



Chapter 3

Facility Requirements

To effectively plan for the long-term development of Santa Fe Regional Airport (SAF), it is essential to identify the types and quantities of facilities needed to support airport operations over the next 20 years. Airport facilities are generally categorized into airside and landside components. Airside facilities include elements such as runways, taxiways, navigational aids, markings, and lighting, while landside facilities encompass the passenger terminal complex, hangars, aircraft parking aprons, and automobile parking areas. The determination of facility requirements is based on analysis derived from four primary sources:

- **Aviation Demand Forecasts:** The forecasts of aviation demand developed in the previous chapter serve as data inputs to various models, which have been constructed following Federal Aviation Administration (FAA) guidance, to generate facility needs.
- **Design Standards Review:** Various design standards that apply to the airport are reviewed, as they can change based on modifications to FAA guidance or activity changes at the airport. Design standards primarily relate to the imaginary safety-related surfaces and separation distances.
- **Facility Maintenance:** Airports are required to maintain their pavement surfaces for the useful life of those pavements. The pavements require routine maintenance and occasionally must be rehabilitated or reconstructed. This category includes maintenance of airport structures and landside facilities.
- **Support Facilities:** This category includes all airport-related facilities that do not naturally fall within the airside and landside categories, including elements such as fuel facilities, access and circulation, and general on-airport land use.



The purpose of this analysis is to assess the adequacy of existing airport facilities and identify any additional facilities that may be required to accommodate projected demand. This evaluation also considers the anticipated timing for the implementation of such improvements. Once these facility requirements have been established, potential alternatives for meeting these needs will be examined and evaluated in the subsequent chapter. The facility requirements at SAF were evaluated using guidance contained in several FAA publications, including the following:

- Advisory Circular (AC) 150/5300-13B, *Airport Design*
- AC 150/5060-5, *Airport Capacity and Delay*
- AC 150/5325-4B, *Runway Length Requirements for Airport Design*
- AC 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities*
- Federal Aviation Regulation (FAR) Part 77, *Objects Affecting Navigable Airspace*
- FAA Order 5090.5, *Formulation of the National Plan of Integrated Airport Systems (NPIAS) and Airports Capital Improvement Plan (ACIP)*

PLANNING HORIZONS

An updated set of aviation demand forecasts for the airport has been established and a summary of the primary forecasting elements was presented previously on Exhibit 2E. These activity forecasts include annual operations, based aircraft, fleet mix, and enplanements. With this information, specific components of the airfield and landside systems can be evaluated to determine their capacity to accommodate future demand.

Cost-effective, efficient, and orderly development of an airport should rely more on actual demand at the airport than on a time-based forecast figure. To develop a master plan that is demand-based, rather than time-based, a series of planning horizon milestones have been established that take into consideration the reasonable range of aviation demand projections. The planning horizons presented in **Table 3A** are segmented as the short term (approximately years 1–5), the intermediate term (approximately years 6–10), and the long term (years 11–20 and possibly beyond).

It is important to consider that actual activity at the airport may be higher or lower than what the annualized forecast portrays. By planning according to activity milestones, the resultant plan can accommodate unexpected shifts or changes in the area's aviation demand. It is important for the plan to accommodate these changes so airport officials can respond to unexpected changes in a timely fashion.

The most important reason for utilizing milestones is that doing so allows airport management to make decisions and develop facilities according to the needs generated by actual demand levels. The demand-based schedule provides flexibility in development, as development schedules can be slowed or expedited according to demand at any given time over the planning period. The resultant plan provides airport officials with a financially responsible and needs-based program.

TABLE 3A | Planning Activity Levels

	Base Year (2025)	Planning Horizon		
		Short Term	Intermediate Term	Long Term
Enplanements	202,405	235,900	261,500	359,000
Based Aircraft	179	187	195	213
Itinerant Operations				
Air Carrier (>59 Seats)	5,890	7,904	7,842	9,146
Air Taxi (<60 Seats)	6,265	6,800	8,200	10,900
General Aviation	15,130	23,114	23,227	23,453
Military	2,144	2,314	2,314	2,314
Total Itinerant Operations:	29,429	40,132	41,583	45,813
Local Operations				
General Aviation	9,702	18,540	18,657	18,894
Military	1,516	1,141	1,141	1,141
Total Local Operations:	11,218	19,681	19,798	20,035
Total Annual Operations:	40,647	59,813	61,381	65,848

Source: Coffman Associates analysis

AIRFIELD CAPACITY

An airfield's capacity is expressed in terms of its annual service volume (ASV). ASV is a reasonable estimate of the maximum level of aircraft operations that can be accommodated in a year without incurring significant delay factors. As operations near or surpass the ASV, delay factors increase exponentially. Guidance on calculating ASV is found in FAA AC 150/5060-5, *Airport Capacity and Delay*.

FACTORS AFFECTING ANNUAL SERVICE VOLUME

Many factors are considered in the calculation of an airport's ASV, including airfield characteristics, meteorological conditions, aircraft mix, and demand characteristics (aircraft operations). These factors are described as follows and on **Exhibit 3A**.

Airfield Characteristics

The layout of runways and taxiways directly affects an airfield's ASV, including the orientation of a runway and the percentage of time the runway is in use. Additional airfield characteristics include the length, width, load-bearing strength, and instrument approach capability of each runway at an airport, all of which determine the type(s) of aircraft that may operate on the runway, as well as if operations can occur during poor weather conditions.

Runway Configuration

The runway configuration encompasses three intersecting runways: Runway 2-20, Runway 15-33, and Runway 10-28. Runways 2-20 and 15-33 are designated as commercial service runways and offer respective lengths of 8,366 feet and 6,316 feet. Runway 10-28 is primarily utilized by general aviation (GA) aircraft and maintains a length of 6,301 feet.

AIRFIELD LAYOUT

Runway Configuration



Runway Use



Number of Exits



WEATHER CONDITIONS

VMC (VFR)

Visual Meteorological Conditions



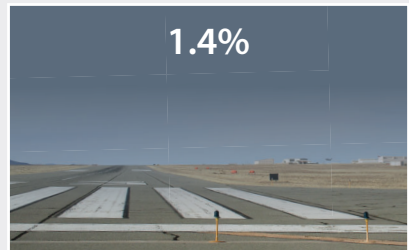
IMC (IFR)

Instrument Meteorological Conditions



PVC

Poor Visibility Conditions



AIRCRAFT MIX

Category A & B Aircraft



Category C Aircraft



Category D Aircraft



OPERATIONS

Arrivals



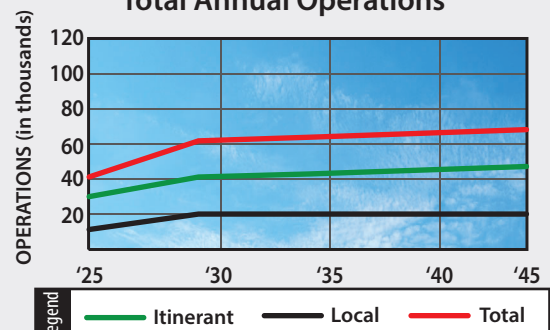
Departures



Touch-and-Go Operations



Total Annual Operations



Meteorological Conditions

Weather conditions have a significant effect on airfield capacity. Airfield capacity is usually highest in clear weather when flight visibility is at its best. Airfield capacity is diminished as weather conditions worsen and cloud ceilings and visibility are reduced. As weather conditions deteriorate, the spacing of aircraft must increase to provide allowable margins of safety. The increased distance between aircraft reduces the number of aircraft that can operate at the airport during any given period; consequently, this reduces overall airfield capacity.

There are three categories of meteorological conditions, each of which is defined by the reported cloud ceiling and flight visibility. Visual flight rule (VFR) conditions exist whenever the cloud ceiling is greater than 1,000 feet above ground level (AGL) and visibility is greater than three statute miles. VFR flight conditions permit pilots to approach, land, or take off by visual reference and see and avoid other aircraft.

Instrument flight rule (IFR) conditions exist when the reported cloud ceiling is less than 1,000 feet AGL and/or visibility is less than three statute miles. Under IFR conditions, pilots must rely on instruments for navigation and guidance to the runway. Safe separations between aircraft must be ensured by following air traffic control rules and procedures. This leads to increased distances between aircraft, which diminishes airfield capacity.

For SAF, poor visibility conditions (PVC) exist when cloud ceilings are less than 200 feet AGL or visibility is less than ½ mile.

SAF has an on-field automated surface observing system (ASOS). According to the last 10 years of data retrieved from the ASOS weather station, VFR conditions have been in effect 95.72 percent of the time, IFR conditions have been in effect 2.87 percent of the time, and PVC have been in effect 1.41 percent of the time. **Table 3B** summarizes the annualized meteorological conditions at SAF.

TABLE 3B | Meteorological Conditions

Type	Observations	Percentage
VFR	89,261	95.72%
IFR	2,678	2.87%
PVC	1,312	1.41%
Total:	93,251	100.00%
IFR = instrument flight rules PVC = poor visibility conditions VFR = visual flight rules		

Source: National Oceanic and Atmospheric Administration (NOAA), 10 years of data from the on-airport ASOS from 2016–2025

Instrument Approach Procedures

The instrument approach capabilities of a runway factor into the airfield capacity determination. The lower the cloud ceiling minimums and visibility minimums are, the more capable a runway is, resulting in greater airfield capacity. Runway 2 has an instrument landing system (ILS) with 200-foot cloud ceilings and ¾-mile visibility minimums. Runway 20 has an area navigation (RNAV)-global positioning system (GPS) approach with a 451-foot cloud ceiling height minimum and one-mile visibility minimums. Runways 15 and 33 have RNAV-GPS approaches with a 250-foot cloud ceiling height and ¾-mile (Runway 15) and ½-mile (Runway 33) visibility minimums. Runway 28 has an RNAV-GPS approach with a 653-foot cloud ceiling height and one-mile visibility minimums.

Runway Use

Runway use is normally dictated by wind conditions. The direction of takeoffs and landings is generally determined by the speed and direction of wind. It is effectively safest for aircraft to depart and land into the wind, avoiding a crosswind or tailwind component during these operations.

When runways are not dimensioned equally, their use by aircraft operating at the facility may vary. Some runways may be able to accommodate the entire fleet mix operating at the facility and other runways may only be sufficient for smaller aircraft. The three runways at SAF are different lengths. Runways 2-20 and 15-33 are designated as commercial service runways; as such, they can accommodate all aircraft types that operate at SAF. Runway 10-28 is used primarily by smaller general aviation aircraft. Airfield capacity is directly affected by the runways in use. Ideally, maximum runway capacity would be achieved if all runways were able to accommodate the entire mix of aircraft. Because Runway 10-28 is not lighted, it is incapable of being utilized for nighttime operations; therefore, the capacity of the existing runway system is slightly lower than if there were no use restrictions.

In general, airplanes will take off and land facing the prevailing wind direction. If the wind comes from the north, the airport will use north flow; if the wind is from the south, the airport will use south flow. **Table 3C** shows runway usage data from 2024, per the FAA's *Instrument Flight Procedures (IFP), Operations, and Airspace Analytics* (IOAA) data tool, which utilizes automatic dependent surveillance–broadcast (ADS–B) operational data. Runways 2 and 20 account for 81.7 percent of operations at the airport and all other runways account for the remaining 18.3 percent.

TABLE 3C | Runway Use Percentage

Runway End	Operations Count	Percent
2	11,281	33.7%
20	16,046	48.0%
15	2,238	6.7%
33	1,929	5.8%
10	344	1.0%
28	1,613	4.8%
Total:	33,451	100%

Source: FAA, IOAA data tool

Exit Taxiways

Exit taxiways have a significant impact on airfield capacity because the number and locations of exits directly determine the occupancy time of an aircraft on the runway. Based on the aircraft mix using the airport, taxiways located between 3,000 and 5,500 feet from the landing threshold and separated by at least 750 feet are factored in the exit rating for the airfield. The greater the number of appropriately spaced taxiway exits, the lower the runway occupancy time is for an aircraft, which contributes to a higher overall capacity for the airfield. For capacity analysis, SAF qualifies for the maximum benefit for exit taxiways.

- Runway 2: One exit taxiway (Taxiway G) is located within the parameters. Taxiway F is also in the range but is within 750 feet of Taxiway G, so it is excluded from the count.

- Runway 20: One exit taxiway (Taxiway F) is located within the parameters. Taxiway G is also in the range but is within 750 feet of Taxiway F, so it is excluded from the count.
- Runway 15: One exit taxiway (Taxiway D) is located within the parameters.
- Runway 33: One exit taxiway (Taxiway F) is located within the parameters.
- Runway 10: One exit taxiway (Taxiway D) is located within the parameters.
- Runway 28: Two exit taxiways (Taxiways F3 and F2) are located within the parameters and are separated by approximately 1,340 feet.

Aircraft Mix

Aircraft mix refers to the speeds, sizes, and flight characteristics of aircraft operating at the airport. As the mix of aircraft operating at an airport increases to include larger aircraft, airfield capacity begins to diminish due to larger separation distances that must be maintained between aircraft of different speeds and sizes.

Aircraft mix for capacity analysis is defined by the FAA in terms of four aircraft classes. Classes A and B consist of single-engine and multi-engine aircraft that weigh less than 12,500 pounds. Aircraft within these classifications are primarily associated with GA operations, but this classification also includes some air taxi aircraft. Class C consists of aircraft that weigh over 12,500 pounds but do not exceed 300,000 pounds. Class D aircraft are those over 300,000 pounds. Class D aircraft do not currently operate at SAF with regularity and are not anticipated to operate with greater frequency in the future.

For the capacity analysis, the percentage of Class C aircraft operating at the airport impacts the ASV, as these classes include the larger and faster aircraft in the operational mix. By the long-term planning period, activity by aircraft that weigh more than 12,500 pounds is estimated to represent 31 percent of overall operations. **Table 3D** summarizes the aircraft operational fleet mix as classified for the capacity model.

