORAGE	1006 SF
1405	GSE OFFICE	302 SF
1409	MECH. RM.	1183 SF
1410	SOUTHWEST AIRLINES STORAGE	390 SF
1411	ELEC. RM.	98 SF
1412	TEL. RM.	47 SF
1413	SOUTHWEST AIRLINES STORAGE	102 SF
1414	TLT	66 SF
1415	TLT	97 SF
1416	STORAGE RM.	123 SF
1417	ELEV. EQUIP. RM.	73 SF
1418	HOLDROOM	1413 SF
1133	BAG SERVICE OFFICE (BSO)	90 SF
1134	SOUTHWEST AIRLINES OPERATIONS	2291 SF
1137	AIRPORT STORAGE	1237 SF
1138	RECORD STORAGE	347 SF
1140	DELTA STORAGE	244 SF
1141	CORRIDOR	575 SF
1122	INFORMATION KIOSK & MAPS	23 SF
1131-1	UNITED AIRLINES OPERATIONS	1067 SF
Grand total: 142		81914 SF

DEPT. LEGEND

- AIRPORT SUPPORT
- BAGGAGE CLAIM
- CAR RENTAL
- CHECK-IN LOBBY
- CIRCULATION
- CONCESSIONS / TENANT
- HOLDROOM
- MEP
- OUTBOUND BAGGAGE
- TSA
- USCBP

AREA SCHEDULE L1

Name	Area
LEVEL 1	
AIRPORT SUPPORT	4,202 SF
BAGGAGE CLAIM	9,582 SF
CAR RENTAL	2,278 SF
CHECK-IN LOBBY	13,876 SF
CIRCULATION	20,856 SF
CONCESSIONS / TENANT	9,416 SF
HOLDROOM	1,148 SF
MEP	2,459 SF
OUTBOUND BAGGAGE	5,944 SF
TSA	15,150 SF
USCBP	728 SF
Grand total: 33	85,639 SF

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GRAPHIC SCALE (FEET)

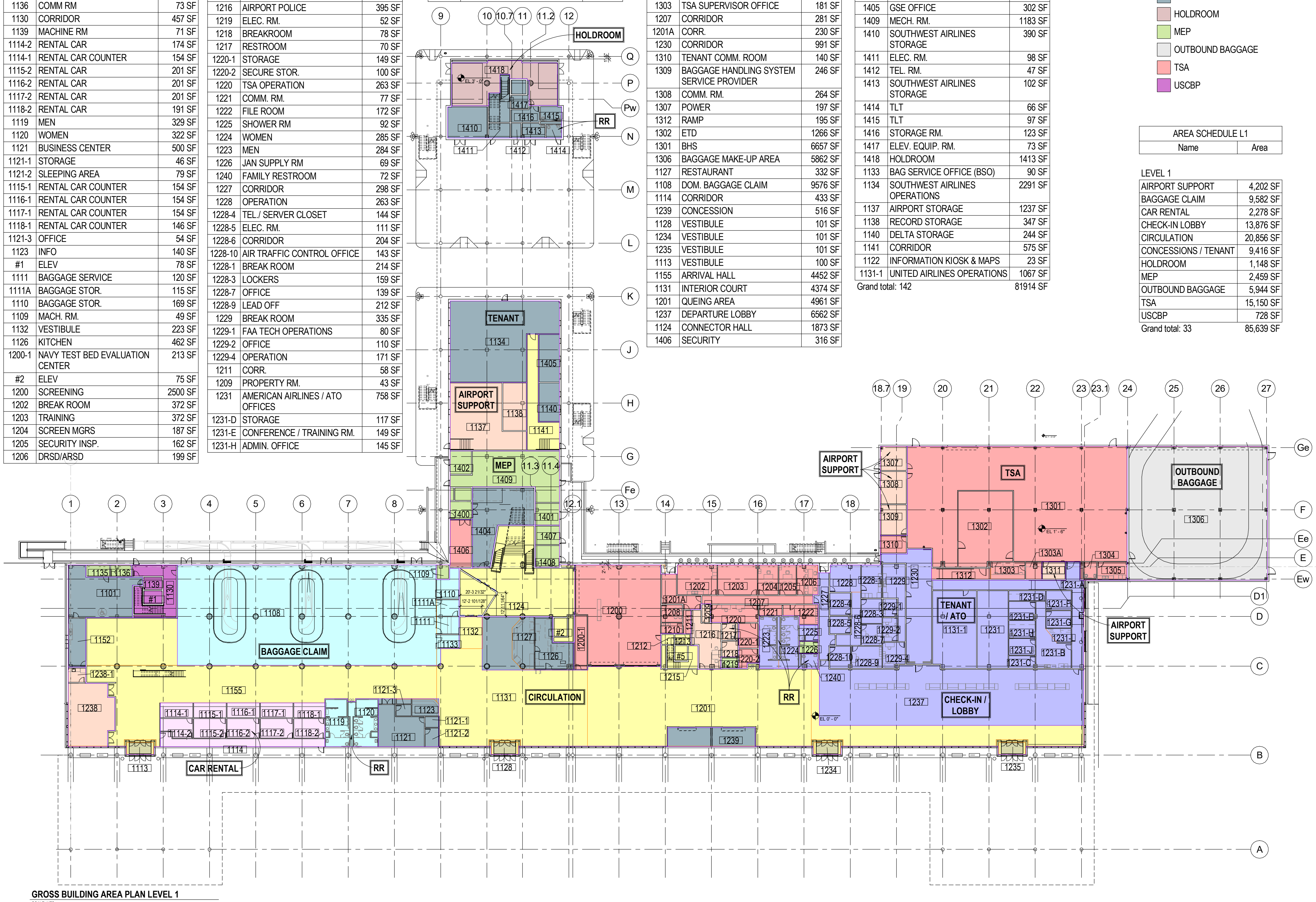


Figure 4-8
Functional Area Layout - Existing Level 1 Floor Plan

PREPARED BY LEO A DALY
10 Tenth Street N.E., Suite 200
Atlanta, GA 30309, Tel 404.874.8333

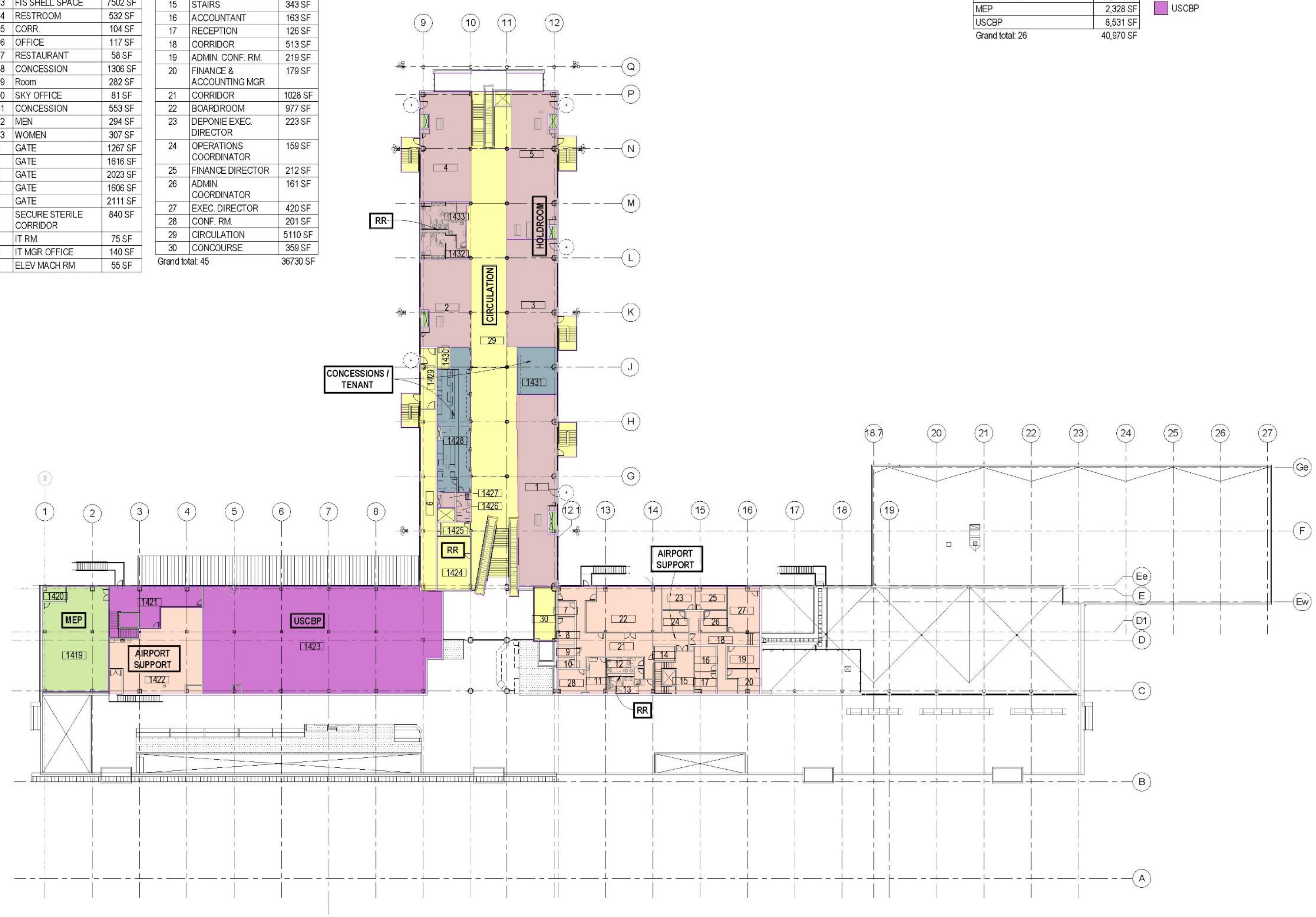
Figure 4-9 – Functional Area Layout – Existing Level 2 Floor Plan

ROOM SCHEDULE LEVEL 2		
Rm #	Name	Area
1419	MECH. EQUIP.	1970 SF
1420	MECH	106 SF
1421	FIS EXIT CORRIDOR	857 SF
1422	USO OFF. SPACE FUTURE CBP	1838 SF
1423	FIS SHELL SPACE	7502 SF
1424	RESTROOM	532 SF
1425	CORR.	104 SF
1426	OFFICE	117 SF
1427	RESTAURANT	58 SF
1428	CONCESSION	1306 SF
1429	Room	282 SF
1430	SKY OFFICE	81 SF
1431	CONCESSION	553 SF
1432	MEN	294 SF
1433	WOMEN	307 SF
2	GATE	1267 SF
4	GATE	1616 SF
5	GATE	2023 SF
3	GATE	1606 SF
1	GATE	2111 SF
6	SECURE STERILE CORRIDOR	840 SF
7	IT RM.	75 SF
8	IT MGR OFFICE	140 SF
9	ELEV MACH RM	55 SF

ROOM SCHEDULE LEVEL 2		
Rm #	Name	Area
10	STOR.	55 SF
11	BREAK RM.	216 SF
12	MEN	144 SF
13	WOMEN	197 SF
14	ELEC RM.	87 SF
15	STAIRS	343 SF
16	ACCOUNTANT	163 SF
17	RECEPTION	126 SF
18	CORRIDOR	513 SF
19	ADMIN. CONF. RM.	219 SF
20	FINANCE & ACCOUNTING MGR	179 SF
21	CORRIDOR	1028 SF
22	BOARDROOM	977 SF
23	DEPONIE EXEC. DIRECTOR	223 SF
24	OPERATIONS COORDINATOR	159 SF
25	FINANCE DIRECTOR	212 SF
26	ADMIN. COORDINATOR	161 SF
27	EXEC. DIRECTOR	420 SF
28	CONF. RM.	201 SF
29	CIRCULATION	5110 SF
30	CONCOURSE	359 SF
Grand total: 45		36730 SF

AREA SCHEDULE L2	
Name	Area
LEVEL 2	
AIRPORT SUPPORT	8,590 SF
CIRCULATION	9,822 SF
CONCESSIONS / TENANT	1,929 SF
HOLDROOM	9,769 SF
MEP	2,328 SF
USCBP	8,531 SF
Grand total: 26	40,970 SF

DEPT. LEGEND
- AIRPORT SUPPORT
- CIRCULATION
- CONCESSIONS / TENANT
- HOLDROOM
- MEP
- USCBP



GROSS BUILDING AREA PLAN LEVEL 2

Source: Leo A Daly, October 2019.
Prepared by: AGD Associates LLC, February 2020.

The major airlines serving ECP include American Airlines (AA), Delta Air Lines (DL), Southwest Airlines (WN) and United Airlines (UA). As part of the existing facility analysis and facility requirements development, the space was analyzed as a complete system for each functional category and not subdivided by the individual airlines. In some cases, functional areas being used for other purposes were included as part of the total functional area for that category. As an example, Airport Operations is occupying space that would be classified as check-in facilities, thus the space has been categorized as check-in facilities.

Check-in Lobby

The check-in lobby consists of the functional spaces between the landside wall adjacent to the curb to the airline ticket offices (ATO) typically located behind the check-in facilities. The functional areas include: any entry vestibules; non-secure public circulation; public amenities such as restrooms or seating areas; airline check-in facilities to include full-services agent positions, self-service kiosk positions and bag drop positions; queuing areas for check-in facilities, active check-in area for the various check-in facilities; and other miscellaneous spaces located in the check-in lobby, proper. At ECP, it was also assumed that some airline operations functions are accommodated in the ATO, as is typical at comparable airports. **Table 4-28** shows the area of the various elements of the existing check-in lobby.

Table 4-28 – Existing Check-In Lobby Functional Areas

Check-in Lobby	# of Positions	Sizing	Notes
Active Check-in Facilities	28 Pos	2,637 SF	16 full-service agent/bag drop positions, 12 self-serve kiosk positions
Check-in Queue Area		2,050 SF	Queue area marked by stanchions, not defined on plans
Airline Ticketing Office (ATO)		6,606 SF	Includes airline operations functional area
Airline Operations		1,147 SF	Includes airline operations functional area
Circulation		3,134 SF	Area between queue and landside walls, vestibules, etc., not defined on plan
Public Restrooms		758 SF	
Total Check-In Lobby		**16,332 SF**	

Source: Leo A Daly CAD Floor Plans, AGD Floor Plan Analysis, January 2020.
Prepared by: AGD Associates LLC, February 2020.

