Auburn California

Auburn Municipal Airport

Master Plan

2024

FACILITY REQUIREMENTS

January 2025 DRAFT

CHAPTER 3

FACILITY REQUIREMENTS

3.1 INTRODUCTION

Chapter 3 – Facility Requirements outlines existing conditions and the necessary improvements to accommodate the forecasted level of demand presented in **Chapter 2** – **Aviation Activity Forecasts**. Any nonstandard facilities identified in Chapter 3 will be evaluated for potential modification in **Chapter 4 – Improvement Alternatives**. The facility requirements were evaluated using criteria specified within published Federal Aviation Administration (FAA) standards as outlined in the following FAA Advisory Circulars (AC): FAA AC 150/5070-6B, *Airport Master Plans*, FAA AC 150/5300-13B, *Airport Design*-Change 1, and FAA AC 150/5060-5, *Airport Capacity and Delay.*

The following areas contain technical analysis of the Auburn Municipal Airport's (AUN or Airport): infrastructure related to its ability to both support the critical and / or design aircraft and the annual number of total operations.

- Airfield System Capacity
- Airport Design Standards / Compliance
- Wind Coverage
- Taxiway Design Standards
- Pavement Marking / Lighting / Signage
- Navigational Aids (NAVAIDs)
- Instrument Procedures
- General Aviation Facilities
- Runway Length and Location
- FAR Part 77 Imaginary Surfaces

There are three primary components at AUN: the airfield and surrounding airspace, airside facilities, and landside facilities. Each component contributes to the safe, efficient, and secure operation of the Airport providing an integrated environment for all airport users.

3.2 AIRFIELD SYSTEM CAPACITY

Airfield capacity is generally defined as the number of aircraft operations that can be safely accommodated on the runway-taxiway system at a given point in time before an unacceptable level of delay is experienced.

The ability of the Airport's current airside facilities to accommodate aviation operational demand is described below and is expressed in terms of potential excesses and deficiencies in capacity. The methodology used for the measurement of airfield capacity in this study is described in FAA AC 150/5060-5, *Airport Capacity and Delay*.

Through this approach, airfield capacity is defined in the following terms:

- Annual Service Volume (ASV): A reasonable estimate of an airport's annual capacity (i.e., level of annual aircraft operations that will result in an average annual aircraft delay of approximately one to four minutes).
- Hourly capacity of runways: The maximum number of aircraft that can be accommodated under conditions of continuous demand during a one-hour period.

In the initial stages of evaluating an airport's long-term requirements, it is crucial to examine issues related to capacity and delay. The annual capacity of an airport, also known as the ASV, represents the number of flight operations that an airfield can handle over the course of a year. The existing and projected annual demand is compared with the ASV to determine the percentage capacity at which the airport is functioning, and to estimate the schedule for future enhancements in airfield capacity. As annual demand approaches ASV, average delays increase.

The discussion of airfield system capacity describes each analysis conducted to calculate the ASV, capacity, and potential delay that could occur at AUN for the planning period from 2023 to 2043. Any parameters and assumptions are defined using FAA AC 150/5060-5*, Airport Capacity and Delay*, which describes a broad criterion in which calculations of capacity are applied.

3.2.1 Critical Aircraft

The critical aircraft, as detailed in **Chapter 2** – **Aviation Activity Forecasts**, does not inhibit larger aircraft from operating at AUN both now and in the future. Data for determining the critical aircraft was gathered from FlightAware and the Traffic Flow Management System Counts (TMFSC) for the FAA fiscal year 2023. The existing critical aircraft was chosen from the Runway Design Code (RDC) B-I (Small) group, as no single aircraft type exceeded 500 annual operations. The Beechcraft Baron (BE58) and the Cesena 421 Golden Eagle (C421) were identified to represent this group. As the critical aircraft weighs less than 12,500 pounds, it is classified under the B-I (Small) category in the RDC for runway design. The future critical aircraft also is expected to be B-I (Small) aircraft, which means the runway design or standards for AUN will not change.

3.2.2 Analysis of Annual Service Volume

The ASV and the hourly capacity are determined using a methodology outlined by the FAA in AC 150/5060-5, *Airport Capacity and Delay*. This method involves the use of a mix index and runway use configuration to calculate the ASV. The mix index is a formula represented as (C+3D) which is used to ascertain the proportion of aircraft operations with a Maximum Takeoff Weight (MTOW) exceeding 12,500 pounds. Here, C denotes the percentage of aircraft weighing more than 12,500 pounds but less than 300,000 pounds, while D signifies the percentage of aircraft weighing over 300,000 pounds. Data from the 2023 fiscal year procured from FlightAware was used to categorize operations based on their MTOW. **Table 3-1** summarizes the data from FlightAware which is a proxy for fleet weight distribution and not a reflection of total airport operations.

Table 3-1: Operation Weight Categories (from available data – not inclusive of all operations)

Weight Category (MTOW)	Total Operations	Percent of Operations	Estimated Relative to Forecast
Operations < 12,500 pounds	23,702	80.6%	59,644
C (≥12,500 pounds to 300,000 pounds)	38	0.1%	74
D (>300,000 pounds)	0	0%	0
Total Operations	29,407	100%	74,000

Source: FlightAware, 2023.
Note: Does not include annual helicopter operations or aircraft operations with unspecified tail numbers or aircraft incompatible with ADS-b tracking technology.

Based on operations data from FlightAware, 0.1 percent of the total annual operations fell within weight category C. This percentage of operations represents the 2023 base year mix index for AUN and was used to determine the ASV. While operations data from FlightAware does not equal the total operations for AUN for 2023, the data provides insight into the larger and heavier aircraft that operate at AUN and whether additional facilities or capacity are warranted.

With the mix index of 0.1 percent, the next step is to determine the runway use configuration. The FAA provides guidance on runway use configuration in AC 150-5060-5, *Airport Capacity and Delay*. The proper runway use configuration for AUN is Configuration One, a single runway. Using the mix index and Configuration One, the hourly capacity for operations per hour and ASV can be determined. These are shown in **Table 3-2** and result in the following capacities and ASV at AUN:

- Hourly Capacity of 98 Visual Flight Rules (VFR) Operations Per Hour
- Hourly Capacity 59 Instrument Flight Rules (IFR) Operations Per Hour
- ASV of 230,000 Operations Per Year

Table 3-2: Runway Use Configuration One

Single Runway (Configuration 1)			
Mix Index (C+3D)	**Hourly Capacity Operations / Hours (IFR and VFR)**		**Annual Service Volume (Operations / Year)**
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: AC 150-5060-5, Airport Capacity and Delay, Figure 2-1.

Based on the forecast for 2042, the number of single-engine piston aircraft operations is increasing at AUN but it is not forecasted to grow beyond the 0 to 20 mix index range; therefore, the mix index for AUN will remain in the 0 to 20 percent mix index category. This means the future ASV, VFR hourly capacity, and IFR hourly capacity will remain the same.

There are two assumptions for ASV, as they relate to **Table 3-2,** both of which are included in detail below:

- Assumption No. 1 – IFR Weather Conditions
- Assumption No. 2 – Runway Use Configuration

3.2.2.1 IFR Weather Conditions

IFR weather conditions pose unique challenges for aircraft operators, necessitating additional equipment and stricter standards for both airports and aircraft. The FAA's Airport Data and Information Portal (ADIP) provides crucial wind and weather observations for various conditions:

- IFR: Ceiling below 1,000 feet and/or visibility less than 3 miles.
- VFR: Ceiling at or above 1,000 feet and visibility greater than or equal to 3 miles.
- All-weather conditions: Observations that do not fall under VFR or IFR categories.

According to **Table 3-3**, IFR conditions occur 2.5% of the time, meeting the assumption related to ASV.

Table 3-3: AUN Wind Data Observations

Weather Conditions	Total Observations	Percent of Observations
All-Weather	248,006	50.1
IFR	12,433	2.5
VFR	234,759	47.4
All Observations	495,198	100

Source: FAA ADIP, 2023.

3.2.3 Airfield Demand / Capacity Analysis

The analysis of airfield demand and capacity assesses the airfield's capability to handle the projected number of aircraft operations. This evaluation considers both the annual demand and peak demand periods. This process is crucial in ensuring that the airfield can efficiently manage its operations and meet the needs of its users throughout the year, especially during times of high demand. It also helps in planning for future expansions or modifications to the airfield's infrastructure.

As mentioned previously, AUN falls into runway use Configuration One, resulting in hourly capacities of 98 VFR operations per hour and 59 IFR operations per hour. To confirm that these hourly capacities are accurate, the following capacity assumptions from FAA AC 150/5060-5, *Airport Capacity and Delay,* were evaluated. These calculations are based on the runway utilizations that produce the highest sustainable capacity consistent with existing air traffic rules, practices, and guidelines.

- Runway Use Configuration
- Percent Arrivals and Departures
- Percent Touch-and-Go's

- Taxiways
- Airspace and Flight Procedure Limitations
- Runway Instrumentations
- Flight Procedures and NAVAIDs

3.2.3.1 Runway Use Configurations

AUN operates with a specific runway use configuration known as Configuration One. This configuration, which is one of FAA AC 150/5060-5's predetermined runway use configurations, involves the number, location, and orientation of the active runway(s), the type and direction of operations, and the flight rules in effect at a particular time. It provides the greatest hourly capacity approximately 80 percent of the time, satisfying the assumptions relating to hourly capacity documented in FAA AC 150/5060-5, *Airport Capacity and Delay*. With these assumptions met, the ASV based on runway use Configuration One is accurate for AUN.

3.2.3.2 Percent Arrivals and Departures

The 2023 FlightAware operations data was evaluated to determine the types of operations that were occurring at AUN. **Table 3-4** summarizes arrival and departure data for AUN not including touch-and-go operations.

Table 3-4: Arrivals and Departures

Operations	Total Observations	Percent of Observations
Arrival	9,008	48.8
Departure	9,436	51.2
Total	18,444	100

Source: FlightAware, AUN Operations 2023 Fiscal Year.

For fiscal year 2023, arrivals made up 48.8 percent of the non-touch-and-go operations, and departures made up 51.2 percent. Since the data represents a portion of the total operations at AUN, the assumption that the percent of arrivals equals the percent of departures was made.

3.2.3.3 Percent Touch-and-Go's

Additional information can be derived from the 2023 FlightAware data including an overview of touch-and-go operations. This data pinpointed 10,963 touch-and-go operations, accounting for 37.3 percent of the 29,407 total operations. Given that this data only represents a fraction of total operations at AUN, it is assumed that the proportion of touch-and-go operations will stay steady at around 37.3 percent. This data aligns with the touch-and-go percentage assumption, as for a mix index ranging from 0 to 20, the percentage of touch-and-go operations should be between zero to 50 percent of all operations. This also aligns with the assumption about hourly capacity in the FAA AC 150/5060-5, *Airport Capacity and Delay*.

