Prepared for:

ALBANY
INTERNATIONAL AIRPORT

Airport Master Plan

Albany International Airport

DRAFT Working Paper #2

June 2023

Prepared by:

CHA

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In order to ensure that Albany International Airport (ALB) is capable of supporting the forecasted increase in aviation activity, capacity evaluations were conducted to identify recommendation facilities to adequately accommodate 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 aviation activity forecast presented in **Chapter 3**, the airport facility needs were determined, which form the basis of the development concepts that will be discussed in **Chapter 5**. In addition to capacity shortfall, this chapter review deficiencies in satisfying FAA design standard for both the airfield and terminal, air cargo, and general aviation areas.

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

- Advisory Circular 150/5060-5, *Airport Capacity and Delay*
- AC 150/5300-13B, *Airport Design*
- AC 150/5325-4B*, Runway Length Requirements for Airport Design*
- AC 150/5190-4B, *Airport Land Use Compatibility Planning*
- AC 150/5360-13B, *Airport Terminal Planning*

4.1 Airfield Capacity Requirements

Airfield capacity refers to the maximum numbers 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, *Airfield Capacity and Delay*, and explains how to compute airfield capacity for the purposes of airport planning and design. This evaluation helped to determine if there is a need for capacity-related improvements or expansions to support future flight activity levels. The estimated capacity of the airfield at ALB was 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 an acceptable level of delay. This calculation is typically used in long-range planning and referenced for capacity-related improvement.

Capacity Calculation Factors

To calculate these two measurements of capacity, several key factors and assumptions specific to ALB were defined. Consistent with the guidance provided in AC 150-5060-5, these included:

- 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 runways

Aircraft Fleet Mix Index

An 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 has established four categories in classifying an aircraft by its maximum takeoff weight (MTOW), as depicted in Table 4-1.

Table 4-1 – 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, 2021.

The aircraft mix index is calculated using the formula *%(C + 3D)*, the letters corresponding with the aircraft class. This product falls into one of the FAA-established mix index ranges listed below and is used in capacity calculations herein:

• 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 were gathered from a review of operations that occurred in 2020:

- Class A & B = 50.0 percent of the Airport's operations
- Class C = 49.9 percent of the Airport's operations
- Class D = 0.1 percent of the Airport's operations

As such, the base year aircraft mix index is **50.2** [49.9 + 3(0.1)]. By the end of the planning horizon, the aircraft mix index may potentially increase to be **56.7** [46.8 + 3(3.3)] if FedEx transitions the critical aircraft from a Boeing 757 to and Airbus A300 conducting air cargo operations. However, the lower 50.3 Index was used to ensure the airfield capacity is not provide over estimated.

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 runways used in conjunction with the taxiways and aprons during the various levels of aviation activity directly affects an airport's operational capacity.

If an airfield layout consists of more than one runway, those runways can be termed as either "independent" or "dependent" of each other. An independent runway is one that is not operationally affected by the other runways during normal operations (e.g., parallel runways with sufficient separation). A dependent runway is one that is configured in such a way that aircraft must wait for operations to complete on another runway before resuming (e.g., intersecting runways). Due to this wait time, airfields with dependent runway systems are inherently limited compared to independent runways. The intersection runways at ALB are thus dependent.

Runway 1/19 has a north/south orientation and serves as the primary runway for all airport operations. Runway 10-28 has an east/west orientation and serves as the crosswind runway.

4.1.1 Hourly Capacity

As outlined in AC 150/5060-5, hourly capacity estimates were made under the following assumptions:

- Percent Arrivals: Arrival operations equal departure operations.
- Percent Touch-and-Go Operations: Percent of touch-and-go operations is within the ranges shown in AC 150/5060-5, *Table 2-1*. As reported by the Air Traffic Control Tower (ATCT), the percent of touch-and-go operations is just a few percent at ALB. This places the airport in the lowest category of 'between 0 and 20 percent' throughout the planning period.
- Taxiways: Full-length parallel taxiway, ample runway entrance/exit taxiways, and no taxiway crossing problems. These assumptions accurately represent the taxiway layout at ALB.
- Airspace Limitations: There are no airspace limitations which would adversely impact flight operations or otherwise restrict aircraft which could operate at the Airport.
- Runway Instrumentation: The airport has two runway end equipped with an Instrument Landing System (ILS) and has the necessary Air Traffic Control (ATC) facilities and services to carry out operations in a radar environment.

Based on the runway-way use configuration and aircraft mix index at ALB, and in accordance with FAA AC 150/5060-5, current and future hourly capacity (or operations per hour) through in 2041 under VFR and IFR conditions are approximately 74 and 57 operations, respectively, as shown in **Table 4-2**.

Table 4-2 – Capacity and ASV for Long Range Planning (ALB Hourly Capacity)

Mix Index	Hourly Capacity (Ops/Hr)		Annual Service Volume (Ops/Yr)
% (C+3D)	VFR	IFR	
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 130	51	50	240,000

Source: FAA AC 150/5060-5 [*Figure 2-1]*.

ALB's peak hourly activity in all weather conditions is forecasted to reach 24 by 2041, which is well within the maximums of both VFR and IFR conditions based on the table above. With 24 peak hour operations and an estimated capacity of 74, hourly airfield capacity would reach approximately 33%, or one-third. As such, improvements in airfield capacity are not necessary from a peak hour perspective.

4.1.2 Annual Service Volume

Annual Service Volume (ASV) is an expression of the total number of aircraft operations that an airfield can support per annum. As outlined in AC 150/5060-5, *Chapter 2: Capacity and Delay Calculations for Long Range Planning,* air service volume estimates were made under the following assumptions:

- VFR weather conditions occur roughly 77 percent of the time
- Runway-Use Configuration: Roughly 80 percent of the time the airport is operated with the runway-use configuration which produces the greatest capacity (i.e., Runway 1-19).

Based on the runway-use configuration and mix index, the annual air service volume at ALB is estimated at 195,000 during the planning period, as shown in **Table 4-3**. With, annual operations for 77,530 by 2041 time, that capacity at ALB is forecast to reach a maximum of approximately 40 percent capacity, improvements in airfield capacity are not necessary from an ASV perspective.

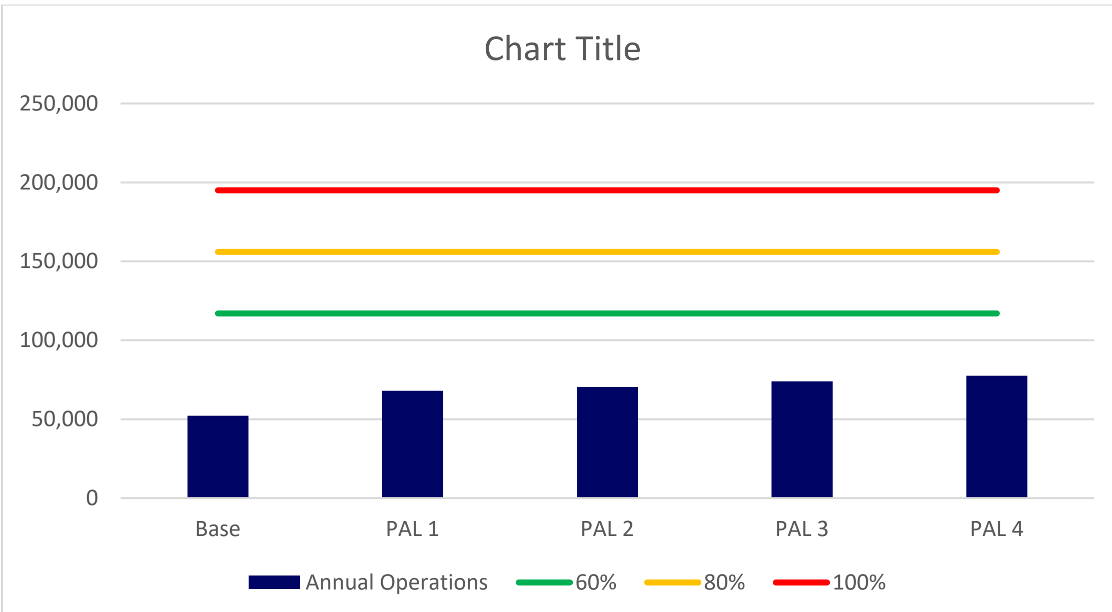
Table 4-3 – Annual Service Volume

Factor	Base	2041
Annual Operations	52,228	77,530
Annual Service Volume	195,000	195,000
Capacity Level	**26.8%**	**39.8%**

Source: FAA AC 150/5060-5 [*Figure 2-1]*, CHA

As demand increases, operational efficiency begins to decline exponentially. Delays per aircraft amount to approximately 45 seconds at around 60% capacity, 1.5 minutes at 80%, and 3.5 minutes at 100% capacity. In summary, the current runway capacity is adequate to serve the Airport's activity well beyond the planning horizon. The FAA considers airport that are forecast to remain below 60% of their hourly and annual capacities to not need planning for additional capacity. **Figure 4-1** illustrates the forecast annual operations at ALB, in comparison to the 60%, 80%, and 100% capacity level. Per this analysis, ALB falls within this category of "below 60%." Therefore, identified airfield improvements focus on FAA Design Standards and safety, rather than capacity. This finding is common for small hub airports, which rarely have airfield capacity shortfalls.

Figure 4-1 – Projected Demand



Source: FAA AC 150/5060-5 [*Figure 2-1*]*, CHA*

4.2 Airfield Facility Requirements

The above section concludes that additional airfield facilities are not needed for capacity purposes along. This section considers potential needs for safety improvements, including FAA established design standards, which have been revised in the past several years. This review includes the three key components of the ALB airfield: Runways, Taxiways, and Navigational Aids.

Airfield facility requirements are primarily determined by the critical aircraft (aircraft with the longest wingspan, highest tail, and fastest approach speeds) that conducts "regular use" of the airport as a whole, and specific runways and terminal/landside facilities. FAA AC 150/5000-17 defines "regular use" as 500 annual operations, including both itinerant and local operations but excluding touch-and-go operations.

4.2.1 Aircraft & Airport Classification

As introduced in Chapter 2, 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, aprons, and other facilities at ALB. As described in FAA AC 150/5300-13B, *Airport Design,* the standard classifications for the airfield are the Aircraft Approach Category (AAC), the Airplane Design Group (ADG), which combined comprise the Airport Reference Code (ARC). Additionally, the Taxiway Design Group (TDG) affects the requirements for taxiway width and standards. **Table 4-4** presents the applicability of these classification systems to the FAA airport design standards for individual airport components.

Table 4-4 – 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 and Taxiway Object Free Areas (OFAs), parking configuration, taxiway-to-taxiway separation, runway-to-taxiway separation
Airport Reference Code (ARC)	The combination of the AAC and ADG.
Taxiway Design Group (TDG)	Taxiway width, radius, fillet design, apron area, parking layout

Source: FAA AC 150/5300-13B, CHA, 2023.

The ARC is used for planning and design only; it does not limit the aircraft that may be able to operate safely on the airport. The specific definitions of these items were provided in Table 2-12.

The "critical aircraft" or "design aircraft family" represents 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 the airport on a regular basis (i.e., ≥500 annual operations). The design aircraft family was identified for ALB in **Section 3.5.8**. For facility requirements planning, the critical aircraft are further reviewed and determined for each component of the airport, as discuss below.

Airfield

With existing annual operations of over 1,700, the Boeing 757 is the critical aircraft for the airport as a whole, including Primarily Runway 1/19, parallel Taxiway "A", and other connecting taxiways. For Crosswind Runway 10/28, and parallel Taxiway "C", there is use by the Boeing 757, but not necessarily regular use. As such, ALB's airfield Critical Aircraft is listed below.

Table 4-5 – Airfield Critical Aircraft

Facility	Sample Aircraft	ARC	TDG
Current			
Runway 1/19	Boeing 757	C/D-IV	4
Runway 10/28	Boeing 737	C/D-III	3
Future			
Runway 1/19*	Airbus A300*	C/D-IV	5
Runway 10/28	No Change		

Source: FAA TFMSC flight plan database and Airport Forecast

*The potential change in the Critical Aircraft is not yet determined, or FAA approved.

The Airbus A300 is currently used weekly at ALB by FedEx, with approximately 100 annual operations. As FedEx has not determined any additional use of the A300, it is not yet known if it will become the overall critical aircraft at ALB. As such, it is important that the planning activities enable an upgrade to a future larger aircraft model with a TDG of 5 at ALB for all portions of the airfield that will accommodate TDG 5 aircraft. Taxiway widths are further discussed in **Section 4.2.6**.

Terminal / Landside Facilities

In addition to the airfield, the future terminal area facilities must consider the most demanding aircraft anticipated throughout the planning period. Based on a review of industry trends, the activity forecasts, and interviews with existing airport operators, an existing and future critical aircraft was also identified for passenger terminal apron, air cargo apron, as well as the MRO, FBO and general aviation facilities at ALB, as presented below.

Table 4-6 – Terminal/Landside Critical Aircraft

Facility	Sample Aircraft	ARC	TDG
Current			
Passenger Terminal	Boeing 737, Airbus A320	C/D-III	3
Air Cargo Area	Boeing 757	C/D-III	4
MRO Facilities	Embraer E-145	C-II	2B
FBO/Corporate	Gulfstream 550	C/D-III	2
Light GA/T-Hangars	Cessna 172, Beach Baron	A/B-I	1A
Future			
Passenger Terminal	No Change		
Air Cargo Area*	Airbus A300*	C/D-IV	5
MRO Facilities**	Embraer E-175**	C-III	3
FBO/Corporate/GA	No Change		
Light GA/T-Hangars	No Change		

* The potential change in Critical Aircraft is not yet determined or FAA approved

**Change from E-145 to the E-175 also results in a tail height increase from 22’ to 32’

In summary, as activity grows at ALB over time, a majority of the increase in activity is anticipated to consist of additional operations by the same category of aircraft. However, based on this review, there are two circumstances where potential aircraft changes will affect the facility requirements and subsequent development recommendations. These include:

- Airfield Critical Aircraft change from TDG 4 to 5 (e.g., change from B757 to A300 for air cargo). This is a potential change that is not yet confirmed. However, as cargo operators may upgrade to an A300 or other TDG 5 aircraft in the future, the airfield planning must be able to accommodate this change. Additionally, as TDG 5 aircraft conduct weekly operations at ALB currently, taxiways that do not accommodate that size aircraft may prevent or eliminate that existing activity.
- MRO Facilities aircraft change from ARC C-II to C-III regional jets (e.g., change from EMB-145 to EMB-175). During the planning period, both existing MRO facility operators anticipate this aircraft upgrade at ALB. The planning for these facilities must consider the larger wingspan and tail heights that will need to be accommodated.

4.2.2 Runway Requirements

As part of this master plan, FAA runway design and safety standards were evaluated to identify potential deficiencies to be addressed in the study. The FAA standards include dimensions, separation distances, protection zones, etc.