Checked Baggage Inspection System (CBIS) and Baggage Make-Up (BMU)

The Checked Baggage Inspection System (CBIS) functional space includes the area needed for baggage screening equipment such as expLOSive detection system (EDS) machines, on-screen resolution (OSR) or electronic trace detection (ETD) and Checked Baggage Reconciliation Area (CBRA) stations, as well as the conveyor equipment needed to queue the baggage before and after the CBIS equipment. The baggage make-up (BMU) area consists of an accumulation device to collect bags once they have been screened, a cart staging area adjacent to the accumulation device, and circulation space for baggage tug and cart maneuvering. **Table 4-29** shows the area of the various elements of the existing CBIS and baggage make-up functions.

Table 4-29 – Existing CBIS and Baggage Make-Up Areas

Checked Baggage Inspection System (CBIS) and Baggage Make-up	Sizing	Notes
CBIS Area	9,892 SF	Includes area EDS and CBRA stations
Outbound Baggage Make-up Area	5,540 SF	
Total CBIS and Baggage Make-Up Area	**15,432 SF**	

Source: Leo A Daly CAD Floor Plans, AGD Floor Plan Analysis, January 2020.
Prepared by: AGD Associates LLC, February 2020.

SSCP

The Security Screening Checkpoint (SSCP) at ECP is used for all passenger and employee screening. The functional areas within the SSCP include queuing space, Transportation Security Administration (TSA) passenger screening lanes (consisting of document check positions, walk-through metal detectors, carry-on baggage screening machines/devices, advanced imaging technology (AIT) whole-body imaging devices, passenger divestiture and recomposing areas), and TSA space to support the passenger/employee screening operations. **Table 4-30** shows the area of the various elements of the existing SSCP functions.

Table 4-30 – Existing Security Screening Checkpoint (SSCP)

Passenger Security Screening Checkpoint (SSCP)	Sizing	Notes
Security Screening Checkpoint	9,073 SF	No layout provided showing lanes
TSA Other Spaces	6,914 SF	
Total Passenger SSCP	**15,987 SF**	

Source: Leo A Daly CAD Floor Plans, AGD Floor Plan Analysis, January 2020.
Prepared by: AGD Associates LLC, February 2020.

Holdrooms

Holdrooms at ECP are located on the second level (Gates 1 – 5) and on the ground level (Gates 6 and 7). There are designated areas for seating and passenger enplaning and deplaning, as well as a separate corridor for access to and from the holdroom areas. Holdrooms on the second level are equipped with passenger boarding bridges for enplaning and deplaning passengers. Holdrooms at the lower level currently ground load and unload passengers from aircraft. ECP is in the process of a holdroom expansion project to expand the ground level holdroom area, which is expected to be operational in mid-June 2020. The expansion project includes a 112-foot by 64-foot building ground-level expansion to house additional holdroom space, restrooms, concessions, and circulation area. Additionally, the expanded lower level holdroom will include passenger boarding bridges for enplaning and deplaning passengers. **Table 4-31** shows the various elements of the existing holdroom functional areas.

Table 4-31 – Existing Holdrooms

Holdroom Areas	-
Number of Gates	7
Holdroom Area	14,688 SF
Circulation, Restrooms, Amenities	7,356 SF
Total Holdroom Areas	**22,044 SF**

Source: Leo A Daly CAD Floor Plans, ECP Holdroom Expansion Project, AGD Floor Plan Analysis, January 2020.
Prepared by: AGD Associates LLC, February 2020.

Baggage Claim Lobby and Inbound Baggage

The existing baggage claim lobby has three baggage claim devices with active queue and baggage retrieval areas. Additionally, the lobby includes airline baggage storage rooms, entry vestibules, non-secure public circulation, and public amenities, such as restrooms and seating areas. The rental car facilities are adjacent to the baggage claim lobby and share the public circulation corridor with the baggage claim function. Inbound baggage drop-off areas occupy space in the non-public secure area adjacent to the baggage claim lobby separated by a wall. This area includes the load conveyor belt, the bag tug and cart parking area adjacent to the load belt and the drive aisle. **Table 4-32** shows the area for the various elements of the baggage claim and inbound baggage areas.

Table 4-32 – Existing Baggage Claim Lobby

Baggage Claim Lobby	Units	Sizing	Notes
Baggage Claim Device	3	2,117 SF	110 linear frontage (LF) per device, 330 LF total
Baggage Claim Active Queue/Bag Retrieval Area		6,105 SF	
Public Circulation		2,874 SF	
Other Areas		1,242 SF	Baggage storage and restrooms
Inbound Baggage		5,271 SF	
Rental Car Facilities		1,803 SF	Includes counter and office
Total Baggage Claim Lobby		**19,412 SF**	

Source: Leo A Daly CAD Floor Plans, AGD Floor Plan Analysis, January 2020.
Prepared by: AGD Associates LLC, February 2020.

Concessions

Concessions at ECP can be categorized into two main groups – Pre-SSCP concessions and Post-SSCP concessions. Within each group are Food & Beverage, Retail/News & Gifts, and Specialty. A high-level space breakout is shown in **Table 4-33** for concessions space pre- and post-SSCP.

Table 4-33 – Existing Concessions

Concessions	Sizing	Notes
Pre-SSCP Concessions	1,905 SF	Includes storage areas
Post-SSCP Concessions	1,929 SF	Includes storage areas
Total Concessions	**3,834 SF**	

Source: Leo A Daly CAD Floor Plans, AGD Floor Plan Analysis, January 2020.
Prepared by: AGD Associates LLC, February 2020.

Other Functional Areas

The last major category of space is referred to as Other Areas. This category is used mainly to capture the remaining functional space within a terminal facility that is not calculated based on passenger volumes. These other areas are either a direct requirement expressed by the airport operator or a percentage of total functional areas typical at other airport terminal facilities. The functional areas contained is this category are: non-secure (pre-SSCP) public circulation not associated with other functions listed above; non-public circulation that is typically not used by the public except in emergencies – these include egress stairs and corridors as well as other non-public areas; mechanical, electrical, plumbing and building systems (walls, structure, etc.). And finally, other spaces not always included in the terminal facility but vary by airport are the Airport

Operators administrative spaces, welcome and information centers and other miscellaneous spaces such as museums. Many, if not most, of these spaces are non-revenue generating but provide significant value to the Airport users and Airport Operator.

4.5.2 Demand Capacity Analysis

Demand that drives facility requirements is typically expressed in the peak hour volume of passengers for departures and arrivals, peak hour aircraft operations, and annual passenger volumes. The peak hour passengers and operations are derived from the peak month-average day (PMAD) activities. Capacity of the facility is expressed as the number of peak hour passengers that can be processed by the existing individual processors. Facility requirements are derived using the demand parameters established from a recommended forecast along with input variables related to processing time, area per passenger, and level of service goals. This section will identify the future facility requirements to accommodate the recommended forecast discussed in **Chapter 3** (**Section 3.10**) as well as quantify the existing facility capacity expressed in annual passenger volumes.

Demand Levels

The basis for future facility requirements was the forecast developed for 2024, 2029, 2034 and 2039, which relate to a 5, 10, 15 and 20-year planning horizon. The years were converted to planning activity levels (PALs), consist with those discussed in **Section 4.1.1**. The average day of the peak month (ADPM) is used for facility requirements development, and peak hour passenger volumes and aircraft operations are used in the facility requirements analysis. The recommended forecast described in **Section 3.10** that was used to developed facility requirements is shown in **Table 4-34**.

Table 4-34 – Recommended Forecast Used for Facility Requirements

Description	PAL 1	PAL 2	PAL 3	PAL 4
Annual Enplanements	823,553	923,351	1,022,076	1,126,637
Peak Hour Deplaning Passengers (Arrivals)	976	1083	1209	1343
Peak Hour Enplaning Passengers (Departures)	974	1,081	1,207	1,340
Peak Hour Passengers (Total)	1855	2060	2299	2553
Peak Hour Operations (Flights)	17	19	20	22
Peak Hour Load Factor	82.4%	83.6%	84.9%	86.1%

Source: CHA Analysis, October 2019.
Prepared by: AGD Associates LLC, March 2020.

Facility Requirements

Facility requirements were developed to achieve an Optimum Level of Service (LOS) based on IATA's current ADRM guidelines. Optimum LOS replaced LOS C and, "over-design" and "sub-optimum" replaced LOS A and B and D and E, respectively. The goal is to achieve Optimum LOS during the peak periods, while during non-peak periods the facility would operate at a better LOS.

Requirements are developed using several variables and assumptions specifically for ECP. The variables and assumptions come from several resources such as the recommended forecast, ACRP reports, the IATA ADRM, industry best practices, and comparable airports. Comparable airports refer to airports of similar size and operational characteristics to ECP. Comparable airports used for the ECP requirements analysis include Asheville Regional Airport (AVL), Fort Wayne International Airport (FWA), and Roanoke-Blacksburg Regional Airport (ROA). Additionally, data relative to specific airline operations (kiosk and bag drop use, etc.) at other airports such as Baltimore-Washington International Thurgood Marshall Airport (BWI) and Ronald Reagan Washington National Airport (DCA) were used as reference in the analysis. Facility requirements were developed to achieve an optimum level of service based on IATA's current ADRM guidelines. **Table 4-35** through **Table 4-38** show the variables used in developing the facility requirements for ECP.

Table 4-35 – Facility Requirement Variables for Full-Service, Bag-Drop or Self-Service Positions

Full-Service / Bag Drop / Self-Service Kiosk		
Peak hour originating passengers	Varies	Based on ECP forecast
Ratio of passengers using self-service kiosks	40.0%	Assumed for ECP
Process time per passenger at self-service kiosk	120 sec	IATA
Maximum Queuing Time for self-service kiosk	2.5 min	IATA
Area Occupied by a Single Self-Service Kiosk	16.8 sf	Standalone or in-counter kiosk
Space per Person in queue	16.1 sf	IATA range 14 sf to 19 sf
Ratio of Passengers By-Passing Check-in going directly to security screening	28.0%	Comparable Airports
Ratio of Passengers By-Passing Check-in, Using Kiosk, Using Traditional Check-in	83.0%	Assumed for ECP = 28% / 40% / 15%
Process Time per Passenger at Baggage Drop (seconds)	45 sec	
Maximum Queuing Time for bag drop and full-service	10 min	IATA range 10 min to 20 min queue for bag drop position
Width of Position (Full-Service/Bag Drop/In-Counter Kiosk)	5.0 ft	See diagram
Space per Person	16.1 sf	IATA range 14 sf to 19 sf
Corridor Width	20.0 ft	
Proportion of Business/First Class Passengers (in % of PHP)	15.0%	Comparable Airports
Ratio of Passengers Using Traditional Check-in Facilities	15.0%	Comparable Airports
Process Time per Passenger at Service Desks for Economy Class Passengers	150 sec	
Process Time per Passenger at Service Desks for Business Class Passengers	180 sec	
Process Time per Passenger at Service Desks for First Class Passengers	240 sec	
Maximum Queuing Time for Economy Class Passengers	10 min	IATA range 10 min to 20 min
Maximum Queuing Time for Business Class Passengers	3 min	IATA range 3 min to 5 min
Maximum Queuing Time for First Class Passengers	2 min	IATA range 1 min to 3 min

Source: AGD Associates LLC Analysis, February 2020.
Prepared by: AGD Associates LLC, March 2020.

Table 4-36 – Facility Requirement Variables for Security Screening Checkpoint

Security Screening Checkpoint		
Peak 30-minute Factor (in % of PHP)	65.0%	ECP forecast - assume 65% of Peak Hour
Standard Lanes - Process (throughput) Time per Passenger at Security	24 sec	TSA Standard lane processing sec/pax (equals 150/lane/hour)
Pre✓ Lanes - Process (throughput) Time per Passenger at Security	15 sec	TSA Standard lane processing sec/pax (equals 240/lane/hour)
Maximum Queuing Time	15 min	IATA range 5 min to 10 min
Maximum Queuing Time Pre✓ Lanes	3 min	IATA range 1 min to 3 min
Depth of One Security Lane	100.0 ft	See diagram
Width of One Security Lane	15.0 ft	See diagram
Space per Person	11.8 sf	IATA range 11 sf to 13 sf
Egress Width Behind Lanes	20.0 ft	

Source: AGD Associates LLC Analysis, February 2020.
Prepared by: AGD Associates LLC, March 2020.

Table 4-37 – Facility Requirement Variables for Holdrooms

Holdrooms / Gates		
Aircraft Load Factor	Varies	Based on ECP forecast
Seated Ratio	75.0%	Assume for ECP
Space per Seated Person	21.0 sf	IATA range 19 sf to 24 sf
Space per Standing Person	14.0 sf	IATA range 13 sf to 16 sf
Width of the circulation corridor not including moving walkways	20.0 ft	Typical small to medium hub airport
Design aircraft wingspan - regional aircraft	81.5 ft	ECP Forecast Fleet Mix – CRJ-900
Design aircraft wingspan - narrow body	117.5 ft	ECP Forecast Fleet Mix – B737-800/A320
Wing to wing clearance	20.0 ft	Typical at most airport for power-in/push-back maneuvers
Design aircraft seating capacity - regional aircraft	79	ECP Forecast Fleet Mix – CRJ-900
Design aircraft seating capacity - narrow body	175	ECP Forecast Fleet Mix – B737-800

Notes:
1. sec = seconds
2. ft = feet
3. sf = square feet
4. min = minutes
5. PHP = Peak hour passengers

Source: AGD Associates LLC Analysis, February 2020.
Prepared by: AGD Associates LLC, March 2020.