TABLE 3D | Aircraft Operational Fleet Mix

Term	A and B ¹	C ²	D ³
VFR (Visual) Weather			
Existing	69%	31%	0%
Short Term	69%	31%	0%
Intermediate Term	69%	31%	0%
Long Term	69%	31%	0%
IFR (Instrument) Weather			
Existing	69%	31%	0%
Short Term	69%	31%	0%
Intermediate Term	69%	31%	0%
Long Term	69%	31%	0%

¹Aircraft 12,500 pounds or less

²Aircraft greater than 12,500 pounds and less than 300,000 pounds

³Aircraft greater than 300,000 pounds

Source: FAA AC 150/5060-5, *Airport Capacity and Delay*

Demand Characteristics

Operations—not only the total number of annual operations, but also the way in which they are conducted—influence airfield capacity. Peak operational periods, touch-and-go operations, and the percentage of arrivals impact the number of annual operations that can be conducted at the airport.

Peak Period Operations

For the airfield capacity analysis, average daily operations during the peak month are determined based on airport traffic control tower (ATCT) data. Typical operational activity is important in the calculation of an airport's ASV, as “peak demand” levels occur sporadically. The peak periods used in the capacity analysis are representative of normal operational activity and can be exceeded at various times throughout the year. The design day for 2025 was 119 operations. By 2045, the design day is estimated to be 221 operations.

Touch-and-Go Operations

A touch-and-go operation involves an aircraft making a landing and then an immediate takeoff without coming to a full stop or exiting the runway. Touch-and-go activity is counted as two operations because an arrival and a departure are involved. A high percentage of touch-and-go traffic normally results in a higher operational capacity because one landing and one takeoff occur within a shorter time period than individual operations. Touch-and-go operations are normally associated with GA training operations and are included in local operations data. Currently, touch-and-go operations account for 24 percent of total operations at SAF. By the long-term planning horizon, touch-and-go operations are anticipated to account for 29 percent of total operations at SAF.

Percent Arrivals

Under most circumstances, a lower percentage of arrivals correlates to a higher capacity. Except in unique circumstances, the aircraft arrival/departure split is typically 50/50.

ESTIMATION OF ANNUAL SERVICE VOLUME

The preceding information was used in conjunction with the airfield capacity methodology developed by the FAA to determine airfield capacity for SAF. **Table 3E** shows the calculation of the ASV, which is C (weighted hourly capacity) $\times D$ (ratio of annual demand to average daily demand during the peak month) $\times H$ (ratio of average daily demand to peak hour demand during the peak month). Following this formula, the current airfield capacity is estimated at 221,000 annual operations. With the increase of operations projected over time and the increasing number of operations by larger aircraft (requiring greater separation distances on landing), the ultimate ASV is estimated at 174,000 annual operations.

TABLE 3E | Annual Service Volume Calculation

ASV Calculation Input	2025	Short Term	Intermediate Term	Long Term
C	170	159	158	154
D	40,647 annual operations/ 119 design day operations = 342	59,813 annual operations/ 201 design day operations = 298	61,381 annual operations/ 206 design day operations = 298	65,848 annual operations/ 221 design day operations = 298
H	119 design day operations/ 8 design hour operations = 15	201 design day operations/ 14 design hour operations = 14	206 design day operations/ 15 design hour operations = 14	221 design day operations/ 16 design hour operations = 14
ASV = C x D x H*	221,000	179,000	178,000	174,000

*ASV is rounded to the nearest 1,000 and C, D, and H ratios are fractions.

Delay

As the number of aircraft operations approaches the airfield's capacity, increasing amounts of delay begin to occur for arriving and departing aircraft in all-weather conditions. Arriving aircraft delays result in aircraft holding outside the airport traffic area, while departing aircraft delays result in aircraft holding at the runway end until they can safely take off.

Currently, total annual delay at the airport is estimated at 68 hours annually (approximately 12 seconds per aircraft) (reference Figure 2.2, FAA AC 150/5060-5). If no capacity improvements are made, the total annual delay can be expected to reach 183 hours (approximately 24 seconds per aircraft) by the long-term planning horizon. At times, delays five to 10 times the average could be experienced by individual aircraft.

Conclusion

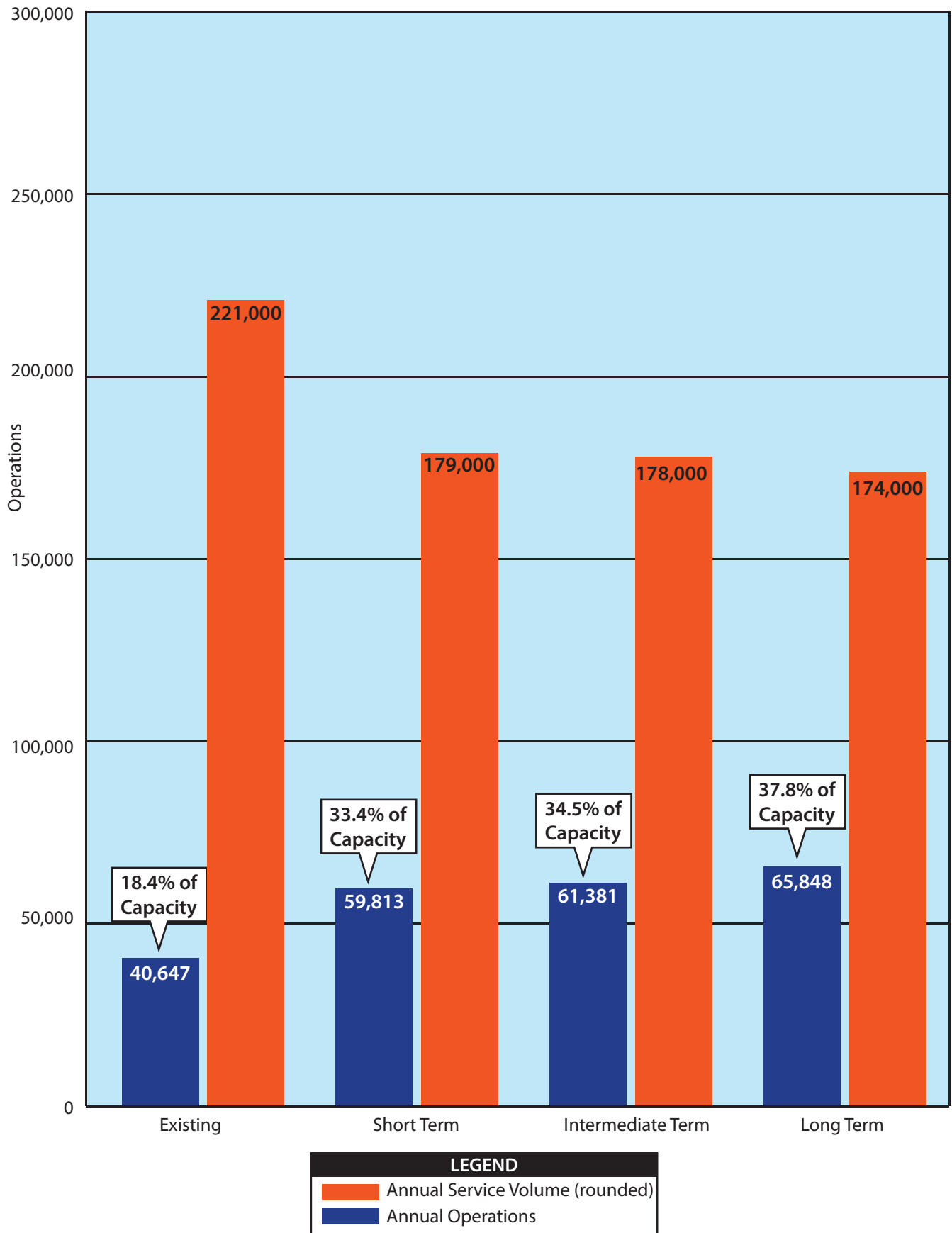
Table 3F provides a comparison of the ASV at the operational level for each planning horizon. The current level of operations represents 18.4 percent of the ASV. In 20 years, the percentage is projected to reach 37.8 percent of the ASV.

TABLE 3F | Annual Service Volume Summary

	Annual Operations	Weighted Hourly Capacity	Annual Service Volume	Percent of Capacity
Existing Configuration				
Existing	40,647	170	221,000	18.4%
Short Term	59,813	159	179,000	33.4%
Intermediate Term	61,381	158	178,000	34.5%
Long Term	65,848	154	174,000	37.8%

Source: Coffman Associates analysis using FAA AC 150/5060-5, Airport Capacity and Delay

FAA Order 5090.5, *Formulation of the NPIAS and ACIP*, indicates that improvements for airfield capacity purposes should be considered when operations reach 60 percent of the ASV and should be implemented by the time operations reach 80 percent of the ASV. The projected operations levels at SAF will stay well below these ASV thresholds; therefore, no major capacity enhancements, such as additional runways, are necessary. **Exhibit 3B** summarizes the airfield capacity analysis.



AIRFIELD REQUIREMENTS

As indicated earlier, airport facilities include airfield and landside components. Airfield facilities are those related to the arrival, departure, and ground movement of aircraft. The FAA has established various dimensional design standards related to the airfield to ensure the safe operation of aircraft.

The FAA design standards impact the design of each airfield component to be analyzed. The following airfield components are analyzed in detail for compliance with FAA design standards:

- Runway configuration
- Runway design standards
- Runway elements
- Taxiways
- Navigational and weather aids
- Instrument approaches

RUNWAY CONFIGURATION

Runway 2-20 serves as the primary runway and is aligned along a northeast-southwest axis. For optimal operational safety and efficiency, primary runways are ideally oriented to align as closely as possible with prevailing wind patterns. This alignment minimizes crosswind components that can affect aircraft during takeoff and landing. The second commercial service runway, Runway 15-33, is aligned along a northwest-southeast axis, and crosswind runway 10-28 is aligned in an east-west manner. At SAF, the prevailing winds predominantly flow in a north-south and south-north direction; Runways 2-20 and 15-33 are utilized for most operations.

According to FAA Order 5100.38D, *Airport Improvement Handbook*, only one runway at any NPIAS airport is eligible for ongoing maintenance and rehabilitation funding unless the FAA Airports District Office (ADO) has made a specific determination that a crosswind or secondary runway is justified. A runway that is not a primary runway, crosswind runway, or secondary runway is an “additional” runway, which is not eligible for FAA funding. It is not unusual for a two-runway airport to have a primary runway and an additional runway, and no crosswind or secondary runway. **Table 3G** presents the eligibility requirements for runway types.

TABLE 3G | Runway Eligibility

If the following runway type...	Meets all the following criteria...	It is...
Primary Runway	1. A single runway at an airport is eligible for development, consistent with FAA design and engineering standards.	Eligible
Crosswind Runway	1. The wind coverage on the primary runway is less than 95%.	Eligible if justified
Secondary Runway	1. There is more than one runway at the airport. 2. The nonprimary runway is not a crosswind runway. 3. Either of the following: a. The primary runway is operating at 60% or more of its annual capacity. b. The FAA has made a specific determination that the runway is required.	Eligible if justified
Additional Runway	1. There is more than one runway at the airport. 2. The nonprimary runway is not a crosswind runway. 3. The nonprimary runway is not a secondary runway.	Ineligible

Source: FAA Order 5100.38D, *AIP Handbook*

FAA AC 150/5300-13B, *Airport Design*, recommends a crosswind runway when the primary runway orientation provides for less than 95 percent wind coverage for specific crosswind components. The 95 percent wind coverage is computed based on wind not exceeding a 10.5-knot (12 miles per hour [mph]) component for runway design code (RDC) A-I and B-I; a 13-knot (15 mph) component for RDC A-II and B-II; a 16-knot (18 mph) component for RDC A-III, B-III, C-I through C-III, and D-I through D-III; and 20 knots for wider wingspans.

It is preferable to analyze weather data that is local to the airport being studied. The ASOS weather sensor located at SAF was utilized for the wind coverage analysis.

According to FAA guidelines, the most recent 10 years of wind data should be analyzed to determine various facility requirements, including the appropriate runway configuration. **Exhibit 3C** shows wind rose analysis of 10 years of wind data from SAF during all-weather and IFR conditions. A wind rose is a graphic tool that gives a succinct view of how wind speed and direction are historically distributed at a location. The table at the top of the wind rose exhibit indicates the percentage of wind coverage for the runway at specific wind intensities.

Runway 2-20 provides 85.84 percent wind coverage at 10.5 knots, 91.58 percent wind coverage at 13 knots, and 96.36 percent at 16 knots. Runway 15-33 provides 87.32 percent wind coverage at 10.5 knots, 92.07 percent wind coverage at 13 knots, and 96.70 percent wind coverage at 16 knots. Runway 10-28 provides 85.85 percent wind coverage at 10.5 knots, 92.79 percent wind coverage at 13 knots, and 98.09 percent wind coverage at 16 knots. When combined, the commercial service runways (Runway 2-20 and Runway 15-33) provide 94.31 percent coverage at 10.5 knots and greater than 97 percent coverage at 13 knots and above. Combined, all runways provide for greater than 95 percent wind coverage at 10.5 knots and above.

The FAA has expressed that it will provide funding assistance to maintain the two commercial service runways at SAF while the New Mexico Department of Transportation (NMDOT) provides funding assistance for the maintenance of Runway 10-28. This arrangement is anticipated to be carried forward through the planning period.