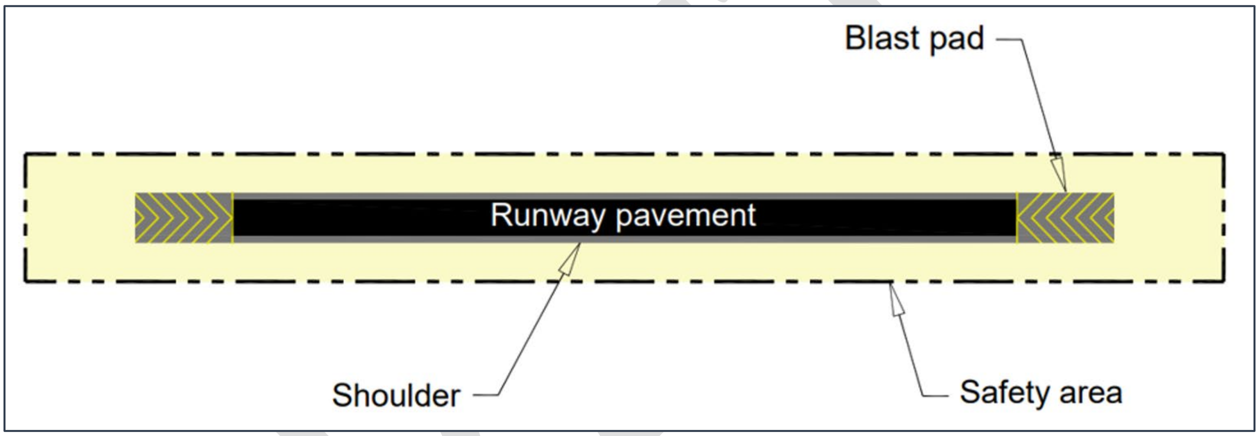
Each runway is assigned a Runway Design Code (RDC), which signifies the design standards specific to the individual runway. As detailed in **Chapter 3, *Forecast***, the overall Airport Reference Code (ARC) is currently D-IV. Runway 1/19 contains Instrument Landing Systems (ILS) with visibility minimums as low as 1,200 feet. The RDC is simply the ARC with the lowest available visibility added. As such, the Runway 1/19 RDC is D-IV-1200. The 4-digit number represents the minimum visibility of any published instrument approach on either end of the runway. With Runway 10/28 used regularly by ARC C-III aircraft and a 1-mile visibility minimum, the Runway 10/28 RDC is listed as C-III-5000. The future ARC and visibility minimums are not anticipated to change on either runway during the planning period.

The key FAA design and safety standards related to the runways at ALB, as defined in AC 150/5300-13B, *Airport Design*, are described below.

Runway Width – Runway width requirements are based on the critical aircraft associated with each runway. For ARC C-III through D-IV, the required runway width is 150 feet. Currently, both Runways 1/19 and 10/28 are 150 feet wide, thereby meeting this design requirement.

Runway Safety Area (RSA) – The RSA is a rectangular area bordering a runway that is intended to reduce the risk of damage to aircraft in the event of an undershoot, overrun, or excursion from the runway, as illustrated below. 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 storm sewers to prevent water accumulation, be able to support snow removal and firefighting equipment, and be free of objects except those required because of their function.

Figure 4-2 – Runway Safety Area



Source: FAA AC 150/5300-13B

The RSA for a Group IV runway is required to be 500 feet wide and extend 1,000 feet beyond the runway end, with gradients as follows:

- Longitudinal: First 200 feet: 0 percent to -3.0 percent
- Longitudinal: Remaining 800 feet: No more than -5.0 percent
- Transverse grades: -1.5 percent to -3.0 percent

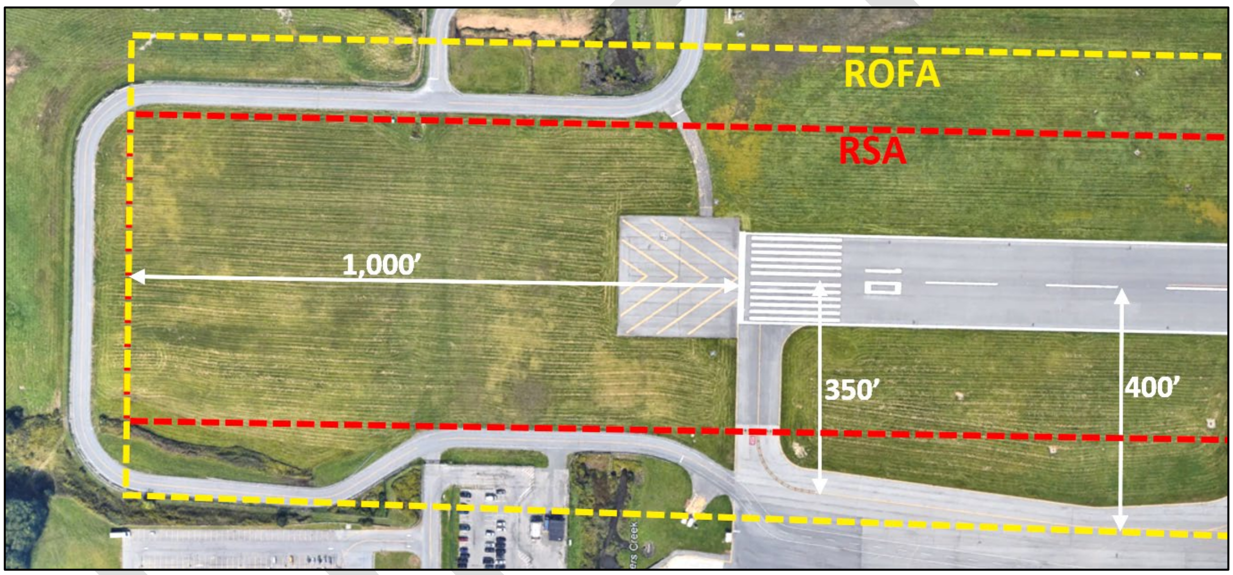
The Runway 1/19 RSA meets the length, width, and grading requirements of the RSA. Recently, the airport completed drainage improvements to reduce temporary standing water in the RSA. The Runway 10/28 also meets the requires through the application of declared distances and a displaced threshold on the east end of the runway. The location of public roads east of the runway prevents a full 1,000-foot RSA beyond the runway end.

Runway Object Free Area (ROFA) – The ROFA is a rectangular area bordering a runway intended to provide enhanced safety for aircraft operations. The ROFA is an area clear of parked aircraft or other equipment not required to support air navigation or ground maneuvering of aircraft. The ROFA design standard for Group III and IV runways is 800 feet wide, centered about the runway, and extends 1,000 feet beyond each runway end. Both ALB runways adhere to the prescribed ROFA geometry.

However, the airport service road is within the limits of the ROFA in a few locations, including beyond the north end of Runway 19 and west end of Runway 10 (see **Figure 4-3**). In these locations, the service road was located closer to the runway to avoid filling of regulated wetlands. Additionally, a portion of the airport employee parking lot is located in the Runway 10 ROFA.

These nonstandard ROFA conditions should be addressed during the study planning period, with potential options to reduce or eliminate these conditions as part of the alternative evaluation. As Runway 10 is the least used runway end, the improvements could be deferred and combined with a rehabilitation project for the associated apron, taxiway, and service road.

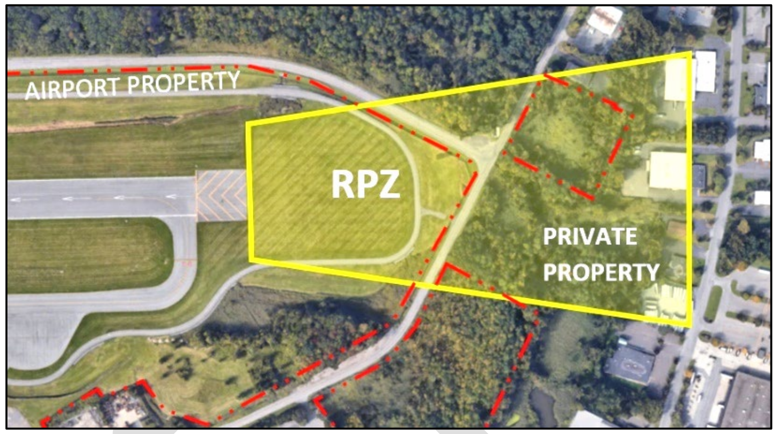
Figure 4-3 – Runway 10 RSA and ROFA



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 is the same as the elevation of the nearest point on the runway centerline. The ROFZ extends 200 feet beyond each end of the runway, and its width is based on visibility minimums and aircraft size. The ROFZ width for Runways 1/19 and 10/28 is 400 feet, and satisfies FAA standards.

Runway Protection Zone (RPZ) – The RPZ is a trapezoidal area located 200 feet beyond the runway ends and centered on the extended runway centerline. The RPZ is primarily a land use control area that is intended to enhance the protection of people and property on the ground through airport control. Such control includes clearing of RPZ areas of incompatible objects and activities. Currently, the RPZs at ALB are primarily owned by the airport, or controlled by easements. However, as common to many airports, public roads transverse each of the RPZs at ALB.

Figure 4-4 – Runway 28 RPZ



Where feasible, it is recommended that the Airport continue to acquire private land located within the RPZ's. The area beyond the east end of Runway 28 contains several acres of private property that should be considered for acquisition and will be identified in the Development Alternatives chapter.

Runway Separation – Adequate runway separation is critical to the safety of aircraft operations and is a measurement of distance from the runway centerline to adjacent airfield facilities (i.e., taxiways and aircraft parking aprons). The key separation standards for ARC D-III and D-IV Include:

- Runway Centerline to Parallel Taxiway Centerline: 400 feet
- Runway Centerline to Aircraft Parking Areas: 500 feet

One location at ALB does not satisfy these separation requirements is Runway 10 and Taxiway 'C', where the separation narrows from the standard 400 feet to approximately 350 feet toward the east end of the runway (see **Figure 4-4**). In this location, the proximity of the adjacent terminal apron prevents a standard separation between Parallel Taxiway 'C' and the apron. Therefore, this area of the taxiway is a non-movement area not under the control of the ATCT. Alternatives to increase the Runway Centerline to Parallel Taxiway Centerline separation should also evaluate and address the lack of separation to the apron.

4.2.3 Crosswind Runway Requirements

As discussed above, Runway 10/28 serves as the crosswind runway for ALB. It is oriented 90 degrees relative to primary Runway 1/19, thus providing ideal wind coverage for the overall airport. As a result, the combined wind coverage at ALB from both runways is over 95 percent for all weather conditions and aircraft types.

Wind conditions affect all airplanes in varying degrees, generally the smaller the airplane, the more affected its operations are by crosswinds. A detail crosswind evaluation was conducted and provided in Section 2.3.3, and is used here to identify the need for crosswind Runway 10/28 per FAA standards. Crosswind runways are justified (and eligible for federal funding) when the wind coverage on the primary runway is less than 95 percent. Table 4-7 identifies the all-weather wind coverage on primary Runway 1/19.

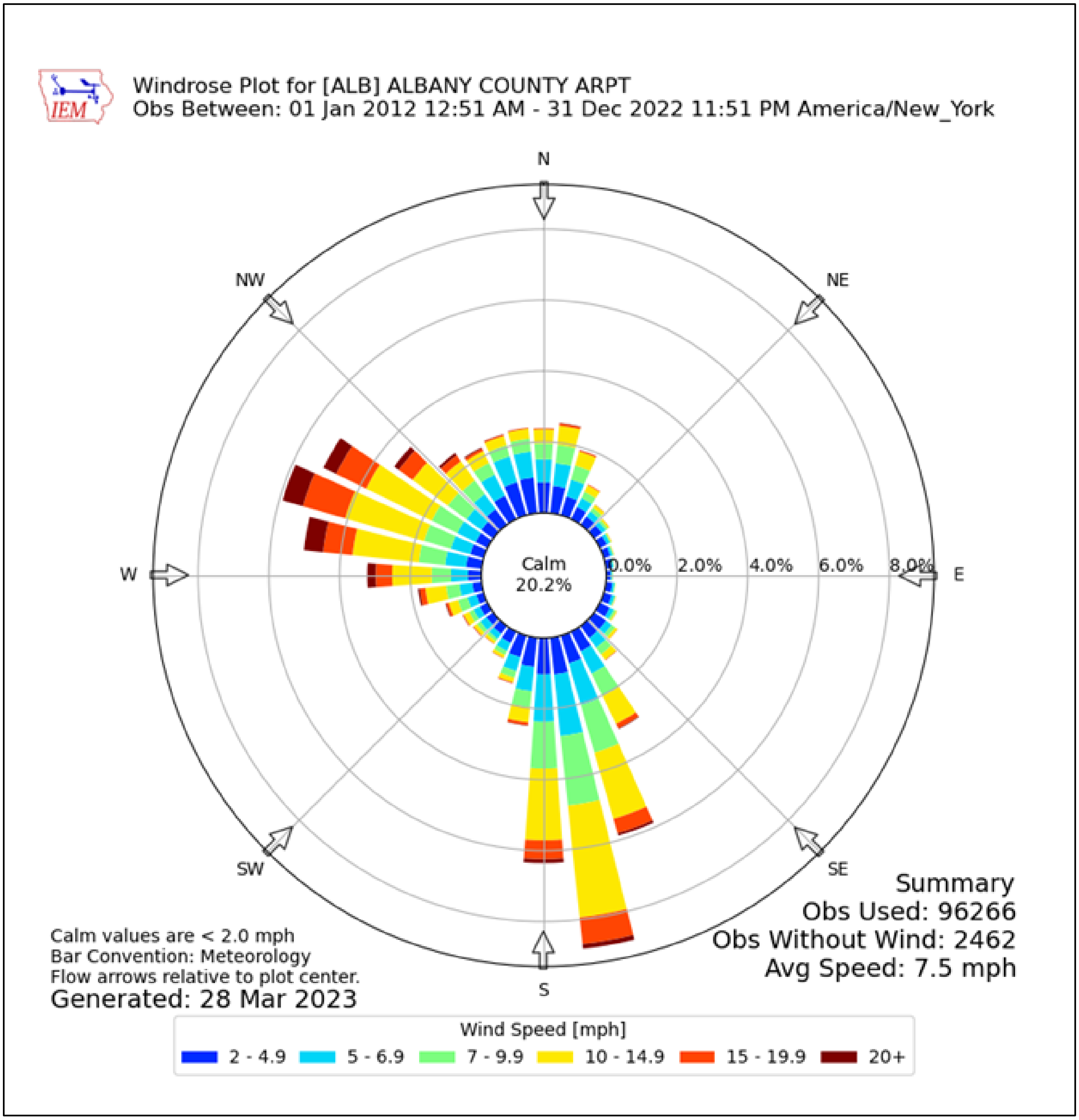
Table 4-7 – Primary Runway 1/19 Wind Coverage

Aircraft Type	ACR	Crosswind Component	Wind Coverage
Light aircraft	Up to B-I	10.5 knots	90%
Turboprops & Light Jets	A-II & B-II	13 knots	94%
Corporate & Regional Jets	C/D-II, C/D-III	16 knots	98%
Commercial Jets	ADG IV & Up	20 knots	100%

Source: NOAA, ALB ASOS 2010-2019.

Based on local winds, a crosswind runway at ALB is needed and eligible for general aviation aircraft including light jets up to ARC B-II. Runway improvements to crosswind Runway 10/28 would not typically be needed for larger aircraft as wind coverage on Runway 1-19 is adequate; however, the current Runway 10/28 size should be maintained as large jets use the runway 5-10% of the time due to strong westerly winds as illustrated in **Figure 4-5**.