Table 4-38 – Facility Requirement Variables for Baggage Claim and Concession

Baggage Claim		
Number of passengers in the design aircraft - Regional Aircraft (seats * LF)	64	ECP Forecast Fleet Mix – CRJ-900
Number of passengers in the design aircraft - Narrow Body (seats * LF)	148	ECP Forecast Fleet Mix – B737
Claim frontage per passenger	2.8 ft	IATA
Ratio of passengers collecting bags	75%	Assumed for ECP
Peak hour terminating passengers	Varies	Based on ECP forecast
Proportion of passengers arriving by regional aircraft	Varies	Based on ECP forecast
Proportion of passengers arriving by narrow body aircraft	Varies	Based on ECP forecast
Average claim device occupancy time per regional aircraft	15 min	IATA, Industry standard
Average claim device occupancy time per narrow body	20 min	IATA, Industry standard
Concessions		
Annual Enplaned Passengers	Varies	Based on ECP forecast
Concessions Planning Factor	15.1 sf	IATA range 8.6 to 16.1 sf per 1,000 annual enplaned passengers

Source: AGD Associates LLC Analysis, February 2020.
Prepared by: AGD Associates LLC, March 2020.

The variables used to determine rental car facilities are like the check-in variables except a 40 percent ratio of the peak 30-minute terminating passenger volume is used to determine full service and self-service rental car facilities. In most cases the various rental car agencies will request a minimum frontage for marketing and branding purposes which may not match facility requirements.

Using the variables established above, the terminal functional area facility requirements were developed for ECP. The terminal facility requirements were divided into eight major functional areas as listed below.

- Check-in Lobby
- Checked Baggage Inspection System (CBIS) and Baggage Make-up (BMU)
- Passengers Security Screening Checkpoint (SSCP)
- Holdrooms
- Baggage Claim Lobby and Inbound Baggage Handling
- Concessions
- Rental Car Facilities
- Other Areas

Table 4-39 summarizes the facility requirements for the PALs compared to the need in 2019 and existing 2018 areas.

Table 4-39 – Facility Requirements Summary

Item	Description	2018 (Existing)	Base	PAL-1	PAL-2	PAL-3	PAL-4	Remarks
	Annual Enplanements	528,431	679,100	823,553	923,351	1,022,076	1,126,637	ECP Draft Commercial Forecast Report
	Peak Hour Enplaning Passengers (Departures)	644	859	976	1083	1209	1343	ECP Draft Commercial Forecast Report
	Peak Hour Deplaning Passengers (Arrivals)	642	857	974	1081	1207	1340	ECP Draft Commercial Forecast Report
	Peak Hour Passengers (Arrivals & Departures)	1224	1633	1855	2060	2299	2553	
	Peak Hour Operations (Flights)	11	15	17	19	20	22	ECP Draft Commercial Forecast Report
	Peak Hour Load Factor	80.3%	81.3%	82.4%	83.6%	84.9%	86.1%	ECP Draft Commercial Forecast Report
Item	**Description**	**2018 (Existing)**	**2019**	**PAL-1**	**PAL-2**	**PAL-3**	**PAL-4**	**Remarks**
1	**Check-In Lobby**	**16,332 SF**	**17,605 SF**	**19,855 SF**	**22,041 SF**	**24,647 SF**	**26,638 SF**	
2	**CBIS and Outbound Baggage Make-Up**	**15,432 SF**	**23,548 SF**	**29,893 SF**	**31,633 SF**	**36,703 SF**	**38,443 SF**	
	Outbound Screening	9,892 SF	13,108 SF	13,363 SF	13,363 SF	17,563 SF	17,563 SF	
	Outbound Baggage Make-up Area	5,540 SF	10,440 SF	16,530 SF	18,270 SF	19,140 SF	20,880 SF	
3	**Passenger Security Screening Checkpoint (SSCP)**	**15,987 SF**	**19,248 SF**	**22,274 SF**	**28,103 SF**	**28,549 SF**	**31,797 SF**	Assumes future use of automated security lanes (ASL's)
4	**Holdroom Area**	**22,044 SF**	**35,266 SF**	**42,115 SF**	**44,902 SF**	**45,419 SF**	**50,563 SF**	See Program Summary detail for areas included
5	**Baggage Claim and Inbound Baggage Handling**	**17,609 SF**	**19,874 SF**	**28,567 SF**	**28,727 SF**	**28,727 SF**	**28,887 SF**	See Program Summary detail for areas included
6	**Concessions**	**4,106 SF**	**17,268 SF**	**20,941 SF**	**23,478 SF**	**25,988 SF**	**28,647 SF**	See Program Summary detail for areas included
	Pre-SSCP Concessions	1,905 SF	1,926 SF	2,336 SF	2,619 SF	2,899 SF	3,196 SF	
	Post-SSCP Concessions	2,201 SF	10,916 SF	13,238 SF	14,843 SF	16,430 SF	18,110 SF	
	Concession Storage		4,425 SF	5,366 SF	6,016 SF	6,659 SF	7,341 SF	
7	**Rental Car Facilities**	**1,803 SF**	**3,545 SF**	**3,641 SF**	**3,937 SF**	**4,464 SF**	**4,959 SF**	See Program Summary detail for areas included
8	**Other Areas**	**40,407 SF**	**45,890 SF**	**65,155 SF**	**71,919 SF**	**76,968 SF**	**81,883 SF**	See Program Summary detail for areas included
	Airport Support – Admin	670 SF	670 SF	5,245 SF	5,245 SF	6,285 SF	6,285 SF	
	Airport Support – Operations	389 SF	389 SF	2,250 SF	2,420 SF	2,420 SF	2,420 SF	
	Airport Support – Other Areas	11,712 SF	4,966 SF	6,814 SF	8,530 SF	8,880 SF	9,343 SF	
	All other Areas	28,695 SF	39,866 SF	50,846 SF	55,724 SF	59,383 SF	63,835 SF	
	Total Terminal Functional Requirements	**133,720 SF /3**	**182,243 SF**	**232,440 SF**	**254,739 SF**	**271,464 SF**	**291,816 SF**	

Notes:

1. 2019 passenger and activity were projected
2. 2018 areas developed from area take-offs
3. Includes ground level holdroom expansion

Source: CHA Forecast Analysis, October 2019, AGD Associates LLC Analysis, February 2020.
Prepared by: AGD Associates LLC, March 2020.

The following section describes the facility requirements comparison to existing facilities. A description of the key processor elements within each functional group is provided.

Check-In Lobby

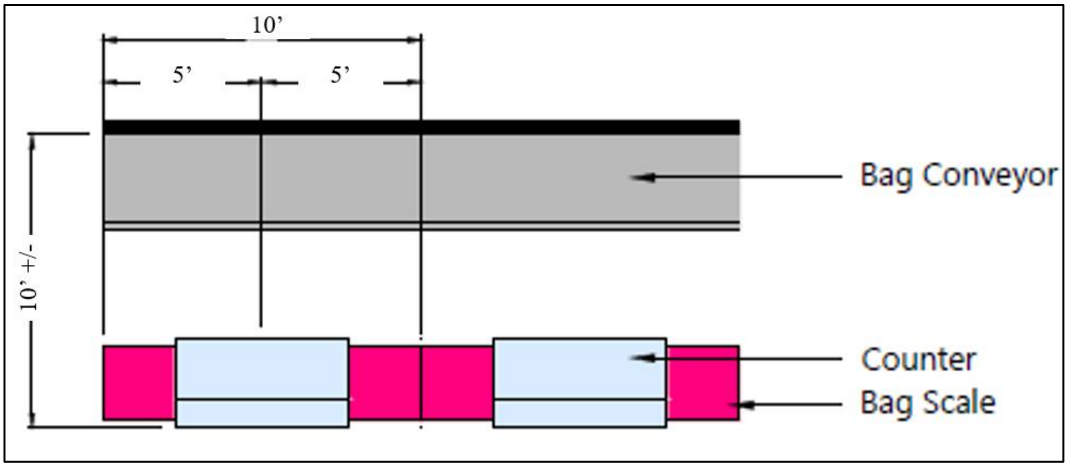
The existing check-in lobby includes up to 16 full-service agent and bag drop positions with 102 linear feet of counter frontage. The existing check-in counters range from 4.5 feet to 7 feet in length with varying bag scale widths for self-service and full-service counters. Check-in counters today are typically 5 feet to 6 feet in length with a 2.5-foot to 3-foot bag scale. **Figure 4-10** shows a typical check-in configuration assumed for programming purposes at ECP. Facility requirements for the check-in lobby are shown in **Table 4-40**.

Table 4-40 – Check-In Lobby Detail Requirements

Description	PAL-1	PAL-2	PAL-3	PAL-4
Total Check-in Positions	**37**	**41**	**46**	**51**
Full Service and Bag Drop Positions	21	23	26	29
Kiosks	16	18	20	22
Check-in Positions/Kiosk/Bag Drop, Active Check-in Area	3,682 SF	4,080 SF	4,577 SF	5,075 SF
Queue Area	2,848 SF	3,136 SF	3,520 SF	3,888 SF
Airline Ticket Office	4,625 SF	5,125 SF	5,750 SF	6,375 SF
Airline Operations	3,000 SF	3,600 SF	4,200 SF	4,200 SF
Public Circulation	3,700 SF	4,100 SF	4,600 SF	5,100 SF
Restrooms	2,000 SF	2,000 SF	2,000 SF	2,000 SF
Total Check-in Lobby	**19,855 SF**	**22,041 SF**	**24,647 SF**	**26,638 SF**

Source: CHA Forecast Analysis, October 2019, AGD Associates LLC Analysis, February 2020.
Prepared by: AGD Associates LLC, July 2018.

Figure 4-10 – Check-In Position Assumed



Source: AGD Associates LLC, March 2020.
Prepared by: AGD Associates LLC, March 2020.

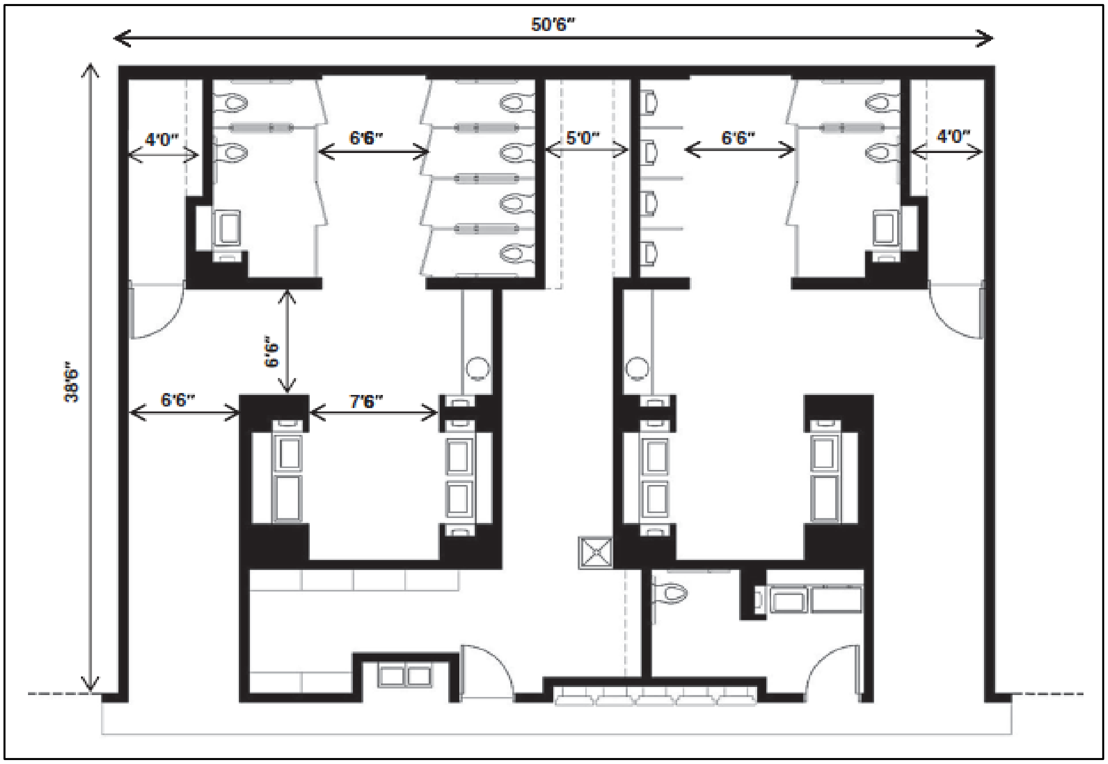
Based on this analysis, the existing length of the check-in counter needs to increase within the 5-year period to meet demand and continue to increase through PAL 4. The number of check-in positions would need to increase from 28 positions today to almost double by PAL 4 (51 positions). The check-in positions include kiosk, bag drop, and full-service agent positions.

The check-in lobby is approximately 32 feet deep as measured from passenger side of the ticket counter to the wall opposite the ticket counters. The check-in lobby area directly in front of the check-in counter is approximately 4,400 square feet. The check-in lobby encompasses the active check-in space from the passenger side of the counter to the queuing area, the queuing area, and public circulation. Additionally, the check-in lobby contains a restroom core consisting of a men's, women's, and family restroom, as shown in **Figure 4-11**. The total area for active check-in, queue, and circulation is approximately 7,800 square feet. By PAL 1, this functional space would need to increase to 10,200 square feet. This space will again need to increase during the planning period to 11,300 square feet and 14,000 square feet by PAL 2 and PAL 4, respectively. Based on this analysis, the existing facilities will need to be addressed in the next five to ten years to meet projected demand.

At ECP, the area directly behind the public check-in lobby accommodates the airline ticket office functions as well as some of the airline operations' functions. Requirements for airline operational space is based on a net 600 square feet per airline operating at ECP and is separate from airline ticket office space. Five airlines were assumed in PAL 1, six airlines in PAL 2, and seven airlines in PAL 3 and PAL 4. Both ATO and airline operations functional requirements are anticipated to increase throughout the planning period.

Requirements for airline ticket office space were based on a 25-foot deep zone behind the ticket counter backwall times the length of positions required. The 25-foot zone would include a common use corridor to access all airline ticket offices

Figure 4-11 – Typical Restroom Core



Source: Airport Cooperative Research Program, Report 130 "Guidebook for Airport Terminal Restroom Planning and Design".
Prepared by: AGD Associates LLC, June 2017.

Check-in lobby requirements for are summarized in **Table 4-40**.