RUNWAY DESIGNATIONS

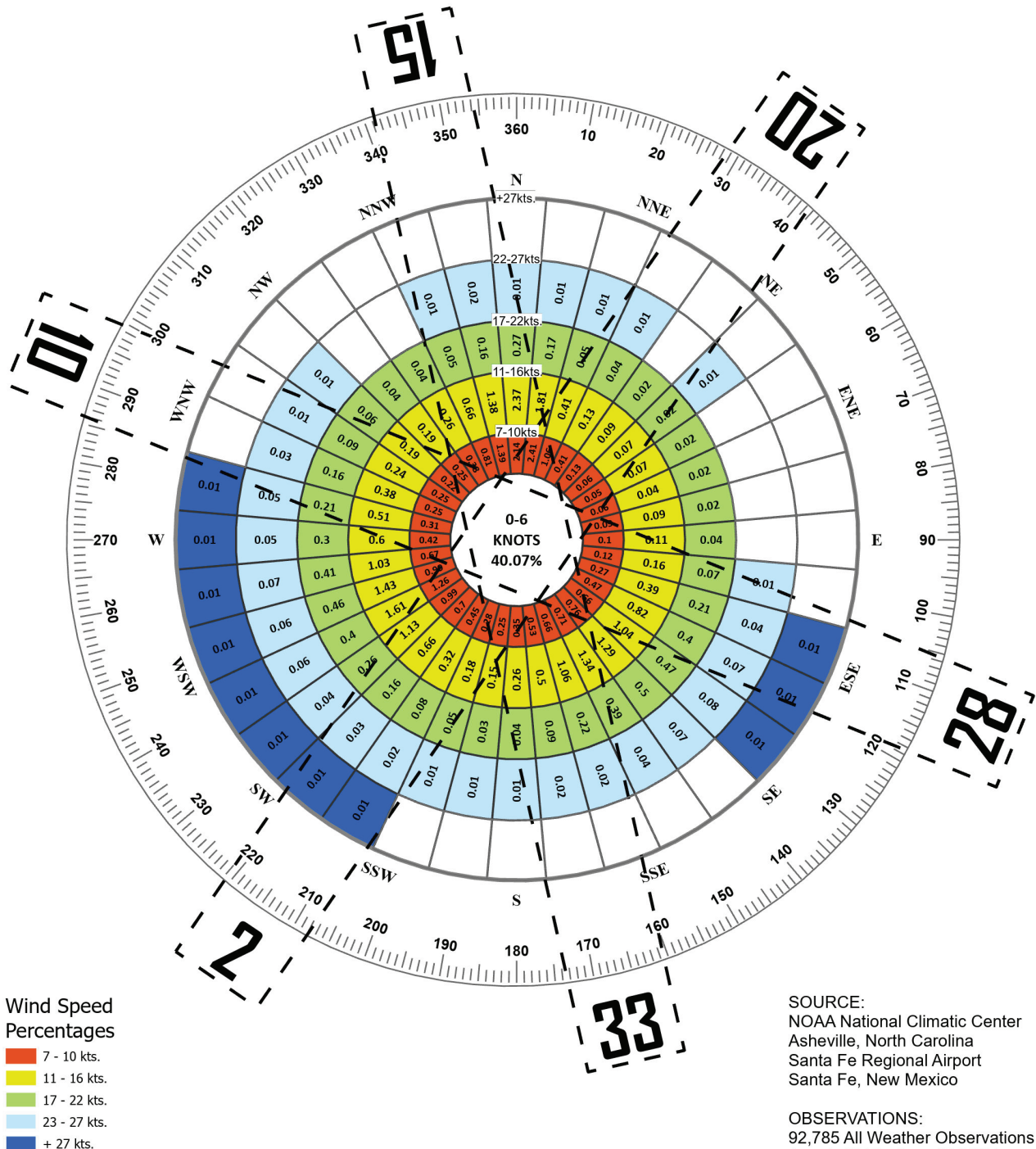
Runway designation numbers are magnetic compass headings, rounded to the nearest 10 degrees and truncated, that represent the direction of the runway takeoff or landing. The FAA utilizes the World Magnetic Model (WMM) to provide magnetic declination data. **Table 3H** summarizes the results of the WMM model specific to SAF.

TABLE 3H | Runway Designations (2025)

Existing Runway ID	True Heading	Magnetic Declination (decimal degrees)	Magnetic Heading	Ideal Runway ID
2	35°	7.68°E	27.3°	3
20	215°	7.68°E	207.3°	21
15	167°	7.68°E	159.3°	16
33	347°	7.68°E	339.3°	34
10	112°	7.68°E	104.3°	10
28	292°	7.68°E	284.3°	28
Magnetic Declination = 7° East (degrees/minutes) Annual Rate of Change = 5' West (minutes)				

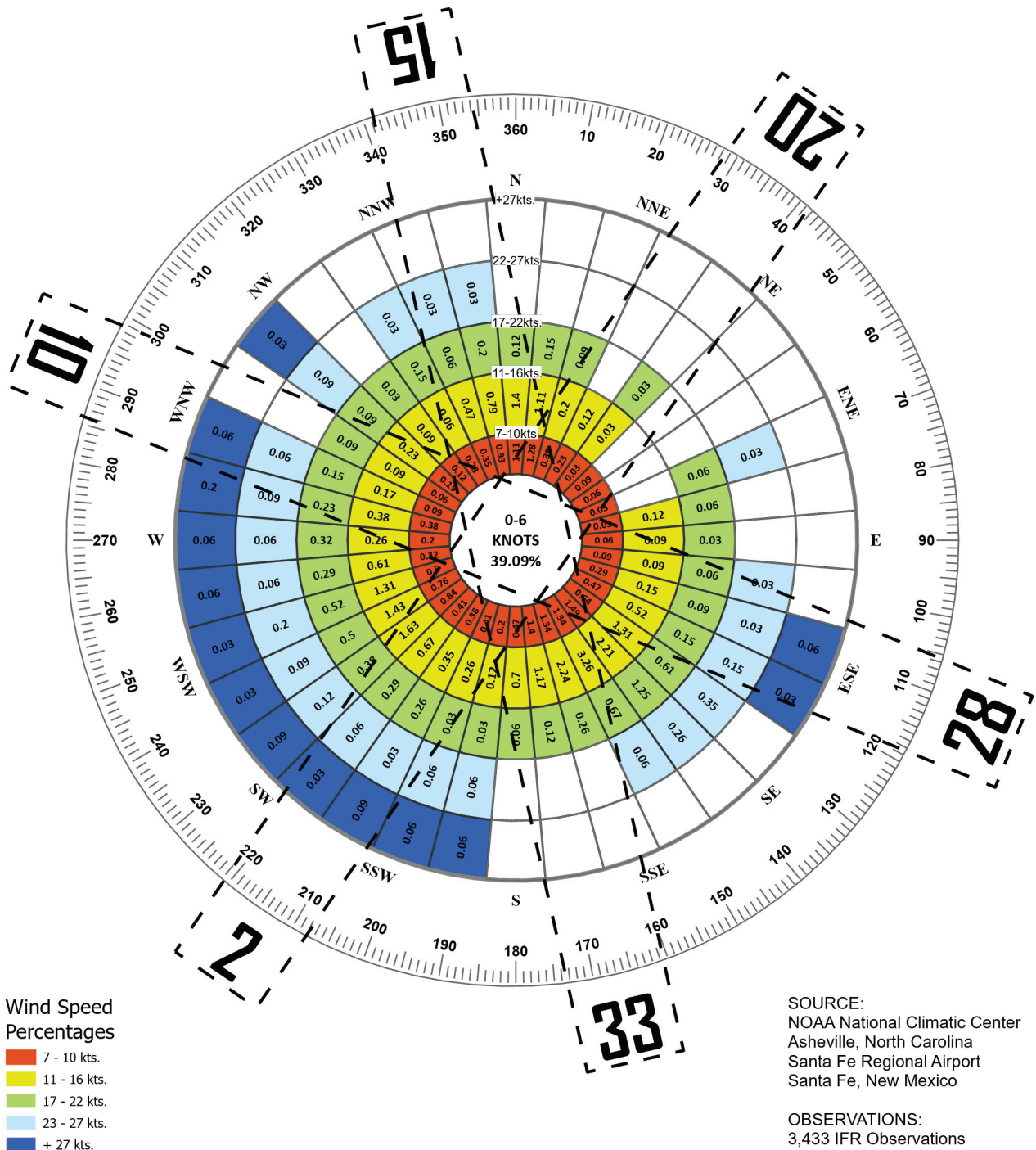
ALL WEATHER WIND COVERAGE

Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 02-20	85.84%	91.58%	96.36%	98.99%
Runway 15-33	87.32%	92.07%	96.70%	99.05%
Runway 10-28	85.85%	92.79%	98.09%	99.56%
Runway 02-20 & 15-33	94.31%	97.24%	99.00%	99.80%
All Runways	99.27%	99.87%	99.97%	100.00%



IFR WIND COVERAGE

Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 02-20	81.59%	88.41%	94.27%	97.68%
Runway 15-33	86.64%	91.00%	95.27%	97.93%
Runway 10-28	84.53%	92.01%	97.11%	98.94%
Runway 02-20 & 15-33	94.16%	96.66%	98.34%	99.25%
All Runways	98.82%	99.67%	99.92%	100.00%



The designations of two of the runways should change in the following manner:

- Runway 2-20 to Runway 3-21
- Runway 15-33 to Runway 16-34

It is typical for the FAA to require remarking of the runway designations in conjunction with another project impacting the runway.

RUNWAY DESIGN STANDARDS

The FAA has established several design standards to protect aircraft operational areas and keep them free from obstructions that could affect their safe operation. These include the runway safety area (RSA), runway object free area (ROFA), runway obstacle free zone (ROFZ), and runway protection zone (RPZ). **Exhibit 3D** shows the design standard for each safety area overlaid on an aerial image of the airport.

The entire RSA and ROFZ must be under the direct ownership of the airport sponsor to ensure these areas remain free of obstacles and can be readily accessed by maintenance and emergency personnel. The ROFA should also be under the ownership of the airport sponsor, but this is not required if the clearance standards are met. The RPZ for each runway end should also be under airport ownership; however, an alternative to outright ownership of the RPZ is the purchase of aviation easements (acquiring control of designated airspace within the RPZ) or having sufficient land use control measures in place to ensure the RPZ remains free of incompatible development.

As discussed in the previous chapter, the applicable design standards are primarily based on the critical aircraft and the instrument approach visibility minimums for each runway, which are described as the runway design code (RDC). The critical design aircraft is the aircraft or group of aircraft types with similar characteristics that account for 500 or more annual operations on each runway. The existing RDC for Runways 2-20 and 15-33 is C-III-4000. The RDC for Runway 10-28 is B-II-VIS. **Table 3J** presents the primary runway design standards for each runway.

The applicable design standards for an airport can (and do) change periodically. Often, this change is outside the control of the airport sponsor because the airport cannot restrict aircraft operations. When a change occurs and is sustained (typically for at least three years), the airport sponsor should have a plan to meet the design standards to the greatest degree practicable. The RDCs for the commercial service runways are anticipated to change from C-III-4000 to D-III-4000; however, the design standards remain the same, so no changes to the safety area dimensions will occur. The RDC for Runway 10-28 is expected to remain B-II-5000 and is not anticipated to change within the 20-year planning horizon for this master plan.

TABLE 3J | Runway Design Standards

Airport Data Category	Design Standards		
	Runway 2-20	Runway 15-33	Runway 10-28
Design Aircraft	C/D-III-3	C/D-III-3	B-II-2B
Runway Design Code	C/D-III-4000	C/D-III-4000	B-II-5000
Lowest Visibility Minimums	¾-mile	¾-mile	1-mile
RUNWAY DESIGN			
Runway Width	100'	100'	75'
Runway Shoulder Width	20'	20'	10'
Blast Pad	200' long x 140' wide	200' long x 140' wide	150' long x 95' wide
RUNWAY PROTECTION			
Runway Safety Area (RSA)			
Width	500'	500'	150'
Length Beyond Departure End	1,000'	1,000'	300'
Length Prior to Threshold	600'	600'	300'
Runway Object Free Area (ROFA)			
Width	800'	800'	500'
Length Beyond Departure End	1,000'	1,000'	300'
Length Prior to Threshold	600'	600'	300'
Runway Obstacle Free Zone (ROFZ)			
Width	400'	400'	400'
Length Beyond End	200'	200'	200'
Approach Runway Protection Zone (RPZ)			
Approach Minimums	¾-mile (2); 1-mile (20)	¾-mile (15); ⅞-mile (33)	1-mile (10, 28)
Length	1,700'; 1,700'	1,700'	1,000'
Inner Width	1,000'; 500'	1,000'	500'
Outer Width	1,510'; 1,010'	1,510'	700'
Departure Runway Protection Zone (RPZ)			
Length	1,700'	1,700'	1,000'
Inner Width	500'	500'	500'
Outer Width	1,010'	1,010'	7000'
RUNWAY SEPARATION			
Runway Centerline to Holding Position	314'	314'	200'
Runway Centerline to Parallel Taxiway	400'	400'	240'