Figure 4-5 – ALB All-Weather Wind Graph



Source: Iowa Environmental Mesonet (IEM), Iowa State University, 2023

Interviews with ALB operations personnel raised questions regarding the above finding, noting that strong westerly winds, particularly in winter months result in significant use and need for Runway 10/28, including for jet aircraft. As such, an additional wind analysis was conducted using the same ALB data set, but with restricting the observations to the colder six months of the year (October through March), and to the hours of the day containing scheduled commercial operations (5 AM to Midnight). This alternative wind analysis demonstrated a lower wind coverage on Runway 1/19 and the need for crosswind Runway 10/28 for all passenger airline activity with wind coverage under 95%.

Table 4-8 – Modified Primary Runway Wind Coverage

Aircraft Type	ACR	Crosswind Component	Wind Coverage
Light aircraft	Up to B-I	10.5 knots	86%
Turboprops & Light Jets	A-II & B-II	13 knots	90%
Corporate & Regional Jets	C/D-II, C/D-III	16 knots	94%
Commercial Jets	ADG IV & Up	20 knots	98%

Source: NOAA, ALB ASOS 2010-2019, limited to October – March and 5 AM to Midnight.

Based on these findings, it is recommended that the airport maintain crosswind Runway 10/28 in its current configuration throughout the planning period, to enable regular use by airline jets.

4.2.4 Runway Length Requirements

To ensure that ALB can support existing and anticipated aircraft and airline operational demands, a limited 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 types that can operate and the destinations (i.e., stage lengths) that the airport serves. Runway lengths can place restrictions on the allowable takeoff weight of the aircraft, which 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 calculation for ALB:

<u>Aircraft Specifics</u>

- ✈ Model and Engine Type – the aircraft version and engine type. The most common and demanding aircraft specific to ALB were used.

- Estimated Takeoff Weight – the estimated weight at takeoff, which includes the payload (i.e., passengers and baggage) and the fuel required to reach the intended destination (with reserve fuel).
- 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 "Standard Day (59ºF) + 25°F" (i.e., hot temperature of 84ºF) methodology listed in each aircraft manufacturer's specific APMs was used. The FAA uses the parameter of 25°F above standard for planning purposes.
- Elevation – the elevation above sea level at the airport. As elevation increases, air density decreases, making takeoffs longer and landings faster. ALB is located 285 feet above mean sea level (MSL). Sea level elevation was used for calculation due to manufacturer APMs using 1,000 foot increments
- 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

Two representative aircraft were used for this evaluation: the Boeing 737 Max 8 for commercial passenger service, and the Boeing 757-200 for air cargo operations. The 757 is the Critical Aircraft as the largest and heaviest regular user at ALB. The 737 Max 8 is the most demand aircraft, from runway length standpoint, in regular use at ALB. The assumptions for each aircraft are outlined below.

Boeing 737 Max 8 – For the runway takeoff length analysis, a stage length of 2,500 nautical miles (nm) was used as a most-demanding scenario with 90 percent maximum payload capacity. This stage length would allow for nonstop service to any airport within the contiguous United States. For the runway landing length analysis, the Maximum Landing Weight (MLW) was used.

Boeing 757-200 – For the runway takeoff length analysis, a stage length of 1,000 nm was used with 90 percent maximum payload capacity. This stage length encompasses operations to and from both hubs of UPS in Louisville, KY and FedEx in Memphis, TN. For the runway landing length analysis, the Maximum Landing Weight (MLW) was used.

Runway Length Requirement

Based on the parameters discussed above the runway length calculations and requirements for ALB are shown below.

Table 4-9 – Takeoff and Landing Weights

Aircraft	Takeoff Weight (90% Max Payload) (Pounds)	Landing Weight (Max Landing Weight) (Pounds)
Boeing 737 Max 8 (LEAP 1B Series Engines) – ALB-LAX	175,000	152,800
Boeing 757-200PF (PW2037/2040 Engines) – ALB-MEM	218,000	210,000

Source: Aircraft Performance Manuals (B737 MAX, B757), CHA, 2023.

Table 4-10 – Runway Length Requirements

Aircraft	Takeoff Length Requirement (Feet)	Landing Length Requirement (Feet)
Boeing 737 Max 8 (LEAP 1B Series Engines) – ALB-LAX	7,700	5,000
Boeing 757-200PF (PW2037/2040 Engines) – ALB-MEM	5,800	5,100

Source: Aircraft Performance Manuals (B737 MAX, B757), CHA, 2023.

It is pertinent that these calculations represent a worst-case scenario. Currently, the farthest nonstop service from ALB is to Denver International Airport, a distance of 1,400 nm. The pre-COVID non-stop destination of Las Vegas was the longest regular flight at ALB with a distance of approximately 2,000 nm. As such, a future potential stage length of 2,500 was used as a worst case (e.g., distance to Los Angeles, Seattle), along with the 90% payload and high temperatures.

<u>Conclusion</u>

Based on the calculations from the aircraft manufacturer's APMs, the primary runway length should be a minimum of 7,700 feet. As 8,500 feet is available, this provides a buffer for departures with over a 90% payload and/or temperatures above 84ºF. The crosswind runway would also ideally provide 7,700 feet of runway available for takeoff. However, as Runway 10/28 is typically only used during westerly winds (a headwind that reduces runway length requirements), the existing 7,200-foot length is considered adequate. Landings generally require less runway length than takeoff, as was determined in this evaluation for ALB.

Therefore, it is concluded that the current runway lengths at the airport are adequate to serve existing activity, forecast growth, and future non-stop destinations that may occur during the planning period.

<u>NYS Runway Length Comparison</u>

New York State contains six small-hub commercial service airports, including ALB, as defined by the passenger activity levels. These airports serve a few international destinations, in Canada, Mexico, and the Caribbean; however, the longest non-stop destination from these six airports is the U.S. West Coast, including Las Vegas, Phoenix, and Los Angeles. These destinations require the longest takeoff runway length due to the required fuel load. In general, to serve these destinations, a runway length of 8,000 feet is usually adequate for the modern Boeing 737 and Airbus 320 series aircraft that can fly these stage lengths.

With an existing Primary runway length of 8,500 feet, ALB's runway length is considered adequate to service additional destinations, with longer stage lengths, that may occur during the planning period. Below is a comparison of the longest available runway lengths at the six small-hub airports in the State.

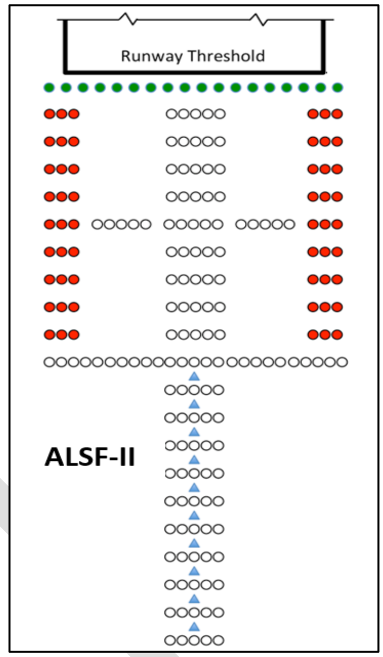
- Westchester County Airport (HPN): 6,500 Feet
- Long Island MacArthur (ISP): 7,000 Feet
- Greater Rochester International (ROC): 8,000 Feet
- **Albany International (ALB): 8,500 Feet**
- Buffalo-Niagara International (BUF): 8,800 Feet
- Syracuse-Hancock International (SYR): 9,000 Feet*

*Served F-16 fighter jets and other military aircraft.

4.2.5 Navigational, Landing, and Lighting requirements

Pilots utilize a variety of navigational aids (NAVAIDs), visual aids (VISAIDS) and instrument approach procedures to safely operate at commercial airports. These include Instrument Landing Systems (ILS), Area Navigation (RNAV) GPS, and Very High Frequency (VHF) Omni Direction Range (VORs), as well as runway and approach lighting systems (ALS). By providing navigation and position data, these systems assist pilots to locate airports, approach and land aircraft, taxi, and depart safely and efficiently during nearly all meteorological conditions.

A summary of the facilities currently provided and future requirements is provided below.



Instrument Landing Systems (ILS) – At ALB, both ends of Runway 1/19 are equipped with an ILS providing standard minimums, with a decision height of 200 feet, and visibility minimum of ½ mile. The ILS is a precision instrument procedure providing both horizontal and vertical guidance to the runway end. At ALB they include the following set of equipment:

- Localizer (LOC), for electronic lateral guidance
- Glide Slope (GS), for electronic vertical guidance
- Medium Intensity Approach Lighting Systems with Runway Alignment Indicator Lights (MALSR), for visual reference to the runway end. The existing Runway 1 MALSR at ALB is in very poor condition as determined in the 2022 *ALB Runway 1 MALSR Condition Assessment Report*
- Inner marker beacon, for audio reference
- Runway Visual Range (RVR), providing runway visibility at both the touchdown and rollout positions
- High Intensity Runway Lights (HIRL)

Additionally, Runway 1 provides ILS Category (CAT) II capability, adding Touchdown Zone Lights and Runway Centerline Lights, which reduces the decision height to 100 feet, with a visibility minimum of only ¼ mile or 1,200 feet.

The standard approach light system for ILS Category II includes a more substantial system called an ALSF-II. This lighting system contains three rows of light bars and closer spacing than a MALSR and provides substantially enhance visual reference at night and in poor visibility.

However, the existing ILS approach to Runway 1 has a Special Authorization (SA) CAT II approach that enables CAT II minimums with only a MALSR system. While this alternative does not provide the full FAA standard, it is considered an adequate and lower cost alternative to adding a full ALSF-II system. Therefore, it is recommended to fully refurbish the existing Runway 1 MALSR system as long as the existing SA CAT II approach minimums (i.e. 100 feet decision height and 1,200 feet visibility) are maintained throughout the planning period.

Non-precision Instrument Approaches (NPI) – All four runway ends at ALB include a published RNAV GPS procedure. The RNAV approaches procedures are based on satellite radio signals, and do not require ground base navigational equipment. The RNAV procedures for Runway 1, 19, and 28 each include vertical guidance with an LPV approach. Runway 10/28 also provide HIRL and Centerline Lights. A VOR based procedure is also available to Runway 28 using the ALB VORTAC.

These NPI procedures provide sufficient backup and an alternative to the ILS procedures. No additional systems or procedures are recommended at ALB.

Visual Aids – The airport is also equipped with several additional systems, these include:

- Precision Approach Path Indicators (PAPI) are provided on Runways 1, 19, and 28 and provide a visual reference to the standard approach slope to the runway end. PAPI systems ensure clearance over any obstacles in the final approach path using a set of lights that identify if the aircraft it above, on, or below the designated glide path.
- Runway End Identification Lights (REIL) are a set of strobe lights positioned at the runway ends to better identify the location of runway threshold during reduced visibility conditions. REIL are available on Runways 10 and 28, where full approach lighting systems are not available.
- Airport Rotating Beacon is required at all airports with runway lighting. The beacon can be seen from up to 20-miles from the airport and is used at night to provide an early visual identification of the airport's location.

Airfield Signage & Marking – FAA guidance include detailed advisor circulars on airport signage and marking. As required by the FAR Part 139 Certificate, ALB maintains a detailed plan for signage and marking, and satisfies the associated facility requirements.

Recommendation: An ALSF-II approach lighting system or replacement MALSR is recommended for Runway 1 (if minimums can be maintained). No other navigational or lighting deficiencies were identified.

4.2.6 Taxiway Requirements

Taxiway Design Standards

Similar to runways, taxiways include FAA design requirements such as dimensions, separation distances, and safety standards. The FAA standards for taxiways are also defined in AC 150/5300-13B, Airport Design, and are described below.

Taxiway Width – Taxiway width and standards are based on an airport's Taxiway Design Group (TDG), which is currently a TDG 4 for the ALB airfield as a whole. The FAA standard taxiway width is 50 feet for TDG 4. Presently, all taxiways at ALB meet or exceed this required width, as most of the taxiways at ALB are currently 75 feet in width.

As discussed above, the Airbus A300 is a weekly user of the airport in TDG 5, but is not the designated critical aircraft. The A300 requires the 75-foot wide taxiways, creating a situation where the facility requirement per FAA standards is not adequate for a current airport user. Therefore, and as the existing taxiways are 75' wide, the facility recommendation is to retain these taxiways at 75' wide, although this is above the standard for TDG 4. Reducing existing taxiway widths could be a safety concern for TDG 5 aircraft, and could potentially prevent use of the A300 aircraft at ALB. Additionally, proposed taxiway alternatives servicing the Cargo Apron would require planning for TDG 5 taxiways at 75' widths as discussed below.

Parallel Taxiways – Full parallel taxiways are considered a standard safety facility, providing access to and from runways, and preventing the need to 'back-taxi' on the runway for takeoffs or landings. Both runways at ALB are equipped with a full parallel taxiway.

As Runway 1/19 has aircraft facilities positioned on both sides of the runway, a full parallel taxiway is recommended for the east side of the runway. Currently, the air cargo, general aviation, and Army National Guard facilities are located on the east side of the runway. In order to access parallel Taxiway 'A', these users must taxi across the primary runway for most takeoffs and landings. FAA considers these runway crossings a safety concern, which can be eliminated with the second parallel taxiway.

As shown in the Alternative Development evaluation (Chapter 5), the majority of the new development locations on the airport property are located on the east side of Runway 1/19. While facilities improvements are anticipated in all locations throughout the planning period, new or expanded corporate, general aviation, air cargo, and support facilities will be focused on the east side of the airport as the only sizable undeveloped area of the Airport. Thus, the safety benefit of the second parallel taxiway will increase as new facilities are added at ALB.

The width of this recommended future parallel taxiway would be 75' as the air cargo facility is located on the east side of Runway 1/19. As a 'new' taxiway, FAA funding may need to be justified for this width if the Critical Aircraft remains a Boeing 757 (TDG 4). The potential justification would be based on the existing TDG 5 aircraft use at the airport, whereas taxiways under 75' in width could result in an aircraft excursion (i.e. safety impact to the operating environment), and/or prohibition of the use of such aircraft (i.e. financial impact). Eligibility determination for the taxiway width would typically include a cost-benefit analysis provided by the Airport for consideration by the FAA Region and Headquarters. The justification would not be required if the Critical Aircraft became a TDG 5 aircraft at some point in the future. There, the new parallel taxiway should be planned for the 75' width.

Taxiway Safety Area (TSA) and Taxiway Object Free Area (TOFA) – Similar to the RSA and ROFA, taxiways also have designated standards to improve safety during an excursion from the taxiway and to provide adequate wingtip clearance from other aircraft and fixed or movable objects. The TSA and TOFA are based on the prescribed ADG of IV at ALB. Presently, all taxiways at the Airport contain the required TSA and TOFA dimensions without impacts in most areas of the airport. As the ADG is expected to remain Group IV throughout the planning horizon, no additional requirements are necessary to meet future standards.

Taxiway Fillets – For taxiway turns onto runways, aprons, or others taxiways, there are FAA design standards for the geometry of the fillets, based on the angle of the turn. Currently, the taxiways at ALB do not meet the fillet dimension dimensions as they were constructed prior to the current standards. It is recommended that the fillet changes are considered at each intersection when the pavement is in need of rehabilitation or reconstruction, in consultation with the FAA. For new taxiways, all current design standards would be applicable.