Checked Baggage Inspection System (CBIS) and Outbound Baggage Make-Up

The existing CBIS and outbound baggage inspection system occupies roughly 9,900 square feet. Facility requirements to meet the projected demand is summarized in **Table 4-41**. Assumptions were to maintain an automated in-line system throughout the planning period. By PAL 4, four explosive detection system (EDS) machines are needed to accommodate the full CBIS area requirements of approximately 12,900 square feet. CBRA stations are estimated based on TSA guidelines but can vary by airport based on demand for Level 3 bag screening. During detailed design it is suggested to confirm with TSA CBRA stations required. Based on this analysis, the existing facilities should be evaluated for future expansion options.

Table 4-41 – CBIS and Baggage Make-Up Requirements Summary

Description	PAL-1	PAL-2	PAL-3	PAL-4
EDS Machines	3	3	4	4
CBRA Stations	3	3	3	3
CBIS Area	13,363 SF	13,363 SF	17,563 SF	17,563 SF
Bag Cart Staging	19	21	22	24
Baggage Makeup Area	16,530 SF	18,270 SF	19,140 SF	20,880 SF
Total CBIS and Bag Makeup	**29,893 SF**	**31,633 SF**	**36,703 SF**	**38,443 SF**

Note: Check Baggage Reconciliation Area (CBRA).
Source: CHA Forecast Analysis, October 2019, AGD Associates LLC Analysis, February 2020.
Prepared by: AGD Associates LLC, July 2018.

The baggage makeup function is currently 5,500 square feet with projected requirements of 16,500 square feet projected by PAL 1. The significant increase in baggage makeup functions compared to existing space can be attributed to a deficiency assumed today. Based on the analysis, it is anticipated that the BMU function requires expansion now to address capacity constraints that undoubtedly impact safety within the BMU area. The total quantity of bag cart staging positions is noted in **Table 4-41** but should be confirmed with the airlines during detailed design since bag cart staging and orientation can vary from airline to airline. Total functional area for baggage makeup is projected to be 20,900 square feet by PAL 4.

Passenger Security Screening Checkpoint (SSCP)

The existing SSCP occupies roughly 16,000 square feet. Facility requirement projections for the SSCP is shown in **Table 4-42**. The projected SSCP requirements are for standard lanes which can process up to 150 people per hour per lane, based on TSA guidelines, and Pre✓ lanes with a processing rate of up to 240 people per hour. A typical SSCP configuration is shown in **Figure 4-12** (supporting the current TSA protocols). SSCP requirements did not consider use of the TSA "innovation lanes" at this point, but an allowance factor was included that would address new equipment and possible configuration changes in the future. Based on this analysis, the existing SSCP should be evaluated for expansion in the 5- to 10-year time frame. Total SSCP functional space is anticipated to be about double the existing area.

Table 4-42 – SSCP Requirements Summary

Description	PAL-1	PAL-2	PAL-3	PAL-4
Standard Lanes (Qty)	5	6	6	7
Pre-✓ Lanes *(Qty)	2	3	3	3
SSCP Lane Area	14,280 SF	18,360 SF	18,360 SF	20,400 SF
Queue Area	3,328 SF	3,856 SF	4,208 SF	4,736 SF
TSA Support Area	4,666 SF	5,887 SF	5,981 SF	6,661 SF
Total SSCP Area	**22,274 SF**	**28,103 SF**	**28,549 SF**	**31,797 SF**

Source: CHA Forecast Analysis, October 2019, AGD Associates LLC Analysis, February 2020.
Prepared by: AGD Associates LLC, July 2018.

Figure 4-12 – Typical Security Screening Checkpoint Configuration

Source: TSA Planning and Design Guidelines / AGD Associates LLC, March 2020.
Prepared by: AGD Associates LLC, March 2020.

Holdrooms and Gates

There are seven existing gates served by dedicated holdroom areas. The existing holdroom areas total approximately 9,850 square feet and include the check-in podium and the entrance and exit corridor to access the boarding doors. As indicated previously in this section, there is a holdroom expansion project currently underway which will add approximately 4,800 square feet of holdroom space, with the total holdroom area at completion of the project being approximately 14,700 square feet. The projected gate demand based on analysis of the forecast increases to 12 gates by PAL 4. All parking positions were operationally assumed as power-in and push-back. The total projected holdroom area is shown in **Table 4-43**.

Table 4-43 – Holdroom Area Requirements Summary

Description	PAL-1	PAL-2	PAL-3	PAL-4
Gates	10	11	11	12
Holdroom Area	14,629 SF	17,095	17,311	19,511
Allowance for Amenities	1,463 SF	1,710	1,731	1,951
Common Use Club	1,950 SF	1,950	1,950	1,950
Circulation	9,753	11,397	11,541	13,007
Restrooms	4,000	4,000	4,000	4,000
Total	**31,795 SF**	**36,152 SF**	**36,533 SF**	**40,420 SF**

Source: CHA Forecast Analysis, October 2019, AGD Associates LLC Analysis, February 2020.
Prepared by: AGD Associates LLC, July 2018.

Baggage Claim Lobby and Inbound Baggage Handling

There are three existing baggage claim devices, each with approximately 110 linear feet of frontage for passenger queue and bag retrieval. The active queue and bag retrieval area is roughly 8,200 square feet. Other areas include airline baggage storage areas, inbound baggage drop-off, baggage claim lobby circulation, and public restrooms. Based on the peak arrivals demand in PAL 1, the quantity of claim devices would increase by one and remain at that level through PAL 4. Quantity of claim devices are shown as number of re-circulating devices + oversized bag claim slides. Future facility requirements to accommodate the projected demand is summarized in **Table 4-44**.

Table 4-44 – Baggage Claim and Inbound Baggage Requirements Summary

Description	PAL-1	PAL-2	PAL-3	PAL-4
Baggage Claim Devices (Qty)	4+1	4+1	4+1	4+1
Baggage Claim Area	12,184 SF	12,184 SF	12,184 SF	12,184 SF
Baggage Storage	480 SF	640 SF	640 SF	800 SF
Meeter/Greeter	1,828 SF	1,828 SF	1,828 SF	1,828 SF
Circulation	7,006 SF	7,006 SF	7,006 SF	7,006 SF
Restrooms	2,000 SF	2,000 SF	2,000 SF	2,000 SF
Inbound Baggage Drop	5,070 SF	5,070 SF	5,070 SF	5,070 SF
Total	**28,567 SF**	**28,727 SF**	**28,727 SF**	**28,887 SF**

Source: CHA Forecast Analysis, October 2019, AGD Associates LLC Analysis, February 2020.
Prepared by: AGD Associates LLC, July 2018.

Concessions

Based on the high-level requirements evaluation developed for ECP, the total area of existing concessions space is lower than projected future requirements. It is recommended the Authority retain a professional airport retail planning expert to further define the concessions program requirements. Project requirements are summarized in **Table 4-45** for Pre-SSCP and Post-SSCP concessions.

Table 4-45 – Concessions Requirements Summary

Description	PAL-1	PAL-2	PAL-3	PAL-4
Pre-SSCP Concessions	2,336 SF	2,619 SF	2,899 SF	3,196 SF
Post SSCP Concessions	13,238 SF	14,843 SF	16,430 SF	18,110 SF
Concessions Storage	5,366 SF	6,016 SF	6,659 SF	7,341 SF
Total Concession Areas	**20,941 SF**	**23,478 SF**	**25,988 SF**	**28,647 SF**

Source: CHA Forecast Analysis, October 2019, AGD Associates LLC Analysis, February 2020.
Prepared by: AGD Associates LLC, July 2018.

Rental Car Facilities

Existing rental car facilities include counters and associated queue and office space. Project requirements summarized in **Table 4-46**.

Table 4-46 – Rental Car Requirements Summary

Description	PAL-1	PAL-2	PAL-3	PAL-4
Rental Car Positions, Agent + Kiosk	9+5	9+6	11+6	12+7
Rental Car Area	3,641 SF	3,937 SF	4,464 SF	4,959 SF

Source: CHA Forecast Analysis, October 2019, AGD Associates LLC Analysis, February 2020.
Prepared by: AGD Associates LLC, July 2018.

Other Areas

As discussed in an earlier section of this report, this section is used mainly to capture the remaining functional space within the terminal facility that is not calculated based on passenger volumes. These other areas are either a direct requirement expressed by the airport operator or a percentage of total functional areas as observed at other airport terminal facilities. The space for Other Areas is summarized in **Table 4-47**.

Table 4-47 – Other Areas Summary

Description	PAL-1	PAL-2	PAL-3	PAL-4
Airport Support – Administrative	5,245 SF	5,245 SF	6,285 SF	6,285 SF
Airport Support – Operations	2,250 SF	2,420 SF	2,420 SF	2,420 SF
Business Center	0 SF	250 SF	250 SF	250 SF
Common Use Club	0 SF	1,000 SF	1,000 SF	1,000 SF
Mothers Nursing Room	120 SF	120 SF	120 SF	120 SF
Art Gallery	600 SF	600 SF	600 SF	600 SF
Information Booth	200 SF	200 SF	200 SF	200 SF
Military Welcome Center	675 SF	675 SF	675 SF	675 SF
Facilities Support and Services	5,019 SF	5,485 SF	5,835 SF	6,298 SF
FAA Space	200 SF	200 SF	200 SF	200 SF
Building Structure	10,896 SF	11,941 SF	12,725 SF	13,697 SF
Vertical Circulation – stairs, elevator, etc.	12,712 SF	13,931 SF	14,846 SF	15,959 SF
Mechanical/Electrical/Utility	18,159 SF	19,901 SF	21,208 SF	22,798 SF
Allowance for design variations	9,080 SF	9,951 SF	10,604 SF	11,399 SF
Total Other Areas	**65,155 SF**	**71,919 SF**	**76,968 SF**	**81,883 SF**

Source: CHA Forecast Analysis, October 2019, AGD Associates LLC Analysis, February 2020.
Prepared by: AGD Associates LLC, July 2018.

Capacity Analysis

Capacity of the existing facility is expressed as the number of peak hour passengers that can be processed by the individual processor. The primary processors that determine terminal facility capacity are as follows:

- Check-in Lobby
  - Number of full-service, bag drop, and self-service kiosk positions
  - Check-in queue
- Checked Baggage Inspection System (CBIS) and Baggage Make-up (BMU)
  - Number of EDS machines and throughput rate
  - Number of cart staging positions
- Passenger Security Screening Checkpoint (SSCP)
  - Number of Standard lanes and throughput rate
  - Number of Pre✓ lanes and throughput rate
  - Queuing area
- Holdrooms
  - Gates and square feet per gate
- Baggage Claim Lobby and Inbound Baggage Handling
  - Number of claim devices to accommodate peak hour arrivals activity
  - Presentation length of claim units

Many of the existing facilities' key processors and related functional areas are deficient today based on current industry programming guidelines. This is identified in the need for a facility which is approximately 90 percent larger than the existing facility or nearly doubling the existing facility within the 5-year planning horizon. As the facility is expanded and upgraded to meet the near-term facility requirements, this positions the airport for more modest expansions in the 10-year and 20-year planning horizons.

The facility requirements projections are anticipated based on the forecast. The most significant increase occurs during the near-term planning period (5-year to 10-year) and in many cases is the most accurate based on the Airport's current activities and market service development happening today. This facility requirements analysis implies that ECP needs a major expansion to meet the near-term demand and to position the Airport for future activity increases.

4.6 SUPPORT FACILITY REQUIREMENTS

Support facilities provide vital functions related to the overall operation of the Airport and typically include facilities related to general aviation, air cargo, military operations, aircraft fueling, Aircraft Rescue and Firefighting (ARFF), and airfield maintenance. As airport operations increase, the use of these facilities and infrastructures increase, creating a greater demand and less available capacity to meet the demand. The following sections detail the current capacity and projected demand for the previously mentioned facilities.

4.6.1 Airport Perimeter Fence

As discussed in **Chapter 1**, a 10-foot high chain-link fence (measuring approximately 46,000 linear feet) securely encompasses ECP's runway, taxiways, and aircraft movement and non-movement areas. The fence currently meets standards set forth by the Transportation Security Administration (TSA). Airport personnel continuously inspect the perimeter fence to ensure compliance, taking immediate action if necessary.

4.6.2 Aircraft Deicing Facilities

Due to the region's humid-subtropical climate, there is no foreseen demand for a complete deicing infrastructure, such as a designated deicing apron, glycol storage tanks, and glycol drainage/recycling. Deicing is conducted rarely, taking place on an on-demand basis on the terminal apron.

4.6.3 General Aviation (GA) Facilities

Aside from dedicated apron areas discussed in **Section 4.3.4**, general aviation buildings at ECP include a separate terminal building (the Executive Terminal) that is operated by the FBO and 28 hangars. These facilities are located on the southwest side of the airfield and are owned, operated, and leased under various entities (i.e., the Airport, Sheltair, Bay Aircraft Owners Association, etc.). For the purposes of this Study, the GA facilities were evaluated as a whole rather than being broken down by owner and/or operator.

Hangar requirements are generally a function of the number and type of based aircraft, owner preferences, hangar rental costs, and area climate. Because of the warmer climate in the Panama City region, heat and sun exposure can damage avionics and fade paint. Thunderstorms and hailstorms also occur, with the potential to cause considerable amounts of damage to aircraft if not properly stored.

General Aviation Aircraft Storage Requirements

Locally based operators at ECP employ the use of hangar space. The hangar storage areas, which (as previously discussed) are owned by the Airport and operated by, and leased to the various aircraft owners, consist of two FBO-owned bulk hangars, 15 land-lease corporate hangars, eight T-hangars (four ECP-owned T-hangars and four Bay Aircraft Owners Association T-hangars), and six land-lease, single-aircraft hangars.

Source: Google Earth (Accessed April 2020).

Table 4-48 depicts each type of storage hangar at the Airport, its approximate size, and the amount of storage provided for based aircraft at ECP (excluding tie-down spaces).