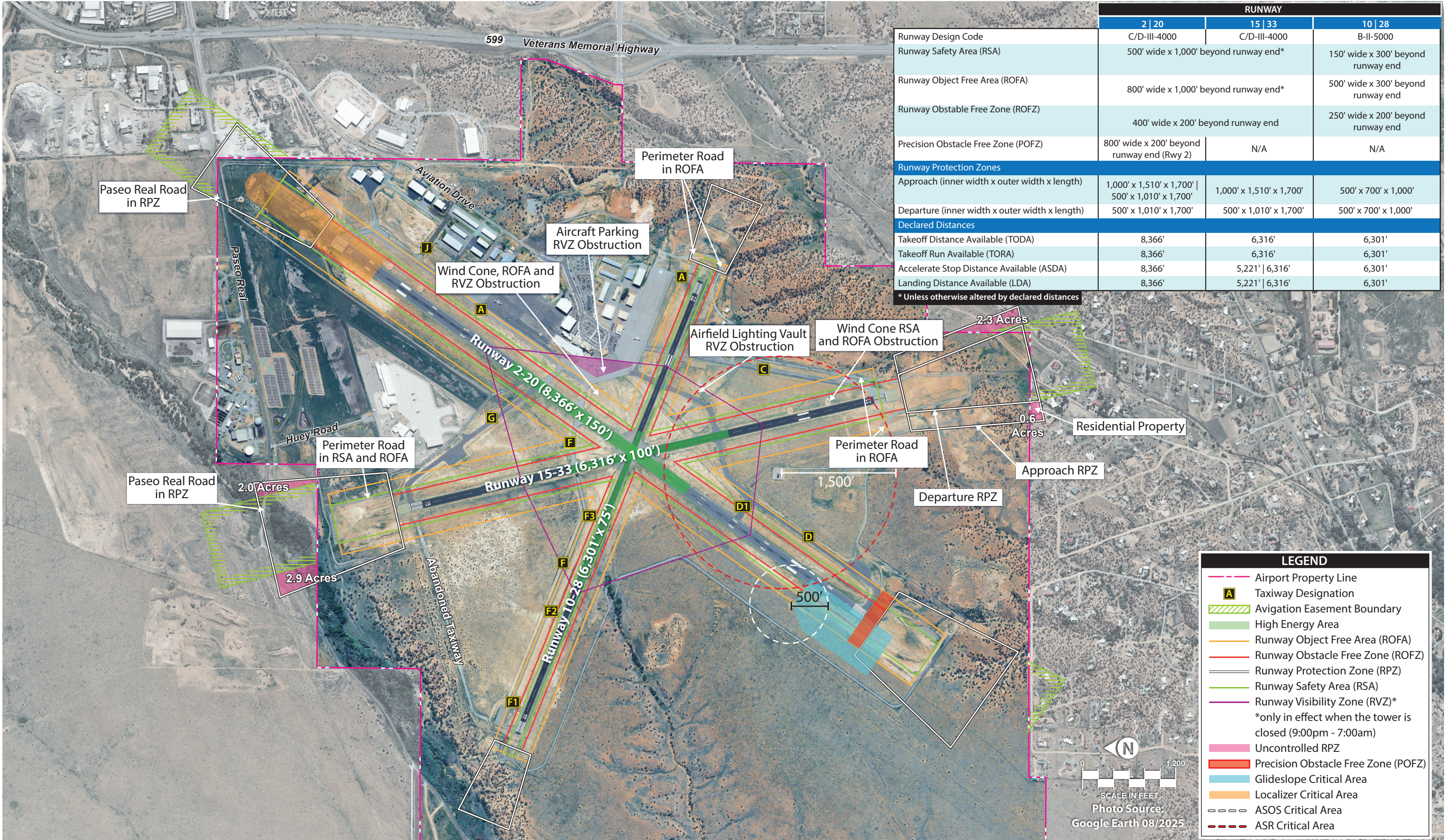
Note: all dimensions are in feet.

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

Runway Safety Area (RSA)

The RSA is defined in FAA AC 150/5300-13B, *Airport Design*, as a “surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of undershoot, overshoot, or excursion from the runway.” The RSA is centered on the runway and dimensioned in accordance with the approach speed of the critical design aircraft using the runway. The FAA requires the RSA to be cleared and graded, drained by grading or storm sewers, capable of accommodating the design aircraft and fire and rescue vehicles, and free of obstacles not fixed by navigational purpose, such as runway edge lights or approach lights.

The C/D-III RSA is 500 feet wide, centered on the runway, and extends 1,000 feet beyond the runway end. The RSA also extends 600 feet prior to the landing threshold on each runway end. The grade of the RSA to the sides of the runway must not exceed 3.0 percent and must slope downward. The grade of the



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RSA beyond the runway end must be no greater than 3.0 percent downward for the first 200 feet and no more than 5.0 percent thereafter. The RSA cannot have a positive slope within the first 200 feet beyond the runway end.

For Runway 10-28, the B-II RSA is 150 feet wide, centered on the runway, and extends 300 feet beyond the runway end. The RSA also extends 300 feet prior to the landing threshold on each runway end. There are no known incompatibilities within the existing/ultimate RSA for Runway 10-28.

In the existing condition and the ultimate condition, several RSA incompatibilities exist on the airfield. Beyond the Runway 15 threshold, an airport service road penetrates the RSA on the eastern side of the runway. Beyond the Runway 33 threshold, an airport service road penetrates the standard RSA, along with a portion of the surrounding perimeter fencing and vegetation. As a result of these incompatibilities, the airport has applied declared distances on Runway 15-33, which limit the use of some runway pavement for landing and takeoff operations so the runway can meet RSA standards.

Declared distances are used to define the effective runway length for landing and takeoff when a standard RSA or ROFA cannot be achieved or an RPZ needs to be relocated. The four declared distances include the following:

- *Takeoff run available (TORA)*: the runway length declared available and suitable for the ground run of an aircraft taking off (factors in the positioning of the departure RPZ)
- *Takeoff distance available (TODA)*: the TORA plus the length of any remaining runway or clearway beyond the far end of the TORA; the full length of the TODA may need to be reduced because of obstacles in the departure area
- *Accelerate-stop distance available (ASDA)*: the runway plus stopway length declared available and suitable for the acceleration and deceleration of an aircraft aborting a takeoff (factors in the length of the RSA/ROFA beyond the runway end)
- *Landing distance available (LDA)*: the runway length declared available and suitable for landing an aircraft (factors in the length of the RSA/ROFA beyond the runway end and the positioning of the approach RPZ)

Due to the airport service road and nonconforming terrain on the southern end of Runway 15-33, SAF has applied an ASDA and LDA of 5,221 feet to Runway 15. As a result, the RSA ends 95 feet prior to the end of the runway pavement on the south. The TORA and TODA declared distances for Runway 15-33 are the full pavement length of 6,316 feet. The alternatives chapter will explore mitigation options that could eliminate the need for declared distances on Runway 15-33 and address the penetration by the perimeter road beyond the Runway 15 end.

Runway Object Free Area (ROFA)

The ROFA is a two-dimensional ground area that surrounds runways and must be clear of objects, except for objects with locations that are fixed by function (i.e., airfield lighting). The ROFA does not have to be graded and level like the RSA; instead, the primary requirement for the ROFA is that no object in the ROFA penetrates the nearest lateral elevation of the RSA. The ROFA is centered on the runway, extending out in accordance with the critical design aircraft utilizing the runway.

The C/D-III ROFA is 800 feet wide, centered on the runway, and extends 1,000 feet beyond the runway ends. The length of the ROFA prior to (600 feet) and beyond (1,000 feet) the runways is the same as the RSA. For B-II, the ROFA is 500 feet wide, centered on the runway, and extends 300 feet beyond the runway ends. The length of the B-II ROFA prior to the runway threshold is also 300 feet.

For Runway 2-20, the only non-standard ROFA condition identified is the presence of the wind cone near the terminal apron. Wind cones should be located outside the ROFA. Due to terrain limitations, the airport's perimeter road was constructed through small portions of the ROFA associated with Runways 15-33 and 10-28, as identified on **Exhibit 3D**. The alternatives will examine options for rerouting the perimeter road and relocating the wind cone outside the ROFA.

It should be noted that, like the RSA, the ROFA for Runway 15-33 is adjusted by the declared distances for Runway 15. The ROFA ends 95 feet prior to the end of the runway pavement on the south side.

Obstacle Free Zone (OFZ)

The OFZ is an imaginary volume of airspace that precludes object penetrations, including taxiing and parked aircraft. The only allowance for OFZ obstructions is navigational aids mounted on frangible bases that are fixed in their locations by function (such as airfield signs). The OFZ is established to ensure the safety of aircraft operations. If the OFZ is obstructed, the airport's instrument approaches may be removed or approach minimums could be increased.

The OFZ for all runways is 400 feet wide, extending 200 feet beyond the pavement ends. All three OFZs meet the design standards and will be maintained.

Precision Obstacle Free Zone (POFZ)

The POFZ is a volume of airspace above an area beginning at the threshold, at the threshold elevation. It extends along the extended runway centerline beyond the runway end for a distance of 200 feet at a width of 800 feet. The POFZ is an object clearing surface; however, it is only in effect when aircraft are on final approach utilizing a precision instrument approach, such as the ILS approach. Runway 2 is the only runway at SAF for which the POFZ applies. The POFZ surface should be maintained as long as there is a precision instrument approach.

Runway Protection Zone (RPZ)

The RPZ is a trapezoidal area centered on the runway, typically beginning 200 feet beyond the runway end. When an RPZ begins at a location other than 200 feet beyond the end of a runway, two RPZs are required (i.e., a departure RPZ and an approach RPZ). The RPZ has been established by the FAA to provide an area clear of obstructions and incompatible land uses to enhance the protection of people and property on the ground.

FAA AC 150/5190-4B, *Airport Land Use Compatibility Planning*, addresses RPZ land use compatibility. Airport-compatible land uses are those that can coexist with a nearby airport without constraining the safe and efficient operation of the airport.

Ensuring compatible land uses within the RPZ is best achieved through:

- Airport ownership of the RPZ property;
- Possessing sufficient interest in the RPZ property through easements, deed restrictions, etc.;
- Possessing sufficient land use control authority to regulate land use in the jurisdiction that contains the RPZ;
- Possessing and exercising the power of eminent domain over the RPZ property; or
- Possessing and exercising permitting authority over proponents of development within the RPZ.

Expectations of Airport Sponsors

The FAA requires all federally obligated airport sponsors to comply with FAA grant assurances. These include (but are not limited to) Grant Assurance 21, *Compatible Land Use*. Sponsors should take appropriate measures to protect against, remove, or mitigate land uses that introduce incompatible development within RPZs. For projects proposed by the sponsor (such as runway extensions or new runways) that would result in moving the RPZ into an area that has incompatible land uses, the FAA expects the sponsor to have or secure sufficient control of the RPZ, ideally through fee simple ownership, including any off-airport property within the RPZ.

Existing Incompatible Land Uses

The FAA expects airport sponsors to seek all possible opportunities to eliminate, reduce, or mitigate existing incompatible land uses. Examples may include land acquisition, land exchanges, easements, right-of-first-refusal to purchase, agreements with property owners on land uses, or other such measures. The FAA also expects sponsors to actively consider and evaluate available options any time there is an airport layout plan (ALP) update or master plan update and be vigilant for any other opportunities that may arise to eliminate or minimize existing incompatibilities, especially opportunities to purchase land. The FAA expects airport sponsors to document their efforts to demonstrate that they are complying with the relevant FAA grant assurances. **Table 3K** summarizes FAA expectations regarding existing incompatible land uses within an RPZ.

TABLE 3K | Expectations of Airport Sponsors – Existing Incompatible Land Uses

Type of Land Use Control	Expectations of Airport Sponsors
The airport sponsor owns the land.	Because the sponsor has total land use control, the FAA considers it a reasonable expectation that the sponsor will establish and enforce the necessary zoning controls or lease terms to enable the sponsor to address existing incompatible land uses when the opportunity arises.
The property is off airport but the sponsor has land use authority or the local jurisdiction and land use regulatory authority are owned by the same governing body.	Because the sponsor has at least some influence over land use control, the FAA considers it a reasonable expectation that the sponsor will seek to establish the necessary zoning controls to enable the sponsor to address existing incompatible land uses when the opportunity arises.
The sponsor has no land use control (i.e., RPZ land falls within another jurisdiction).	Even though the sponsor has no land use control, the FAA still considers it a reasonable expectation that the sponsor will actively seek opportunities to establish the necessary zoning controls to enable the sponsor to address existing incompatible land uses when the opportunity arises. The FAA will consider financial assistance to public-sector airport sponsors for land acquisition, even if the airport sponsor has no land use control, but only if the sponsor demonstrates that the sponsor is taking all appropriate steps available to enhance control and mitigate existing risks.

Source: FAA AC 150/5190-4B, Airport Land Use Compatibility Planning

Proposed Incompatible Land Uses

The FAA expects the airport sponsor to take active steps to prevent or mitigate proposed incompatible land uses. The FAA expects the airport sponsor to actively seek opportunities to prevent or mitigate risks associated with proposed incompatible land uses within the RPZ. The FAA expects the airport sponsor to secure control of land within the RPZ if a sponsor-initiated project results in incompatible land use within the newly defined RPZ. This is expected regardless of the funding source(s) involved. Sponsors should actively monitor conditions, publicly object to proposed incompatible land uses, and make it a high priority (financially or otherwise) to acquire land or otherwise establish land use controls that prevent incompatible uses. The FAA expects airport sponsors to document their efforts so they can demonstrate that the airport is complying with its grant assurances. **Table 3L** summarizes FAA expectations regarding proposals for introducing new incompatible land uses within an RPZ.

Potential new incompatible land uses within an RPZ might be caused by one or more circumstances. Some of these circumstances may result from airport sponsor-proposed projects, including (but not limited to) the following:

- An airfield project (e.g., runway extension or runway shift)
- A change in the critical design aircraft that increases the RPZ dimensions
- A new or revised instrument approach procedure that increases the size of the RPZ
- A local development proposal in the RPZ (either new or reconfigured), which could include roadway construction, relocation, or improvements

TABLE 3L | Expectations of Airport Sponsors – New Incompatible Land Uses

Type of Land Use Control	Expectations of Airport Sponsors
The airport sponsor owns the land.	Because the sponsor has total land use control, the FAA expects that the sponsor will establish all necessary protections to prevent new incompatible land uses.
The property is off airport but the sponsor has land use authority or the local jurisdiction and land use regulatory authority are owned by the same governing body.	The FAA expects the sponsor to take all appropriate steps available to establish and exercise zoning controls necessary to prevent any new incompatible land uses. The FAA recognizes that the standard of “appropriate action, to the extent reasonable” does not mean, in this case, that the sponsor can always prevail; rather, the FAA expects the sponsor to demonstrate and document a reasonable effort.
The sponsor has no land use control (i.e., RPZ land falls within another jurisdiction).	Even though the sponsor has no land use control, the FAA still expects the sponsor to actively pursue and consider all possible steps to secure land necessary to prevent any new incompatible land uses. The FAA recognizes that the standard of “appropriate action, to the extent reasonable” may not succeed; even so, the FAA expects the sponsor to demonstrate and document a reasonable effort. The FAA expects the airport sponsor to adopt a strong public stance to oppose incompatible land uses and to communicate the purpose of the RPZ and associated risks to the proponent, and to actively consider measures such as land acquisition, land exchanges, right-of-first-refusal to purchase, agreements with property owners regarding land uses, or other such measures.