Taxiway Lights – All taxiways at ALB are equipped with Medium Intensity Taxiway Lights. Taxiways that cross runways are also equipped with Runway Guard Lights. These systems are adequate throughout the planning period.

Taxiway Designations – The FAA provides guidance for the naming (i.e. designations) of taxiways with the intent of improved pilot and controller awareness and spatial orientation. The existing taxiway designations were reviewed, and improvements have been identified. Specifically, the FAA prefers that the exit taxiways (i.e. stub taxiways) along a runway a alphanumeric and associated with the parallel taxiway. Fore example, at ALB there are seven exit taxiways between Runway 1/19 and parallel Taxiway 'A'. These exits are currently designated as 'M', 'B', 'D', etc. Per FAA, these exits should be designated as 'A1', 'A2', 'A3', etc. Updated taxiway designation recommendations are provided in the Alternatives evaluation.

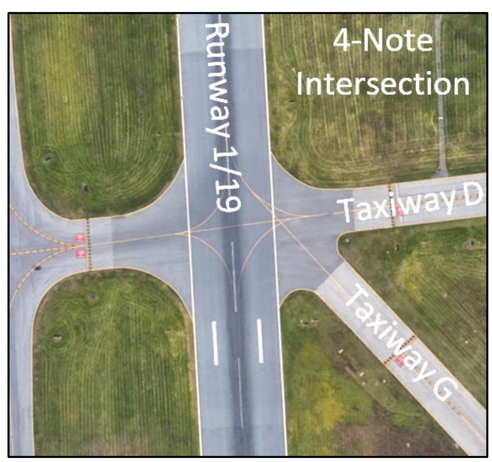
Taxiway Recommendations:

- Retain the existing 75' taxiway width for all parallel and exit taxiways. Connector Taxiways 'D', 'G', 'P', etc. should follow the standard needed for the specific aircraft users utilizing these airfield areas.
- Provide a full parallel taxiway on east side of Runway 1/19
- Upgrade the taxiway intersection fillets if and when taxiways required reconstruction
- Update the Airport's taxiway designation to adhere to FAA guidelines

4.2.7 Airfield Geometry

Taxiway Intersections – The FAA standards recommends taxiway intersections be at a 90 degree angle, as acute angle taxiway crossings can create blind spots while holding short. Currently, Taxiways 'G', 'J', 'K', 'M' (northwest quadrant only), and 'Q' do not meet this geometry standard. It is recommended that the non-standard geometry be considered for improvements when pavement rehabilitation for the aforementioned taxiways is required. Cost and environmental impacts would be considered for each location.

Figure 4-6 – Non-Standard Intersections



As a result of the 90-degree intersection angle, the FAA recommends intersection points to have no more than three nodes (i.e., an aircraft taxiing can continue straight, turn 90 degrees left, or turn 90 degrees right). More than three turn options can lead to spatial disorientation. There is currently one location at ALB that exceeds the 3-node intersection geometry consisting of Runway 1-19, Taxiway D, and

Taxiway G. This results in a 4-node intersection and acute angles. It is recommended that this area be realigned to meet the FAA standard.

Figure 4-7 – Direct Apron-to-Runway Access

Direct Apron-to-Runway Access – Direct apron-to-runway access refers to a nonstandard airfield geometry allowing an aircraft to taxi from a point on an apron, directly onto the runway, without making any turns. Such a layout can cause unsafe operating scenarios in which a pilot mistakes the runway for a taxiway. Presently, the taxiway connections from the terminal apron each provide a nonstandard direct apron-to-runway access. Additionally, the air cargo, FBO, and other aprons also have this nonstandard layout. It is recommended that these nonstandard geometries be mitigated with the use of painted green islands or configuration changes.

Limit Runway Crossings – Minimize runway crossings to the extent possible and reduce crossings within the center third of the runway (i.e., the high-energy area). At ALB, there are three taxiway crossings in the middle third of the runways and others in proximity (<1,000 feet) of the next crossing. During the Development Alternatives, potential taxiways that could be modified or ultimately eliminated will be identified for consideration. A few examples of this condition include:

- Taxiway 'G' - which connects to Runway 1/19 in the center third of the runway
- Taxiway 'K' - is located in proximity (<1,000 feet) to adjacent taxiways to the east and west (Taxiway 'K' also provides direct apron-to-runway access, and is at a 70 degree angle).

Separate Parallel Taxiways from Non-Movement Areas – The west end of Taxiway C is co-located with the Terminal Apron, where aircraft are pushed-back from the gates. As such, this location of Taxiway 'C' is a Non-Movement area, not under the positive control of the Air Traffic Control Tower (ATCT). This is the only location at ALB with this condition. If feasible, a separation between Taxiway 'C' and the apron would mitigate this condition and gain positive ATCT control of this area.

Airfield Hot Spots – A Hot Spot is a location within the airfield with a history or potential risk of collision or runway incursion due to factors such as airport layout, traffic flow, airport marking, signage and lighting, that reduce situational awareness. They typically center around runway/taxiway or taxiway/taxiway intersections. Hot Spots are depicted on Airport Diagrams and designated as "HS 1", "HS 2", etc., along with textual descriptions outlining the reason for the Hot Spot. ALB currently does not have any Hot Spots.

Figure 4-8 – Non-Standard Runway to Taxiway Separation

4.2.8 Airfield Facility Requirement Summary

Overall, the existing airfield satisfies most of the identified requirements throughout the planning period. Furthermore, it is noted that the identified airfield shortcomings are not directly related to activity levels or forecast growth. Rather they are mainly related to changes in FAA runway and taxiway design standards that have occurred in the last 10-years. The airfield facility requirements are summarized below:

- The ROFA contains portions of the airport service road. If feasible, the service road should be relocated in these locations.
- Small portions of the RPZs are not owned by the Airport. Acquisition or easements should be considered for these locations that remain in private ownership to provide airport control over future development.
- A portion of Taxiway 'C' has less than the minimum 400' runway-taxiway offset. This location is also in a Non-Movement Area of the taxiway.
- Crosswind Runway 10/28 provides additional airport wind coverage needed to support all aircraft types and users. It should be maintained as ARC D-III to support airline jets due to strong westerly winds.
- Per FAA Standards, Runway 1 should be equipped with a full ASLF-II Approach Lighting System supporting the ILS Category II procedure. Alternatively, a MALSR system can suffice if it is capable of supporting Category II minimums.
- The Critical Aircraft is forecast to remain ARC D-IV; however, if regular air cargo operations change from a Boeing 757 to an Airbus A300, the TDG would increase from 4 to 5, which increase the minimum taxiway width to 75 feet for appropriate taxiways.
- Add a full parallel taxiway to the east side of Runway 1/19 to avoid runway crossings, improve safety, and promote better land use utilization on the Airport.

- Recent FAA taxiway geometry changes has impacts on the following existing conditions at ALB:
  - Taxiway Fillets: Upgrade to the new FAA standard geometry during runway rehabilitation projects.
  - Modify taxiway intersections to 90 degrees, where practical.
  - Eliminate 4-node intersection of Runway 1/19, at Taxiways 'D' and 'G'
  - Reduce or eliminate direct apron-to-runway access, which currently exist at most exit taxiways.
  - Consider reducing the number of available runway crossings, particularly in the middle third of the runways.

4.3 Terminal Facility Requirements

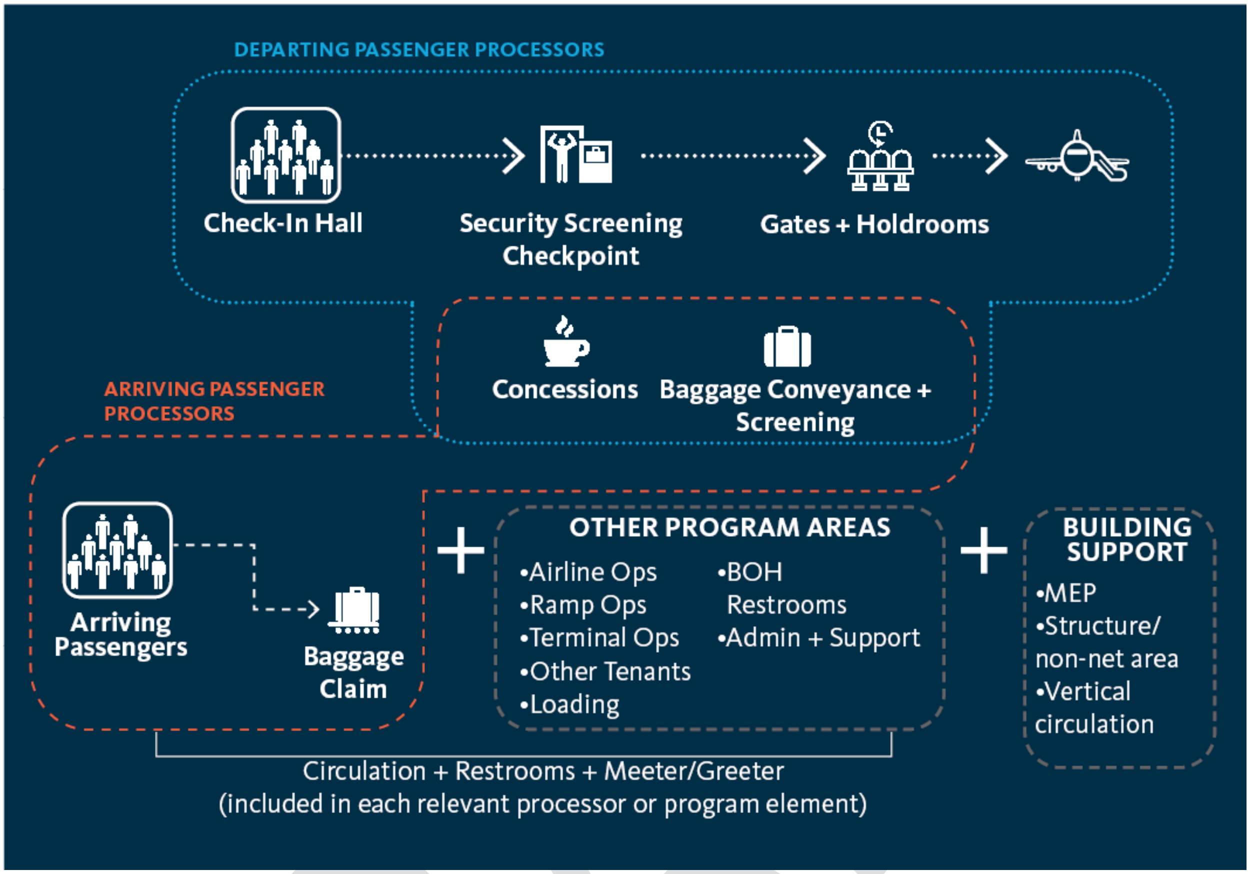
4.3.1 Terminal Programming

The approach to terminal programming uses a combination of Annual Volume, Peak Hour Passenger numbers and number of Gates to provide an estimate of required terminal program areas.

For the terminal program, space needs have been separated for analysis by processor and function:

- Departing Passenger Processors
  - Check-In Hall
  - Security Screening Checkpoint
  - Gates and Holdrooms
- Arriving Passenger Processors
  - Baggage Claim
- Shared Processors
  - Concessions
  - Baggage Conveyance + Screening
- Other Program Areas
  - Airline Ops
  - Ramp Ops
  - Terminal Ops
  - Other Tenants
  - Loading
  - BOH Restrooms
  - Administration and Support Spaces
- Building Support Spaces
  - Mechanical/Electrical/Plumbing Areas
  - Structure/Non-Net Areas
  - Vertical Circulation

This approach is graphically shown in the following illustration:



Summary sections have been provided for each process and function type. These outline Key Planning Assumptions used (for instance, processing speeds and preferences) and quantities and summaries by space type.

Overall circulation spaces (for example, Concourse circulation) have been assigned to each processor. This allows for an easier translation of program areas to physical planning by space and provides an opportunity to optimize circulation space as appropriate by zone.

Programming has been completed for each of the processors individually using the reference data as a base. However, understanding that any future modifications to this facility will require renovation and potentially expansion, the program areas should not be evaluated as absolute and are subject to consideration in context existing conditions. A summary chart at the end of the document lists the aggregated space programming recommendations for the terminal compared against the current inventory of terminal areas.

4.3.2 Planning Assumptions

For physical planning purposes, two planning horizons, or Planning Activity Levels (PALs) have been assessed at this time for terminal space programming. The PALS generally refer to a future activity level, based on a forecast year (i.e. PAL 1 = 2026; PAL 2 = 2031; PAL 3 = 2036; PAL 4 = 2041). However, the term is intended to acknowledge that facility requirements are based on a future activity level, which may occur before or after the forecast year. For the terminal requiremenets, the evaluation references PAL 2 and PAL 4, or the mid and long-term planning horizons. For reference, the program also includes an "Existing" category indicating current program areas augmented due to the known upcoming expansion planned as part of the Pre-TSA Expansion Improvement project.

The Projected Activity Level assumptions used as the basis of the terminal facilities program are outlined in **Table 4-11**. These include Baseline activity (which utilizes 2019 data, representative of pre-Pandemic levels of activity), PAL 2, and PAL 4 information. Annual Volume and Peak Hour Passenger (PHP) information have been referenced as the primary drivers of terminal program.

It is assumed that all passenger traffic will be for domestic operations throughout the planning period.

Table 4-11 – Projected Activity Levels

		Baseline (2019)	PAL 2	PAL 4
ANNUAL VOLUME	Domestic Passengers (Enplaned)	1,492,305	1,841,000	2,107,000
	International Passengers (Enplaned)	0	0	0
	Connections / In-Transit Passengers	0	0	0
	TOTAL (Enplaned + Connections)	1,492,305	1,841,000	2,107,000
PASSENGER PROFILES	Domestic Passengers	100%	100%	100%
	International Passengers	0	0	0
PEAK HOUR PASSENGERS	Departing Passengers	905	1,130	1,300
	Arriving Passengers	737	925	1,057
GROWTH	Departing Passengers	-	24.86% increase over baseline	43.65% increase over baseline

Source: Gensler, 2023

The number of Aircraft Gates were provided as a Planning Assumption based on future flight schedules and forecasts generated for PAL 2 and PAL 4 in **Section 3.5.2**. These assumptions indicate that future passenger growth will be achieved through optimization or existing gate layout, paired with a 2-gate replacement project intended to replace two ground gates with Group III gates with aircraft accessed directly from the Concourse level.

Table 4-12 – Aircraft Gates

			Baseline (2019)	PAL 2	PAL 4
GATES	Domestic Gates	Group III (or smaller)	**14**	**16**	**16**
	TOTAL		**14**	**16**	**16**
	Hardstand Positions		**0**	**0**	**0**

Source: Gensler, 2023

In discussions with the Airport, physical planning should anticipate potential locations for four additional aircraft positions, or 20 total Gates, if airline requirements or passenger demands result in a higher than forecasted need. For the purposes of this program, additional resultant areas have not been included in overall program totals.

Throughout the document, where Level of Service is referenced, the target has been set at the International Air Transportation Association's (IATA) midpoint Optimum Level of Service (LOS), IATA, 10th Ed, and where peak 30-minute loading is used, and a 60% peaking factor has been assumed.

Assumptions about Common Use, Preferential Use, and/or Proprietary Use models have been specifically included where applicable; these assumptions vary by processor. In certain key areas, benchmarking against current facility program has been provided.