Table 4-48 – Aircraft Hangar Units

Hangar Type/Description	Approximate Building Size (SF)	Approximate Hangar Storage Capacity (SF)	Single/Mult-Engine Piston/Rotor	Jets	Total Aircraft Storage
FBO Bulk Hangar 1	10,000	9,400	0	2	2
FBO Bulk Hangar 2	20,000	19,800	1	4	5
Corporate Hangar 1	10,300	9,400	0	2	2
Corporate Hangar 2	8,190	7,700	3	1	4
Corporate Hangar 3	8,250	7,700	3	1	4
Corporate Hangar 4	14,420	14,100	0	3	3
Corporate Hangar 5	3,750	3,000	3	0	3
Corporate Hangar 6	3,670	3,000	3	0	3
Corporate Hangar 7	10,120	9,400	0	2	2
Corporate Hangar 8	10200	9,400	0	2	2
Corporate Hangar 9	10200	9,400	0	2	2
Corporate Hangar 10	10,200	9,400	0	2	2
Corporate Hangar 11	8,790	8,700	4	1	5
Corporate Hangar 12	4,900	4,700	0	1	1
Corporate Hangar A-1	3,920	3,000	3	0	3
Corporate Hangar A-2	5,000	5,000	5	0	5
Corporate Hangar A-3	8,185	7,700	3	1	4
Bay Aircraft T-Hangar B	22,550	21,800	3	4	7
Bay Aircraft T-Hangar E	13,090	13,000	13	0	13
Bay Aircraft T-Hangar H	10,680	9,700	5	1	6
Bay Aircraft T-Hangar K	10,600	9,700	5	1	6
ECP T-Hangar C	13,100	13,000	13	0	13
ECP T-Hangar F	12,000	12,000	12	0	12
ECP T-Hangar I	12,000	12,000	12	0	12
ECP T-Hangar N	8,440	7,700	3	1	4
Land Lease Hangar 1	1,225	1,000	1	0	1
Land Lease Hangar 2	1,430	1,000	1	0	1
Land Lease Hangar 4	1,230	1,000	1	0	1
Land Lease Hangar 5	1,230	1,000	1	0	1
Land Lease Hangar 6	2,590	2,000	2	0	2
Land Lease Hangar 7	1,440	1,000	1	0	1
Total	**261,700**	**246,700**	**101**	**31**	**132**

Source: ECP, Airport Geographic Information System (AGIS), Google Earth, CHA, 2019.

As of 2018, according to Sheltair, the Airport had 104 based aircraft. As depicted by the based aircraft activity forecasts presented in **Chapter 3**, based aircraft at ECP are expected to increase to 124 aircraft by PAL 4, with jet aircraft primarily contributing to the growth. As such, it is likely that additional hangar space will be warranted at ECP to accommodate the projected demand. To develop a projection of required hangar space, assumptions were made based on the average square feet of space required to store each type of aircraft and the forecasted fleet mix in the planning period. Based on the storage capacity of the current hangars (approximately 246,700 SF), the Airport is capable of supporting approximately 132 aircraft (101 single/multi-engine/rotorcraft and 31 jets), which may vary based on aircraft types. **Table 4-49** provides anticipated hangar space requirements based on these assumptions.

Table 4-49 – Hangar Space (Stalls) Requirements

Aircraft Type	Existing Maximum Capacity	Planning Period (Recommended Number of Hangar Stalls)					
		2018	Base	PAL 1	PAL 2	PAL 3	PAL 4
Single-Engine Piston	**Aircraft Capacity: 132**	76	76	77	77	77	78
Multi-Engine Piston		11	11	12	12	13	13
Turbo-Prop		0	0	0	0	0	0
Jet		17	18	21	25	30	34
Rotorcraft		0	0	0	0	0	0
Total Based Aircraft		**104**	**105**	**110**	**114**	**120**	**125**

Source: Sheltair, CHA, 2019.

Although the Airport currently has adequate hangar space to support based aircraft, it is anticipated that additional hangar space will be needed by PAL 4 to support the increase in jet aircraft, as jets require more hangar storage space than single- and multi-engine aircraft or rotorcraft. **Table 4-50** shows the current usable hangar space, the future hangar space requirements, and the forecasted deficit of stall space by fleet mix.

Table 4-50 – Hangar Space Requirements (Sq. Ft.)

Aircraft Type	Available Hangar Space (SF)	Planning Period [Aircraft Hangar Space Required (SF)]					
		2018	Base	PAL 1	PAL 2	PAL 3	PAL 4
Single/Multi-Engine Piston & Rotorcraft	101,000	87,000	87,296	88,393	88,977	89,640	90,438
Turbo-Prop	0	0	0	0	0	0	0
Jet	145,700	79,900	82,996	99,801	118,728	138,831	159,644
Total Required Space	**246,700**	**166,900**	**170,292**	**188,194**	**207,705**	**228,471**	**250,082**
Surplus/Deficit	**-**	**79,800**	**76,408**	**58,506**	**38,995**	**18,229**	**(3,382)**

Source: CHA, 2019.

Based on the forecasted growth of based aircraft, hangar demand will increase from the current space demand of approximately 166,900 SF to approximately 250,082 SF by the end of the planning period. Current FBO plans and recommendations will be further discussed as alternative development plans in **Chapter 5**.

4.6.4 Air Cargo Facilities

The sole cargo processing building at ECP is located on the west side of the airfield, south of the Airport's main terminal and in the vicinity of the airfield maintenance and ARFF/Public Safety buildings. According to Airport Geographic Information Systems (AGIS), the cargo processing facility is approximately 5,121 SF.

As previously discussed in **Chapter 3**, the number of cargo operations occurring and the volume of cargo being processed at the Airport are anticipated to increase during the forecast horizon. The projected increases were based on industry trends, as well as the assumption that cargo operations at ECP will transition from seasonal service to year-round service while maintaining the schedule of one daily scheduled flight Monday through Friday for five years and will receive an additional daily flight year-round on weekends (Saturday and Sunday) in 15 years. Cargo operations are performed via Cessna 208 Caravans, which is anticipated to continue being the primary aircraft providing services to ECP throughout the planning horizon.

Table 4-51 shows the forecast of cargo operations and volume.

Table 4-51 – Cargo Annual Forecasts

Factor	Base	PAL 1	PAL 2	PAL 3	PAL 4
Total Operations	397	437	480	512	546
Total Volume (tons)	633	695	765	815	869

Source: FAA Aerospace Forecast (FY 2019-2039), Boeing World Air Cargo Forecast (2018-2037), Airbus Global Market Forecast (2018-2037), CHA, 2019.

To analyze and determine the sizing requirements for the air cargo facility throughout the forecast period, a utilization rate for the cargo facility was determined. The utilization rate establishes the tons of cargo processed per square foot, which is then applied to projected cargo volume to determine the necessary space. According to the Airports Council International - North America (ACI-NA), *Air Cargo Guide (September 2019)*, “the average utilization rate for small airports is approximately 0.5 tons to 1.0 tons per square foot...For general planning purposes, it is recommended that a utilization rate of one ton per square foot be used as a macro benchmark, subject to the specific requirements or circumstances of an airport.”

For the purposes of this Study, the utilization rate of 0.5 tons/SF was chosen, as it is within the average utilization rate for small airports but accounts for the worst-case-scenario for ECP. As shown in **Table 4-52**, the cargo facility (assuming the worst-case-scenario) will be capable of accommodating projected cargo volume throughout the planning horizon, as the facility will only reach approximately 33.9 percent in PAL 4.

Table 4-52 – Cargo Building Space Requirements

Factor	BASE	PAL 1	PAL 2	PAL 3	PAL 4
Air Cargo Building Space Required (SF)	1,266	1,391	1,529	1,630	1,738
Existing Facility Sizing (SF)	5,121	5,121	5,121	5,121	5,121
Surplus/Deficit (SF)	**3,855**	**3,730**	**3,592**	**3,491**	**3,383**

Source: AGIS, ACI Air Cargo Guide (September 2019), CHA, 2020.

4.6.5 Fueling Facilities

The Airport’s fuel farm servicing commercial and GA activity is located on the west side of the airfield, south of the Airport’s airfield maintenance facility and west of the ARFF/Public Safety building. Although the fuel farm is owned by the Airport, management and operations of the facility are under contract. Menzies Aviation is responsible for commercial refueling of all airlines operating at ECP. Menzies also manages a consortium for the fuel farm, ground service equipment (GSE) for Southwest and American, and manages fuel storage for the FBO; however, Sheltair is responsible for the fueling of GA aircraft.

The fuel farm consists of eight above-ground fuel tanks, composed of four 50,000-gallon tanks storing Jet-A fuel and four 15,000-gallon tanks storing Avgas. In other words, the fuel farm can store up to 200,000 gallons of Jet A and 60,000 gallons of Avgas, for a total of 260,000 gallons of fuel. The majority of aircraft operating at ECP consume Jet-A fuel, as Avgas is used primarily by small aircraft. According to Sheltair, 75 percent or more of the fuel consumed by GA users is Jet-A fuel.

Fuel is transported from the fuel farm to aircraft via specialized fuel trucks. Sheltair transports Jet-A fuel to GA users via two 5,000-gallon trucks and transports Avgas via one 1,200-gallon truck and one 750-gallon truck. Menzies transports fuel via two 5,500-gallon trucks.

According to Menzies Aviation, the Airport receives six to eight fuel deliveries per week during peak periods and four to five during the Airport's off-peak timeframe, with each delivery containing 48,000 gallons of fuel. Based on this information, growth in fuel consumption was assumed for the 20-year forecast period by determining a ratio of the approximate amount of fuel delivered to the commercial and GA operations in 2018. The ratio was then applied to each projected year's operations to determine approximate annual fuel consumption, assuming the ratio remains static. For this Study, fuel consumption was evaluated for peak[4] and off-peak times, along with the average. After determining approximate fuel consumption, the results were split by the PMAD factors for commercial and GA operations to estimate an average daily usage of fuel throughout the forecast period. Finally, the daily usage was applied to reserve availability.

Table 4-53 provides an overview of commercial and GA operations occurring in 2018 and projected operations throughout the planning horizon (as presented in **Chapter 3**). **Table 4-54** depicts the estimated annual fuel consumption in gallons over 20-years, while reserve availability and requirements are portrayed in **Table 4-55**.

Table 4-53 – Air Carrier and GA Operations

Year	Commercial	GA	Total
2018	10,871	40,579	51,450
Base	14,141	40,970	55,112
PAL 1	17,214	41,604	58,817
PAL 2	19,014	42,281	61,295
PAL 3	20,744	43,007	63,751
PAL 4	22,532	43,784	66,316
AAGR 2019-2039	**2.4%**	**0.3%**	**0.9%**
Growth 2019-2039	**59.3%**	**6.9%**	**20.3%**

Source: FAA 2018 TAF, BTS T-100 Data, ECP, ECP ATC, CHA, 2019.

[4] FAA OPSNET data was evaluated for 2018 and 2019 to determine the peak operating periods for cumulative air carrier and GA operations. Based on the evaluation, the months March through October were identified as the Airport's peak operating period in terms of air carrier and GA operations; therefore, November through February represent the off-peak periods.

Table 4-54 – Estimated Annual Fuel Deliveries to ECP (Gallons)

Year	Peak	Off-Peak	Total
2018	11,760,000	5,760,000	17,520,000
Base	12,596,937	6,169,928	18,766,865
PAL 1	13,443,945	6,584,789	20,028,735
PAL 2	14,010,386	6,862,230	20,872,616
PAL 3	14,571,628	7,137,124	21,708,752
PAL 4	15,157,872	7,424,264	22,582,136

Source: Menzies, CHA, 2019.

Table 4-55 – Fuel Storage Requirements (Gallons)

Year	PMAD Fuel Consumption	Fuel Reserve (Number of Days)		
		3.5	5	7
Peak Operating Period (March-October)				
2018	43,591	152,568	217,954	305,135
Base	46,693	163,426	233,465	326,851
PAL 1	49,833	174,414	249,163	348,829
PAL 2	51,932	181,763	259,661	363,526
PAL 3	54,013	189,044	270,063	378,088
PAL 4	56,186	196,650	280,928	393,300
Off-Peak Operating Period				
2018	21,351	74,727	106,753	149,454
Base	22,870	80,045	114,350	160,090
PAL 1	24,408	85,427	122,039	170,855
PAL 2	25,436	89,027	127,181	178,054
PAL 3	26,455	92,593	132,276	185,186
PAL 4	27,520	96,318	137,598	192,637
Average of Peak and Off-Peak Operating Periods				
2018	32,471	113,647	162,353	227,295
Base	34,782	121,735	173,908	243,471
PAL 1	37,120	129,921	185,601	259,842
PAL 2	38,684	135,395	193,421	270,790
PAL 3	40,234	140,819	201,170	281,637
PAL 4	41,853	146,484	209,263	292,968

Source: ECP, FAA OPSNET, CHA, 2019.

Summary of Fuel Storage Requirements

All requirements assume that fuel deliveries will be maintained at 48,000 gallons per delivery throughout the forecast. If the amount of fuel delivered per delivery increases or the frequency of delivery increases, the need for fuel storage may need to be accelerated; therefore, activity should continuously be monitored throughout the planning horizon.

<u>Peak Operating Periods</u>

During peak operating periods, the Airport will not exceed its current 260,000-gallon storage capacity during the planning horizon if only wanting to maintain a 3.5-day fuel reserve. If wanting to maintain a five-day fuel reserve during peak operating periods, the fuel farm will exceed maximum storage capacity in PAL 3. To achieve a seven-day fuel reserve, immediate action is necessary, as the current facilities are unable to support this amount of fuel during peak operation periods.

Off-Peak Operating Periods

During off-peak operating periods, the Airport is expected to be capable of supporting up to a seven-day fuel reserve throughout the planning cycle.

Average of Peak and Off-Peak Operating Periods

The average represents the calculated mean of the peak and off-peak operations. On average, the Airport is capable of supporting fuel storage requirements throughout the planning horizon if wanting to maintain a 3.5- or five-day fuel reserve. The fuel farm, on average, can support a seven-day fuel reserve now and throughout the base year and PAL 1, after which alternative fuel storage options should be considered.

4.6.6 Airport Equipment Storage and Maintenance Facilities

The Airport's maintenance and equipment storage area, which is comprised of two buildings, is located just south of the terminal building. The east building is approximately 6,000 square feet and serves as the storage unit for the Airport's maintenance and utility vehicles, as well as the support space for maintenance staff. The west building is approximately 5,000 square feet and serves as an additional garage for the Airport's maintenance and utility vehicles. According to maintenance personnel at ECP, parking at the maintenance facility is insufficient. Options for additional parking at the maintenance facility will be further evaluated in **Chapter 5**.