Table 3-5: Arrivals and Departures

Operations	Total Observations	Percent of Observations
Arrival	9,008	48.8
Departure	9,436	51.2
Touch and Go	10,963	37.3
Total	29,407	100

Source: FlightAware, AUN Operations 2023 Fiscal Year.

3.2.3.4 Taxiways

Access to Runway 7/25 is provided by Taxiway A, a full-length parallel taxiway. It is situated between the main runway and the terminal. Additionally, there are four taxiway connectors, Taxiways B, C, D, and E, all of which are designed to accommodate Taxiway Design Group (TDG) 1 aircraft. These connectors enable transit from the ramp to the runway ends, and the reverse. Multiple runway exits are necessary as AUN discourages back taxi procedures on Runway 7/25. These factors satisfy the assumption relating to hourly capacity in FAA AC 150/5060-5, *Airport Capacity and Delay*.

3.2.3.5 Airspace and Flight Procedure Limitations

The current flight capacity requirements are adequately addressed by the existing flight procedures and airspace category at AUN. Presently, there are no limitations or constraints identified in the airspace or flight procedures.

3.2.3.6 Runway Instrumentation

The FAA establishes guidelines for aircraft separation and operational procedures. These guidelines consider factors such as the size of the aircraft, presence of radar in the terminal area, availability of instrument procedures, and existence of an Airport Traffic Control Tower (ATCT). The availability of these facilities and procedures can enhance the capacity of the airfield by enabling more efficient traffic management.

Although there is no ATCT at AUN, Beale Air Force Base, Sacramento International, and Sacramento Mather all possess ATCTs and are situated within a 30-nautical-mile radius of AUN. Furthermore, the Northern California Approach and Departure Control (NorCal TRACON) services all airports in the vicinity of AUN, including AUN itself. The surrounding Air Traffic Control (ATC) infrastructure contributes to the control over aircraft entering or exiting AUN airspace.

AUN is equipped with a single instrument approach procedure, specifically the Area Navigation Global Positioning System (RNAV GPS) to Runway 7. This further enhances the control and safety of aircraft operations at AUN. This runway instrumentation asset further supports Assumption No. 1 − IFR Weather Conditions relating to hourly capacity as defined by the FAA.

3.2.3.7 Flight Procedures and NAVAIDs

A review of the current flight procedures, weather patterns, and airspace considerations is presented in **Chapter 1**. It concludes that the existing flight procedures and NAVAIDs at AUN are adequate to meet the demand of the aircraft that utilize them. The need for additional NAVAIDs, such as lighted wind cones and runway end identifier lights, is explored in the following chapter. No additional flight procedures are forecasted to be necessary during the planning period.

3.2.4 Analysis of Delay

As presented in FAA AC 150/5060-5, *Airport Capacity and Delay,* delay is the difference between constrained and unconstrained operating time. As the number of total operations increases, the amount of capacity left at an airport decreases and the amount of time between individual aircraft takeoffs or landings (delay) increases. The FAA recommends that planning for additional airfield capacity should start when annual demand reaches 60 percent of the ASV, and construction of additional airfield capacity should begin when annual demand reaches 80 percent of ASV.

To determine the delay, the following information is needed:

- Annual Demand
- Ratio of Annual Demand to ASV
- Average Delay Per Aircraft

3.2.4.1 Annual Demand

A total of 75,077 operations occurred at AUN in 2023, and operations are forecasted to increase to 81,316 annual operations in 2043.

3.2.4.2 Ratio of Annual Demand to ASV

The FAA AC for capacity and demand identifies AUN's runway use configuration as one. This relates to an ASV of 230,000 annual operations. This results in the ratio of annual demand of ASV of 0.33 (33 percent) in 2023, and 0.35 (35 percent) in 2043.

3.2.4.3 Average Delay Per Aircraft

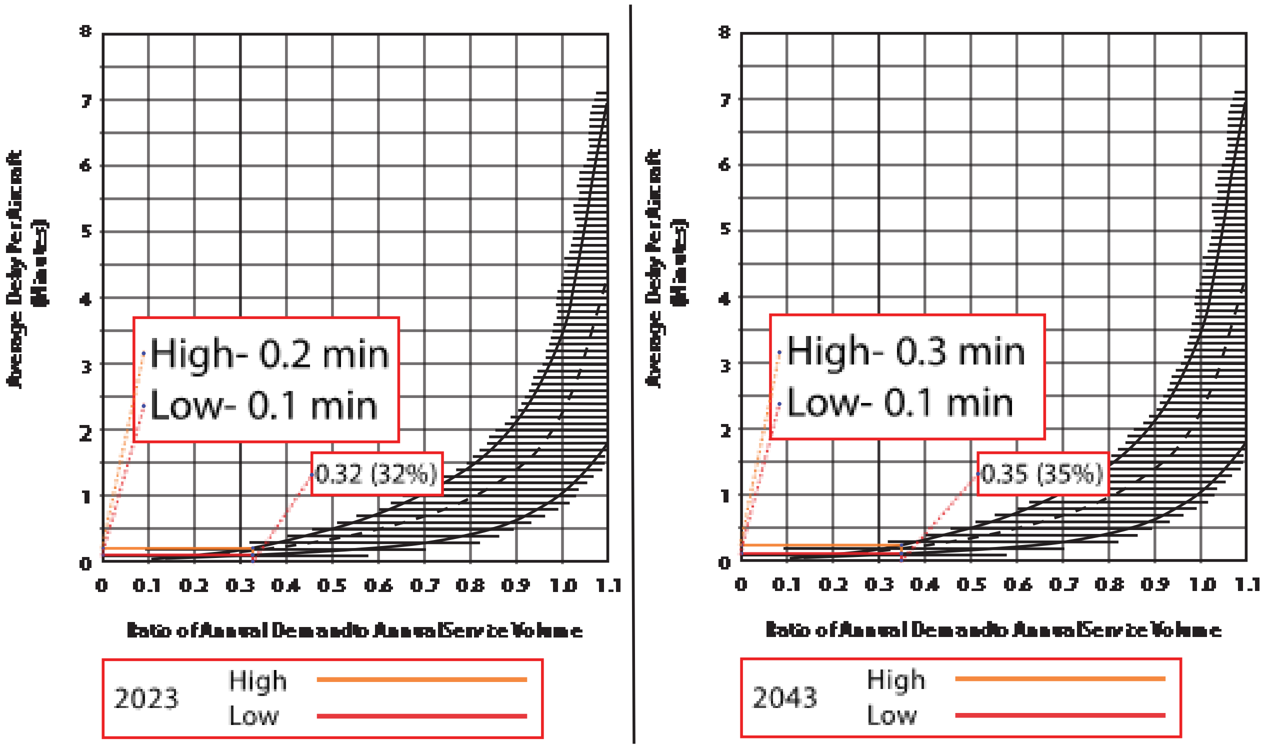
The ratios for annual demand to ASV for 2023 and 2043 are used to determine average delay per aircraft using FAA AC 150/5060-5, *Airport Capacity and Delay*. **Figure 3-1** shows the existing and future average delay per aircraft. The full band of the curve is used for AUN as most operations are General Aviation (GA). In 2023, the average delay per aircraft, measured in minutes, fluctuates between 0.1 (equivalent to 6 seconds) and 0.2 minutes (or 12 seconds). This delay is projected to vary from 0.1 (6 seconds) to 0.3 minutes (18 seconds) by 2043. The average delay at AUN is so minimal that it doesn't necessitate any planning considerations during the planning period. **Table 3-6** presents the breakdown of annual delay for AUN for 2023 and 2043.

Table 3-6: AUN Annual Delay

Year	Average Delay Per Aircraft		Annual Delay (Minutes)	
	Low	High	Low	High
2023	0.1	0.2	7,508	15,015
2043	0.1	0.3	7,508	22,523

Source: FlightAware, AUN Operations 2023 Fiscal Year.

Figure 3-1: Existing / Future Average Delay Per Aircraft



*Source: AC 150-5060-5, Airport Capacity and Delay, **Figure 2-2** Average Delay Per Aircraft for Long Range Planning.*

3.2.4.4 Recommendations

The ratios of annual demand to ASV for the period from 2023 to 2043 are below 60 percent and, therefore, are acceptable for the planning period. No additional runways are necessary to reduce delay at AUN as the percentage does not meet the threshold.

3.3 AIRPORT DESIGN STANDARDS

The FAA holds the primary responsibility for ensuring the safety of civil aviation within the United States. As such, FAA design standards and policies prioritize safety above all else. Following safety, efficiency and utility are also addressed as secondary objectives by the FAA.

FAA AC 150/5300-13B, *Airport Design*, presents FAA's design standards to guide facility planning. The FAA AC uses a coding system to determine standards for designing airports based on the operational and physical characteristics of the aircraft that operate or intend to operate at an airport. Two categories of aircraft characteristics yield the Airport Reference Code (ARC): the Aircraft Approach Category (AAC), which is based on aircraft approach speed, and Airplane Design Group (ADG), which is based on the wingspan and tail height. RDC adds a third component to the ARC based on runway approach visibility minimums and is expressed as Runway Visual Range (RVR). The RDC, which is the FAA classification for the airfield design, establishes the dimensions and setback requirements of airfield facilities based on the design aircraft. RDC coding designations are shown in **Table 3-7**.