4.3.3 Check-In Hall

The analysis for the Check-In processors assumes a mix of Full-Service agent positions (where passengers complete their entire transaction with an agent), Bag Drops (where passengers drop bags after checking-in on-line or at a kiosk), Self Service Kiosks, and an estimate for the number of passengers who complete check-in remote (i.e. at curb, home, via mobile device, etc.).

Full-Service positions are computed in accordance with IATA Airport Development Reference Manual (ADRM) equations, utilizing an assumed Peak 30-Minute factor of 60%.

Bag Drop positions are assumed to be spatially comparable to the Full-Service counters. Future deployment of self-drop induction points may result in space savings. However, equivalent dimensions between Full-Service and Bag Drops were maintained throughout the planning period in order to protect short term flexibility without compromising future reconfiguration potential.

Bag Drop Kiosk demand is determined by assuming all passengers utilizing Bag Drops are using Kiosks in a two-step transaction (where passengers check-in and print bag tags at the kiosk before moving to the actual induction point).

Self Service Kiosks are provided for those passengers requiring e-ticket services but who are not checking bags. Key assumptions for percentage of passenger split and processing times are listed below.

The Departures Public Concourse is located between the terminal entries and the start of the ticketing queues, the size of this area is determined by taking the linear frontage of the terminal processor and multiplying it by a nominal 35-foot depth of circulation.

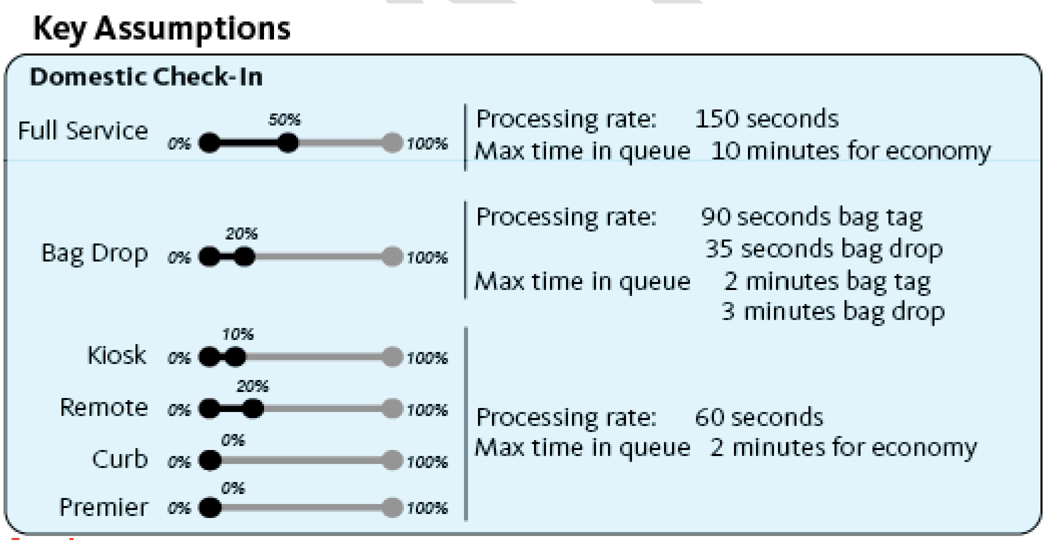
The Departures Meeter/Greeter Area is calculated by assessing occupancy, assuming that every tenth passenger will have one Meeter/Greeter, spending 20 minutes within the terminal. The peak hour occupancy is multiplied by 23 SF per IATA LOS standards.

The Airline Ticket Support Offices (ATO) area assumes that these offices run continuously behind the row of Full-Service Counters and Bag Drop positions, at a 30ft depth.

Check-In Hall Customer Service area uses an industry standard square foot per passenger ratio of 1 SF per 10 peak hour departing passengers.

Operations and Support spaces adjacent to the Departures Hall use a planning guideline of 2.5% of overall terminal operations space.

Key processing assumptions for the Common Use positions are shown below. In the future, it is anticipated that adoption of mobile and semi-independent ticketing modes (such as Bag Drop, Kiosk, and Remote Check-In) will increase. However, to allow flexibility for infrequent travellers, Common Use assumptions retain a higher portion of Full-Service Counter positions as a baseline.



Two analyses for Ticket Counter positions have been conducted. The first analysis (see **Table 4-13**) indicates the number of counters that would be required if all positions are programmed as Common Use.

The second analysis (see **Table 4-14** and **Table 4-15**) indicates what would be required with a combination of leased and Common Use Ticket Counters. Currently, the Airport has a combination of leased ticketing counters and unbranded/Common Use positions. Future analysis assumes that the four airlines with the highest activity levels (American Airlines, Delta Air Lines, United Airlines and Southwest Airlines) will retain leased positions and that the number of their positions will grow at pace with overall departing passenger growth. Common Use positions will comprise the remaining Ticket Counters. Future forecasts indicate that 100% of the peak hour passenger activity will be represented by the four main carriers, but that overall, these carriers will represent 92% of overall daily departing passenger traffic. Therefore, additional Common Use counter requirements have been calculated to capture 8% of the overall daily departing passenger traffic. For the purposes of the overall area summary in **Table 4-22**, the second analysis has been used.

Table 4-13 – Check-In Requirements – All Common Use

		Existing		PAL 2		PAL 4	
		Count	Area (sf)	Count	Area (sf)	Count	Area (sf)
Check-in Positions, Circulation, and Queuing Areas	Full Service Counters (One counter = 2 positions | One scale provided per counter)	30	6,010	25	8,200	28	9,184
	Bag Drop Induct	-		4	1,312	5	1,640
	Bag Tag Kiosks	-		8	513	10	590
	Self Service Kiosks	-		4	268	4	291
Airline Ticketing Offices	ATO (Assumes 30lf depth behind Full-Service and induct positions)	-	10,849	-	6,960	-	7,920
Departures Restrooms	Restroom Module	-	897	1	1,631	1	1,631
Circulation	Public Concourse (Assumes 30lf depth in front of Check-In and Security)	-	11,907	-	10,290	-	11,805
Meeter/Greeter		-	-	-	879	-	1,018
Customer Service		-	-	-	200	-	200
Operations and Support		-	-	-	600	-	600
TOTAL		29,663		31,483		34,879	

Source: Gensler, 2023

Table 4-14 – Ticket Counter Requirements – Combination of Leased and Common Use

Airline / Service Provider	Existing In-Line Positions / Equivalent Standard Counter Count	PAL 2 Equivalent Standard Counter Count	PAL 4 Equivalent Standard Counter Count
American	10 / 5.5	8	8
Delta	6 / 3	4	6
United	6 / 3	4	6
Southwest	7 / 6	8	10
Jetblue	6/3	14	15
Allegiant	6/3		
Frontier	6/3		
Unbranded	6/3		
TOTAL	**53/29.5**	**38**	**45**

Source: Gensler, 2023

Notes:

- Future Ticket Counter positions for the four airlines indicated in orange rows have been extrapolated using increases in peak hour passenger data for those activity periods. Existing in-line counts are based on actual positions, which may use different dimensions than a standard paired counter dimension. For planning purposes, equivalent standard counter count numbers have also been included. For future planning purposes, the equivalent standard counter count number has been increased and rounded up to the nearest full even number. This is an estimate only and will be subject to actual space programming requirements from the airlines.
- Other positions have been aggregated into a Common Use model, assuming 8% of overall daily passenger volume will use these positions at non-peak times.
- Current Equivalent Standard Counter Count has been shown as 29.5 because current American Airlines ticketing counter positions utilize half an equivalent counter, while there is space for 30 full counters.

Table 4-15 – Check-In Requirements– Combination of Leased and Common Use

		EXISTING		PAL 2		PAL 4	
		Count	Area (sf)	Count	Area (sf)	Count	Area (sf)
Check-in Positions, Circulation, and Queuing Areas	Full Service Counters (One counter = 2 positions | One scale provided per counter)	**30**	**6,010**	38	12,464	45	14,760
	Bag Drop Induct	-		INC ABOVE		INC ABOVE	
	Bag Tag Kiosks	-		8	513	10	590
	Self Service Kiosks	-		4	268	4	291
Airline Ticketing Offices	ATO (Assumes 30lf depth behind Full Service and induct positions)	-	**10,849**	-	9,120	-	10,800
Departures Restrooms	Restroom Module	-	**897**	1	1,631	1	1,631
Circulation	Public Concourse (Assumes 30lf depth in front of Check-In and Security)	-	**11,907**	-	13,410	-	14,130
Meeter/Greeter		-	-	-	879	-	1,018
Customer Service		-	-	-	200	-	200
Operations and Support		-	-	-	600	-	600
TOTAL		**29,663**		**39,085**		**44,020**	

Source: Gensler, 2023

Note: The split Leased/Common Use counter position analysis applies to inline positions only. Projected bag tag Kiosks and Self Service Kiosks (which are frequently located in the queue areas, or elsewhere in the ticketing hall) have used the Common Use analysis calculations.

4.3.4 Security Screening Checkpoint

Security screening requirements use IATA ADRM equations for developing passenger demand and TSA Automated Screening Lanes (ASL) estimates for spatial requirements. As ASL lanes typically require more area than traditional lanes, their incorporation in the program will safeguard for their future adoption. The number of screening lanes are established by taking the Peak 30-Minute throughput (assumed to be 60% of peak hour demand) created by the Full-Service Check-In counters, Bag Drops, Self Service Kiosks, and passengers bypassing Check-In altogether and proceeding directly to the checkpoint.

Standard Lanes and PreCheck Lanes and their respective queues are computed separately using their individually assumed processing rates and queuing times.

Key assumptions for processing speeds and Standard Lane/PreCheck adoption split are outlined in the Key Assumptions, below. Both have been fixed for the entire duration of planning, applying to both PAL 2 and PAL 4 programs. However, it is anticipated that changes in processes and efficiencies in processing will occur in the next 20 years, potentially decreasing demand for security lanes.

Key Assumptions

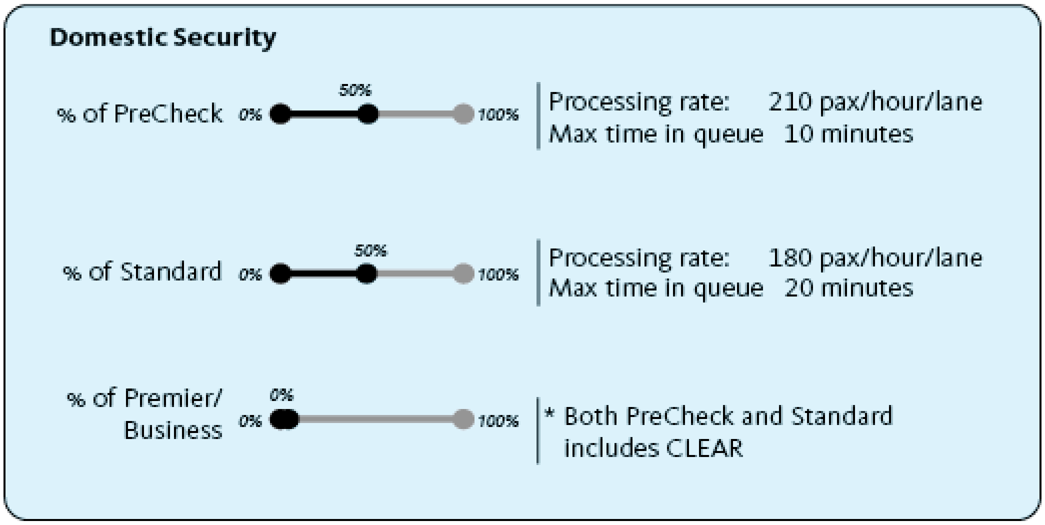


Table 4-16 – Security Screening Checkpoint Requirements

		EXISTING		PAL 2		PAL 4	
		Count	Area (sf)	Count	Area (sf)	Count	Area (sf)
Security Lanes	PreCheck Lanes	3	4,103	3	10,323	4	12,044
	Standard Lanes	3		3		3	
	Total	6		6		7	
Circulation	Boarding Pass Check	-	1,331	4	1,279	5	1,510
	Security Checkpoint Queue	-		-	3,330	-	3,885
	Recompose (Assumes 20lf recompose zone)	-	Inc. Above	-	2,220	-	2,590
Security Operations and Support	Includes KCM, TSA Checkpoint space, PSRs, etc	-	6,891	-	1,795	-	1,795
Remote Security Agency Support		-	-	-	315	-	368
TOTAL		12,546		19,262		22,192	

Source: Gensler, 2023

Notes:

- Dedicated employee screening lane has not been included in calculations at this time.
- It is assumed that increased processing speed and efficiency could potentially reduce the number of Security Lanes in future horizons.

4.3.5 Gates and Holdrooms

As outlined in Section 4.4.2, the number of Gates have been determined by future flight schedules. For this analysis, it is assumed that each gate will have one corresponding Holdroom.

The amount of Holdroom area required is determined by the seats per aircraft to be accommodated, applying a load factor (i.e. what percentage of the aircraft will be occupied) and then evaluating how many passengers would be in the Holdroom prior to the flight. Of the passengers in the Holdroom, a breakdown of seated versus standing passenger is completed to determine area per passenger. Specific assumptions are shown in the Key Assumption chart, below. In addition, an allowance is made at each gate for Operations Spaces (e.g. podium area for agents, enplaning corridor dimension, area for wheelchair staging), located at the Gate.

If provided in the future, Airline Lounge occupancy is assumed to be 3% of peak hour departures. The occupancy load is then multiplied by an estimated standard area per passenger to calculate the total lounge needs.

Concourse Customer Service uses an industry standard SF per passenger ratio of 1 SF per four peak hour departing passengers.

Departures Concourse Operations and Support areas along the Departures Concourse is determined by using a benchmark metric of 3%.

Concourse Circulation is determined by first establishing a typical linear footage for each contact gate position, which is calculated by adding the wingspan to a standard clearance dimension and multiplying it by the total number of aircraft. This overall linear dimension is then multiplied by a Concourse width of 40’. The program makes the assumption that 65% of the flightline is double loaded (i.e. holdrooms and gates on both side of the Concourse).

Key Assumptions

- Seat Counts
  Group III: 190 seats
- 90% Load factor
- 80% Pax at gate
- 70% Seated / 30% Standing at gate
- Assume 50% of gates are paired. Paired gates have 10% space reduction for seating area only
- The October 2021 Forecast Update Draft assessed likely replacement aircraft that will be utilized in the future. The largest replacement aircraft identified is an A320/321 with a seat count of between 150 and 190 seats. For interoperability of gates, 190 seats is used as the basis of determining future gate areas.