4.6.7 Aircraft Rescue and Firefighting (ARFF) / Public Safety Facilities

ECP's ARFF facility and Public Safety building are co-located just south of the cargo building.

ARFF Facility

The ARFF facility currently meets most of the building design requirements found in AC 150/5210-15A, *Aircraft Rescue and Firefighting (ARFF) Station Building Design*; however, based on on-site interviews conducted with ARFF personnel, the current facility is at capacity and parking for the facility is inadequate. As aircraft operations increase, it may be necessary to revisit the FAA guidance for ARFF facility requirements as new construction may be necessary to accommodate increased demand for facility sizing in the future.

In October 2019, ECP transitioned from ARFF Index B to Index C. The Airport currently has one rescue truck and two crash tracks (13- and 25 years old); however, only one crash truck is recognized by the FAA. The Airport is currently in the procurement process for an additional ARFF vehicle to support this increased index.

The Airport's present crash trucks meet the specifications as described below:

- Two vehicles, each carrying 1,500 gallons of water, 500 pounds of dry suppressant and 110 pounds of Aqueous Film Forming Foam (AFFF).

Public Safety Facility

The Public Safety building includes Airport Police functions, as well as the Airport Operations Center (AOC) where the Airport's Closed-Circuit Television (CCTV) Security System and security access points are monitored and controlled.

On-site interviews were also conducted with Public Safety personnel, who also advised that facility and parking are insufficient.

Site recommendations for the ARFF training facility, as well as options for expanding the ARFF/Public Safety facilities and areas for additional personnel parking, will be presented in **Chapter 5**.

4.6.8 Airport Operations Center

The Airport Operations Center is located immediately south of the Air Traffic Control Tower, beyond the passenger terminal. This complex includes the Airport Equipment Storage and Maintenance Facility, and the Public Safety Building. The Public Safety Building, itself, includes the Aircraft Rescue and Firefighting (ARFF) facility. These facilities will be detailed in subsequent sections. At the present period, these facilities are undersized and have reached their useful life. Possible expansion plans will be discussed further in **Chapter 5**, though there is currently discussion for expansion of the second floor of the Public Safety Building.

4.6.9 Air Traffic Control Facilities

The Airport Traffic Control Tower (ATCT) is located immediately south of the terminal. The tower was built with the Airport in 2010 and is 204 feet tall. Seven automobile parking spaces are available to serve the ATCT. The facility, whose services are contracted out by the FAA to Robinson Aviation (RVA Aviation), is operational daily from 6:00 am to 10:00 pm Central Standard Time (CST). During the time the tower is closed, pilot-activated lighting systems are utilized to control the following lights: HIRL for Runway 16/34, the Runway 16 MALSR and PAPI, and the Runway 34 REIL and PAPI. It is anticipated that the ECP ATCT will sufficiently serve the Airport throughout the forecast horizon.

4.7 SURFACE TRANSPORTATION AND PARKING REQUIREMENTS

The forecasted growth in aviation activity will impact all operational areas of the Airport, including the landside facilities and adjacent roadways. The Airport and Republic Parking provided transaction information for Airport parking facilities for 2018. These numbers provided a baseline for parking requirement analysis. The 2.6 percent average annual growth rate (AAGR) identified in **Chapter 3** (**Table 3-7)** was applied to the 2018 numbers to forecast future automobile traffic.

The methodology for calculating peak month, peak-month-average day (PMAD), and PMAD peak hour values found in **Chapter 3** (**Section 3.10.2**) was applied to the values found in **Table 4-56** to establish peak activity levels as needed for **Section 4.7.1** through **Section 4.7.11**.

Planning assumptions for this evaluation were garnered from professional experience and the following sources:

- Florida DOT's *Guidebook for Airport Master Planning (2017)*
- ACRP, *Report 113: Guidebook on General Aviation Facility Planning*
- ACRP, *Report 40: Airport Curbside and Terminal Area Roadway Operations*
- *FAA Advisory Circular (AC) 150/5360-13A Airport Terminal Planning*

The number of parking spaces currently available, as well as future parking space demand, by lot are shown in **Table 4-56**.

Table 4-56 – Available Parking and Future Demand

Activity	Existing (2018)	Base	PAL 1	PAL 2	PAL 3	PAL 4
Short-Term Parking	180	157	178	202	230	261
Covered Long-Term Parking	300	294	336	381	432	492
Uncovered Long-Term Parking	851	646	740	842	953	1,089
Transportation Network Companies (TNC) Parking	40	23	26	30	34	39
Employee Parking	204	196	223	253	288	327
Rental Car Parking	250	244	277	315	358	407
Total Estimated Annual Vehicles	**1,825**	**1,560**	**1,780**	**(2,023)**	**(2,295)**	**(2,615)**

Source: Northwest Florida Beaches International Airport, Republic Parking, AVCON, CHA, 2019.

4.7.1 Short-Term Public Parking

Currently, there are 180 short-term parking spaces at the Airport. The average ticket price and parking fee schedule were referenced to determine an average dwell time of 110 minutes. Because of the relatively short dwell times experienced in these spaces, the best indicator of demand is the PMAD-peak hour demand. **Table 4-57** depicts the anticipated demand of the short-term parking lot. Occupancy rate was evaluated by multiplying the PMAD-peak hour usage by the average dwell time (1.8), then dividing by the number of available spaces. Per the reports from Republic Parking, the Airport's demand during the PMAD-peak hour was 120 vehicles in 2018.

Table 4-57 – Short-Term Parking Demand

Activity	Existing (2018)	Base	PAL 1	PAL 2	PAL 3	PAL 4
Yearly Vehicles	117,293	120,343	136,822	155,558	176,860	201,079
PMAD-Peak Hour Vehicles	120	123	140	160	181	206
Occupancy Rate	**85%**	**87%**	**99%**	**112%**	**128%**	**145%**

Source: Republic Parking, AVCON, CHA, 2019.

FAA AC 150/5360-13A, *Airport Terminal Planning*, recommends parking lots contain 10 percent more spaces than demand dictates due to the requirement of finding empty spaces within the lot and poorly parked vehicles making some spaces inaccessible. Occupancy rate during the PMAD-peak hour is projected to surpass 90 percent capacity by PAL 1. Due to the time required to design and construct new pavements, expansion of the short-term parking lot should be considered an immediate requirement. Evaluation of alternatives for expansion, including surface parking and a parking garage, will be provided in **Chapter 5**.

4.7.2 Long-Term Public Parking

Long-term parking can be divided into two separate categories: covered and uncovered. The Airport currently maintains 300 covered and 851 uncovered spaces, for a total of 1,151 long-term public parking spaces. Due to the extended dwell times these spaces experience, the key indicator for increased demand is the peak month growth of passengers originating or terminating at the Airport. The average dwell time was multiplied by the peak month vehicles and divided by the total number of days (31) in the peak month (July) to determine the occupancy rates in long-term covered and uncovered parking, found in **Table 4-58** and **Table 4-59,** respectively.

Covered Parking

Republic Parking reported 20,923 annual tickets for long-term covered parking in 2018. The average ticket price and parking fee schedule were used to determine an average dwell time of 4.3 days. These numbers indicate the 300-space lot is currently operating at 96 percent occupancy during the peak month.

Table 4-58 – Long-Term Covered Parking Demand

Activity	Existing (2018)	Base	PAL 1	PAL 2	PAL 3	PAL 4
Yearly Vehicles	20,923	21,467	24,407	27,749	31,549	35,869
Peak Month Vehicles	2,071	2,125	2,416	2,747	3,123	3,551
Occupancy Rate	**96%**	**98%**	**112%**	**127%**	**144%**	**164%**

Source: Republic Parking, AVCON, CHA, 2019.

As previously discussed, FAA AC 150/5360-13A recommends parking lots contain 10 percent more spaces than demand dictates due to the requirement of finding empty spaces within the lot and poorly parked vehicles making some spaces inaccessible. Due to the 96 percent occupancy in 2018, immediate expansion should be considered. Evaluation of alternatives for expansion including will be provided in **Chapter 5**.

Uncovered Parking

Republic Parking reported 48,442 annual tickets for long-term uncovered parking in 2018. The average ticket price and parking fee schedule were used to determine an average dwell time of 4.1 days. These numbers indicate the 851 spaces available in the long-term uncovered lots are currently at 75 percent occupancy during the peak month.

Table 4-59 – Long-Term Uncovered Parking Demand

Activity	Existing (2018)	Base	PAL 1	PAL 2	PAL 3	PAL 4
Yearly Vehicles	48,442	49,701	56,508	64,246	73,043	83,046
Peak Month Vehicles	4,796	4,920	5,594	6,360	7,231	8,222
Occupancy Rate	**75%**	**76%**	**87%**	**99%**	**112%**	**128%**

Source: Republic Parking, AVCON, CHA, 2019.

To reiterate, FAA AC 150/5360-13A recommends parking lots contain 10 percent more spaces than demand dictates due to the requirement of finding empty spaces within the lot and poorly parked vehicles making some spaces inaccessible. The long-term uncovered lots are projected to near 90 percent capacity in PAL 1 and to exceed 90 percent capacity by PAL 2. Evaluation of alternatives for expansion including will be provided in **Chapter 5**.

Overflow Parking

Long-term overflow parking is currently accommodated in the 300-space, unpaved, overflow parking area between the parking campus and rental car return facility. This space is a candidate to expand the long-term parking lots in the future. At present, it is primarily used during holiday periods or other times of peak demand exclusively; therefore, construction of a permanent, paved parking area is not economical.

4.7.3 Rental Car Ready and Return Car Parking

The rental car ready/return lot is comprised of 250 spaces allocated among the seven rental car agencies. The key indicator for occupancy of rental car spaces found in **Table 4-60** was assumed to be the PMAD due to the requirement to transition the rental cars at the ready/return lot to and from the rental car facility. The occupancy rate was evaluated based on allowing a single vehicle to operate in a space each day. The Airport reports the rental car facility is currently at 95 percent occupancy.

Table 4-60 – Rental Car Parking Demand

Activity	Existing (2018)	Base	PAL 1	PAL 2	PAL 3	PAL 4
Yearly Vehicles	65,737	67,446	76,682	87,182	99,121	112,694
PMAD Vehicles	238	244	277	315	358	407
Occupancy Rate	**95%**	**97%**	**111%**	**126%**	**143%**	**163%**

Source: Republic Parking, AVCON, CHA, 2019.

The rental car lot is expected to surpass 100 percent capacity in PAL 1; therefore, planning for expansion of the existing rental car lot should begin immediately.

4.7.4 Rental Car Vehicle Storage and Maintenance Facilities

The rental car quick turnaround facility (QTA), which is shared by all rental car companies operating at the Airport, is situated west of the designated overflow parking lot. The QTA area is situated on an approximate 7.2-acre site that contains a QTA facility measuring approximately 15,000 SF in conjunction with a parking lot to the north and another to the south of facility. The QTA facility contains five bays for vehicular maintenance activities and five wash bays. Five fueling stations, each equipped with two pumps, are also located within this area. According to some of the rental car companies providing services at ECP, the QTA area is insufficiently sized in terms of vehicular storage space, and an additional wash bay is needed. As such, it is recommended, when practical, to consider expanding the QTA functional area.

4.7.5 Employee Parking

The employee parking lot consists of 204 parking spaces on the west campus, with an additional 20 spaces directly south of the terminal. Estimations for the required number of parking spaces was based on the reports from the Airport that indicated as few as 13 of the 204 spaces being available at times during shift changes, for a 94 percent occupancy rate (or approximately 191 occupied spaces).

Table 4-61 – Employee Parking Demand

Activity	Existing (2018)	Base	PAL 1	PAL 2	PAL 3	PAL 4
Yearly Vehicles	52,851	54,225	61,650	70,092	79,691	90,603
PMAD Vehicles	191	196	223	253	288	327
Occupancy Rate	**94%**	**96%**	**109%**	**124%**	**141%**	**160%**

Source: Northwest Florida Beaches International Airport, AVCON, CHA, 2019.

As indicated in **Table 4-61**, employee parking is nearly at capacity. Thus, planning efforts for expansion of the lot should begin immediately.

4.7.6 Access Roadways and Circulation

Access to the terminal is via State Road 388 and West Bay Parkway. State Road 388 is a two-lane highway which is currently being expanded to a four-lane highway, including a large roundabout at the intersection with West Bay Parkway. West Bay Parkway is an Airport-owned four-lane divided roadway servicing the Airport from SR 388 to the terminal and parking facilities. The capacity of West Bay Parkway is considered sufficient for the terminal's needs for the foreseeable future.

4.7.7 Cashier Plaza Requirements

The cashier plaza has a three-lane capacity servicing both short-term and long-term parking lots. At this time, staffing is generally only provided for a single lane for general operations, indicating the capacity of the parking lots being serviced is unlikely to require expansion of the existing plaza.

In the event a permanent parking lot is constructed at the existing overflow parking area, an additional toll booth will be required to service this location.

4.7.8 Commercial Vehicle Requirements

There are currently five spaces in a pull-through lot north of the terminal dedicated to commercial and bus traffic. Per discussions with the Airport, traffic in this lot is considered minimal, with spaces often used as additional employee parking; therefore, a requirement for expansion of this lot is not anticipated.

4.7.9 Transportation Network Companies (TNC) Staging Area

Transportation Network Companies' (TNC) drivers stage at a small (approx. 20,000 SF) paved lot south of Johnny Reaver Rd and west of the Sheltair complex. This lot provides space for up to 40 vehicles to park while waiting for patrons. Upon receiving a ping, the operators may proceed to one of the four designated TNC spaces in the short-term lot for passenger pick-up. The short dwell times at the pick-up location indicate the staging area is the controlling factor determining TNC capacity. The Airport reported 22,335 TNC trips to ECP in 2018. Occupancy rate was determined by assuming each available TNC space may accommodate one vehicle per hour. As seen in **Table 4-62,** the existing lot is expected to reach 98 percent of the staging capacity by PAL 4.