Source: FAA AC 150/5190-4B, Airport Land Use Compatibility Planning

The FAA has higher expectations for the airport sponsor to mitigate potential incompatible land uses within the RPZ when the introduction of the incompatible land use is the result of an airport sponsor-initiated project (regardless of funding source). The sponsor should submit an alternatives evaluation to the FAA, unless the land use is permissible. The following are permissible land uses that require no further evaluation:

- Farming that meets airport design clearance standards in FAA AC 150/5300-13B, *Airport Design*, and guidance as outlined in AC 150/5200-33C, *Hazardous Wildlife Attractants on or near Airports*
- Irrigation channels that meet the standards of AC 150/5200-33C and the FAA/U.S. Department of Agriculture (USDA) manual, *Wildlife Hazard Management at Airports*
- Airport service roads, as long as they are not public roads and are directly controlled by the airport operator
- Underground facilities, as long as they meet other design criteria (such as RSA standards), as applicable
- Navigational aids (NAVAIDs) and aviation facilities, such as equipment for airport facilities that is considered fixed by function in regard to the RPZ
- Aboveground fuel tanks associated with backup generators for unstaffed NAVAIDs

The guidance (FAA AC 150/5190-4B, *Airport Land Use Compatibility Planning*) essentially places the final compatibility determination on the airport sponsor. Conformity with the AC is voluntary and nonconformity will not affect rights and obligations under existing statutes and regulations; however, the use of the guidelines is mandatory for projects funded under federal grant assistance programs, such as the Airport Improvement Program (AIP), and for projects funded through the Passenger Facility Charge (PFC) program.

The AC states:

“It is not the FAA’s decision whether the sponsor should accede to a new incompatible land use. Rather, FAA’s assessment is limited to whether the airport has made an adequate effort to pursue and consider appropriate and reasonable alternatives. The FAA will not approve or disapprove of the airport sponsor’s preferred alternative. The FAA will only evaluate whether the sponsor has completed an acceptable level of alternatives analysis before the sponsor makes the decision to allow or not allow the proposed land use within the RPZ.”

Table 3M summarizes the RPZ land use compatibility at SAF. In total, the RPZs have approximately 97 percent compatible land uses. A portion of the Runway 20 RPZ extends beyond airport property and contains an industrial facility. In addition, Paseo Real Road, a public road, traverses the Runway 20 RPZ. The Runway 33 RPZ extends beyond airport property and aviation easements and encompasses portions of two residential properties. Approximately 4.9 acres of the Runway 15 RPZ extends beyond airport property and aviation easements; however, the only incompatibility is Paseo Real Road, which traverses the RPZ. The future disposition of these RPZ incompatibilities will be examined in the airport alternatives analysis.

TABLE 3M | RPZ Land Use Compatibility (Existing)

Runway	RPZ Dimensions	RPZ Size	Owned in Fee/Easement (acres)/% Owned	Existing Incompatible Land Uses
2	Inner Width: 1,000' Outer Width: 1,510' Length: 1,700'	48.93 acres	48.93 acres/100%	None
20	Inner Width: 500' Outer Width: 1,010' Length: 1,700'	29.47 acres	29.47 acres/100%	Paseo Real Road; Industrial Facility
15	Inner Width: 1,000' Outer Width: 1,510' Length: 1,700'	48.93 acres	44.03 acres/90%	Paseo Real Road
33	Inner Width: 1,000' Outer Width: 1,510' Length: 1,700'	48.93 acres	46.03 acres/94%	Residential Property
10	Inner Width: 500' Outer Width: 700' Length: 1,000'	13.88 acres	13.88 acres/100%	None
28	Inner Width: 500' Outer Width: 700' Length: 1,000'	13.88 acres	13.88 acres/100%	None

RPZ = runway protection zone

Source: Coffman Associates analysis

Runway Visibility Zone (RVZ)

The RVZ is an area formed by imaginary lines connecting two physically intersecting runways' line-of-sight points. Any two points within the RVZ that are five feet above the runway elevation at that point must be mutually visible. The RVZ precludes objects not fixed by function from blocking the pilot's view to the intersecting runway, including parked aircraft. The RVZ applies only when the SAF ATCT is closed (9:00 p.m. to 7:00 a.m.).

The primary wind cone, which is more than five feet tall, is located south of the terminal apron, adjacent to the intersection of all runways, and is a penetration of the RVZ. Moreover, in the event aircraft are parked on the terminal aircraft parking apron outside ATCT operational hours, these aircraft would be considered an RVZ obstruction; therefore, potential options to mitigate these conditions will be analyzed in Chapter Four.

Runway/Taxiway Separation

The design standards for the separation between runways and parallel taxiways are a function of the critical design aircraft and the instrument approach visibility minimum. The runway/taxiway separation standard for the commercial service runways (Runway 2-20 and Runway 15-33) is 400 feet and the separation standard for Runway 10-28 is 240 feet. Taxiways A, D, and F serve as parallel taxiways. The centerlines of Taxiways A and D are situated 400 feet from the Runway 2-20 centerline, which meets the standard. The southern portion of Taxiway A turns to the east, south of the terminal apron, where it runs parallel to Runway 10-28. This portion of Taxiway A is situated at a separation distance of 375 feet from the Runway 10-28 centerline. The Taxiway F centerline is situated 240 feet from the Runway 10-28 centerline, which meets the standard.

Holding Position Separation

Holding position markings are placed on taxiways leading to runways. When instructed, pilots must stop short of the holding position marking line. The C-III design standard holding position location is a separation distance of 250 feet with an additional one foot added for every 100 feet the airport is situated above 5,100 feet mean sea level (MSL). At 6,349 feet MSL, the holding position markings should be set at 263 feet for all taxiways associated with the commercial service runways (Runways 2-20 and 15-33).

In the existing condition, only two of the taxiway holding position markings serving Runway 2-20 satisfy FAA design standards; Taxiway D1 and the entrance taxiway at Runway 2 are separated from the centerline by 314 feet. The remaining taxiway holding position markings serving Runway 2-20 have less than 263 feet of separation from the runway centerline. For Runway 15-33, all taxiway holding position markings are 250 feet from the runway and are therefore non-standard.

The B-II holding position separation distance standard for Runway 10-28 is 200 feet from the runway centerline. In the existing condition, only two of the holding positions on Taxiway D satisfy the design standard of 200 feet of separation. The remaining holding position markings have less than 200 feet of separation and therefore do not conform to design standards.

In the ultimate condition, the standard holding position location for D-III is 250 feet plus one foot for every 100 feet the airport is situated above sea level. The airport's elevation of 6,349 feet MSL adds 63 feet to the separation standard, resulting in a need for the holding position markings to be located 314 feet from the runway centerlines. As previously mentioned, holding position markings for the commercial service runways (Runways 2-20 and 15-33) are all set at least 250 feet from the runway centerline; however, all markings, except the holding position markings on Taxiway D1 and the Runway 2 threshold connector, do not account for the additional separation distance per every 100 feet above MSL. The Taxiway D1 and Runway 2 threshold connector markings meet the ultimate design standard of 314 feet of separation from the runway centerline.

RUNWAY ELEMENTS

The adequacy of the existing runway system at SAF has been analyzed from several perspectives, including runway orientation and adherence to safety area standards. From this information, requirements for runway improvements were determined for the airport. Runway elements, such as configuration, length, width, and strength, are discussed in this section.

Runway Length

AC 150/5325-4B, *Runway Length Requirements for Airport Design*, provides guidance for determining runway length needs. The determination of runway length requirements for SAF is based on four primary factors:

- Airport elevation (6,349 feet MSL)
- Mean maximum temperature (88.5 degrees Fahrenheit [°F])
- Critical aircraft expected to use the runway
- Runway gradient (0.9 percent or 75 feet)

There is not a direct relationship between the classification of the critical aircraft and runway length, as airplanes operate on a wide variety of available runway lengths. The suitability of the runway length is governed by many factors, including elevation, temperature, wind, aircraft weight, wing flap settings, runway condition (wet or dry), runway gradient, vicinity airspace obstructions, useful load, and any special operating procedures.

Aircraft performance declines as elevation, temperature, and runway gradient factors increase. For SAF, the mean daily maximum temperature of the hottest month is 88.5°F, which occurs in July. The airport’s elevation is 6,349 feet MSL. The runway elevation difference is approximately 75 feet for Runway 2-20, which equates to a 0.9 percent gradient change.

Commercial Aircraft Runway Length Requirements

The runway length analysis for SAF should focus on the performance requirements of the regional jet aircraft currently providing scheduled passenger service, primarily including the Bombardier CRJ700 and Embraer ERJ175. As shown in **Table 3N**, Current nonstop markets range from approximately 263 nautical miles (nm) to Denver to approximately 932 nm to Chicago, with intermediate markets including Phoenix (321 nm), Dallas-Fort Worth (479 nm), Los Angeles (616 nm), and Houston (639 nm). Given Santa Fe’s high elevation and seasonal high temperatures, aircraft takeoff performance and operating weight should be evaluated for representative passenger and baggage loads associated with these markets. The typical maximum range for the CRJ700 and the ERJ175 ranges from 1,650 nm (CRJ700) to 1,750 nm (ERJ175). The existing nonstop destinations are well within the nominal range capability of these regional jets, although the fuel required for longer routes can materially affect takeoff weight and runway performance.

TABLE 3N | Nonstop Trip Lengths

Existing Daily Nonstops	Approximate Distance (nautical miles)
Denver	263 nm
Phoenix	321 nm
Dallas/Fort Worth	479 nm
Los Angeles	616 nm
Houston (seasonal)	639 nm
Chicago	932 nm

Source: Distances calculated utilizing SkyVector Aeronautical Charts (accessed at <https://skyvector.com/>)

Using the previously described conditions at the airport, the approximate takeoff runway length under several useful load conditions was evaluated. **Table 3P** shows the runway length calculations for commercial aircraft. Considering the existing Runway 2-20 length of 8,366 feet, the existing commercial aircraft fleet, which primarily consists of the ERJ175 and CRJ700, can operate at up to 80 percent (ERJ175) and 90 percent (CRJ700) useful loads. The Airbus A319 and A320, which are considered ultimate critical aircraft, are much more runway-efficient, needing only up to 6,000 feet (A319) and 7,000 feet (A320) at maximum takeoff weight. The Boeing 737 series of aircraft, which are also considered potential ultimate critical aircraft, have higher maximum takeoff weights (MTOWs) ranging from 154,500 to 181,200 pounds. The takeoff length requirements for these aircraft are the most demanding of the potential future commercial aircraft, ranging from 7,000 feet to 14,700 feet. For scenarios in the table that result in “out of limits” useful loads, this does not necessarily mean the aircraft cannot operate in that scenario, but the scenario is outside the range for the aircraft manufacturer’s published performance data.

TABLE 3P | Commercial Aircraft Takeoff Runway Length

Aircraft Type	Takeoff Length Requirements					
	MTOW (pounds)	Useful Load				
		60%	70%	80%	90%	100%
B737-700	154,500	7,000	7,800	9,700	14,700	Out of limits
B737-800	174,200	7,200	8,700	10,000	Out of limits	Out of limits
B737-900	174,200	8,500	9,700	12,400	14,700	Out of limits
B737-Max8	181,200	8,000	8,900	9,800	10,800	Out of limits
A319	145,505	4,000	4,000	4,300	5,000	6,000
A320	157,630	4,000	4,700	5,800	6,000	7,000
CRJ-900	82,500	6,400	7,900	8,600	9,600	Out of limits
ERJ-175	79,344	5,000	6,000	8,000	10,000	11,000
CRJ-700	75,000	5,500	6,000	7,200	8,000	Out of limits

Airfield Elevation = 6,349' MSL
Mean Maximum Temperature of the Hottest Month = 88.5°F
MTOW = maximum takeoff weight
Boldface is representative of the current critical aircraft

Source: Aircraft Flight Planning Manuals

General Aviation Aircraft Runway Length

FAA AC 5325-4B, *Runway Length Requirements for Airport Design*, provides several methodologies for estimating runway length needs for general aviation aircraft. The first is a method for evaluating small aircraft, which are those under 12,500 pounds. The second is a method for evaluating runway length for business jets that weigh between 12,500 and 60,000 pounds. The third uses airport planning manuals from the individual aircraft manufacturers to determine runway length needs. There is often overlap among these categories, as there are business jets that weigh less than 12,500 pounds, and there are occasions to use the individual planning manuals for business jets that weigh less than 60,000 pounds. All three methods are examined in the following analysis.

Small Aircraft (<12,500 Pounds)

The airport is utilized by small aircraft that weigh less than 12,500 pounds. These aircraft comprise most local operations and a portion of itinerant operations. Following the guidance from AC 150/5325-4B, to accommodate 100 percent of small aircraft, a runway length of 7,800 feet is recommended.

Business Jets Between 12,500 and 60,000 Pounds

The airport is also utilized by aircraft that weigh between 12,500 and 60,000 pounds, which includes small- to medium-size business jets. FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*, provides a methodology for determining runway length for this class of aircraft, which is segmented into groupings of airplanes that comprise zero to 75 percent of the national fleet and airplanes that comprise the remaining 100 percent of the national fleet. Runway lengths are further determined by the aircraft's useful load and the airport's conditions. The useful load of an aircraft consists of passengers, cargo, and usable fuel.