Table 3-7: Runway Design Code Designations

Aircraft Approach Category (AAC)		
AAC		**Approach Speed**
A	Approach Speed less than 91 knots	
B	Approach speed 91 knots or more but less than 121 knots	
C	Approach speed 121 knots or more but less than 141 knots	
D	Approach speed 141 knots or more but less than 166 knots	
E	Approach speed 166 knots or more	
Airplane Design Group (ADG)		
Group Number	**Wingspan (in feet)**	**Tail Height (in feet)**
I	< 49	< 20
II	49 - < 79	20 - < 30
III	79 - < 118	30 - < 45
IV	118 - < 171	45 - < 60
V	171 - < 214	60 - < 66
VI	214 - < 262	66 - < 80
Approach Visibility Minimums		
RVR (in feet)	**Flight Visibility Category (statue miles)**	
VIS	Runways designed for visual approach use only	
5,000	Not lower than 1 mile	
4,000	Lower than 1 mile but not lower than ¾ mile	
2,400	Lower than ¾ mile but not lower than ½ mile	
1,600	Lower than ½ mile but not lower than ¼ mile	
1,200	Lower than ¼ mile	
VIS	Runways designed for visual approach use only	

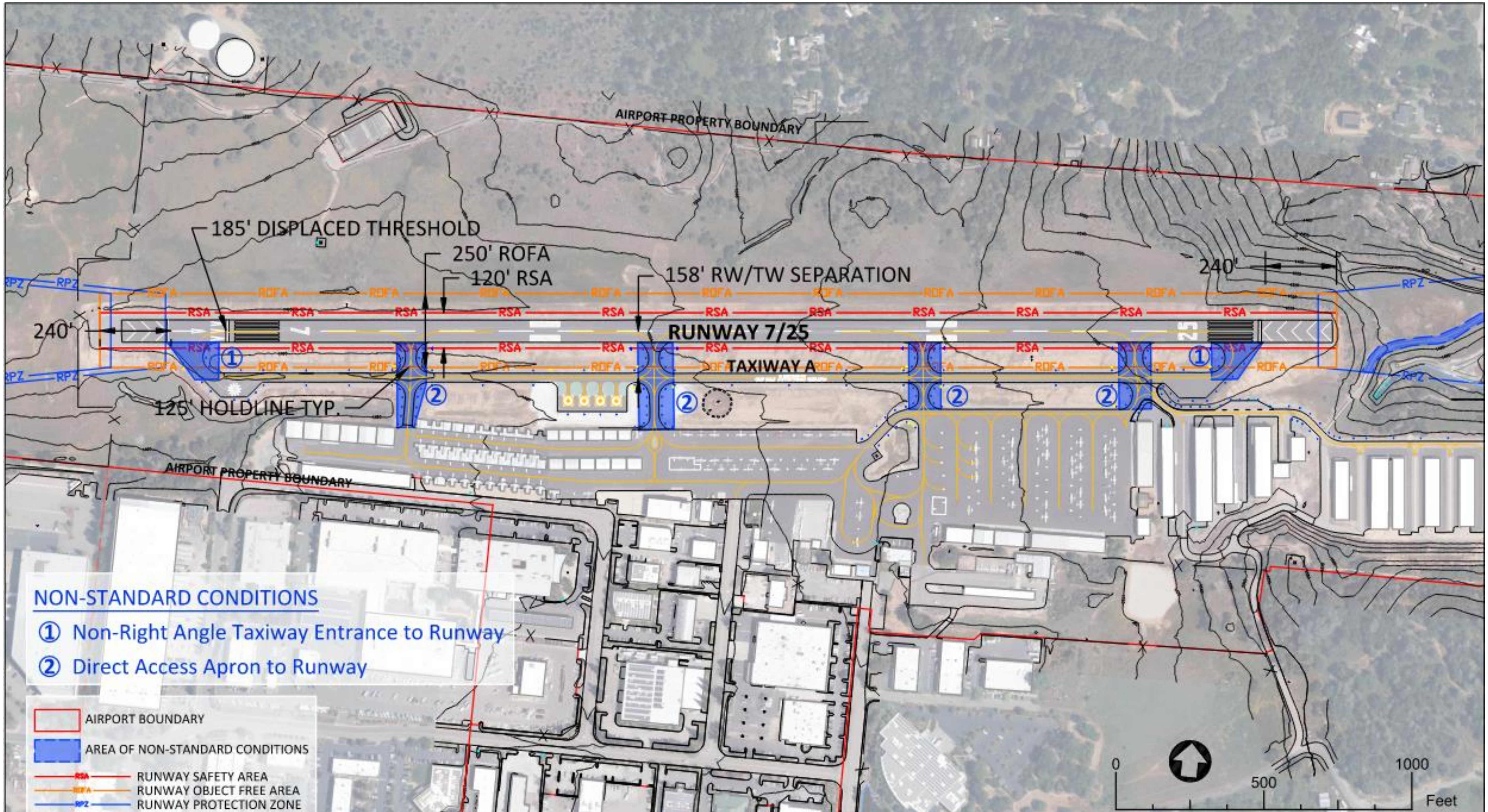
Source: AC 150/5300-13B, Airport Design.

3.3.5 Runway 7/25 Design Standards

Runway design standards address runway safety areas (RSAs), runway object free areas (ROFAs), runway obstacle free zones (ROFZs), runway protection zones (RPZs), and setback distances for taxiways and other airport facilities. Runway length has additional design criteria and will be assessed in a separate section of this chapter. FAA policy does not allow for reducing runway length or the use of declared distances if there would be an operational impact on aircraft currently using AUN. Design standards for Runway 7/25 are shown in **Table 3-8**. **Figure 3-2** shows the surfaces for Runway 7/25 and areas requiring mitigation. **Figures 3-3** shows the RPZs for Runway 7/25. Objects and areas requiring mitigation are called out on figures for runway surfaces and RPZs.

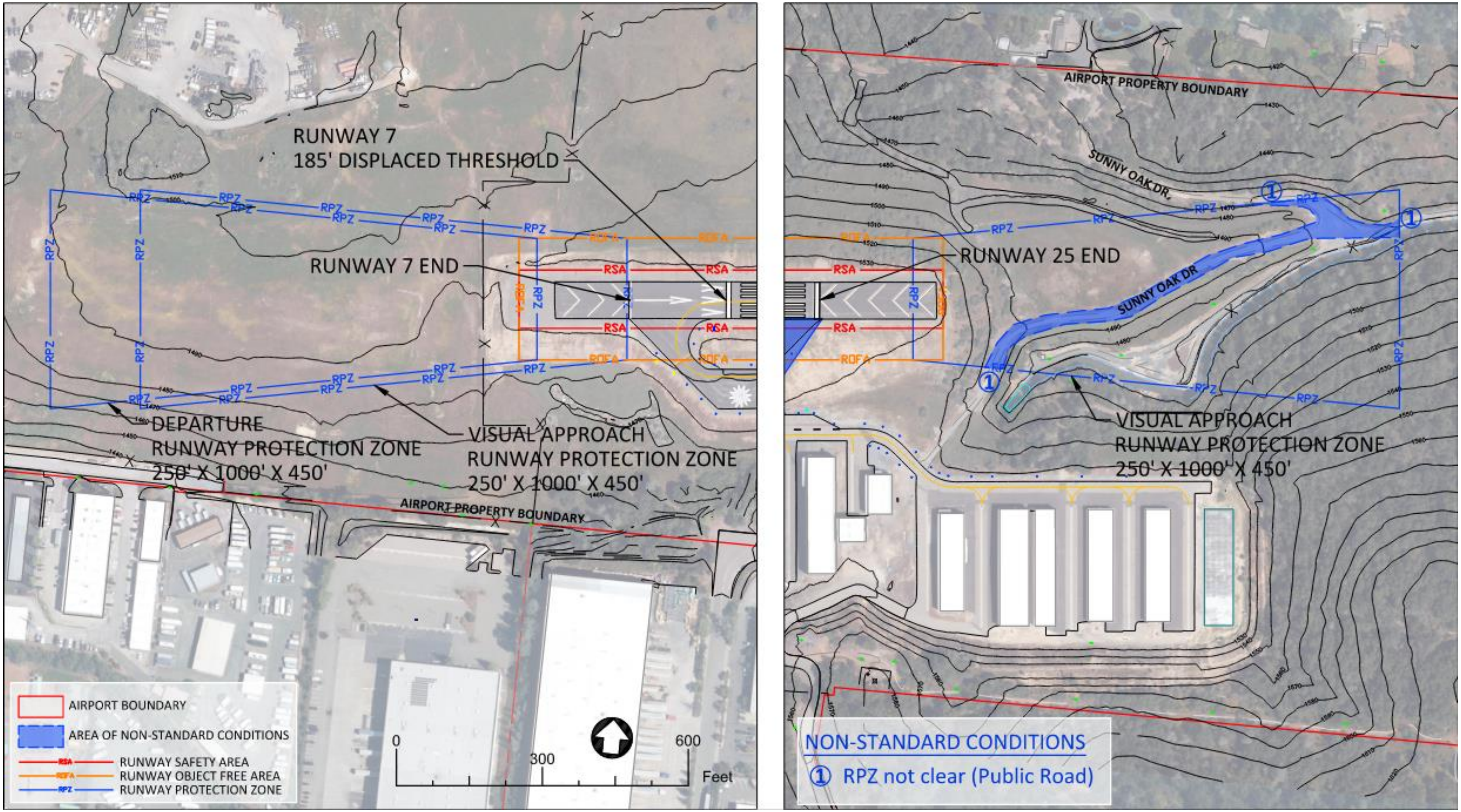
Due to obstructions near the airport Runway 7 has a displaced threshold of 185 feet and Runway 25 does not have a displaced threshold. There are currently no published declared distances. It is understood that because there are no published declared distances, surfaces are set based on physical ends of the runway.

Figure 3-2: Runway 7/25 Design Standards: B-I (Small)



Source: Mead & Hunt, 2024.

Figure 3-3: Runway Protection Zones



Source: Mead & Hunt, 2024.

Table 3-8: Runway 7/25 Design Standards

Runway Design	FAA Standards	Runway 7/25	
	A/B-I (Small)	7	25
Runway Width	60'	**75'**	
Shoulder Width	10'	10'	
Blast Pad Width	80'	**75'**	**75'**
Blast Pad Length	60'	**155'**	**240'**
Displaced Thresholds	N/A	185'	-
Runway Protection			
Runway Safety Area (RSA)			
Length Beyond Departure End	240'	240'	
Width	120'	120'	
Runway Object Free Area (ROFA)			
Length Beyond Departure End	240'	240'	
Width	250'	250'	
Runway Obstacle Free Zone (ROFZ)			
Length Beyond End	200'	200'	
Width	250'	250'	
Approach Runway Protection Zone (RPZ)			
Length	1,000'	1000'	1000'
Inner Width	250'	250'	250'
Outer Width	450'	450'	450'
Departure Runway Protection Zone (RPZ)			
Length	1,000'	1000'	1000'
Inner Width	250'	250'	250'
Outer Width	450'	450'	450'
Runway Separation, Runway Centerline to:			
Holding position	125'	125'	
Parallel Taxiway	150'	**158'**	
Aircraft Parking Area (Fixed Wing)	N/A	305'	
Aircraft Parking Area (Rotor)	N/A	215'	

Source: AC 150/5300-13B, Airport Design.
*Note: **Bold** indicates the existing condition exceeds or is deficient compared to the specified design standards.*

3.3.6 Runway Design

AUN operates with a single runway, designated as Runway 7/25, which spans a length of 3,700 feet, and 75 feet in width, with a single wheel weight limit of 30,000 pounds. Accompanying this runway is a full-length parallel taxiway equipped with multiple connectors. The orientation of Runway 7/25 extends from north by northeast to south by southwest, with a decreasing gradient from the end of Runway 25 to the end of Runway 7.