Table 4-62 – TNC Demand

Activity	Existing (2018)	Base	PAL 1	PAL 2	PAL 3	PAL 4
Yearly Vehicles	22,335	22,916	260,454	29,621	33,678	38,290
PMAD, Peak Hour Vehicles	23	23	26	30	34	39
Staging Area Occupancy	**58%**	**58%**	**65%**	**75%**	**85%**	**98%**

Source: Northwest Florida Beaches International Airport, AVCON, CHA, 2019.

TNC operations nationwide have grown very rapidly in recent years, but future growth is difficult to predict due to the relatively short existence of TNCs. The 2.6 percent growth factor was applied as in other automobile sections.

4.7.10 Taxi Staging Area

The taxi staging area south of the terminal currently provides nine parking spaces for taxis. This lot is also used as a cell-phone lot, accommodating an additional 15 passenger vehicles. The

Airport is currently evaluating relocation of the taxi services and expansion of the existing lot to accommodate an additional 30 spaces.

4.7.11 Curbside Circulation and Capacity

The five lanes adjacent to the terminal provide approximately 1,465 feet of available curb for passenger pick-up and drop-off activities. This curb allows for approximately 66 passenger vehicles to be single-parked while maintaining two maneuver and no through-lanes. No current expansion of the curbside is planned.

4.8 SUMMARY OF FACILITY REQUIREMENTS

This chapter identified Northwest Florida Beaches International Airport's capacity and development needs for existing and anticipated activity levels. Largely based on the aviation activity forecasts presented in Chapter 3, the recommendations described herein will form the basis of development concepts discussed in **Chapter 5**. **Table 4-63** through **Table 4-66** summarize the recommendations presented in this chapter.

Table 4-63 – Summary of Airfield Facility Requirements

Study Area	Existing (2018)	Recommended	
Runway 16/34 Requirements			
ARC (Visibility Minimums)	**C-III (1 Mile) / C-III & D-III (≥ ½ Mile)**	**-**	
Length	10,000'	-	
Width	150'	-	
Shoulders	None	25-foot Shoulders	
RSA Width	500'	-	
RSA Length Past Runway End	1,000'	-	
ROFA Width	800'	-	
ROFA Length Past Runway End	1,000'	-	
Runway OFZ Width	400'	-	
RPZ Length	1,700'	-	
RPZ Inner Width	500'		
RPZ Outer Width	1,010'		
Runway Blast Pads	200' x 200 '	-	
Future Runway 3/21 Requirements			
ARC / Visibility Minimums		**B-I (<3/4 Mile)**	**C/D-III (< 3/4 Mile)**
Length	-	3,600'	7,500'
Width	-	100'	150'
Shoulders	-	10'	25'
RSA Width	-	300'	500'
RSA Length Past Runway End	-	600'	1,000'
ROFA Width	-	800'	800'
ROFA Length Past Runway End	-	600'	1,000'
Runway OFZ Width	-	300'	400'
RPZ Length	-	2,500'	1,700'
RPZ Inner Width	-	1,000'	500'
RPZ Outer Width	-	1,750'	1,010'
Runway Blast Pads	-	100' X 120'	200' x 200'

(Table 4-63 Continued on Next Page)

(Table 4-63 Continued from Previous Page)

Study Area	Required	Taxiways Meeting Requirements	Recommended
Taxiway Requirements			
Width	50'	All, except: Taxiways E1, E2, F,and Part of Taxiways J, K, & M	Expand Taxiways E1, E2, & Part of J, K, M to 50'
Shoulders	20'	None	All Taxiways: Add 20' shoulders (minimum)
TSA	118'	All	-
TOFA	186'	All	-

Study Area	Existing/Available (2018)	Base	PAL 1	PAL 2	PAL 3	PAL 4
Apron Requirements						
General Aviation and FBO Apron Sizing	30,000	50,526 SY	51,308 SY	52,143 SY	53,038 SY	53,997 SY
Cargo Apron	970 SY	399 SY	399 SY	399 SY	399 SY	399 SY

Source: Sheltair, ECP, CHA, 2020.

Table 4-64 – Summary of Terminal Facility & Gate Requirements

Description	Existing/Available (2018)	Base	PAL 1	PAL 2	PAL 3	PAL 4
Passenger Terminal Facility Building and Gate Requirements						
Check-In Lobby	**16,332 SF**	**17,605 SF**	**19,855 SF**	**22,041 SF**	**24,647 SF**	**26,638 SF**
CBIS and Outbound Baggage Make-Up	**15,432 SF**	**23,548 SF**	**29,893 SF**	**31,633 SF**	**36,703 SF**	**38,443 SF**
Outbound Screening	9,892 SF	13,108 SF	13,363 SF	13,363 SF	17,563 SF	17,563 SF
Outbound Baggage Make-up Area	5,540 SF	10,440 SF	16,530 SF	18,270 SF	19,140 SF	20,880 SF
Passenger Security Screening Checkpoint (SSCP)	**15,987 SF**	**19,248 SF**	**22,274 SF**	**28,103 SF**	**28,549 SF**	**31,797 SF**
Holdroom Area	**22,044 SF**	**35,266 SF**	**42,115 SF**	**44,902 SF**	**45,419 SF**	**50,563 SF**
Baggage Claim and Inbound Baggage Handling	**17,609 SF**	**19,874 SF**	**28,567 SF**	**28,727 SF**	**28,727 SF**	**28,887 SF**
Concessions	**4,106 SF**	**17,268 SF**	**20,941 SF**	**23,478 SF**	**25,988 SF**	**28,647 SF**
Pre-SSCP Concessions	1,905 SF	1,926 SF	2,336 SF	2,619 SF	2,899 SF	3,196 SF
Post-SSCP Concessions	2,201 SF	10,916 SF	13,238 SF	14,843 SF	16,430 SF	18,110 SF
Concession Storage	-	4,425 SF	5,366 SF	6,016 SF	6,659 SF	7,341 SF
Rental Car Facilities	**1,803 SF**	**3,545 SF**	**3,641 SF**	**3,937 SF**	**4,464 SF**	**4,959 SF**
Other Areas	**40,407 SF**	**45,890 SF**	**65,155 SF**	**71,919 SF**	**76,968 SF**	**81,883 SF**
Airport Support – Admin	670 SF	670 SF	5,245 SF	5,245 SF	6,285 SF	6,285 SF
Airport Support – Operations	389 SF	389 SF	2,250 SF	2,420 SF	2,420 SF	2,420 SF
Airport Support – Other Areas	11,712 SF	4,966 SF	6,814 SF	8,530 SF	8,880 SF	9,343 SF
All other Areas	28,695 SF	39,866 SF	50,846 SF	55,724 SF	59,383 SF	63,835 SF
Total Terminal Functional Requirements	**133,720 SF /3**	**182,243 SF**	**232,440 SF**	**254,739 SF**	**271,464 SF**	**291,816 SF**

Source: AGD Associates LLC, CHA, 2020.

Table 4-65 – Summary of Support Facility Requirements

Study Area	Existing/Available (2018)	Recommended
Support Facilities		
Airport Perimeter Fence	10 Ft. High	-
Aircraft Deicing Facilities	Conducted On Terminal Apron	-
Airport Equipment Storage & Maintenance Facilities	West Building - 6,000' & East Building - 5,000'	Further Evaluation Necessary
ARFF Equipment	Two vehicles, each carrying 1,500 gallons of water, 500 pounds of dry suppressant and 110 pounds of Aqueous Film Forming Foam (AFFF)	Equipment Currently Being Upgraded to Meet Index C Requirements
On-Site ARFF Training Facility	None	Required - Location To Be Determined
ARFF & Public Safety Personnel Parking Lot	22 Parking Spaces	Consider Possible Expansion
Air Traffic Control Facilities	Contract Tower Adequate	-

Study Area	Existing/Available (2018)	Base	PAL 1	PAL 2	PAL 3	PAL 4
General Aviation Facilities						
Hangar Stalls	132	105	110	114	119	124
Hangar Space	166,900 SF	170,292 SF	188,194 SF	207,704 SF	228,471 SF	250,082 SF
Cargo Building Space	5,121 SF	1,266 SF	1,391 SF	1,529 SF	1,630 SF	1,738 SF
Fuel Storage - Peak Operating Period (March-October)						
3.5 Day Fuel Reserve	260,000 gal.	163,426	174,414	181,763	189,044	196,650
5 Day Fuel Reserve	260,000 gal.	233,465	249,163	259,661	270,063	280,928
7 Day Fuel Reserve	260,000 gal.	326,851	348,829	363,526	378,088	393,300
Fuel Storage - Off-Peak Operating Period						
3.5 Day Fuel Reserve	260,000 gal.	80,045	85,427	89,027	92,593	96,318
5 Day Fuel Reserve	260,000 gal.	114,350	122,039	127,181	132,276	137,598
7 Day Fuel Reserve	260,000 gal.	160,090	170,855	178,054	185,186	192,637
Fuel Storage - Average of Peak and Off-Peak Operating Periods						
3.5 Day Fuel Reserve	260,000 gal.	121,735	129,921	135,395	140,819	146,484
5 Day Fuel Reserve	260,000 gal.	173,908	185,601	193,421	201,170	209,263
7 Day Fuel Reserve	260,000 gal.	243,471	259,842	270,790	281,637	292,968

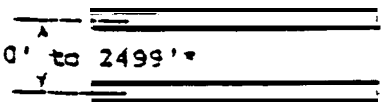
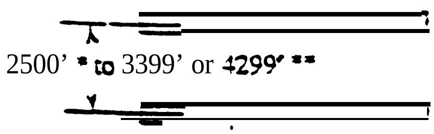
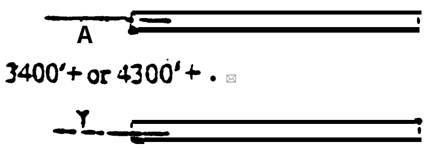
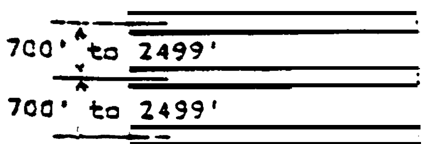
Source: Menzies, ECP, CHA, 2020.

Table 4-66 – Summary of Surface Transportation & Parking Facility Requirements

Study Area	Existing/Available (2018)	Base	PAL 1	PAL 2	PAL 3	PAL 4
Surface Transportation & Parking (By Number of Parking Spaces)						
Short-Term Parking	180	157	178	202	230	261
Covered Long-Term Parking	300	294	336	381	432	492
Uncovered Long-Term Parking	851	646	740	842	953	1,089
TNC Parking	40	23	26	30	34	39
Employee Parking	204	196	223	253	288	327
Rental Car Parking	250	244	277	315	358	407
Total Estimated Annual Vehicles	**1,825**	**1,560**	**1,780**	**2,023**	**2,295**	**2,615**

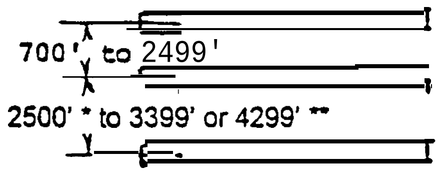
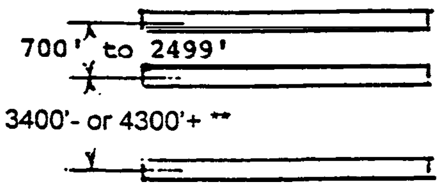
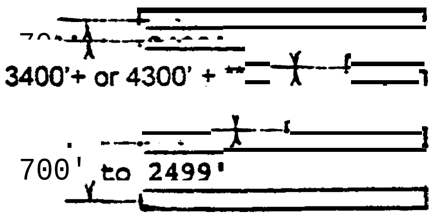
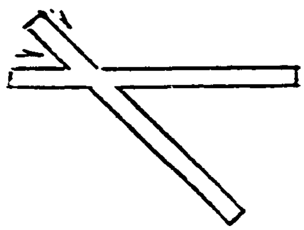
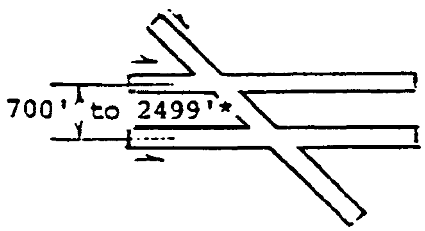
Source: Republic Parking, AVCON, CHA, 2020.

APPENDIX A – FAA AC 150/5060-5, *FIGURE 2-1*

NO.	Runway-use Configuration	Mix Index %(C+3D)	Hourly Capacity Ops/Hr VFR	Hourly Capacity Ops/Hr IFR	Annual Service Volume Ops/Yr
1.		0 to 20	98	59	230,000
		21 to 50	74	57	195,000
		51 to 80	63	56	205,000
		81 to 120	55	53	210,000
		121 to 180	51	50	240,000
2.		0 to 20	197	59	355,000
		21 to 50	145	57	275,000
		51 to 80	121	56	260,000
		81 to 120	105	59	285,000
		121 to 180	94	60	340,000
3.		0 to 20	197	62	355,000
		21 to 50	149	63	285,000
		51 to 80	126	65	275,000
		81 to 120	111	70	300,000
		121 to 180	103	75	365,000
4.		0 to 20	197	119	370,000
		21 to 50	149	113	320,000
		51 to 80	126	111	305,000
		81 to 120	111	105	315,000
		121 to 180	103	99	370,000
5.		0 to 20	295	62	385,000
		21 to 50	213	63	305,000
		51 to 80	171	65	285,000
		81 to 120	149	70	310,000
		121 to 180	129	75	375,000

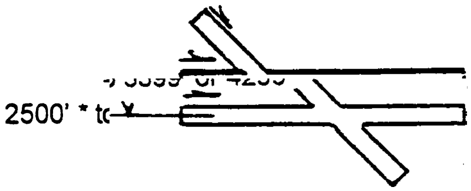
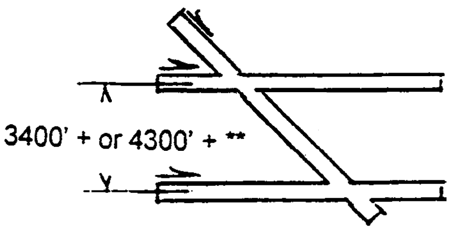
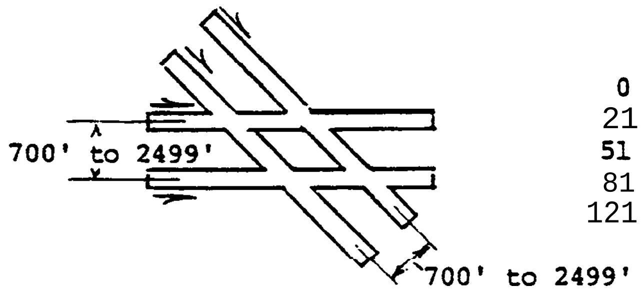
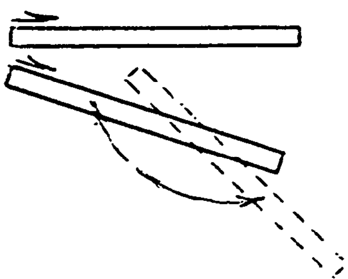
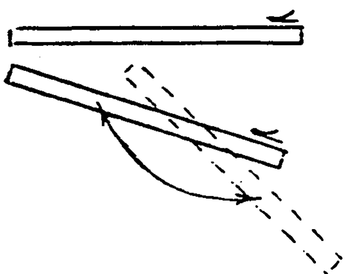
* **Staggered** threshold adjustments may apply, see paragraph 4-6.
** Refer to paragraph 2-2.f.