To accommodate 75 percent of the business jet fleet at 60 percent useful load, a runway length of 8,100 feet is recommended. To accommodate 75 percent of the business jet fleet at 90 percent useful load, a runway length of 9,400 feet is recommended. For 100 percent of the business jet fleet to take off at 60 to 100 percent useful load, a runway length above 11,800 feet is recommended. Unless specifically necessary, the FAA plans runway length requirements at 60 percent useful load. **Table 3Q** presents the business jet runway length requirements for SAF.

TABLE 3Q | Business Jet Runway Length Requirements

Fleet Mix Category	Raw Runway Length from FAA AC	Runway Length with Gradient Adjustment	Wet Surface Landing Length for Jets (+15%)*	Final Runway Length
100% of small airplanes	7,800'	N/A	N/A	7,800'
75% of fleet at 60% useful load	7,321'	8,071'	5,500'	8,100'
100% of fleet at 60% useful load	11,000'	11,740'	5,500'	11,800'
75% of fleet at 90% useful load	8,600'	9,350'	7,000'	9,400'
100% of fleet at 90% useful load	11,000'	11,740'	7,000'	11,800'
Airfield Elevation = 6,349' above MSL Average High Monthly Temperature = 88.5°F (July) Runway Gradient = 0.90% (Runway 2-20) *Maximum 5,500' for 60% useful load and maximum 7,000' for 90% useful load in wet conditions				

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

Runway Length Conclusion

As the primary runway, Runway 2-20 should be the most capable of all the runways at SAF, as it serves a wide variety of commercial service, GA, and military aircraft. These aircraft include the existing critical aircraft, the Embraer ERJ175, and the most widely utilized commercial aircraft currently operating at SAF, the Bombardier CRJ700. The runway length analysis, which considers the average high summer temperature, showed that the CRJ700 and ERJ175 can currently operate at up to 80 percent useful loads and the Airbus A319 and A320 can operate at up to 100 percent useful loads. The Boeing 737 models analyzed, which are heavier and have much longer maximum ranges (3,300 to 3,850 nm), would be subject to more weight restrictions during the hot summer months. During more moderate weather conditions, weight restrictions on commercial aircraft are diminished.

As the commercial fleet transitions to include narrowbody aircraft, particularly the Boeing 737 series, additional length on the primary runway may be necessary. Previous planning documents for SAF included a 638-foot extension of Runway 2-20 to 9,000 feet to better serve the commercial fleet. The alternatives analysis will consider the previous extension plan for Runway 2-20, as well as others, to provide additional length for the primary runway in the event that larger narrowbody aircraft enter the SAF market in the future.

SAF experiences highly variable crosswind conditions, so Runway 15-33, as a secondary air carrier runway, should be planned to accommodate commercial and GA activity to the greatest practicable extent. At 6,316 feet, Runway 15-33 provides adequate length for the regional jets up to a 70 percent useful load. Narrowbody aircraft are subject to more significant weight restrictions when operating on Runway 15-33 during the hottest periods of the summer, compared to Runway 2-20. Previous planning documents for SAF do not include extension of Runway 15-33 due to terrain limitations off both ends of the runway and potential impacts to neighboring residential properties. The existing length of Runway 15-33 is serviceable for the SAF commercial and GA fleet; however, additional length could provide added utility for all operators. The alternatives will consider options to extend Runway 15-33.

Runway 10-28 is planned to be utilized primarily by small GA aircraft during crosswind conditions that prohibit the use of Runways 2-20 and 15-33. Its current length of 6,301 feet is less than the recommended length to accommodate 100 percent of small aircraft (7,800 feet); however, in its role, the existing length is considered adequate.

Runway Width

Runway width standards are based on the critical aircraft and the visibility minimums of the published instrument approach procedures. The commercial service runways are both classified as C/D-III-4000 in the existing/ultimate condition, which has a standard width of 100 feet. Runway 2-20 is 150 feet wide, which exceeds the design standard, and Runway 15-33 is 100 feet wide, which meets the design standard. FAA design standards specify a provision for aircraft with MTOWs greater than 150,000 pounds that require a runway width of 150 feet. As the airport transitions to the ultimate critical aircraft, the Airbus A320 and Boeing 737 aircraft have MTOWs greater than 150,000 pounds; therefore, Runway 2-20 should be maintained at 150 feet wide and Runway 15-33 should be widened to 150 feet.

RDC B-II-5000 standards stipulate a runway width of 75 feet. Runway 10-28, which is 75 feet wide, meets this design standard.

Runway Shoulders

Runway shoulders provide resistance to blast erosion and allow the passage of maintenance and emergency equipment, as well as the occasional aircraft veering from the runway. FAA design standards require that runways designed to airplane design group (ADG) III standards have shoulders that measure 20 feet wide. A provision for design aircraft with MTOWs of 150,000 pounds increases the shoulder width standard to 25 feet. Runways designed to ADGs I, II, and III should have (at a minimum) stabilized shoulders consisting of turf or stabilizing soil treatments, but ADG III runways are recommended to have paved shoulders.

In the existing condition, runway shoulders are not present for any runway at SAF. Runways 2-20 and 15-33 should be planned for paved 25-foot shoulders and Runway 10-28 should maintain unpaved shoulders of at least 10 feet wide.

Runway Blast Pads

A runway blast pad provides erosion and foreign object debris (FOD) protection beyond the runway from propeller wash and jet blast. Blast pads are not required but are recommended for runways serving critical aircraft in ADG III and larger. The ADG III blast pad standard measurement is 200 feet by 140 feet for Runways 2-20 and 15-33; however, as the airport transitions to critical aircraft that have MTOWs of 150,000 pounds or more, the standards specify a provision that increases the width of the blast pad to 200 feet. Runways 2 and 20 currently have 200-foot by 150-foot blast pads. It is recommended that the blast pads for Runways 2 and 20 be widened to 200 feet. Runways 15 and 33 currently have 150-foot by 120-foot blast pads. It is recommended that the blast pads for Runways 15 and 33 be improved to the ultimate standard of 200 feet long by 200 feet wide. Blast pads are not required for ADG II runways, so none are recommended for Runways 10 or 28.

Runway Strength

An important feature of airfield pavement is its ability to withstand repeated use by aircraft. **Table 3R** summarizes current pavement strength ratings for each SAF runway. Also included in the table are the aircraft classification ratings (ACRs) for the critical aircraft for each runway. The ACR is a numerical value representing the relative effect of an aircraft on airport pavement. It is used to compare an aircraft's pavement loading capability with the pavement classification rating (PCR). If an aircraft's ACR is less than or equal to the pavement's PCR, the pavement is considered capable of supporting that aircraft under the application rating conditions.

TABLE 3R | Runway Pavement Strength Requirements

	Runway 2-20	Runway 15-33	Runway 10-28
Pavement Classification Rating (PCR)			
Existing PCR	170/F/D/X/T	80/F/D/X/T	80/F/D/X/T
Critical Aircraft ACRs (assuming improvement to medium-strength subgrades [B])			
Bombardier CRJ700	156		N/A
Embraer ERJ175	173		N/A
Airbus A319	365		N/A
Airbus A320	341		N/A
Boeing 737 Max 8	417		N/A
Cessna Citation II/Bravo	N/A		59
Is Existing PCR Adequate?	No	No	No
Recommended PCR	417/F/B/X/T	417/F/B/X/T	80/F/B/X/T
ACR = aircraft classification rating N/A = not applicable			

Sources: NMDOT Aviation Division, 2024 Pavement Classification Rating (PCR) Report; Coffman Associates analysis

According to a 2024 report, each runway has an ultra-low subgrade strength represented by the code designation (D). It is recommended that each runway be improved to a subgrade strength of at least medium (B) rating. Assuming improvement of the subgrade strength, the ACRs for Runways 2-20 and 15-33 would also need to be improved to accommodate up to a Boeing 737 Max 8, which has an ACR of 417. It is recommended that both commercial service runways be improved to a PCR of 417/F/B/X/T. This translates to the highest critical aircraft ACR of 417 (Boeing 737 Max 8); F for flexible pavement; B for a medium strength subgrade; X for a high tire pressure range; and T for a technical pavement evaluation.

Runway 10-28's PCR of 80/F/D/X/T translates to an ACR of 80; F for flexible pavement; D for ultra-low subgrade strength; X for a high tire pressure range; and T for a technical pavement evaluation. It is recommended that the subgrade for Runway 10-28 be improved to at least a medium grade (B). A representative B-II critical aircraft for Runway 10-28 is the Cessna Citation II/Bravo, which has an ACR of 59. If the subgrade is improved on the runway, the ACR is sufficient for the GA aircraft utilizing the runway.

The pavement strength of the runway does not prohibit aircraft that weigh more than the published strength rating from using the runway. Federally obligated airports must remain open to the public. Pilots are responsible for determining if the runway will support the weight of their aircraft; however, the airport sponsor has an obligation to maintain the useful life of the runway.

Runway Markings

Runway markings are typically designed based on the type of instrument approach available for the runway. FAA AC 150/5340-1M, *Standards for Airport Markings*, provides the necessary guidance to design airport markings.

Runway 2-20 has precision markings that are in good condition and include the runway designation, threshold bars, threshold stripes, centerline stripes, edge lines, touchdown zone, and aiming point markings. These markings should be maintained due to the presence of an ILS approach to Runway 2. Runways 15-33 and 10-28 have non-precision markings that include threshold stripes, centerline lines, and touchdown zone markings. These runway markings are appropriate for Runway 15-33 and Runway 10-28.

Runway Lighting

Runway lighting provides pilots with rapid identification of the runway and its alignment at night. Runways 2-20 and 15-33 are both fitted with medium intensity runway lighting (MIRL). Runway 10-28 is not fitted with any type of runway lighting; however, due to the presence of a GPS instrument approach to Runway 28, edge lighting is required for nighttime instrument approaches, per design standards; therefore, consideration should be given to the installation of MIRL on Runway 10-28 to allow the runway to be used during nighttime activity and to support the instrument approach procedure. The edge lighting for Runways 2-20 and 15-33 should be maintained. In the event a major rehabilitation project is undertaken for Runway 2-20 that involves the replacement of edge lights, consideration should be given to installing high intensity runway lighting (HIRL), which is typical for a runways with a precision ILS approach.

FAA Hot Spots

A hot spot is a location on an airport movement area with a history or potential risk of collision or runway incursion, and where heightened attention by pilots and drivers is necessary. The reason for a hot spot designation may be due to airport layout, traffic flow, airport marking, signage and lighting, situational awareness, and training. Currently, the FAA has not identified any hot spots at SAF.

TAXIWAYS AND TAXILANES

The design standards associated with taxiways/taxilanes are determined by the ADG of the critical design aircraft and the taxiway design group (TDG). The taxiways associated with Runways 2-20 and 15-33 are planned to maintain ADG III and TDG 3 design standards. The taxiways associated with Runway 10-28 are planned to meet ADG II and TDG 2A standards. **Table 3S** presents the taxiway design standards.

TABLE 35 | Taxiway Dimensions and Standards

Standards Based on Wingspan	ADG III	ADG II
	Runway 2-20/Runway 15-33	Runway 10-28
Taxiway Protection		
Taxiway Safety Area (TSA) width	118'	79'
Taxiway Object Free Area (TOFA) width	171'	124'
Taxilane Object Free Area width	158'	110'
Taxiway Separation		
Taxiway Centerline to Fixed or Movable Object	85.5'	62'
Taxiway Centerline to Parallel Taxiway	144.5'	101.5'
Taxilane Centerline to Fixed or Movable Object	79'	55'
Taxilane Centerline to Parallel Taxilane	138'	94.5'
Wingtip Clearance		
Taxiway Wingtip Clearance	26.5'	22.5'
Taxilane Wingtip Clearance	20'	15.5'
Standards Based on TDG	TDG 3	TDG 2A/2B
Taxiway Width Standard	50'	35'
Taxiway Edge Safety Margin	10'	7.5'
Taxiway Shoulder Width	20'	15'
ADG = airplane design group TDG = taxiway design group		

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

Taxiway Design Considerations

FAA AC 150/5300-13B, *Airport Design*, and Engineering Brief 75 provide guidance on recommended taxiway and taxilane layouts to enhance safety by avoiding runway incursions. A runway incursion is defined as “any occurrence at an airport involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft.”

The taxiway system at the airport generally provides for the efficient movement of aircraft, and AC 150/5300-13B, *Airport Design*, provides recommendations for taxiway design. The following is a list of the taxiway design guidelines and the basic rationale behind each recommendation.

1. **Taxi Method:** Taxiways are designed for cockpit-over-centerline taxiing, with pavement that is sufficiently wide to allow a certain amount of wander. On turns, sufficient pavement should be provided to maintain the edge safety margin from the landing gear. When constructing new taxiways, existing intersections should be upgraded to eliminate judgmental oversteering, which is when a pilot must intentionally steer the cockpit outside the marked centerline to ensure the aircraft remains on the taxiway pavement.
2. **Steering Angle:** Taxiways should be designed so the nose gear steering angle is no more than 50 degrees, which is the generally accepted value to prevent excessive tire scrubbing.
3. **Three-Node Concept:** To maintain pilot situational awareness, taxiway intersections should provide a pilot with a maximum of three choices of travel. Ideally, these are right- and left-angle turns and a continuation straight ahead.