Runway 7/25 is categorized as B-I (Small). This category signifies that the runway is designed to accommodate aircraft with a wingspan less than 49 feet, a tail height less than 20 feet, and approach speeds between 91 and 121 knots. The FAA stipulates that runways of this classification should have a minimum shoulder width of 10 feet, and blast pads that are at least 80 feet wide and 60 feet long. In compliance with these standards, Runway 7/25 has a shoulder width of 10 feet. It also features blast pads at both ends, measuring 75 feet wide and 155 feet long at the Runway 7 approach end, and 240 feet long at the Runway 25 approach end. Although the only aspect of the blast pads that meets the requirements is the length at the Runway 25 approach end, the critical aircraft - a single-engine piston aircraft - should be considered when evaluating these deficiencies. Additionally, Runway 7/25 adheres to the B-I (Small) standards for ROFA, RSA, ROFZ, and RPZ. Furthermore, it exceeds the minimum required width for a B-I (Small) runway by 15 feet.

A comprehensive pavement management plan was finalized in 2019, outlining both immediate and long-term strategies for maintaining the runway surface, lighting, and airfield markings throughout the planning period. In anticipation of increased aircraft demand, AUN has reserved land for potential runway expansion. Although the fleet mix at AUN is expected to evolve, the projected operations from larger airframes are not sufficient to reach the annual threshold of 500 operations. No deficiencies or additional improvements have been identified as necessary.

3.3.7 Runway Safety Area

The FAA requires the RSA for runways with a B-I (Small) design classification to extend 240 feet beyond the departure end of the runway. Currently, the RSA extends 240 feet beyond the departure end and meets this requirement. The FAA also requires the RSA to extend a minimum length of 240 feet prior to the runway threshold and have a minimum width of 120 feet. The RSA for Runway 7/25 extends 240 feet prior to the threshold and has a width of 120 feet meeting FAA requirement minimums. The RSA dimensions meet FAA design criteria, and no alterations are required during the planning period.

3.3.8 Runway Object Free Area

The ROFA for Runway 7/25 extends 240 feet beyond the departure ends and has a width of 250 feet which meets the minimum FAA requirements. ROFA dimensions at AUN meet FAA design criteria, and no improvements are required over the planning period.

3.3.9 Runway Protection Zone

For runways that have minimums of not lower than one mile on one end, the FAA requires that the RPZ for a B-I (Small) include an inner width of 250 feet, an outer width of 450 feet, and a length of 1,000 feet. For minimums that are only visual, the RPZ dimensions are the same as above.

The RPZs for both ends of Runway 7/25 follow the prescribed design standards. However, there is an encroachment by a public road on the RPZ at the approach end of Runway 25. In contrast, the RPZ at the approach end of Runway 7 is currently clear of any roads, objects, or hazards. **Chapter 4** includes the evaluation of alternatives for runway extensions and the associated repositioning of the RPZ on the extended centerline of Runway 7/25. This is due to the presence of existing buildings and roads situated to the west on the extended centerline of Runway 7/25.

3.3.10 Runway Centerline Separation to Parallel Taxiway Centerline

The FAA requires B-I (Small) runways equipped with a parallel taxiway to maintain a separation of 150 feet between the runway centerline and parallel taxiway centerline. Taxiway A has a separation of 158 feet from Runway 7/25 meeting the required separation. No improvements are required during the planning period.

3.3.11 Runway Centerline Separation to Holding Positions

FAA regulations require that runways classified as B-I (Small) are mandated to maintain a separation of 125 feet between the runway centerline and a holding position. The holding positions on taxiway connectors leading to Taxiway A comply with this regulation, maintaining a separation of 125 feet from the centerline of Runway 7/25. The connectors of Taxiway A satisfy the minimum separation requirement for a B-I (Small) runway. Therefore, no further modifications are anticipated during the planning period.

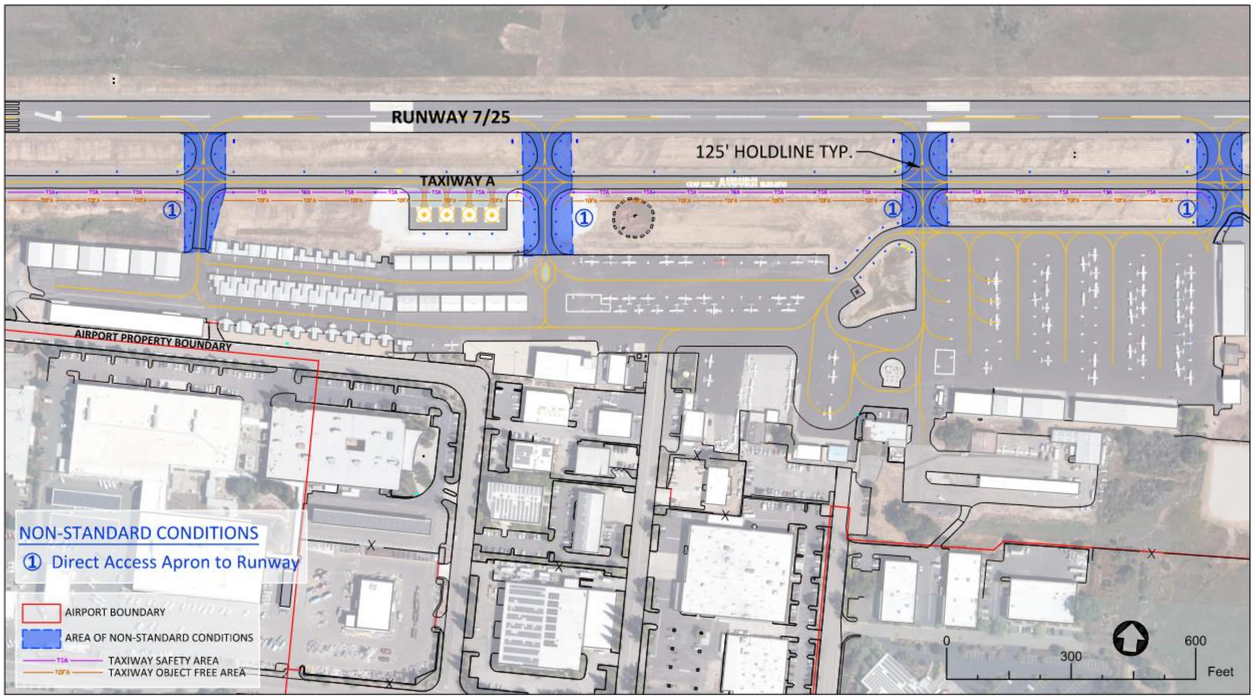
3.4 WIND COVERAGE

The current wind coverage is detailed in **Chapter 1**. It is important to note that AUN does not possess a crosswind runway. However, no further enhancements have been deemed necessary at this time. This is because all components of crosswind are in compliance with the requirement of providing 95 percent wind coverage. Thus, the existing infrastructure adequately addresses the needs for wind coverage.

3.5 TAXIWAY DESIGN STANDARDS

The following section discusses the taxiway design standards as per FAA AC 150/5300-13B, *Airport Design*. It aims to align taxiway system enhancements with forecasted demand and FAA standards ensuring an efficient taxiway system.

Figure 3-4:Taxiway Design Standards



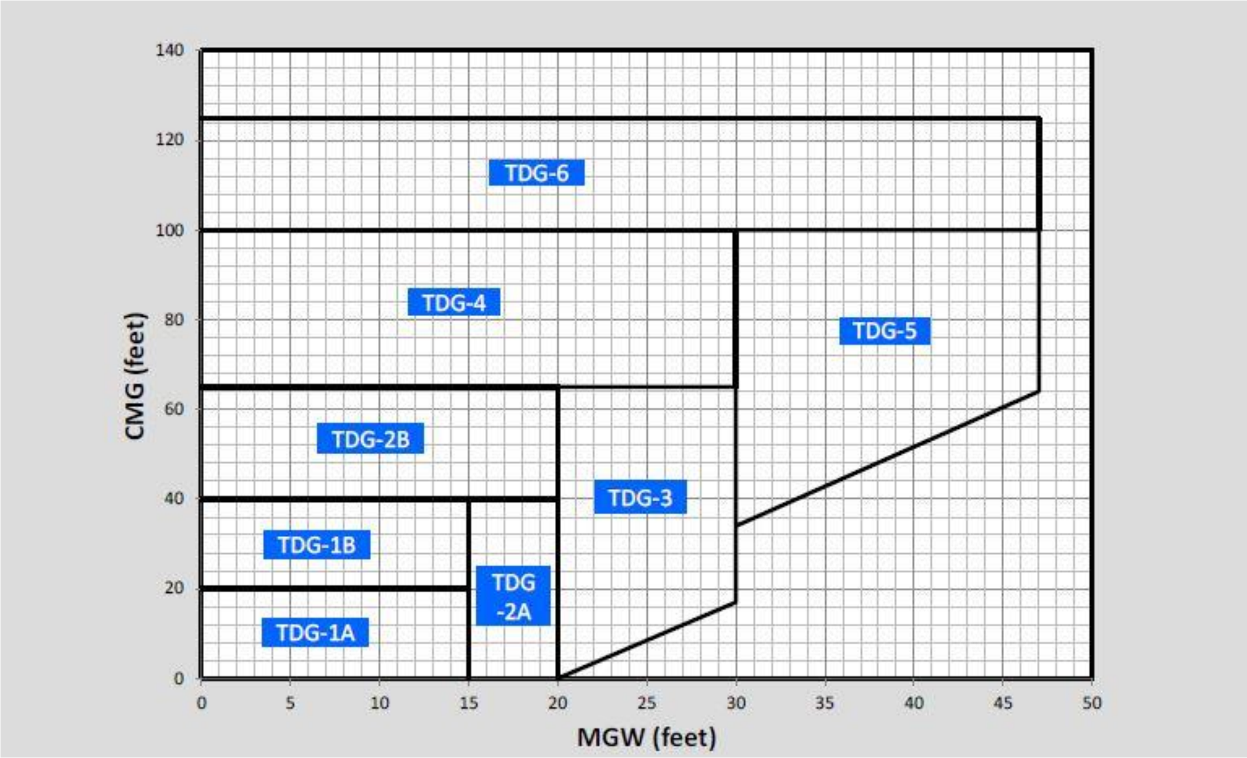
Source: Mead & Hunt, 2024

3.5.12 Overview of Standards

The FAA defines TDG criteria in FAA AC 150/5300-13B, *Airport Design*. The TDG considers the dimensions of the aircraft landing gear to determine the taxiway widths and pavement fillets to be provided at taxiway intersections. The width of the main gear and wheelbase (the distance from nose gear to main gear) distinguishes the TDG classifications. The existing representative aircraft in this category consist of the BE58, which is in classification TDG 1A, and the future critical aircraft, the C421, which is in classification TDG 2A. TDG classifications are presented in **Figure 3-5**. TDG standards are shown in **Figure 3-6**.