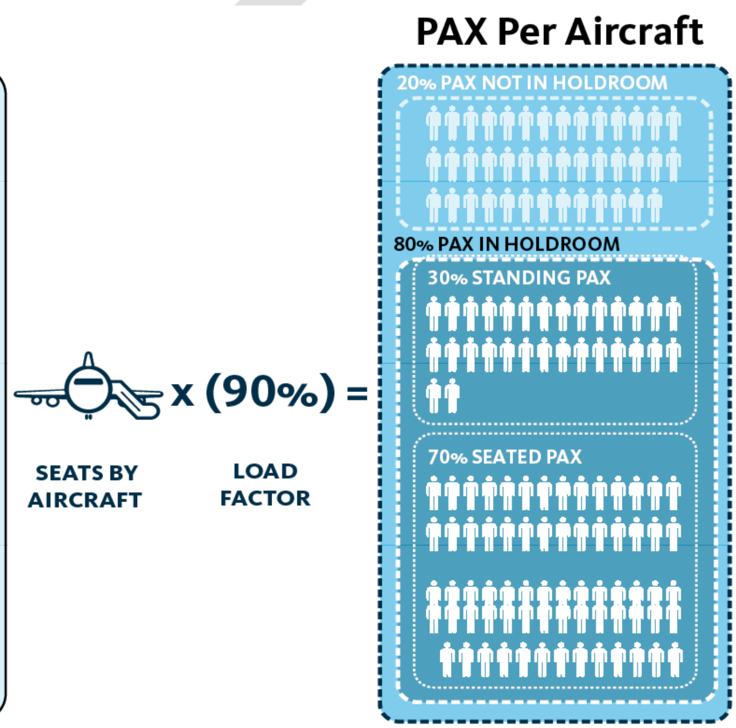


Table 4-17 – Gate and Holdroom Requirements

	EXISTING		PAL 2		PAL 4	
	Count	Total (sf)	Count	Total (sf)	Count	Total (sf)
Holdrooms Group III Domestic	14	40,376	16	41,970	16	41,970
Circulation	-	49,041	-	68,160	-	68,160
Airline Lounges	-	0	-	1,696	-	1,950
Concourse Customer Service	-	0	-	300	-	400
Departures Level Ops + Support	-	-	-	700	-	800
Restrooms	-	6,868	-	4,015	-	4,958
TOTAL	96,285		116,841		118,238	

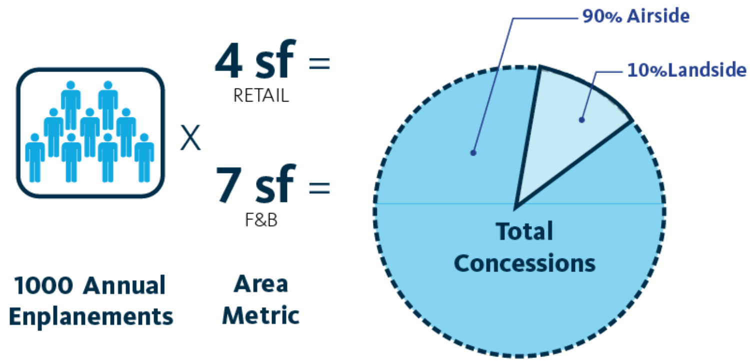
Source: Gensler, 2023

4.3.6 Concessions Requirements

Concessions space allocation is determined as a function of Annual Enplanement numbers. Overall area is divided between airside and landside. The Retail and Food & Beverage numbers indicate net concessions unit areas. Support space is also shown (for remote storage) and a service circulation factor is also shown (for back-of-house servicing and circulation).

Key Assumptions

- For retail rentable: approximately 4 sf/1000 annual domestic enplanements
- For food and beverage (F&B) rentable: approximately 7 sf/1000 annual domestic enplanements
- Concessions support is 30% of rentable area
- Service circulation factor of 30% of rentable area



Based on these Key Assumptions, concessions requirements are as follows:

Table 4-18 – Concessions Requirements

		EXISTING		PAL 2		PAL 4	
		Count	Area (sf)	Count	Area (sf)	Count	Area (sf)
Landside Concessions	Retail	-	2,464	-	737	-	843
	F&B	-		-	1,289	-	1,475
	Support	-		-	608	-	696
	Service Circulation	-		-	608	-	696
Airside Concessions	Retail	-	23,435	-	6,628	-	7,586
	F&B	-		-	11,599	-	13,275
	Support	-		-	5,470	-	6,259
	Service Circulation	-		-	5,469	-	6,259
TOTAL		**25,899**		**32,408**		**37,089**	

Source: Gensler, 2023

4.3.7 Baggage Conveyance + Screening

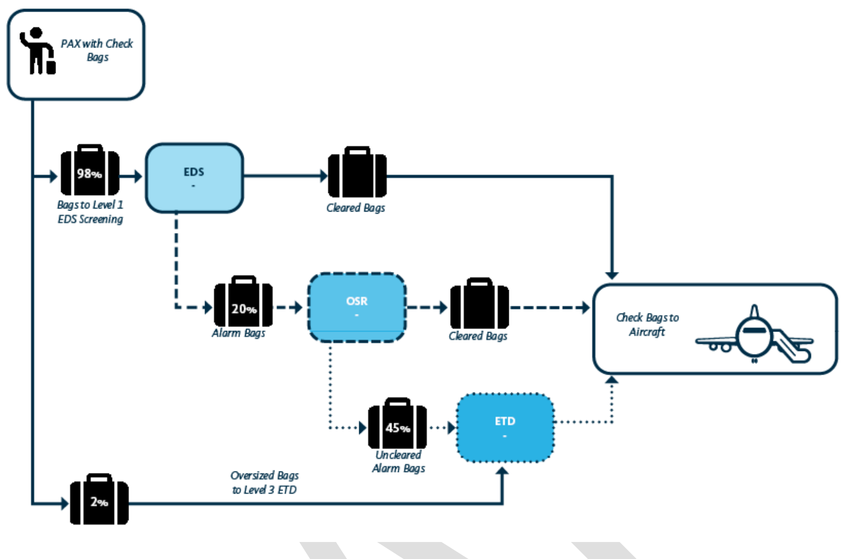
The baggage system is made up of the following constituent elements: outbound screening, baggage makeup, and inbound baggage. The system demand and individual areas are programmed using standard processing rates and benchmarked areas.

Baggage Screening. The number of Peak Hour bags (reduced by the oversize ratio) is divided by an Explosive Detection System (EDS) processing rate to determine the number of devices required for Level 1 screening. The bags for Level 2 and 3 screening are divided by their respective screening rates to establish the number of units required. Assumptions about screening rates are shown in the Key Assumptions chart.

Baggage Make-Up. Baggage Make-Up assumes that each device will service three gates, with an allowance for tug circulation space adjacent to each Make-Up unit.

Inbound Baggage. Inbound Baggage is based upon the estimated number of claim devices. This analysis has been completed assuming future continued utilization of a flat plate, through-wall baggage system.

OUTBOUND



Key Assumptions

OUTBOUND

- Domestic Bag Ratio .75 bags / pax
- International Bag Ratio 2 bags / pax
- 2% oversized bags
- 20% of bags send to Level 2 OSR
- 45% OSR sent to Level 3
- 100% of International transferring bags screened

INBOUND

- 1 Inbound Belt per Narrowbody Claim Device

Table 4-19 – Baggage Conveyance + Screening Requirements

		EXISTING				PAL 2				PAL 4			
		Count (units)	Unit Area (sf/ units)	Extended Area	Total (sf)	Count (units)	Unit Area (sf/ units)	Extended Area	Total (sf)	Count (units)	Unit Area (sf/ units)	Extended Area	Total (sf)
OUTBOUND	Level 1 EDS	-	-	-	23,435	3	1,000	3,000	46,077	4	1,000	4,000	48,677
	Level 2 OSR	-	-	-		2	50	100		3	50	150	
	Level 3 ETD	-	-	-		1	125	125		3	125	375	
	Conveyors and Sorting Matrices	-	-	-		-	-	3,225		-	-	4,525	
	Early Bag Storage	-	-	-		0	0	0		0	0	0	
	Makeup Devices	-	-	-		6	-	11,25 0		6	-	11,25 0	
	Outbound Tug Circulation + Operations	-	-	-		-	-	28,37 7		-	-	28,37 7	
SHARED	Restrooms + Support	-	-	-	-	-	-	-	1,430	-	-		1,430
INBOUND	Stripping Belts	-	-	-	7,051	3	-	585	7,272	4	-	780	9,696
	Outbound Tug Circulation + Operations	-	-	-		-	-	6,687		-	-	8,916	
TOTAL		22,383							54,779				59,803

Notes:

- Inbound and outbound device identification shown is estimated for the purposes of overall preliminary programming and should be validated by a dynamic analysis.
- Areas shown do not include additional storage or maintenance needed for Mobile Inspection Tables (MITs) if selected for use at this facility.
- This analysis represents a shared approach to Makeup Devices and Stripping Belts, not dedicated use.
- Inbound and outbound oversized lines will also be required/provided, in addition to elevator for non-conveyables. These have not been included in this analysis.

4.3.8 Baggage Claim

Domestic claim devices are sized by first determining the claim length required to accommodate the expected occupancy of the claim hall. The Peak Hour Domestic Arriving Passenger count is adjusted by the percentage of passengers claiming bags and how many of them are at claim at one time. This number is multiplied by the assumed frontage per passenger with the final length considering passengers will form one and a half rows around the device (each four linear feet of claim will serve three passengers). This length required is divided by the minimum presentation length to determine the number of devices. Positive claim assumes 15 feet of queue around the device and area for passenger circulation.

Baggage Hall Customer Service uses an industry standard SF per passenger ratio of 1 SF per 10 peak hour arriving passengers.

Baggage Services Offices are assumed to be sized at approximately 10% of the total Bag Claim Hall.

Baggage Claim Hall Operations and Support spaces adjacent to the Bag Claim Hall are typically 2.5% of overall terminal operations space.

the Arrivals Concourse size (located between the terminal exits and the bag claim devices) is determined by taking the linear footage of the bag claim hall (devices assumed to be perpendicular to the terminal face) and multiplying it by a nominal 35-foot depth of circulation.

The Arrivals Meeter/Greeter Area is calculated by first determining its occupancy. It is assumed that every tenth passenger will have one Meeter/Greeter, spending 20 minutes within the terminal. This occupancy is then multiplied by IATA LOS standards to determine overall area.

Key Assumptions

- 75% of pax claiming bags
- 60% of pax at claim at one time
- Average claim frontage per pax: 2 feet/pax
- Rows of pax at claim: 1.5
- Presentation length for Group IIIs is 180 lf
- Additional positive claim length per device: 15 lf
- Width of circulation: 10 lf

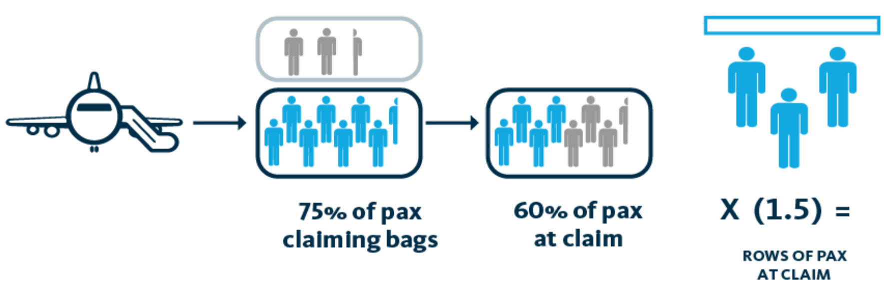


Table 4-20 – Baggage Claim Requirements

		EXISTING			PAL 2			PAL 4		
		Count (units)	Extended Area (sf)	Total (sf)	Count (units)	Extended Area (sf)	Total (sf)	Count (units)	Extended Area (sf)	Total (sf)
DOMESTIC CLAIM DEVICES	Claim Device	3	-	10,597	3	4,200	17,700	4	5,600	23,600
	Positive Claim Area	-	-		-	13,500		-	18,000	
DOMESTIC CLAIM HALL SUPPORT	Customer Service	-	-	1,093	-	100	100	-	200	200
	Baggage Services Offices	-	-		-	4,750	4,750	-	4,750	4,750
	Restrooms	-	-		-	1,631	1,631	-	1,631	1,631
	Baggage Claim Hall Ops + Support	-	-		-	600	600	-	600	600
CIRCULATION	Arrivals Concourse	-	-	8,644	-	5,400	5,400	-	7,200	7,200
	Meeter + Greeter	-	-		-	1,088	1,088	-	1,250	1,250
TOTAL				17,700	31,269			39,321		

Source: Gensler, 2023

4.3.9 Other Program Areas

Based upon benchmarks and typical planning standards, the following assumptions have been used to identify required operations and support areas. These areas are included in the total net building area calculations.

- Operations and Support: 1,000 SF per 100 peak hour passengers
- Back of House Operations and Support:
  - 92% of Total Operations (remainder allocated in public spaces itemized above) allocated as follows:
  - Airlines: 35%
  - Ramp: 20%
  - Terminal: 22%
  - Storage: 10%
  - Tenants/Business Partners: 5%
- Loading Dock: 2 docks for first six Gates with an additional dock for every six additional Gates (rounded up)

Table 4-21 – Other Program Requirements

		EXISTING		PAL 2		PAL 4	
		Count	Area (sf)	Count	Area (sf)	Count	Area (sf)
TERMINAL OPERATIONS	Airline Operations	-	8,393	-	7,200	-	8,300
	Ramp Operations	-	7,559	-	4,200	-	4,800
	Terminal Operations	-	29,530	-	4,600	-	5,200
	Terminal Storage	-	Inc. Above	-	2,100	-	2,400
	Other Tenants/ Business Partners	-	2,463	-	1,100	-	1,200
	Loading Docks	-	Inc. Above	3	2,160	3	2,160
BACK OF HOUSE RESTROOMS	-	-	Inc. Above	-	1,016	-	1,016
TOTAL		47,945		22,376		25,076	

Source: Gensler, 2023

In addition, the following areas have been included to account for building operational spaces and envelope. These areas are calculated as a percentage of the total net building areas and have been included in the overall Program Area Summary **Table 4-22**.

- Mechanical, Electrical, Plumbing & IT Systems: 12% of total net terminal area
- Structure: 2% of total net terminal area
- Vertical Circulation: 8% of total net terminal area

An allowance for design variations has not been included in this program at this time. However, it is recommended that an allowance for design variation be included to capture irregular building geometry and inherent inefficiencies when expanding or modifying existing structures.

4.3.10 Programmatic Summary

A summary chart has been generated to capture program information for each of the individual processors and building support areas.

Table 4-22 – Program Area Summary

		Existing Inventory Area (sf)	PAL 2 Area (sf)	PAL 4 Area (sf)	Recommendations
TOTAL PROGRAM	Departures Check-In Hall	**29,663**	**39,085**	**44,020**	There will be a likely need to expand the current ticketing hall to accommodate additional positions.
	Departures Passenger Processing	**12,546**	**19,262**	**22,192**	See note below regarding additional area to be added to the Existing Inventory as part of the ongoing Pre-TSA Expansion project.
	Departures Concourse	**96,285**	**116,842**	**118,238**	Modifications to the existing Gates and Concourse area should be considered to address perceptions of current gate crowding and anticipate future larger design aircraft at each gate.
	Baggage Processing	**22,383**	**54,779**	**59,803**	Areas shown in the PAL 2 and PAL 4 program are indicative of an inline outbound baggage system. PAL 4 numbers also reflect inbound operations to support an additional claim device.
	Arrivals Baggage Claim Hall	**20,334**	**31,269**	**39,231**	Existing Inventory areas at the baggage claim hall areas do not include circulation space between the devices and the rental cars, while the PAL 2 and PAL 4 numbers do. PAL 4 numbers also include addition of one claim device.
	Other Program Areas	**47,945**	**22,376**	**25,076**	Other program areas in the Existing Inventory include Airline Ops, Airport Ops and Other Ops. Future study should evaluate if these will remain in place. If so, those requirements will supersede the standard planning assumptions used to generate PAL 2 and PAL 4 numbers.
SUBTOTAL		229,156	283,613	308,560	
CONCESSIONS		**25,899**	**32,408**	**37,089**	This indicates opportunities for additional airside concessions.
TOTAL NET PROGRAM AREA		255,055	316,021	345,649	
Mechanical, Electrical, Plumbing + IT Systems		25,654	37,923	41,478	-
Structure/ Non-Net Area		N/A	6,321	6,913	-
Vertical Circulation		11,694	25,282	27,652	-
TOTAL		292,403	385,547	421,692	
TOTAL (after Pre-TSA Expansion project)		315,903			

Note: Existing inventory areas have been excerpted from Draft Working Paper #1, Table 2-6 Terminal Program Areas and do not reflect ongoing improvements, including the Pre-TSA Expansion project. As of April 2023, the current Pre-TSA Expansion areas include approximately 23,500 sf of new construction and 53,800 sf of renovated area. New construction area consists of Circulation, Concessions and Security Queuing Space. The last row of this chart indicates approximate anticipated overall facility area after completion of the current program.