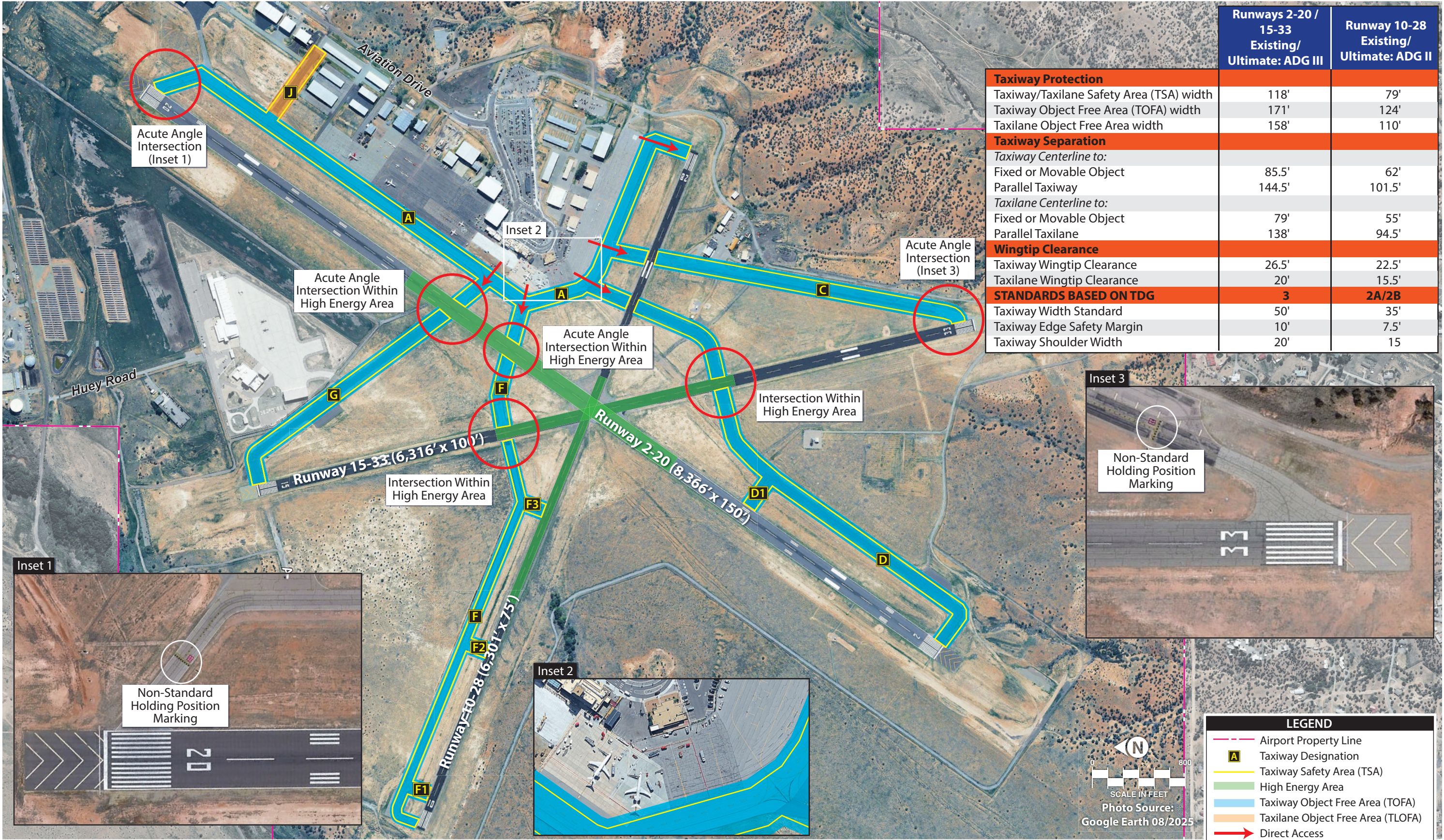
4. *Intersection Angles*: Turns should be designed to be 90 degrees wherever possible. For acute-angle intersections, standard angles of 30, 45, 60, 120, and 150 degrees are preferred.
5. *Runway Incursions*: Taxiways should be designed to reduce the probability of runway incursions.
 - a. *Increase Pilot Situational Awareness*: A pilot who knows where they are on the airport is less likely to enter a runway improperly. Complexity leads to confusion. Taxiway systems should be kept simple using the three-node concept.
 - b. *Avoid Wide Expanses of Pavement*: Wide pavements require placement of signs far from a pilot's eye, which is especially critical at runway entrance points. Where a wide expanse of pavement is necessary, direct access to a runway should be avoided.
 - c. *Limit Runway Crossings*: The taxiway layout can reduce the opportunity for human error. The benefits are twofold: through a simple reduction in the number of occurrences and through a reduction in air traffic controller workload.
 - d. *Avoid High-Energy Intersections*: These are intersections in the middle thirds of runways. By limiting runway crossings to the first and last thirds of the runway, the portion of the runway where a pilot can least maneuver to avoid a collision is kept clear.
 - e. *Increase Visibility*: Right-angle intersections between taxiways and runways provide the best visibility. Acute-angle runway exits should be avoided unless there is a capacity issue (SAF has no capacity issue). A right-angle turn at the end of a parallel taxiway is a clear indication of approaching a runway.
 - f. *Avoid Dual Purpose Pavements*: Runways used as taxiways and taxiways used as runways can lead to confusion. A runway should always be clearly identified as a runway and only a runway.
 - g. *Indirect Access*: Taxiways should not be designed to lead directly from an apron to a runway. Such configurations can lead to confusion when a pilot typically expects to encounter a parallel taxiway.
 - h. *Hot Spots*: Confusing intersections near runways are more likely to contribute to runway incursions. These intersections must be redesigned when the associated runway is subject to reconstruction or rehabilitation. Other hot spots should be corrected as soon as practical.
6. *Runway/Taxiway Intersections*:
 - a. *Right Angles*: Right-angle intersections are the standard for all runway/taxiway intersections, except where there is a need for a high-speed exit. Right-angle taxiways provide the best visual perspective to a pilot approaching an intersection with the runway to observe aircraft in both the left and right directions. They also provide optimal orientation of the runway holding position signs so the signs are visible to pilots.
 - b. *Acute Angles*: Acute angles should not be larger than 45 degrees from the runway centerline. A 30-degree taxiway layout should be reserved for high-speed exits. The use of multiple intersecting taxiways with acute angles creates pilot confusion and improper positioning of taxiway signage.

- c. *Large Expanses of Pavement:* Taxiways must never coincide with the intersection of two runways. Taxiway configurations with multiple taxiway and runway intersections in a single area create large expanses of pavement, making it difficult to provide proper signage, marking, and lighting.
- 7. *Taxiway/Runway/Apron Incursion Prevention:* Apron locations that allow direct access into a runway should be avoided. Pilot situational awareness should be increased by designing taxiways in a manner that forces pilots to consciously make turns. Taxiways originating from aprons and forming a straight line across runways at mid-span should be avoided.
- 8. *Wide-Throat Taxiways:* Wide-throat taxiway entrances should be avoided. Such large expanses of pavement may cause pilot confusion and make lighting and marking more difficult.
- 9. *Direct Access from Apron to a Runway:* Taxiway connectors that cross over a parallel taxiway and directly onto a runway should be avoided. A staggered taxiway layout that forces a pilot to make a conscious decision to turn should be considered instead.
- 10. *Apron to Parallel Taxiway End:* Direct connection from an apron to a parallel taxiway at the end of a runway should be avoided.
- 11. *End-Around Taxiways (EAT):* To improve efficiency and provide a safe means of movement from one side of a runway to the other, an EAT may be desired. EATs must be at least 1,500 feet from the runway end and clear of any runway imaginary surfaces.
- 12. *Taxiway Gradient:* The maximum longitudinal grade should not exceed 1.5 percent.

Taxiway Geometry Issues

The following non-standard conditions currently exist at SAF (identified on **Exhibit 3E**) and will be examined for potential adjustment to improve pilot situational awareness:

- Taxiways C, D, F, G and the Taxiway A connector to the Runway 28 threshold provide direct access from the terminal apron and the east aircraft parking apron to a runway.
- Several taxiways intersect runways at acute angles:
 - Taxiway A's entrance taxiway to the Runway 20 threshold
 - Taxiway C where it intersects with Runway 10-28 and where it connects to the Runway 33 threshold
 - Taxiway F where it intersects with Runway 2-20
 - Taxiway G where it intersects with Runway 2-20 and where it connects to the Runway 15 threshold
- Several taxiways intersect runways within the high-energy area. Taxiways F and G intersect the middle third of Runway 2-20, Taxiway F intersects the middle third of Runway 15-33, and Taxiway D intersects the middle third of Runway 15-33.



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Taxiway Lighting

Taxiway lights assist pilots in maneuvering on the airfield in low visibility conditions. All taxiways at SAF, except the portion of Taxiway F between Runway 2-20 and Runway 15-33, are served by medium intensity taxiway lighting (MITL). This is appropriate lighting and consideration should be given to equipping the entire length of Taxiway F with MITL.

Airfield Signs

Airfield signs assist pilots in identifying where they are on the airfield and directing them to desired locations. The signage system installed at the airport currently identifies runway and taxiway designations, holding positions, routing/directions, and runway ends and exits. The signage system at SAF should be maintained through the planning period.

Taxiway Nomenclature

FAA Engineering Brief 89A, *Taxiway Nomenclature Convention*, recommends the use of an alphanumeric naming convention for shorter connecting or stub taxiways. For example, where there is a parallel taxiway designated Taxiway A, the short connecting taxiways to the runway should be designated A1, A2, A3, etc. Parallel taxiways and other prominent, high-use taxiways should be assigned single-letter designations. The taxiway nomenclature at SAF largely follows the recommended naming convention, with the exception that the entrance taxiways at each runway end should include a number along with the letter designation. For example, the entrance taxiway at the Runway 20 threshold should be changed to “A1” and the entrance taxiway at the Runway 2 threshold should be changed to “D1” (existing D1 would be redesignated as “D2”). Taxiway F is another example where the connectors have been assigned numbers (i.e., F1, F2, and F3), but the entrance taxiway at the Runway 10 threshold, which is currently designated as “F,” should be redesignated as “F1” and the remaining connectors should be redesignated accordingly.

INSTRUMENT NAVIGATIONAL AIDS

The airport has eight published instrument approach procedures, including one ILS/localizer (LOC) approach to Runway 2, five GPS-based RNAV approaches, and two very high frequency omnidirectional range (VOR)-based approaches. The details about the capability of the instrument approaches were previously presented in Table 1G. Runways 2 and 15 have procedures with down to $\frac{3}{4}$ -mile visibility minimums, while Runway 33 has $\frac{7}{8}$ -mile minimums and all other runway ends have one-mile visibility minimums (Runway 10 is equipped with circling-only approach procedures).

Ultimately, it would be preferable to improve the instrument approach minimums for primary Runway 2-20 to provide visibility minimums as low as $\frac{1}{2}$ -mile for Runway 2 and $\frac{3}{4}$ -mile for Runway 20. These improvements would better accommodate the commercial and general aviation aircraft that utilize this runway. Additionally, establishing a $\frac{3}{4}$ -mile visibility minimum for Runway 33 would be beneficial, particularly given the runway’s capability to accommodate commercial service aircraft. The following chapter will evaluate the improvements necessary to enhance instrument approaches throughout the

runway system at SAF. It should be noted that achieving visibility minimums below $\frac{3}{4}$ -mile would require the installation of a sophisticated approach lighting system on the applicable runway end, such as a medium intensity approach lighting system with runway alignment indicator lights (MALSR) or an approach lighting system with sequenced flashing lights (ALSF-2).

VISUAL NAVIGATION AIDS

The airport beacon provides for rapid identification of the airport with a rotating light that is green on one side and white on the opposite side. The beacon is located on top of the ATCT and operates from sunset to sunrise.

Runways 2, 20, and 33 are equipped with four-light visual approach slope indicator (VASI-4) systems. These visual lighting systems indicate to pilots whether they are on the correct glide path to the runway. Consideration should be given to the replacement of the VASI-4 systems with a four-light precision approach path indicator (PAPI-4) system, which is the FAA's current standard visual glideslope indicator (VGSI). Additionally, consideration should be given to the installation of a PAPI-4 system supporting Runway 15 and PAPI-2 systems supporting both ends of Runway 10-28.

Runway end identification lights (REILs) are strobe lights set on either side of the runway. These lights provide rapid identification of the runway threshold to pilots up to 20 miles away. Runways 10, 15, 20, and 33 are equipped with REILs, which should be maintained. The next chapter will depict alternative development options that will include the installation of REIL systems on all remaining runway ends that are not currently equipped.

The runways at SAF are not currently equipped with any type of approach lighting system (ALS). As mentioned, the alternatives analysis will consider lowering the ILS and GPS approach visibility minimums on Runway 2 to $\frac{1}{2}$ -mile minimums, which would require the installation of an ALS.

WEATHER AIDS

SAF is equipped with an ASOS, automatic terminal information service (ATIS), and common traffic advisory frequency (CTAF). These systems should be maintained through the planning period.

SAF is equipped with a lighted wind cone, which is located at the center of the segmented circle. The airfield also has a supplemental wind cone, which is located between Runway 15-33 and Taxiway C, near the Runway 33 threshold. The primary wind cone is currently located within the Runway 2-20 ROFA, as well as the RVZ. The supplemental wind cone adjacent to Runway 15-33 is located within the Runway 15-33 RSA and ROFA. The alternatives analysis will explore relocation options for these wind cones outside the safety areas.

CONTROL TOWER FACILITIES

SAF is served by an ATCT, which is located atop the terminal building. The ATCT currently operates from 7:00 a.m. to 9:00 p.m., seven days a week. Outside the operational hours, no formal air traffic control services are available at the airport; therefore, air traffic advisories must be made utilizing the CTAF.

The height and location of the tower provide acceptable views of all movement areas. Due to the height of the ATCT cab, ATCT controllers have reported a small blind spot present at the helipad, which is located on the southern GA apron. As part of this master plan project, the alternatives analysis will explore new ATCT sites that meet line-of-sight standards for the airfield.

FAA PART 77 AIRSPACE IMAGINARY SURFACES

Federal Aviation Regulation (FAR) Part 77, *Objects Affecting Navigable Airspace*, was established for use by local authorities to analyze the impacts of and control the heights of objects near airports. Airport sponsors should do all in their power to ensure development stays below the FAR Part 77 surfaces to protect the role of the airport. The following discussion describes the FAR Part 77 surfaces at SAF.