Taxiway A and all connectors meet or exceed the existing TDG 1A standards. TDG 2A standards would require Taxiway A; connectors B, C, D, E; and the undesignated taxiways an additional five feet of pavement width, two and a half feet of additional taxiway edge safety margin, and an additional five feet of shoulder width.

Figure 3-5: TDG Classifications



Source: AC 150/5300-13B, Airport Design. 2024
Note: CMG- Cockpit to Main Gear, MGW- Main Gear Width.

Figure 3-6: TDG Standards

Item	TDG							
	1A	1B	2A	2B	3	4	5	6
Taxiway/Taxilane Width [1]	25 ft (7.6 m)	25 ft (7.6 m)	35 ft (10.7 m)	35 ft (10.7 m)	50 ft (15.2 m)	50 ft (15.2 m)	75 ft (22.9 m)	75 ft (22.9 m)
Taxiway Edge Safety Margin [1]	5 ft (1.5 m)	5 ft (1.5 m)	7.5 ft (2.3 m)	7.5 ft (2.3 m)	10 ft (3 m)	10 ft (3 m)	14 ft (4.3 m)	14 ft (4.3 m)
Taxiway Shoulder Width [2]	10 ft (3 m)	10 ft (3 m)	15 ft (4.6 m)	15 ft (4.6 m)	20 ft (6.1 m)	20 ft (6.1 m)	30 ft (9.1 m)	30 ft (9.1 m)
Taxiway/Taxilane Centerline to Parallel Taxiway/Taxilane Centerline w/180 Degree Turn	See Table 4-6 and Table 4-7.							

Source: AC 150/5300-13B, Airport Design. 2024

Table 3-9: Existing and Future Taxiway System Design Standards

Taxiway Name	TDG	Width	Taxiway Edge Safety Margin	Shoulder Width	Meets TDG 1A Standards?	Meets TDG 2A Standards?
A	1A	30’	5’	10’	Yes	No
D	1A	30’	5’	10’	Yes	No
C	1A	30’	5’	10’	Yes	No
B	1A	30'	5’	10’	Yes	No

Source: AC 150/5300-13B, Airport Design. 2024

3.5.13 Taxiway Design Standards

Aircraft operating at AUN utilize a network of taxilanes and taxiways which provide access from apron areas and hangars to each runway end. Each of these are defined in FAA AC 150/5300-13B, *Airport Design*. A taxilane is designed for low speed and precise maneuvering of aircraft and provide access form parking and other terminal areas to the taxiway. Taxiways are established for taxiing aircraft from one part of the airport to another. Taxiway operations at AUN are typically aircraft taxiing from parking to the runway end and vice versa. These elements of the airfield have defined criteria found in AC 150/5300-13B that are associated with the Taxiway/Taxilane Object Free Area (TOFA) and Taxiway/Taxilane safety area (TSA). These boundary areas should provide sufficient separation between the taxiway or taxilane centerline and the nearest object. **Table 3-6** displays the taxiway design standards for AUN. The existing critical aircraft, the BE58, falls into TDG 1A, which means taxiways will have a TOFA width of 89 feet and a TSA width of 49 feet. The future representative aircraft, the C421, is categorized in TDG 2A. The requirements for this TDG are TOFA widths of 124 feet and TSA widths of 79 feet. There are no taxiway surface encroachments at AUN currently.

Vehicle Service Roads (VSR) are roads that are located in the TOFA and/or TSA. Currently, there is one VSR located adjacent to Taxiway A at the Runway 25 approach end. Based on FAA requirements, vehicles may operate within the TOFA provided they give right of way to oncoming aircraft by either maintaining a safe distance from the aircraft or exiting the TOFA. Any parking positions in the area where the TOFA and

TSA overlap must be relocated out of the surfaces. **Table 3-9** above displays the existing nonstandard taxiway conditions which are explained in the following sections.

3.5.14 Visibility (Non- 90 Degree Turns)

Right-angle (90 degree) intersections are ideal for pilots as they offer the greatest visibility. When a pilot makes a right-angle turn, it's a clear signal that they are nearing a runway. However, Runway 7/25 deviates from this standard as it lacks right-angle intersections at both ends. **Chapter 4** presents several options to address this issue at the ends of the runway.

3.5.15 Direct Access

To prevent unnecessary runway incursions, the FAA stipulates that taxiways must not establish a direct link from an apron to a runway without necessitating a turn. Providing direct access from the apron to the runway could potentially lead to runway incursions and may cause confusion for pilots who are expecting a parallel taxiway but instead find themselves on a runway. Please note that the taxiways mentioned below, which provide direct access to a runway, do not conform to the standard design.

- Taxiway B connector
- Taxiway C connector
- Taxiway D connector
- Taxiway E connector

3.5.16 Wide Expanse of Pavement

Large pavement areas can make airfield signs hard to see, reducing visibility of key signals and increasing the risk of pilots losing their bearings. Evaluation of the existing runway, taxiway, and apron system at AUN revealed no concerns for wide expanse of pavement. No additional evaluations are required.

3.6 RUN-UP AREAS

For a more complete description of existing pavement conditions see **Chapter 1**. Existing run-up areas at each end of Runway 7/25 do not allow proper spacing for aircraft and are contributing to the lack of 90 degree turns when utilizing the runway. To address this, **Chapter 4** evaluates alternatives for improving the run-up areas.

3.7 PAVEMENT MARKING, LIGHTING, AND SIGNAGE

Existing runway and taxiway lighting is documented in **Chapter 1**. No deficiencies or additional improvements have been identified as necessary for lighting. Runway 7/25 has non-precision approach markings, taxiway pavement has edge markings, and aprons include nonmovement and aircraft parking markings. Updates to airfield markings will be required during the planning period to address any future nonstandard conditions.

3.7.17 Pavement Marking, Lighting, and Signage to be Evaluated

The following conditions will be evaluated in **Chapter 4** for pavement markings, lighting, and signage.

- Evaluate any service roads, parking, and taxiways that will require new markings, lighting, and signage as needed.
- Remark of displaced thresholds updated geometric configuration and paint as indicated by the new Airport Geographic Information System (AGIS) survey data.

3.8 NAVAIDS

Existing NAVAIDs are documented in **Chapter 1**. Currently, AUN has one lighted windsock that is located approximately at the halfway point of Runway 7/25 on the south side. This windsock has been identified for relocation to the north side of the Runway to allow for increased ramp space. Runway end identifier lights (REIL) make the runway end more identifiable, especially during night operations or at times of low visibility. The installation of REILs on the approach end of Runway 7 are recommended.

3.9 INSTRUMENT PROCEDURES

Existing instrument procedures are documented in **Chapter 1** and have been found to adequately meet the current operating demand at AUN. No deficiencies or additional improvements have been identified as necessary.

3.10 RUNWAY LENGTH ANALYSIS

The following section analyzes the existing runway length at AUN using the FAA standard methodology. Additional runway length considerations are also presented in section 3.10.2, addressing the maximum runway length that AUN can accommodate within its boundaries. This evaluation was conducted as part of the master planning process to determine the necessity of reserving currently available space for the strategic development of the airport beyond the 20-year planning period.

3.10.1 FAA STANDARD RUNWAY LENGTH ANALYSIS

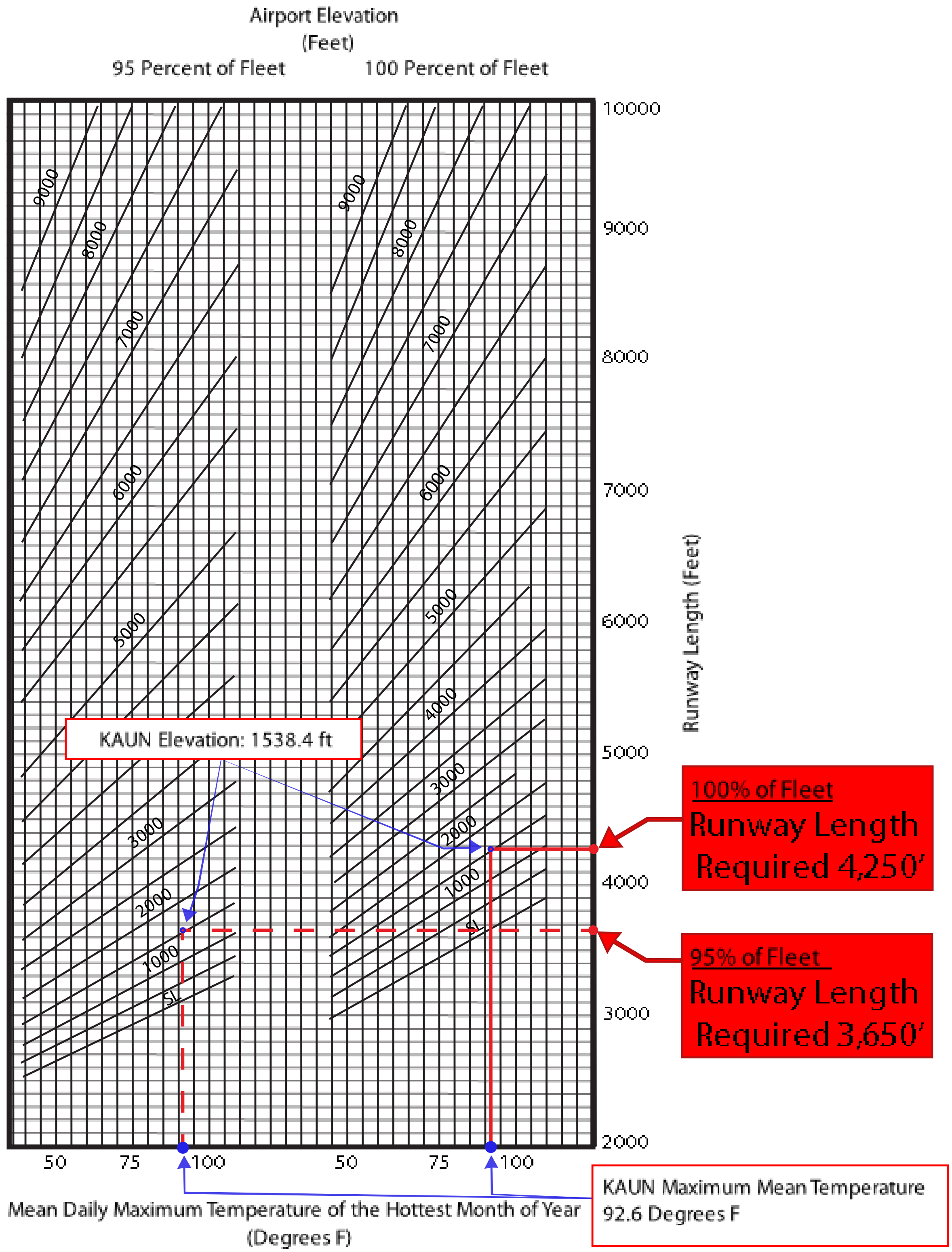
FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design,* provides guidance on determining the required runway length based on several factors. For aircraft weighing less than 12,500 pounds, tables are provided in the AC to determine the appropriate runway length based on a family grouping of aircraft. The family grouping of aircraft that make up the B-I (Small) critical aircraft designation includes aircraft that fall into the "12,500 pounds or less" category. This category and the recommended design approach comprise the primary analysis method used for the Runway 7/25 length analysis. The AC also offers guidance on whether an airport should accommodate a certain percentage of the fleet.