4.4 Airport Parking and Terminal Curbside

This section summarizes requirements for airport parking facilities and terminal curbside, addressing needs for public parking, employee parking, roadway and curbside, and rental car facilities. Approved enplanement forecasts beginning in 2022 are used to calculate future landside facility requirements. **Table 4-23** shows the approved forecast enplanements year-over-year percentage increase.

Table 4-23 – Approved Enplanements Forecast Percentages

Year	%	Year	%	Year	%	Year	%
2022	34.8	2027	1.6	2032	1.5	2037	1.4
2023	1.7	2028	1.6	2033	1.4	2038	1.3
2024	1.7	2029	1.6	2034	1.4	2039	1.3
2025	1.7	2030	1.5	2035	1.4	2040	1.3
2026	1.7	2031	1.5	2036	1.4	2041	1.2

Source: Master Plan Forecast (2022)

4.4.1 Public Parking Requirements

There are four types of parking products offered to the public at ALB: Short Term (surface), Garage, Long Term (surface), and Economy (surface). Amongst these products, the following facilities provide capacity:

- Short Term Parking Lot – 94 spaces (plus an additional 90 spaces in the North Garage)
- Long Term Parking Lots –1,262 spaces
- North Garage – 1,912 spaces (which includes 90 spaces designated for Short Term)
- South Garage – 1,000 spaces
- Economy Lot – 2,763 spaces
- **Total All Public Parking – 7,031 spaces**

Parking data for Calendar Year 2022 was obtained from the Airport. This data included all vehicle entries and exits using cash, credit, and EZPass payment methods for the previously listed parking products, as well as temporary lots that ceased operation by the end of May 2022. In addition, the Airport allows a 30-min grace period for free parking in all lots, known as Zero Dollar transactions. These transactions only include an exit time and thus an entry time assumption was made that each vehicle was in the lot for 20 minutes. The data was analyzed to determine peak-hour parking activity for each product, as well as an aggregate of the entire system. **Table 4-24** shows the current capacity, as well as peaking information for each parking product in 2022.

Table 4-24 – Public Parking Capacity and Peaking

Parking Product	Current Capacity	Peak Utilization	Peak Time
Short Term	184	235 (128%)	4/20 12:00 PM
Long Term	1,262	1,298 (103%)	4/21 10:20 AM
North Garage	1,822	1,803 (99%)	2/24 5:40 PM
South Garage	1,000	1,116 (112%)	4/9 3:20 PM
Economy Lot	2,763	1,292 (47%)	11/24 2:40 PM
Aggregate System	**7,031**	**5,633 (80%)**	**4/21 11:20 AM**

Source: Jacobsen|Daniels (2023)

It is important to note that the Short Term, Long Term, and South Garage products are all showing over capacity. This is due to the fact that the Zero Dollar transactions do not have entry times and it is unknown the actual timeframe these vehicles remained in the parking areas. It was further determined to use the overall Aggregate System as the baseline peaking date for further analysis. April 21, 2022 was then examined for each of the parking products to determine the peak. **Table 4-25** shows the current capacity, as well as peaking information for each parking product on April 21, 2022.

Table 4-25 – Aggregate Peak Day Peaking

Parking Product	Current Capacity	Peak Utilization
Short Term	184	211 (115%)
Long Term	1,262	1,298 (103%)
North Garage	1,822	1,765 (97%)
South Garage	1,000	1,077 (108%)
Economy Lot	2,763	1,131 (41%)
Aggregate System	**7,031**	**5,633 (80%)**

Source: Jacobsen|Daniels (2023)

As shown in the previous table, Short Term, Long Term, and the South Garage are still reporting over 100% capacity. In these cases, it is assumed that the peak utilization for those products is at 100% and equals the current capacity. For the other parking products, the actual peak utilization numbers are used for the baseline utilization.

Approved forecasts for passenger enplanements were then used to forecast future facility requirements based on the existing baseline utilization numbers and the passenger growth percentages. **Table 4-26** shows the public parking facility requirements for all parking products at the Airport throughout the planning period.

Table 4-26 – Public Parking Facility Requirements

Parking Facility	Existing Capacity (spaces)	Forecasted Capacity (spaces)				
		2022	PAL 1 2026	PAL 2 2031	PAL 3 2036	PAL 4 2041
Short Term	184	184	261	282	302	323
Long Term	1,262	1,262	1,789	1,933	2,074	2,212
North Garage	1,822	1,765	2,502	2,703	2,900	3,094
South Garage	1,000	1,000	1,418	1,532	1,643	1,753
Economy	2,763	1,131	1,603	1,732	1,858	1,983
Aggregate System	**7,031**	**5,633**	**7,986**	**8,628**	**9,256**	**9,874**

Source: Jacobsen|Daniels (2023)

As shown, the forecasted growth for all parking products exceeds the existing capacity beginning in 2026. An additional 2,843 spaces in the aggregate system are needed to meet the demand of the 20-year planning period. Discussions with the Airport indicate that parking currently and regularly hits maximum capacity in several of the parking facilities. Therefore, there is an immediate need for additional parking and space should be preserved for future parking facilities at the Airport. Future facilities will be further analyzed in the Development Alternatives section of this report.

4.4.2 Employee Parking Requirements

Employee parking is currently provided at a lot to the west of the terminal apron, at the intersections of the access road and Hockey Lane, which provides 257 spaces. Actual usage data (i.e., entry and exit counts) are not available, therefore an estimate of the existing lot's ability to meet baseline employee demand was based on input from Airport staff. This input has indicated that the existing lot is at 85% capacity at the peak times in the baseline year 2022. Based on the 85% current capacity assumption, the baseline usage for employee parking is 218 vehicles. Using passenger enplanements forecast growth percentages, **Table 4-27** shows the future facility requirements for employee parking.

Table 4-27 – Employee Parking Facility Requirements

Facility	Existing Capacity (spaces)	Forecasted Capacity (spaces)				
		2022	PAL 1 2026	PAL 2 2031	PAL 3 2036	PAL 4 2041
Employee Parking Lot	257	218	309	335	359	384

Source: Jacobsen|Daniels (2023)

Based on the forecasted growth, future demand will exceed existing capacity of the employee parking lot beginning in 2026. An additional 127 spaces are required over the 20-year growth period. Space for additional employee parking should be preserved to meet future demand.

4.4.3 Roadway and Terminal Curbside Requirements

Access to ALB is from and to the south, east, and north via a newly constructed interchange with Interstate 87, the Northway. The interchange (i.e., Exit 3) opened in November 2019 and provides direct access to Albany-Shaker Road which has access to the Airport's entrance and exit roadways. Albany-Shaker Road can also be accessed from the west via New York State Route 7. Field observations and discussions with Airport staff indicated that these roads are adequate for accommodating the future needs of the airport and thus there are no future improvement needs required.

The curbside portion of terminal roadways is where the primary pickup and drop-off functions are accommodated at the Airport. There are two curbside roadways at ALB: an inner road/curb and outer road/curb. The four-lane inner roadway has a southern section intended for passenger drop-off activities and a northern section intended for passenger pickup activities. Commercial vehicles utilize the two-lane outer roadway, accessing it through revenue control access gates. Current estimated curbside areas from Google Earth and airport documentation are as follows:

- Public Lane – 675ft
- Commercial Lane – 670ft
    - Limos and Hotel Shuttles – 170ft (25% of total)
    - Taxis – 200ft (30% of total)
    - Uber and Lyft – 135ft (20% of total)
    - Park N Fly – 165ft (25% of total)

Discussions with the Airport indicated that existing curbside is at 85% capacity at the peak times in the baseline year 2022. Using passenger enplanements forecast growth, **Table 4-28** shows the future facility requirements for terminal curbside requirements. The current percentage split amongst users of the commercial lane is carried forward in forecast years so that the same split remains.

Table 4-28 – Terminal Curbside Facility Requirements

Curbside Designation	Existing Capacity (ft)	Forecasted Capacity (ft)				
		2022	PAL 1 2026	PAL 2 2031	PAL 3 2036	PAL 4 2041
Public Lane	675	573	813	879	945	1,009
Commercial Lane	670	570	809	875	940	1,004
Limos & Hotel Shuttles	*170*	*143*	*202*	*219*	*235*	*251*
Taxis	*200*	*171*	*243*	*262*	*282*	*301*
Uber & Lyft	*135*	*114*	*162*	*175*	*188*	*201*
Park N Fly	*165*	*143*	*202*	*219*	*235*	*251*

Source: Jacobsen|Daniels (2023)

Based on the forecasted capacity, future demand will exceed the existing capacity of the curbside. An additional 334 feet is required for both the public lane and the commercial lane over the 20-year growth period. It should also be noted that these areas are currently in review due to the upcoming terminal checkpoint development.

4.4.4 Rental Car Facility Requirements

Rental car operators have counters located in the passenger terminal building, as well as kiosks in the ready return area of the North Garage. Rental cars are picked up and returned on the ground level of the North Garage, and vehicles are serviced on sites located to the north of Runway 10 along Old Albany-Shaker Road. Service sites encompass 9 acres of land surrounding the Airport. Rental car (ready/return) spaces in the garage are as follows:

- Avis and Budget – 95 spaces (31% of total)
- EHI – 126 spaces (41% of total)
- Hertz – 86 spaces (28% of total)
- **Total Ready/Return – 307 spaces**

For purposes of estimating future facility requirements, ready/return spaces, customer-facing counters, and service sites are considered. Actual usage data (i.e., transactions) were not available, therefore an estimate of the existing facility's ability to meet baseline demand was based on input from Airport staff. This input resulted in the following assumptions:

Service sites – Assumed to be adequate for future demand. No new Airport owned land would be identified for expansion of rental car services sites.

Customer-facing counters/kiosks – Rental car counters within the terminal will be renovated and adjusted per the on-going terminal design and are assumed to be adequate for existing and future operations. Additional or expanded counters/kiosks within the garage will be defined with expanded ready/return lots.

Ready/return spaces – Assumed that existing ready/return spaces are at 85% capacity at peak times in baseline year 2022. With the expansion of Electric Vehicle (EV) infrastructure requirements, as well as typical growth operations, forecasted operations will be in line with enplanements forecasts to ensure that rental car parking areas are expanded in parallel with that demand.

Based on the 85% current capacity assumption, the baseline usage for rental car parking is 261 spaces. The current percentage split amongst rental car companies is carried forward in forecast years so that the same split remains. Using passenger enplanements forecast growth, **Table 4-29** shows the future facility requirements for curbside requirements.

Table 4-29 – Rental Car Facility Requirements

Facility	Existing Capacity (spaces)	Forecasted Capacity (spaces)				
		2022	PAL 1 2026	PAL 2 2031	PAL 3 2036	PAL 4 2041
Rental Car Total	307	261	370	401	430	460
Avis/Budget	*95*	*81*	*115*	*124*	*133*	*143*
EHI	*126*	*107*	*152*	*164*	*176*	*189*
Hertz	*86*	*73*	*104*	*112*	*121*	*129*

Source: Jacobsen|Daniels (2023)

Based on the forecasted capacity, future demand will exceed existing capacity of the rental car ready/return parking lot. An additional 153 total spaces are required over the 20-year growth period. Space for additional rental car parking should be preserved to meet future demand. Expanded capacity will be analyzed within the Development Alternatives section of this report.

4.5 Air Cargo Requirements

Air cargo facilities at ALB are located in the northeast quadrant of the airport property near the Runway 19 approach end. The facility includes a 70,000 SF building and associated approximately 370,000 SF apron area. Current cargo carriers operating out of the facility are UPS, FedEx, and Mobil Air Transport.

The current cargo building and apron are not at maximum capacity. The currently underutilized space will be expanded into by the current cargo operators. Similarly, the apron has space for additional aircraft parking without any pavement expansion.

Overall, the approved forecasts show modest growth for cargo tonnage. The Airport indicated a desire for future cargo expansion for both the building and parking apron. Major growth factors include new cargo operators locating operations at ALB. In terms of landside, the Airport also indicated a need for additional trucking and loading space, as well as employee parking.

For purposes of estimating future facility needs, it is assumed that the current capacities of the existing cargo building and ramp are at 75% and 60%, respectively. Cargo tonnage forecasts (2% per year) and cargo operations forecasts (0.8% per year) were used to estimate the future facility and apron, respectively. **Table 4-30** shows the future facility requirements for cargo facilities.

Table 4-30 – Cargo Facility Requirements

Facility	Existing Capacity (SF)	Forecasted Capacity (SF)				
		2022	PAL 1 2026	PAL 2 2031	PAL 3 2036	PAL 4 2041
Cargo Building	70,000	52,500	56,828	62,742	69,273	76,483
Cargo Apron	370,000	222,000	229,190	238,505	248,199	258,287

Source: Jacobsen|Daniels (2023)

Based on the forecasted capacity, future demand will exceed existing capacity of the cargo building requiring an additional 6,483 SF of space over the 20-year growth period. The cargo apron is within capacity with over 100,000 SF remaining in the 20-year timeframe.

Based on discussions with the Airport and Hub Point, who are the cargo strategic advisors, there is a desire for building expansion, beyond the 6,483 SF, for existing operations and the potential for a new entrant cargo operator. Specific needs are unknown at this time, however the area surrounding the current cargo facilities should be preserved for future development of additional cargo facilities if expanded demand is realized.

4.6 General Aviation Requirements

General Aviation (GA) requirements are developed to accommodate the Fixed Base Operator (FBO) at ALB as they continue to experience growth. In addition to the FBO, the Airport also has airport-owned private hangar facilities and t-hangars, as well as Maintenance, Repair, and Overhaul (MRO) facilities.