Figure 2-1. Capacity and ASV for long range planning

No.	Runway-use Configuration	Mix Index %(C+3D)	Hourly Capacity Ops/Hr VFR	Hourly Capacity Ops/Hr IFR	Annual Service Volume Ops/Yr
6.		0 to 20	295	62	385,000
		21 to 50	219	63	310,000
		51 to 80	184	65	290,000
		81 to 120	161	70	315,000
		121 to 180	146	75	385,000
7.		0 to 20	29s	119	625,000
		21 to 50	219	114	475,000
		51 to 80	184	111	455,000
		81 to 120	161	117	510,000
		121 to 180	146	120	645,000
8.		0 to 20	394	119	715,000
		21 51 to to 50	290	114	550,000
			242	111	515,000
		81 to 120	210	117	565,000
		121 to 180	189	120	675,000
9.		Oto 20	98	59	230,000
		21 to 50	77	57	200,000
		51 to 80	77	56	215,000
		81 to 120	76	59	225,000
		121 to 180	72	60	265,000
10.		0 to 20	197	59	355,000
		21 to so	14s	57	275,000
		51 to 80	121	56	260,000
		81 to 120	105	59	285,000
		121 to 180	94	60	340,000

* Staggered threshold adjustments may apply, see paragraph 4-6.
** Refer to paragraph 2-2.f.

Figure 2-1 .Capacity and ASV for long range planning (cont.)

No.	Runway-use Configuration	Mix Index %(C+3D)	Hourly Capacity Ops/Hr VFR	Hourly Capacity Ops/Hr IFR	Annual S&vice Volume Ops/Yr
11.		0 to 20	197	62	355,000
		21 to so	149	63	285,0C0
		51 to 80	126	65	275,000
			111	70	300,000
		121 81 to to 120 180	103	75	365,000
12.		0 to 20	197	119	370,000
		21 to so	149	114	320,000
		51 to 80	126	111	305,000
		81 to 120	111	105	315,000
		121 to 180	103	99	370,000
13.		0 to 20	197	59	355,000
		21 to 50	147	57	275,000
		51 to 80	145	56	270,000
		81 to 120	138	59	295,000
		121 to 180	125	60	350,000
14.		0 to 20	150	59	270,000
		21 to 50	108	57	225,000
		51 to 80	85	56	220,000
		81 to 120	77	59	225,000
		121 to 180	73	60	265,000
15.		0 to 20	132	59	260,000
		21 to so	99	57	220,000
		51 to 80	82	56	215,000
		81 to 120	77	59	225,000
		121 to 180	73	60	265,000

* Staggered threshold adjustments may apply, see paragraph 4-6.
** Refer to paragraph 2-2.f.

Figure 2-I. Capacity and ASV for long range planning (cont.)

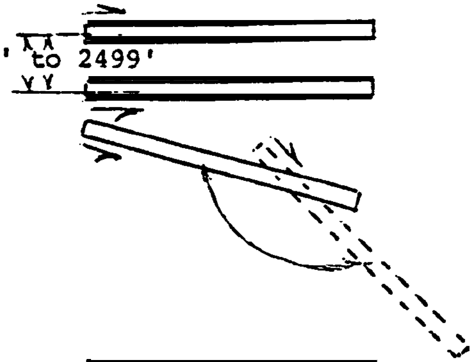
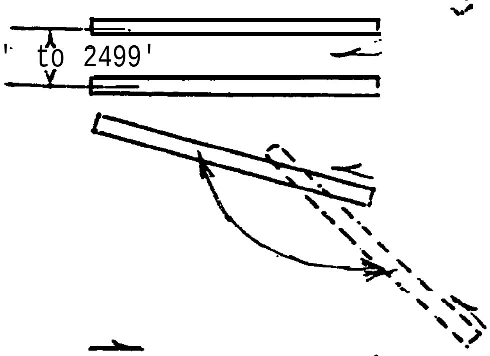
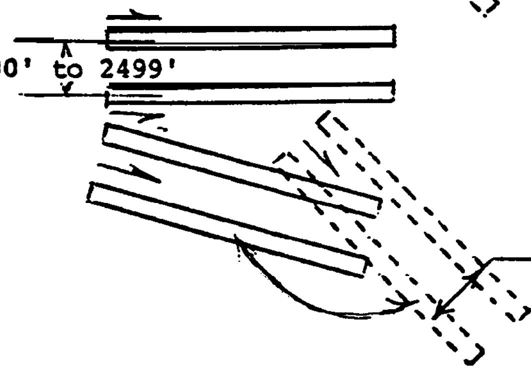
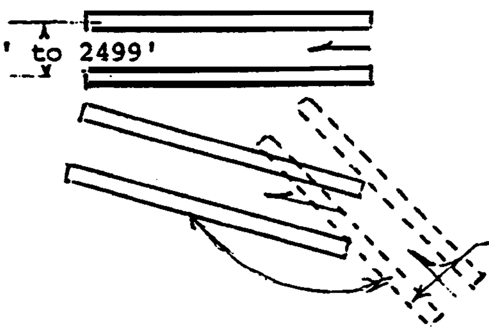
No.	Runway-use Configuration	Mix Index %(C+3D)	Hourly Capacity Ops/Hr VFR	Hourly Capacity Ops/Hr IFR	Annual Service Volume Ops/Yr
16.	700' to 2499' 	Oto 20	295	59	385,000
		21 to so	210	57	305,000
		51 to 80	164	56	275,000
		81 to 120	146	59	300,000
		121 to 180	129	60	355,000
17.	700' to 2499' 	0 to 20	197	59	355,000
		21 to so	14s	57	275,000
		51 to 80	121	56	260,000
		81 to 120	10s	59	285,000
		121 to 180	94	60	340,000
18.	700' to 2499'  700' to 2499'	0 to 20	301	59	385,000
		21 to 50	210	57	305,000
		51 to 80	164	56	275,000
		81 to 120	146	59	300,000
		121 to 180	129	60	355,000
19.	700' to 2499'  700' to 2499'	0 to 20	264	59	375,000
		21 to so	193	57	295,000
		51 to 80	158	56	275,000
		81 to 120	146	59	300,000
		121 180	129	60	355,000

Figure 2-1. Capacity and ASV for long range planning (cont.)

APPENDIX B – FAA TFMSC DISTRIBUTED OPSNET

OPSNET Operations Prorated By TFMS Report

From 07/01/2018 To 07/31/2018 | Airport=ECP

(Daily Averages)

#	Date	Airport	Departure				Arrival				Total Operations
			AC+AT	GA	MIL	Total	AC+AT	GA	MIL	Total	
1	7/1/2018	ECP - Panama City	25	54	1	80	25	52	0	77	157
2	7/2/2018	ECP - Panama City	22	79	66	167	22	79	22	123	290
3	7/3/2018	ECP - Panama City	25	95	24	144	25	95	24	144	288
4	7/4/2018	ECP - Panama City	18	70	0	88	17	70	0	87	175
5	7/5/2018	ECP - Panama City	28	75	7	110	28	75	2	105	215
6	7/6/2018	ECP - Panama City	29	90	28	147	28	90	27	145	292
7	7/7/2018	ECP - Panama City	35	95	1	131	35	94	0	129	260
8	7/8/2018	ECP - Panama City	30	104	4	138	29	103	1	133	271
9	7/9/2018	ECP - Panama City	23	49	22	94	22	49	21	92	186
10	7/10/2018	ECP - Panama City	22	52	54	128	22	52	53	127	255
11	7/11/2018	ECP - Panama City	22	58	38	118	22	57	37	116	234
12	7/12/2018	ECP - Panama City	23	79	50	152	22	79	50	151	303
13	7/13/2018	ECP - Panama City	27	96	22	145	25	95	7	127	272
14	7/14/2018	ECP - Panama City	39	106	0	145	39	104	0	143	288
15	7/15/2018	ECP - Panama City	25	69	3	97	25	69	3	97	194
16	7/16/2018	ECP - Panama City	21	40	80	141	20	39	27	86	227
17	7/17/2018	ECP - Panama City	23	56	57	136	22	56	56	134	270
18	7/18/2018	ECP - Panama City	31	61	17	109	30	60	17	107	216
19	7/19/2018	ECP - Panama City	25	59	40	124	24	58	13	95	219
20	7/20/2018	ECP - Panama City	31	73	9	113	31	72	8	111	224
21	7/21/2018	ECP - Panama City	43	60	0	103	41	60	0	101	204
22	7/22/2018	ECP - Panama City	27	62	0	89	26	60	0	86	175
23	7/23/2018	ECP - Panama City	19	50	13	82	19	50	13	82	164
24	7/24/2018	ECP - Panama City	23	45	19	87	23	44	18	85	172
25	7/25/2018	ECP - Panama City	25	75	13	113	24	75	38	137	250
26	7/26/2018	ECP - Panama City	24	74	9	107	24	72	9	105	212
27	7/27/2018	ECP - Panama City	23	62	10	95	22	61	10	93	188
28	7/28/2018	ECP - Panama City	38	94	0	132	37	93	0	130	262
29	7/29/2018	ECP - Panama City	25	90	6	121	25	90	6	121	242
30	7/30/2018	ECP - Panama City	22	42	23	87	20	41	23	84	171
31	7/31/2018	ECP - Panama City	20	49	22	91	19	49	22	90	181
OPSNET Total :			**813**	**2,163**	**638**	**3,614**	**793**	**2,143**	**507**	**3,443**	**7,057**
TFMS Total * :			**820**	**832**	**38**	**1,690**	**619**	**653**	**21**	**1,293**	**2,983**
TFMS % Of OPSNET * :			**100.86**	**38.5**	**6**	**46.8**	**78.06**	**30.5**	**4.1**	**37.6**	**42.27**

* - Does not include TFMS records if Userclass = O-Other or is missing and does not include TFMS records missing specific times (hour = I

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Sources: Traffic Flow Management System Counts (TFMSC), Aviation System Performance Metrics (ASPM)

OPSNET Operations Prorated By TFMS Report

From 07/2018 To 07/2018 | Airport=ECP
(Daily Averages)

	Date	Airport	Hour	Departure				Arrival				Total Operations
#				AC+AT	GA	MIL	Total	AC+AT	GA	MIL	Total	
1	Jul-18	ECP - Panama City	0	1	3	0	4	0	0	0	0	4
2	Jul-18	ECP - Panama City	2	1	1	1	3	0	0	0	0	3
3	Jul-18	ECP - Panama City	4	1	1	3	5	0	0	2	2	8
4	Jul-18	ECP - Panama City	5	1	1	3	5	0	0	3	3	9
5	Jul-18	ECP - Panama City	6	1	2	2	6	0	0	2	3	10
6	Jul-18	ECP - Panama City	7	2	2	0	5	0	1	0	1	7
7	Jul-18	ECP - Panama City	8	1	6	0	7	0	2	3	7	14
8	Jul-18	ECP - Panama City	9	1	6	2	10	1	5	2	9	20
9	Jul-18	ECP - Panama City	10	1	6	2	9	1	8	0	9	19
10	Jul-18	ECP - Panama City	11	0	6	0	8	4	9	0	13	21
11	Jul-18	ECP - Panama City	12	3	6	0	9	1	8	0	9	19
12	Jul-18	ECP - Panama City	13	1	5	0	7	2	5	0	8	15
13	Jul-18	ECP - Panama City	14	1	4	1	7	2	6	0	10	17
14	Jul-18	ECP - Panama City	15	1	5	0	7	1	5	1	8	15
15	Jul-18	ECP - Panama City	16	1	4	0	6	1	5	0	7	14
16	Jul-18	ECP - Panama City	17	1	3	1	6	1	2	1	5	11
17	Jul-18	ECP - Panama City	18	2	3	0	5	1	2	0	4	10
18	Jul-18	ECP - Panama City	19	1	2	0	4	2	1	0	4	8
19	Jul-18	ECP - Panama City	20	2	1	1	5	1	1	0	3	8
20	Jul-18	ECP - Panama City	21	0	1	0	2	1	1	0	4	6
21	Jul-18	ECP - Panama City	22	0	2	4	7	0	0	0	0	7
22	Jul-18	ECP - Panama City	23	0	0	0	0	0	0	0	0	0
OPSNET Total :				**30.56809538**	**78.41177667**	**29.24153677**	**138.2214088**	**26.59780781**	**70.42736157**	**20.23527826**	**117.2604476**	**255.4818565**
TFMS Total * :				**29.87630219**	**29.09911783**	**1.391529549**	**60.36694957**	**20.780193**	**21.45146122**	**0.699514612**	**42.93116883**	**103.2981184**
TFMS % Of OPSNET * :				**97.74**	**37.11**	**4.76**	**43.67**	**78.13**	**30.46**	**3.46**	**36.61**	**40.43**

* - Does not include TFMS records if Userclass = O-Other or is missing and does not include TFMS records missing specific times (hour = NA).

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Sources: Traffic Flow Management System Counts (TFMSC), Aviation System Performance Metrics (ASPM)