Type 1, which covers 95% of the fleet, is intended for airports serving medium to small population communities in remote recreational areas. Type 2, which covers 100% of the fleet, is for airports serving communities on the fringe of metropolitan areas or larger populations remote from metropolitan areas. Due to AUN proximity to the Sacramento metropolitan area, it falls under Type 2 and should be evaluated for 100% of the fleet.

Temperature significantly influences the calculations for the required runway length for specific aircraft. According to the National Oceanic and Atmospheric Administration (NOAA) Centers for Environmental Information, the mean daily maximum temperature during the hottest month (August) at AUN is 92.6 degrees Fahrenheit (°F). This value was utilized to determine the necessary runway length for Runway 7/25.

Additionally, elevation is an essential factor in these calculations. The highest elevation points on Runway 7/25, located at Runway End 25, is 1,538.4 feet. By using the FAA's provided graphs in the AC, which consider a mean maximum temperature of 92.6°F and an elevation of 1,538.4 feet, a recommended runway length of 4,250 feet was determined. This length is 550 feet longer than the current runway and meets the requirements of 100% of the current general aviation (GA) fleet. The analysis for Runway 7/25 length is illustrated in **Figure 3-7**.

Figure 3-7: Runway 7/25 Length Analysis



Source: Mead & Hunt Analysis using FAA AC 150/5325-4B, Runway Length Requirements for Airport Design. 2024
Mean Maximum Temperature Source: National Oceanic and Atmospheric Administration (NOAA) Centers for Environmental Information

3.10.2 Additional Runway Length Considrations

Within the current boundaries of the airport property, there is sufficient space to accommodate an ultimate runway length of 5,000 feet. While this extended length is not currently justified by the operators and operations counts at AUN, this study highlights the importance of reserving the land and protecting the airspace. These measures are essential for the strategic development of the airport beyond the 20-year planning period and for promoting responsible planning for both the airport and the surrounding areas. The following chapter will provide more technical details regarding this proposed ultimate Runway extension.

As previously discussed, the critical aircraft associated with AUN is the Beechcraft Baron (BE58), which has a maximum takeoff weight (MTOW) of less than 12,500 pounds and is categorized as a B-I aircraft. The future critical aircraft, the C421, also has an MTOW of less than 12,500 pounds and is similarly categorized as B-I. No change in the critical aircraft was identified for the 20-year period associated with this master plan, and similar aircraft with respect to weight and size also operate at AUN.

To determine a more aircraft-specific runway length recommendation and evaluate the necessity for the ultimate runway extension, the based aircraft fleet that operates regularly at AUN was analyzed in greater detail. Several of the most demanding aircraft based at the Airport were selected for evaluation based on their MTOW requirements. The following aircraft all have an MTOW of over 5,000 pounds. To determine runway length recommendations for these specific aircraft, the Pilot Operating Handbooks (POHs) and/or Airplane Flying Manuals for each of these aircraft were reviewed. The results of this analysis are presented in **Table 3-10**. It's important to note that the takeoff and landing length data for these aircraft are within the runway length that exists at AUN today. However, most of these aircraft are multi-engine, which publish accelerate-stop performance calculations.

The accelerate-stop distance is the total distance it takes for an airplane to begin its takeoff roll, have one of its engines fail, and bring the airplane to a stop. Each of these lengths is critical to multi-engine operations, as the takeoff portion is the most critical in the safety of flight for a multi-engine aircraft. As seen in the following table, with the notable exceptions of the Beechcraft Baron 58 and the Piper PA31 Navajo, each of these aircraft would require benefit from additional runway length beyond the existing 3,700 feet available at AUN in consideration of specified accelerate stop distance lengths and increased safety margins.

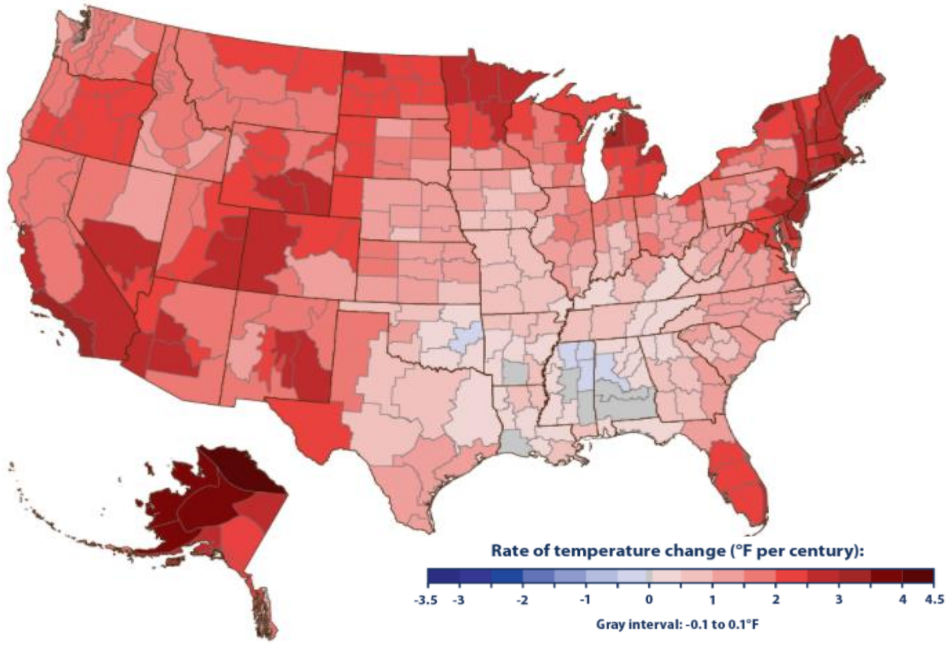
Table 3-10: AUN Fleet Takeoff and Landing Requirements

Aircraft Make	Model	MTOW (lbs.)	Takeoff Lenth	Takeoff Length – 50' Obstacle	Landing Length	Landing length – 50' Obstacle	Accelerate Stop Distance
Beechcraft	Baron 58	5,500	1,650'	2,700'	2,800'	1,610'	3,650'
Cessna	421 Golden Eagle	7,450	2,285'	3,105'	805'	2,375'	4,320'
Piper	PA31 Navajo	6,500	1,730'	2,280'	2,150'	2,700'	3,700'
Cessna	414	6,750	2,740'	3,240'	2,821'	3,315'	4,975'
Cessna	Citation II	13,300	4,685'	n/a	2,495'	n/a	n/a
Cessna	Citation Mustang	8,645	5,075'	n/a	2,800'	n/a	n/a
Beechcraft	Super King Air 200	12,500	2,500'	n/a	2,000'	n/a	3,900'

Aircraft Source: FlightAware, AUN Operations 2023 Fiscal Year.
Runway Length Sources: Pilot Operating Handbooks and Manufacturer Airplane Flying Manuals.
Note: Temperature 33.6° C, Pressure Altitude 1538,
Accelerate Stop Distance: Total distance required to reach a certain airspeed (v1, as defined by the aircraft manufacturer), experience an engine failure at v1, and bring the airplane to a stop.

In addition to evaluating specific aircraft performance, consideration was given to the future climate and its effects on aircraft performance. The U.S. Environmental Protection Agency (EPA) reports that, since 1901, the average temperature in the lower 48 states has risen at an average of 0.16°F per decade. However, temperatures have risen more quickly since 1970, and the past decade is the warmest on record. Temperature change across the United States is not homogenous. The most intense changes have occurred in northern and western areas of the United States. As shown in **Figure 3-8**, the region surrounding the Airport has undergone higher than average temperature changes since 1901 at an increase of 1.5°F.

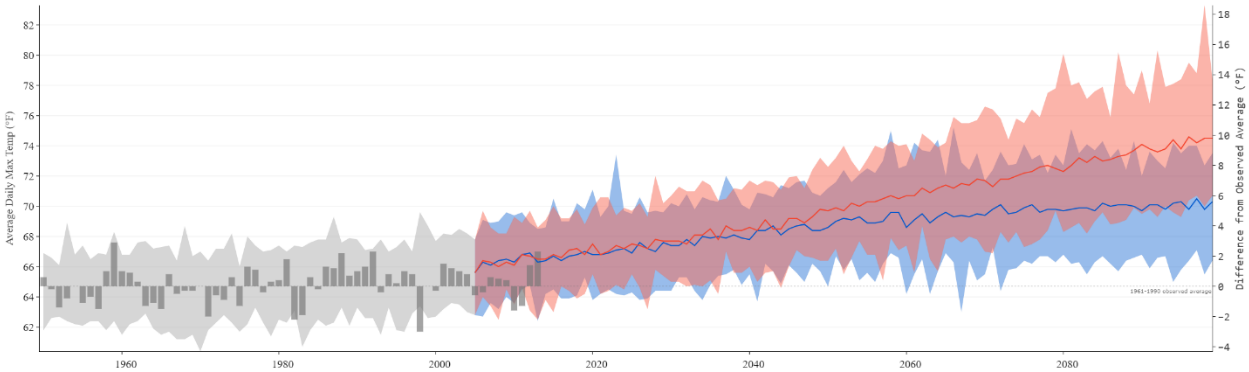
Figure 3-8: Rate of Temperature Change in the United States, 1901-2020



Source: US Environmental Protection Agency, https://www.epa.gov/climate-indicators/climate-change-indicators-us-and-global-temperature

While recent temperature changes in the area have been moderate, the rate of change and extremes of events are expected to increase exponentially. The U.S. Climate Resilience Toolkit is an online resource managed by NOAA that serves as a synthesis of information from the federal government and demonstrates the future impacts of climate change at AUN. As shown in **Figure 3-9**, the average daily maximum temperature for the Airport has increased over time and is expected to continue increasing at a more rapid rate through the 20-year planning period. Additional analysis shows how this ties more closely to runway length needs.