4.6.1 Based Aircraft Storage

The approved forecasts indicate 97 current based aircraft: 60 single-engine, 7 multi-engine, 19 jets, and 11 helicopters. Based on discussions with the Airport and the FBO, the based aircraft are stored in the locations shown in **Table 4-31.**

Table 4-31 –Based Aircraft Storage

Facility	Single-Engine	Multi-Engine	Jet	Helicopter
T-hangars	37 (61%)	4 (57%)	0	0
FBO	15 (25%)	0	19 (100%)	0
Private hangars	4 (7%)	1 (14%)	0	0
T-hangar tiedowns	4 (7%)	0	0	0
NYSP/ANG	0	2 (28%)	0	11 (100%)
TOTAL	**60**	**7**	**19**	**11**

Source: ALB and Million Air (2023)

4.6.2 Fixed Base Operator (FBO)

ALB has one FBO, Million Air, located in the southwest quadrant of airport property. The FBO currently operates two hangars with a combined storage space of 43,000 SF, as well as the adjacent apron (approximately 550,000 SF total). The FBO also leases one bay in the Bluebird hangar (approximately 5,000 SF) in the northwest quadrant of airport property.

The Airport is interested in expansion as both of the hangars are currently at capacity. Several of the current based aircraft customers are anticipating to upgrading their aircraft, and the new aircraft will not be able to fit in the current storage facilities. The newest large corporate jets (e.g., Gulfstream 650, Global Express 750) now have lengths and wingspans of over 100 feet and cannot fit within any existing hangars at the Airport. Currently, the FBO cannot house any new customers due to the lack of hangar space available for their aircraft. In addition, an existing initiative to establish a flight school at the Airport would require expanded hangar and apron parking capacity.

The approved forecasts indicate that based jets will grow from 19 in 2022 to 34 in 2041, as shown in **Table 4-32**.

Table 4-32 –Forecasted Based Jet Aircraft

Based Aircraft	2022	2026	2031	2036	2041
Jets	19	22	24	27	34
Net Increase	-	3	5	8	15

Source: Master Plan Forecast (2022)

This unconstrained forecast results in 15 additional jet aircraft at ALB during the planning period. As corporate jets vary widely in size, the specific hangar area needed to accommodate these future aircraft is unknown. Therefore, a planning estimate of 4,000 SF per jet was used for a mid-sized jet, and results in an estimated need for 60,000 SF of additional hangar space by 2041.

However, based on regular inquiries received by Million Air, there already appears to be a latent demand for corporate jet aircraft storage at ALB by companies in the New York Capital Region, the Hudson Valley, and south to the NYC Metro Area. The FBO estimates a current need for expanded hangar capacity of approximately 50,000 SF to accommodate both existing and future demand. Therefore, the master plan recommends corporate hangar expansion in the short-term of up to 50,000 SF, with appropriate locations reserved for a total of 100,000 SF of new hangar space during the planning period.

While the overall apron adjacent to the FBO is approximately 550,000 SF, only approximately 185,000 SF is available for aircraft parking on the south side of the ramp. This apron space is used solely for transient aircraft, there are no based aircraft parked on the apron. The apron area directly in front of the FBO's north hangar is used for hangar and aircraft staging, not for parking transient aircraft.

Figure 4-9 – FBO Apron

Source: Google Earth and Million Air (2023)

Discussions with the FBO indicate that transient aircraft parking regularly reaches capacity during peak times so there is a desire for more apron space. In order to project the itinerant apron space needed during the planning period, the following parameters were considered:

- The existing itinerant apron is approximately 185,000 SF, which includes taxilanes that cannot be used for aircraft parking.
- The apron is roughly at 50% capacity during non-peak periods.
- During the average day of the peak month (typically August), the apron is at 100% capacity.
- During the peak days of the peak month, the apron can additionally be at 120% capacity.

Using the approved forecast growth, the percentage increase in forecasted GA itinerant operations is shown in **Table 4-33.**

Table 4-33 –Forecasted GA Itinerant Operations

	Existing Capacity (ops)	Forecasted Capacity (ops)				
		2022	PAL 1 2026	PAL 2 2031	PAL 3 2036	PAL 4 2041
GA Itinerant Operations	14,534	15,000	15,900	17,200	17,900	18,700
Percentage Increase		3.2%	6.0%	8.2%	4.1%	4.5%

Source: Master Plan Forecast (2022)

The percentage increase in GA itinerant operations is then applied to the existing capacity of 185,000 SF to determine itinerant apron facility requirements shown in **Table 4-34.** The future itinerant apron demand for 2041 shows the need for approximately 53,000 SF in additional apron.

Table 4-34 –Forecasted GA Itinerant Operations

	Existing Capacity (SF)	Forecasted Capacity (SF)				
		2022	PAL 1 2026	PAL 2 2031	PAL 3 2036	PAL 4 2041
Itinerant Apron	185,000	190,920	202,375	218,970	227,948	238,205

Source: Jacobsen|Daniels (2023)

4.6.3 Private Hangars and T-Hangars

The Airport owns and leases several private hangars in the northwest quadrant of airport property. There are currently two hangars (18,000 SF total) and one additional private hangar, known as Bluebird (20,000 SF). The Bluebird hangar has four bays: one is leased to the FBO, one is leased to a private individual, and the other two are leased to Cape Air for maintenance. ALB currently has three 10-bay nested t-hangars and one 11-bay nested t-hangar totaling 41 units of aircraft storage for general aviation aircraft.

The approved based aircraft fleet mix breakdown is 60 single-engine (SE) and 7 multi-engine (ME) aircraft at ALB. There are four based SE and one based ME located in the private hangars. There are 11 based helicopters and two ME aircraft operated by and located at the New York State Police (NYSP) and Air National Guard (ANG) facilities. These are not included in aircraft storage facility requirements and those facilities are assumed to be adequate for the future needs of the NYSP and ANG. Using the based aircraft splits and assuming that both the private hangars and t-hangar tiedown parking remains constant, the need for space for SE and ME aircraft is shown in **Table 4-35.**

Table 4-35 –SE and ME Aircraft Facility Requirements

Facility	Existing Capacity (aircraft)	Forecasted Capacity (aircraft)				
		2022	PAL 1 2026	PAL 2 2031	PAL 3 2036	PAL 4 2041
T-hangars	41	41	39	37	36	32
Private Hangars	5	5	5	5	5	5
T-hangar Tiedowns	4	4	4	4	4	4
TOTAL	**50**	**50**	**48**	**46**	**45**	**41**

Source: Jacobsen|Daniels (2023)

As indicated in the approved forecasts, there is an overall decrease in SE and ME aircraft based on national trends. However, discussions with the Airport and FBO indicate that due to ALB's geographic location, they expect the desire for t-hangars to remain constant. While there is no official waiting list, the FBO indicated that they receive regular inquiries regarding hangar space at the Airport. There is space for additional t-hangars in the current t-hangar area in the southeast quadrant; that area should be retained for potential additional t-hangar construction. Additional options will be explored in the development alternatives of the master plan.

4.6.4 Maintenance, Repair, and Overhaul (MRO) Facilities

ALB has two MRO facilities at the Airport: CommuteAir (subsidiary of United Airlines) and Piedmont (subsidiary of American Airlines).

CommuteAir

CommuteAir occupies two hangars and office space in the northwest quadrant of the airport property (31,000 SF total). CommuteAir is currently servicing Embraer 145 aircraft and is expecting to upgrade to Embraer 175 aircraft in the second half of the 20-year planning period. The size, space, and layout of their facilities are adequate for current E145 operations. However, the hangar door heights are approximately 30 feet tall and cannot fit the Embraer 175 which has a tail height of 32 feet. If CommuteAir were to relocate from these hangars, they could be repurposed for use by any corporate jets, including the new larger sizes.

The employee parking lots are sufficient, although outside entities sometimes park at the lot adjacent to their office space. There is a desire to relocate the fencing that runs along the adjacent cul-de-sac and the Airport is considering this in the future. Regarding the layout of the two hangars being perpendicular to each other, this does not cause an issue and there is no desire to redesign hangars to a linear layout.

Piedmont

Piedmont is located in a hangar in the southwest quadrant off the GA apron, near the Runway 1 approach end (30,000 SF). Piedmont does not occupy the entire building; occupied areas include the main hangar space on the north side while the south office space remains vacant (previously occupied by CommuteAir). There is a desire to rent the additional office space so that offices located inside the hangar may be relocated to give space for shop and maintenance areas.

Piedmont currently services Embraer 145 aircraft but expects to upgrade to Embraer 175 aircraft within the planning period. The Embraer 175 aircraft will not fit in the current hangar as the tail height is too high, so when these upgrades occur, there will be a need for larger hangar space. The current hangar door is approximately 23 feet tall. If Piedmont were to relocate from this hangar, it could not be repurposed for large corporate jets and would only be sufficient for small and mid-size jets.

In regards to Piedmont's operations, the company is currently growing and expects to double the total aircraft fleet from approximately 50 to 100 in the future. Piedmont is unsure of size requirements for future facilities as it would depend on what aircraft are being serviced, but would need at least three overnight spaces within a future hangar. ALB's geographical location is essential to the existing Piedmont operation, due to the close proximity to the primary northeastern hubs.

During discussions with Piedmont, they did note several issues with the current facilities. Aircraft at Million Air complete run-ups just north of the Piedmont parking lot. There is a desire for a jet blast wall or other similar installations to mitigate the overall jet blast from the run-up operations. Inside the hangar, there is a desire for an upgraded break room as well as servicing for heat and air conditioning. The power supply is inadequate for the needed electronics including space heaters for temperature affected materials. The employee parking lot on the north side is frequently almost at or at full capacity, especially during overnight shifts. Options will be analyzed to alleviate existing capacity constraints within the existing facility location.

Future MRO Facilities

The existing demand is four Embraer 145s for CommuteAir and three Embraer 145s for Piedmont. Both companies indicated a future upgrade to Embraer 175s, which are approximately 30% larger than the 145s. The future demand is based on airline operational needs and business strategies, and the current aircraft demand will remain consistent. Both facilities will need to be replaced as neither has the height to accommodate the E175s. For planning purposes, two facilities of 40,000 SF each with appropriate apron/taxilane access should be accommodated.

4.7 Support Facilities

Requirements for support facilities were developed to include airport maintenance facilities, Air Traffic Control (ATC), Aircraft Rescue and Firefighting (ARFF) facilities, and aircraft fueling facilities.

4.7.1 Airfield Maintenance Facilities

The Airport has a dedicated airport maintenance facility area located in the northeast quadrant adjacent to the control tower, as well as additional vehicle and sand storage facilities in both the southwest and northwest quadrants, respectively. There is expansion space available in the northeast quadrant in the vicinity of the existing maintenance facility. The Airport has indicated their plan to construct an additional unheated storage garage. Airport personnel indicated that this would provide space needed for Snow Removal Equipment (SRE) currently stored outdoors. The location of the additional maintenance facilities will be analyzed during the Development Alternatives section of this report.

4.7.2 Air Traffic Control

The Air Traffic Control Tower (ATCT) is located in the northeast quadrant of airport property. The current location is sufficient, and the Airport is in the process of completing repairs and upgrades to the current facility. ATC personnel indicated that the FAA is purchasing electric vehicles and there will be a need for charging stations onsite. The height of the ATCT requires the removal and maintenance of trees within the northeast quadrant of the airport to maintain the line-of-sight to the runway approaches and taxiways.

4.7.3 Aircraft Rescue and Firefighting (ARFF)

The Airport's Aircraft Rescue and Firefighting (ARFF) services are accommodated in an approximately 18,000 SF facility located in the southwest quadrant on the GA apron. ARFF staff indicated that the 25-year-old facility is undersized for its current and future operations. There is a need for additional vehicle bays, as well as living quarters, office space, etc. **Table 4-36** through **Table 4-38** show the facility requirements as determined by ARFF staff. The existing location of the ARFF building is constrained due to adjacent buildings and the apron; there is minimal space to expand in its current location. A potential relocation of the building would allow for more right-sizing based on the current and future needs of ARFF staff. Options for relocation and expansion of the ARFF building will be analyzed as part of the development alternatives of this master plan. Based on the forecasted fleet mix at the Airport, no change in the ARFF index is anticipated.

Table 4-36 – ARFF Business Area Office Requirements

Office	Current	Future Need	Deficit
Office – Chief	1	1	0
Office – Deputy Chief	0	1	1
Office – Training Chief	0	1	1
Office – Training Assistant	0	1	1
Office – Captain	1	2	1
Office – Lieutenant	0	2	2
Office – Codes Plans Review	0	1	1
Training Room	1 (24 people)	1 (40 people)	
Training Storage	140 SF		
Radio Room/Dispatch	1	1	0
Decon Room/Laundry	1	1	0
Gear Room	0		
Secured Document Storage	140 SF		
First Aid Room	56 SF	Double	
EMS Storage – Secured	55 SF	Double	
EMS Storage – Unsecured	108 SF	Double	
Hazmat Storage	80 SF	double	
SCBA Filling Room/Workshop	100 SF	Double	
Extinguisher Storage Room	95 SF	Double	
Custodial Storage	145 SF	Double	
Equipment Storage Room	160 SF	Double	
Foam/F3 Storage	Racks for 7 265 Totes	Racks for 10 Totes	
Dry Storage	Racks for 10 Pallets	Racks for 20 Pallets	

Source: ALB ARFF Staff (2023)

Table 4-37 – ARFF Living Area Requirements

Living Area	Current Room (Capacity)	Future Need (Capacity)	Deficit
Kitchen	1 (6)	1 (8)	
Firefighter Bunkrooms	4 (8)	6 (12)	
Captain Bunkrooms	2 (4)	2 (4)	2
Radio Room Bunk	1	1	0
LT Bunkrooms	1	1	0

Source: ALB ARFF Staff (2023)

Table 4-38 – ARFF Apparatus and Equipment Requirements

Equipment	Current	Future Need	Deficit
Extra Large Vehicles	3	3	0
Large Vehicles	1	1	0
MCI Trailer	1	1	0
Hazmat Trailer	1	1	0
UTV/Parking Garage High Pressure Unit	1	1	0
Pickup Truck	1	1	0
Chief Truck	1	1	0
DC Truck	0	1	1
Stair Truck	0	1	1
Foam Truck	0	1	1

Source: ALB ARFF Staff (2023)

4.7.4 Aircraft Fueling Facilities

Aircraft fueling facilities are located at a single fuel farm located in the northwest quadrant of airport property which is operated by Million Air. The fuel farm consists of nine tanks with a total capacity of approximately 400,000 gallons. In addition, there is a glycol mixing station. While the Airport indicates that the tank sizes are currently adequate, there is space for an additional large tank in the northeast quadrant of the fuel farm. In addition, the fuel farm layout is not optimal and causes some constraints due to tank location and truck flow. There is a desire for an additional pad with a canopy on the south side of the farm so that trucks can access the glycol mixing station; currently, the trucks are accessing it through the Avgas rack which can cause delays while the glycol trucks are filling and Avgas trucks are needing to be filled.

Future facility requirements for fuel tank capacity were analyzed using approved forecast growth for total operations. **Table 4-39** shows the future facility requirements for fueling operations.

Table 4-39 – Fuel Facility Requirements

Facility	Existing Capacity (gallons)	Forecasted Capacity (gallons)			
		2026	2031	2036	2041
Fuel	400,000	495,152	512,900	538,654	564,381

Source: Jacobsen|Daniels (2023)

In addition to the fuel farm, there was previously a self-serve Avgas facility located at the t-hangars. This tank was removed in 2022 due to its deterioration and the inability to be refurbished. Since the removal of the tank, aircraft located at the t-hangars must taxi over to the FBO ramp in order to get fuel. There is a need to have another self-serve Avgas facility at the t-hangars in the future, for convenience and safety (eliminate unnecessary runway crossings). The decommissioned fueling area should be retained for that purpose.