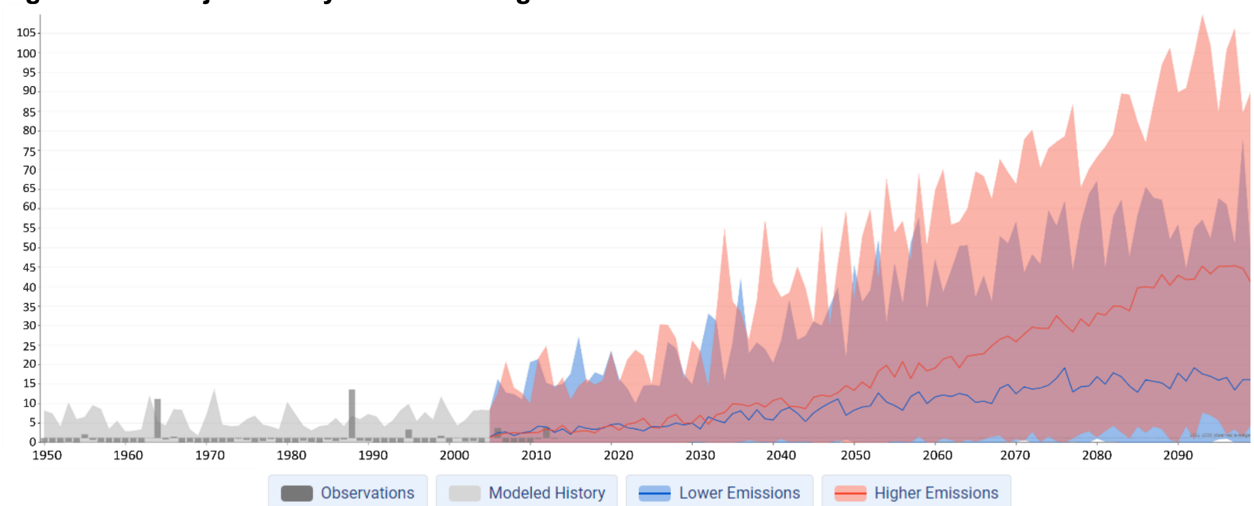
Figure 3-9: Projected Average Daily Maximum Temperature at AUN



Source: The Climate Explorer Tool, https://crt-climate-explorer.nemac.org/

The +15 International Standard Atmosphere (ISA) condition was used to determine runway length at AUN. However, increasing temperature trends indicate that +20 ISA conditions may need to be considered in the future. A temperature of +20 ISA is the equivalent of a 95°F Day and would increase runway needs. **Figure 3-10** shows the number of days above 95°F at AUN to be slightly less than four during the 2010s, a number expected to more than double during the planning period. Additionally, days over 95°F are expected to become increasingly numerous and may reach as high as 47.7 days by the end of this century if emissions continue to increase.

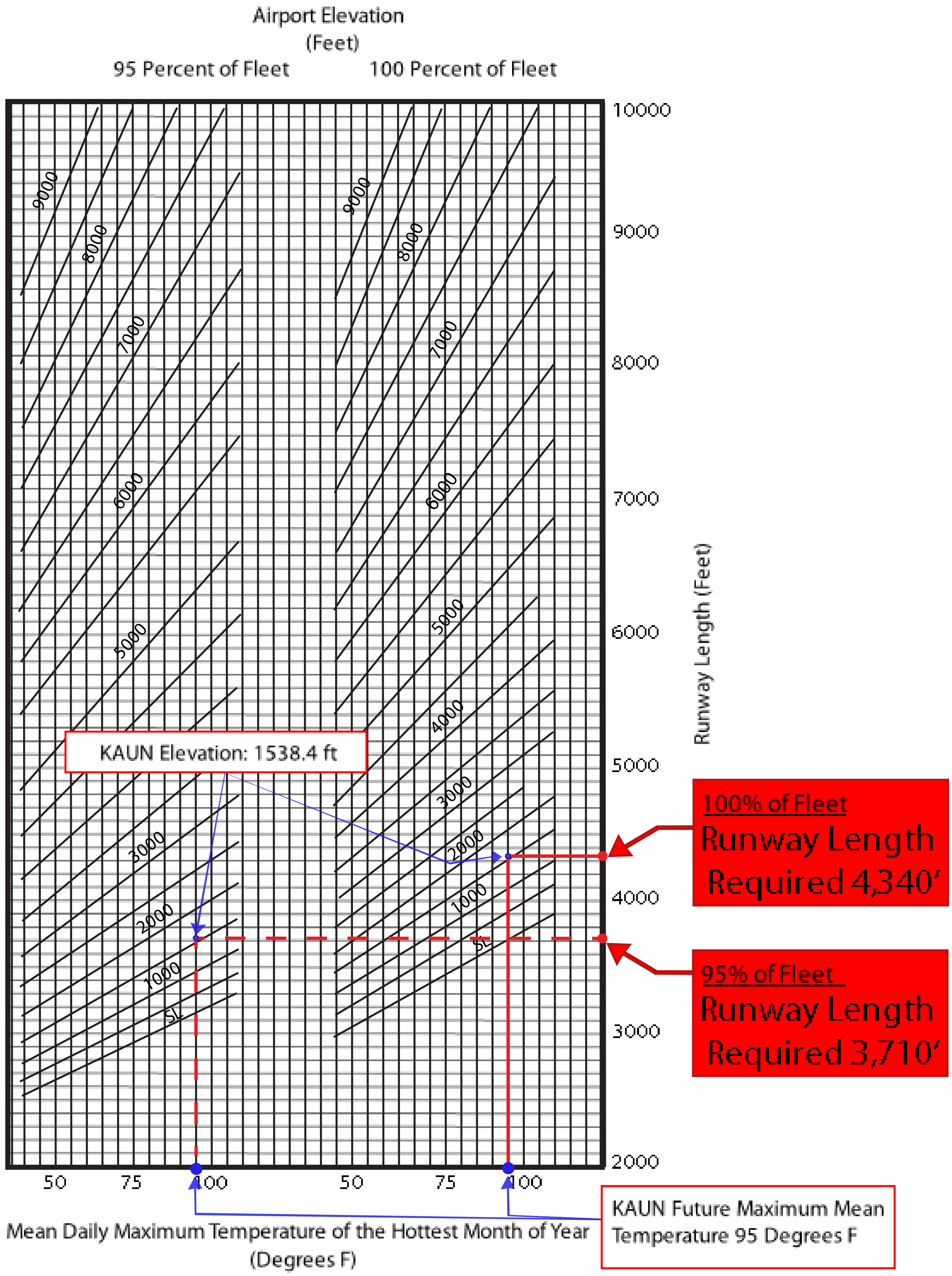
Figure 3-10: Projected Days above 95 Degrees Fahrenheit at AUN



Source: The Climate Explorer Tool, https://crt-climate-explorer.nemac.org/

An additional runway length analysis was completed per the FAA AC as it was earlier, however this time the projected temperature of 95° was used in combination with the field elevation of 1,538.4. The results are included in **Figure 3-11** following this paragraph.

Figure 3-11: Future Mean Max Temperature, Runway 7/25 Runway Length Analysis



Source: Mead & Hunt Analysis using FAA AC 150/5325-4B, Runway Length Requirements for Airport Design. 2024
Future Mean Maximum Temperature Source: National Oceanic and Atmospheric Administration (NOAA) Centers for Environmental Information

3.10.2 Runway Length Summary

The runway length recommendations at AUN are shown in **Table 3-11** below based on the methodology and calculations included in previous sections. The future runway length recommendation is based on FAA guidance and should be a short to medium term project. The ultimate runway length recommendation is based on potential future increases in temperature as well as the potential for larger, faster and higher performance aircraft demand. It is recommended that AUN consider planning for the ultimate length of 5,000 feet on the Airport Layout Plan to reserve the space for this potentially needed facility.

Table 3-10: Runway Length at AUN

Existing	Future	Ultimate
3,700 feet	4,250 feet	5,000 feet

Source: Mead & Hunt Analysis using FAA AC 150/5325-4B, Runway Length Requirements for Airport Design. 2024

3.11 GENERAL AVIATION LANDSIDE AND SUPPORT FACILITIES

GA facilities can include a variety of features to serve the user base. AUN includes the following GA facilities:

- Terminal / Administration Building
- Aircraft Hangars
- Aprons
- Fuel Facilities
- Vehicle Parking
- Roadway Access

3.11.18 Terminal and Administration Building

The current terminal building is located south of Runway 7/25, next to the self-serve fueling station. The AUN terminal building herein referred to as TB, generally describes the building located at the main entrance of the airport which houses the airport administration office, community room with adjoining aeronautical office suites, as well as a Civil Air Patrol office and miscellaneous storage.   One effort of this planning process is to enhance the landside airside interface at AUN. One of the steps towards completing this is identifying the future of the terminal and administration building. The Master Plan team is developing a square footage program for the future terminal and administration building and **Chapter 4** includes alternatives for the relocation and improvement of this building to better accommodate airport operations and community engagement.

This building performs a similar function to a commercial terminal at a larger airport, as it is the main point of public interface between the air and land transportation systems. An important distinction between a commercial terminal and an GA terminal building, however, is that both passengers and pilots are considered to be members of the traveling public in a GA terminal building. For this reason, the building needs several facilities that are commonly found in commercial terminal buildings, such as public restrooms and waiting areas but it also needs to provide facilities for pilots, such as flight planning and a pilot briefing areas.

This TB was evaluated using guidance based on FAA design standards described in *Advisory Circular 150/5300-13B, Airport Design* and *Airports Cooperative Research Program (ACRP) Report 113 General Aviation Facility Planning* in regard to its ability in meeting current and future demand. This section describes future changing uses anticipated by airport management and the resulting requirements for the TB.

The TB was described within Chapter 1, Airport Inventory in detail. It is a 6,200-square foot residential-grade wood framed with a small second floor built in the 1950s building. While the existing TB was built in compliance with past code requirements, it is no longer fully compliant with current building codes. Future renovations will require that all affected portions of the building be brought into compliance with current code. While some code issues such as the tactile exit signs can be remedied with little effort, other issues are inherent to the building's layout and construction that will require systematic changes be made to the building. Federally funded building projects are subject to seismic standards 49 CFR Part 41, requiring a certificate of seismic compliance. Generally, the existing building is heavily dated and does not meet current building codes or environmental sustainability standards. Regarding aesthetics, it falls short of its goal to be the public focal point of the airport. Its location on the airport, roadway access and airfield access are nondescript and inefficient.

Type of Airport Business Operations

The AUN airport uses a hybrid business model whereby the airport sponsor is the operator. The airport contracts out FBO services and fueling. Multiple specialized aviation services operators (SASO) are located on the airfield. The TB assessment will consider this airport business operations model as remaining constant over the planning horizon for TB assessment purposes; however, alternatives will be further evaluated in the Alternatives Chapter offering flexibility to meet changing business needs of the Airport in the future.

Building Demand

The masterplan process is designed to guide the airport in reflecting the community it serves through development of capacity commensurate with the demand it experiences for various activities. During the master plan outreach process two public outreach meetings, and seven planning advisory committee meetings were held. These meetings encouraged aeronautical users and community users to weigh in on facilities and improvements at AUN. The users, as defined by the airport management, and the stakeholders involved in the process, include aeronautical users, aircraft owners, tenants, flight school students, FBO staff members, contractors, passengers, and visiting pilots as well as the broader community with little to no aviation affiliation. This is the user group that was used to evaluate TB needs and facility capacity.

The AUN forecast identifies various aeronautical activities and their relative scale over the planning period. These activities include business aviation, recreational aviation, flight training and “other” which includes fire, EMS, military, utility, law enforcement etc. Some of these functions have been included in the building program for planning purposes, as including them before the design process begins can help to estimate the size of the building and associated site requirements. The planning work does not consider details that are typically worked out between the airport and its tenants or in the building design process such as the final makeup of the building users, the number of floors, the layout of the building, or the layout of the site.

The building users can be divided into two general categories by building use: the traveling public (passengers and pilots) and aeronautical operations users (airport staff and tenants). Demand by the traveling public is driven by the number of passengers and pilots in the building, while aeronautic operations is driven by the number of people working in the building and lease agreements.

Traveling Public (Passengers and Pilots)

Similar to a commercial airport terminal, public areas in a GA terminal are evaluated based on peak public activity. AUN does not have a distinct period of concentrated activity unless it is in early mornings or late afternoons when fog delays flights. Instead, the activity is sustained throughout the day. The AUN GA terminal building has been programmed for a peak usage of approximately 35 pilots and 15 passengers and their respective baggage. This number is based on existing observed activity reported by the Airport Manager. Aviation forecasts show that future usage is expected to remain steady in the foreseeable future. Airport safety and security space is also included in this category as it directly supports the traveling public.

Aeronautical Operations Users (Airport Staff and Tenants)

Aeronautic support includes those spaces that do not directly support the traveling public including airport staff and tenants that hold lease agreements. The AUN Airport management includes the Airport manager, and additional staff as needed. Tenants include flight school instructors and students, FBO staff members, a restaurant and contractors. A larger meeting room space is needed as the airport holds safety meetings of 50 or more attendees, testing for flight students, meeting space for forest service and other government entities when fighting forest fires. Flexible meeting space that could accommodate 100 people would better serve the airport in the future.

TB Spatial Estimate

ACRP RPT 113 gives spatial guidance for space in the building needed to support passengers and pilots and mechanical equipment storage. The amount of space needed for airport administration and leased areas varies with each airport. The estimate for AUN includes these areas as well as a restaurant, meeting room and two maintenance equipment bays, as well as space for the traveling public, airport administration and tenants. A future or improved TB should include a view from the airport manager’s office to the airfield, preferably from a second floor as more of the airfield could be seen. Additionally, an outdoor gathering space should be provided for public aircraft viewing and picnics.

Together, the first and second floors of the existing TB is approximately 6,000 square feet in area. An exterior stair that is necessary for access and egress is approximately 200 square feet, making the total square footage of the building approximately 6,200 square feet. A building designed to meet the uses described above would need to be approximately 12,200 square feet. The actual amount of space needed will be determined as the building design develops. In addition, the number of landside parking stalls should be increased from 60 to approximately 100 to accommodate airport maintenance equipment and vehicles for transient pilots, passengers, restaurant patrons and meeting attendees. Roadway access and building architecture should be reevaluated to make wayfinding to the TB intuitive for visitors.

3.11.19 Aircraft Hangars

Aircraft parking is essential to the healthy operation of any airport. Aircraft hangars at AUN include a total of 153 hangars of various types and sizes:

- General Aviation aircraft storage is located solely along the south side of Runway 7/25. The existing hangars consist of box hangars and T hangars.
- Newer executive box hangars are located south of runway 7/25 on the east end of the field.

The 2043 forecast shows a total based aircraft count of 296 at AUN. Increased demand for aircraft parking and storage must be addressed through available hangar and tiedown space. Alternatives are included in **Chapter 4** of this planning document which address the addition of new hangars and relocation of existing ones to maximize the efficiency of the airfield layout. Additionally, there is one historical hangar at AUN which will remain until plans are brought forward for preservation.

3.11.20 Aprons

Chapter 1 provides an in-depth look at the existing aprons. The current layout of the apron features various orientations. A comprehensive analysis of these configurations, as well as potential alternative arrangements, is presented in **Chapter 4**.

3.11.21 Helicopter eVTOL (electric Vertial Takeoff and Landing) Facilities

Helicopter operation guidelines are in place at AUN, but the current infrastructure frequently requires rotorcraft to operate in areas with high traffic or in ways that contradict these procedures. AUN includes several areas that, if equipped with the right infrastructure, would be ideal for helicopter operations, such as hangars and parking zones. Many of these areas would also be ideal for future eVTOL operations. These areas are further described in **Chapter 4** including an analysis of areas for potential vertiport facilities at AUN.

3.11.22 Solar Farm

Airport property, located north of the runway, is a prime candidate for solar energy production due to its favorable terrain and Part 77 surface restrictions. This planning process is evaluating the potential future demand resulting from increased electrification and is investigating various alternatives, as outlined in **Chapter 4.**

3.11.23 Fuel Facilities

The fuel facilities at AUN are comprehensively detailed in **Chapter 1**. Identified deficiencies and proposed enhancements are as follows: The existing aircraft fuel storage and dispensing system, located adjacent to the Fixed Base Operator (FBO), comprises three subterranean fuel tanks. These tanks are projected to reach the end of their service life within the designated planning period. Consequently, the subsequent chapter will present alternative solutions for the optimal placement of new fuel tanks and dispensing system.

Additionally, to meet increasing demand for fuel at AUN, it will be necessary for AUN to procure an additional fuel truck within the planning period.

3.11.24 Roadway Access

AUN is accessible solely from its southern side via New Airport Road. Rickenbacker Way offers an alternative route for vehicles to directly access the airside. Currently, there is no control at the landside-airside interface at AUN. As part of the planning process, and as explored in the Alternatives Chapter, there are options under consideration for introducing control mechanisms for existing access routes and for integrating additional pathways to facilitate future expansion on the north and south sides of AUN.

3.12 FAR PART 77 IMAGINARY SURFACES

FAA regulations for FAR Part 77 (14 CFR Part 77) *Safe, Efficient Use, and Preservation of the Navigable Airspace*, Part 77.1 provides the following:

- Requirements to provide notice to the FAA of certain proposed construction, or the alteration of existing structures.
- Standards to determine obstructions to air navigation, and navigational and communication facilities;
- A process for aeronautical studies of obstructions to air navigation or navigational facilities to determine the effect on the safe and efficient use of navigable airspace, and air navigation facilities or equipment.; and
- A process to petition the FAA for discretionary review of determinations, revisions, and extensions of determination.

The following sections will provide an overview of the Part 77 surfaces that make up an airport's airspace.

3.12.25 Primary Surface

The primary surface is a longitudinally centered surface on the runway that extends 200 feet beyond both ends of the runway. The surface width varies based on the types of approaches to the runway and the weight of aircraft.

Runway 7 has a RNAV GPS approach with a one and one quarter statute mile visibility minimum. The GPS approach is a non-precision approach and extends the width of the primary surface out to 500 feet.

3.12.26 Transitional Surface

The transitional surface is a sloping surface that extends outward and upward to the runway centerline and extended runway centerline starting from the edges of the primary surface. The transitional surface is a 7:1 slope that extends outward until it intersects the horizontal surface and the conical surface for precision approaches.

3.12.27 Approach Surface

The approach surface is a sloping surface that extends outward from each end of the primary surface. The dimensions and slope of an approach surface is set by the weight of aircraft using the runway and the types of instrument approaches or visual approaches to the runway ends.

For AUN, Runway 7 has a RNAV GPS approach described above and in **Chapter 1**. Runway 7/25 is considered a utility runway because the C421 is less than 12,500 pounds. As a result, Runway 25 has a visual approach set to Category A, and Runway 7 has a non-precision approach set to Category A. The slope for Runway 7 is 34:1 and the slope for Runway 25 is 20:1.

3.12.28 Horizontal Surface

The horizontal surface is a flat plane that is 150 feet above the established airport elevation. The perimeter of the horizontal surface is established by identifying arcs of specified radii from the center of each end of the primary surface. The tangents of the arcs are connected to each other to form a singular boundary. The radii of the arcs are set by the type of approaches and the weight of aircraft using the runway. For AUN, the arcs will be 5000 feet wide, because the critical aircraft sets the runway to a utility runway and the approach surface for the GPS approach to Runway 7 is a non-precision instrument approach for a utility runway.

3.12.29 Conical Surface

The conical surface is like the transitional surface, but it extends out from the bounds of the horizontal surface at a 20 to 1 slope for 4,000 feet.

3.12.30 Part 77 Surfaces to be Evaluated

The following conditions will be evaluated in **Chapter 4** and Airport Layout Plan (ALP) development for FAR Part 77:

- Objects from the AGIS survey will be analyzed during ALP development for penetrations against Part 77 surfaces for existing and extended runway conditions. Penetrations to Part 77 surfaces will be called out and documented on the ALP, as well as all information required in Standard Operating Procedure (SOP) 2.0 for documenting penetrations.

3.12.31 Facility Requirements Summary

The information presented in this chapter analyzed the current facilities and their ability to meet current and future demand efficiently and safely. AUN has airfield and landside capacity available accommodate projected demand. However, several improvements are recommended within the 20-year planning period including:

- Evaluate additional runway length for Runway 7/25
- Increase the available space in the run-up areas
- Maintain pavement and update markings
- Replace GA terminal
- Identify improvements for the airside/landside interface including the current GA terminal
- Additional hangar and aircraft storage facility's
- Replace fuel facilities
- Correct nonstandard airfield conditions