Penetrations to any of the FAR Part 77 surfaces are considered obstructions. If there are obstructions, additional evaluation criteria are examined by the FAA to determine if an obstruction is a hazard to air navigation. This determination is typically made during an airspace determination conducted by the FAA.

The FAR Part 77 criteria assign three-dimensional imaginary surfaces to the airport. These imaginary surfaces emanate from the runway centerline and are dimensioned according to the visibility minimums associated with the approach to the runway end and the size(s) of aircraft that operate on the runway. The FAR Part 77 imaginary surfaces include the primary surface, approach surface, transitional surface, horizontal surface, and conical surface. Each surface is described as follows.

Primary Surface

The primary surface is an imaginary surface longitudinally centered on the runway and extends 200 feet beyond each runway end. The elevation of any point on the primary surface is the same as the elevation along the nearest associated point on the runway centerline. The primary surface for Runways 2-20 and 15-33 has a width of 1,000 feet, centered on the runway. The primary surface for Runway 10-28 has a width of 500 feet, centered on the runway.

Approach Surface

An approach surface is established for each runway end. The approach surface begins at the end of the primary surface, extends upward and outward from the primary surface end, and is centered along an extended runway centerline. The approach surface leading to each runway is based on the type of approach (instrument or visual) available or planned.

The precision approach surface for Runway 2 extends outward and upward to an ultimate width of 16,000 feet. The slope is 50:1 for the first 10,000 feet and an additional 40,000 feet at a slope of 40:1. The non-precision approach surface for Runway 15 extends upward and outward to a width of 4,000 feet at a slope of 34:1 and a distance of 10,000 feet. The non-precision approach surfaces for Runways 10, 20, 28, and 33 extend upward and outward to a width of 3,500 feet at a slope of 34:1 and a distance of 10,000 feet.

Transitional Surface

The transitional surface begins at the outside edge of the primary surface at the same elevation as the runway. This surface rises at a slope of 7:1 up to a height 150 feet above the highest runway elevation. At that point, the transitional surface is replaced by the horizontal surface.

Horizontal Surface

The horizontal surface is established at 150 feet above the highest elevation of the runway surface. The horizontal surface has no slope and connects the transitional and approach surfaces to the conical surface.

Conical Surface

The conical surface begins at the outer edge of the horizontal surface. The conical surface continues for an additional 4,000 feet horizontally at a slope of 20:1; therefore, at 4,000 feet from the horizontal surface, the elevation of the conical surface is 350 feet above the highest airport elevation.

As part of this master plan project, a new FAR Part 77 airspace map will be included as a drawing within the ALP set. All penetrations to the FAR Part 77 surfaces will be identified. The FAA will review the ALP and conduct an airspace review of the plan. Additional mitigation for airspace penetrations may be required, based on the FAA airspace study.

APPROACH AND DEPARTURE SURFACES

The approach surface and departure surfaces, as defined in FAA AC 150/5300-13B, *Airport Design* (differentiated from the Part 77 approach surface), are other imaginary surfaces that are applied to the approach ends of the runways and referred to as the 13B approach/departure surface.

13B Approach Surfaces

For runways with ILS or localizer performance with visual guidance (LPV) instrument approach capability, two 13B approach surfaces apply: Surface 5 and Surface 6. Runways 2, 15, and 33 qualify for both approach surfaces. For these runway ends, Surface 5 begins 200 feet from the runway threshold, where it is 400 feet wide. It extends outward and upward to a distance of 10,000 feet at a width of 3,400 feet and a slope of 20:1. Furthermore, Surface 6 begins at the runway threshold, where it is the runway width plus 200 feet. It extends outward and upward to a distance of 10,200 feet at a width of 1,520 feet and a slope of 30:1.

For runways with non-precision approaches or visual approaches, Surface 1, Surface 2, Surface 3, and Surface 4 are applicable. Runways 20 and 28 fall under Surface 4, beginning 200 feet from the runway threshold, where it is 400 feet wide and extends outward and upward to a distance of 10,000 feet at a width of 3,400 feet and a slope of 20:1. Runway 10 falls under Surface 2, beginning at the runway threshold, where it is 250 feet wide and extends outward and upward to a distance of 2,250 feet at a width of 700 feet and a slope of 20:1. Surface 2 continues extending outward and upward for an additional 2,750 feet, maintaining the 700-foot width and slope of 20:1.

The 13B approach surfaces should be clear of penetrations. When penetrations exist, certain mitigating actions may be taken by the FAA, including lighting of penetrations, adjusting vertical glide path slopes, increasing minimums, and/or displacing landing thresholds. The ALP associated with this master plan will include analysis of the current and planned approach surfaces for the airport.

13B Departure Surface

The 13B departure surface is situated at the far end of a takeoff operation and is comprised of two sections. Section 1 is the central portion, which begins at the runway end and is the width of the runway. It rises at a slope of 40:1 to a distance of 12,152 feet and a width of 6,662 feet. Surface 2 of the 13B departure surface extends from the sides of Section 1 at a slope of 3:1. On each side of Section 1, Section 2 is 425 feet wide. Each side of Section 2 extends to a distance of 12,152 feet. The departure surface is applied to any runway that supports instrument departure procedures. Currently, there are three instrument departure procedures published for SAF: Poake Two, Tafoy Three, and Zias Five.

AIRSIDE SUMMARY

Santa Fe Regional Airport has a good complement of airside systems, including a primary and secondary commercial service runway, a crosswind runway, multiple parallel taxiways, nearly full airfield edge lighting, instrument approach/departure procedures, and visual approach aids.

The FAA capacity model for SAF shows that the three-runway system provides enough capacity for the next 20 years. Projects are specific to increasing capacity needed only when operational levels reach between 60 and 80 percent of the ASV. In the 20-year timeframe, the operational levels reach 38 percent of the ASV; therefore, the runway system provides enough capacity.

The runways have been analyzed regarding their adequacy to serve current and future activity. Runway 2-20 has adequate length to accommodate most commercial aircraft using the airport now but needs improved subbase and strength capacity and consideration of an extension to support heavier commercial aircraft that may use the airport in the future. Runway 15-33 also needs an improved subbase and strength rating, as well as consideration of an extension to increase its ability to accommodate commercial aircraft that routinely utilize the runway. Runway 10-28 is adequate in terms of length and width but also needs enhanced subbase.

A summary of the airside needs at SAF is presented on **Exhibit 3F**.

COMMERCIAL TERMINAL COMPLEX

Components of the terminal area complex include the terminal building, terminal curb, aircraft apron, and vehicle parking lots. This section identifies the facilities required to meet the airport's needs through the 20-year planning period. The current terminal building is approximately 21,042 square feet.

The terminal building analysis is based on guidance provided in the following sources:

- FAA AC 150/5360-13A, *Airport Terminal Planning and Design Guidelines for Airport Terminal Facilities*
- Airport Cooperative Research Program (ACRP), Report 25, *Airport Passenger Terminal Planning and Design, Volume 1: Guidebook*
- ACRP, Project Number 07-04, *Spreadsheet Models for Terminal Planning and Design*
- International Air Transport Association (IATA), *Airport Development Reference Manual*

COMMERCIAL PASSENGER ACTIVITY LEVELS

Forecasted annual enplanement levels comprise the most basic factor utilized when analyzing terminal complex requirements. The forecasted enplanement levels of 233,900 (5-year), 259,500 (10-year), and 357,000 (20-year) for each planning horizon were utilized. Many terminal building elements are primarily a function of peak hour enplanements and aircraft utilization assumptions. **Table 3T** presents the baseline assumptions utilized to determine the terminal building requirements; these were calculated in Chapter Two and are summarized here.

TABLE 3T | Airline Peaking Activity Levels

	2025 (Current)	Short Term	Intermediate Term	Long Term
Enplanements				
Annual	197,702	233,900	259,500	357,000
Peak Month	21,711	25,686	28,497	39,204
Design Day	700	829	919	1,265
Design Hour	77	91	101	139
Deplanements				
Design Hour	77	91	101	139
Total Passengers				
Design Hour	103	122	135	186
Commercial Operations				
Annual	7,204	7,904	7,842	9,146
Peak Month	749	822	815	951
Design Day	24	27	26	31
Design Hour	2	2	2	3
Departures/Arrivals				
Design Day	24	28	26	32
Design Hour	5	6	5	7

Source: Coffman Associates analysis

AIRCRAFT GATES

There are currently three designated gates; two are in regular use and a third is used primarily during times of overflow. Because the current design of the terminal building has ground-level gates, none of the gates are currently equipped with passenger loading bridges (PLBs), so mobile staircases and ramps are used for passenger boarding. Ground loading is common at nonhub airports served by regional jet aircraft, such as SAF.

	RUNWAY 2-20		RUNWAY 15-33		RUNWAY 10-28	
CATEGORY	EXISTING	ULTIMATE	EXISTING	ULTIMATE	EXISTING	ULTIMATE
RUNWAY						
Runway Design Code	RDC C-III-4000	RDC D-III-4000	RDC C-III-4000	RDC D-III-4000	RDC B-II-5000	RDC B-II-5000
Length	8,366	Consider extension alternatives	6,316'	Consider extension alternatives	6,301'	Maintain
Width	150'	Maintain	100'	150'	75'	75'
Pavement Classification Rating (PCR)	170/F/D/X/T	417/F/B/X/T	80/F/D/X/T	417/F/B/X/T	80/F/D/X/T	80/F/B/X/T
SAFETY AREAS						
Runway Safety Area	500' x 1,000'	Meets Standard - Maintain	Modified from Standard Utilizing Declared Distances	Explore Improvements to Mitigate Declared Distances	150' x 300'	Meets Standard - Maintain
Runway Object Free Area	800' x 1,000'	Meets Standard - Maintain	Modified from Standard Utilizing Declared Distances	Explore Improvements to Mitigate Declared Distances	500' x 300'	Meets Standard - Maintain
Obstacle Free Zone	400'x200'	Meets Standard - Maintain	400'x200'	Meets Standard - Maintain	250'x200'	Meets Standard - Maintain
Precision Obstacle Free Zone	200'x800'	Meets Standard - Maintain	NA	NA	NA	NA
Runway Protection Zone	Runway 2 - 1,700'x1,000'x1,510'; Runway 20 - 1,700'x500'x1,010	Remove any incompatible land uses; Prevent future incompatibilities	1,700' x 1,000' x 1,510'	Remove any incompatible land uses; Prevent future incompatibilities	1,000' x 500' x 700'	Remove any incompatible land uses; Prevent future incompatibilities
TAXIWAYS						
Taxiway Design Group	3	Maintain	3	3	2A	2B
Width	50'	All Taxiways to be at least 50' wide	50'	All Taxiways to be at least 50' wide	35'	Maintain
Parallel Taxiway Separation	400'	Maintain	NA	NA	375' (Taxiway A); 240' (Taxiway F)	Maintain
NAVIGATIONAL AIDS						
Instrument Approaches	3/4-mile (lowest visibility)	Consider 1/2-mile	3/4-mile (lowest visibility)	Maintain	1-mile (lowest visibility)	Maintain
Glideslope Antenna	Yes (Part of ILS)	Maintain	NA	NA	NA	NA
Localizer Antenna	Yes (Part of ILS)	Maintain	NA	NA	NA	NA
VISUAL APPROACH AIDS						
Glide Path Indicator Lights	VASI-4 (2,20)	Consider PAPI-4	NA (15)/VASI-4 (33)	Consider PAPI-4 (15,33)	NA	Consider PAPI-2 (10,28)
Runway End Identification Lighting	No (2)/Yes (20)	Maintain	Yes	Maintain	NA	Consider REILs
Approach Lighting System	NA	Consider MALSR or ALSF-2	NA	NA	NA	NA
LIGHTING, MARKING, SIGNAGE						
Runway Markings	Precision	Maintain	Non-Precision	Maintain	Non-precision	Maintain
Runway Edge Lighting	MIRL	Maintain	MIRL	Maintain	NA	Consider MIRL
Taxiway Edge Lighting	MITL	Maintain	MITL	Maintain	MITL; except on Taxiway F from Runway 2-20 to Rwy 15-33	Install MITL on unlit portion of Taxiway F
Hold Position Marking	250' from runway centerline	Increase to 314' from runway centerline	250' from runway centerline	Maintain	125' from runway centerline	Increase to 200' from runway centerline

	EXISTING	ULTIMATE
Airport Identification	Rotating beacon	Maintain
Lighted Airfield Signage	Yes	Maintain
Control Tower	Yes	Evaluate New ATCT Locations to provide better line-of-sight to all areas of the airfield
Weather Aids	ASOS Windsocks	Maintain Relocate supplemental wind cones outside of safety areas

KEY	Pavement Strength S - Single Wheel Load D - Dual Wheel Load DD - Double Dual Wheel Load PCR - Pavement Classification Rating	VASI - Visual slope approach indicator lights ILS - Instrument approach landing system HIRL - High intensity runway lights MIRL - Medium intensity runway lights MITL - Medium intensity taxiway lights MALSR - Medium intensity approach lighting system with runway alignment indicator lights	ALSF-2 - High intensity approach lighting system with sequenced flashing lights ASOS - Automated surface observing system PAPI - Precision Approach Path Indicator
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Several methods were utilized to determine aircraft gate requirements for the airport. The ACRP model utilizes two different approaches. The first approach uses the current ratio of annual passengers per gate, adjusted for forecasted changes in fleet mix and annual load factors. This methodology assumes the pattern of gate utilization will remain relatively stable over the 20-year forecast period. The changes in passengers per gate are due to changes in enplanements per departure (due to forecasted increases in seating capacity and load factors), as opposed to increasing or decreasing the number of departures per gate. The second ACRP method considers the number of departures per gate. The two methods are averaged to arrive at the aircraft gate forecast. The ACRP methods result in an average gate requirement of three gates through 2035 and four gates by 2045. The calculated need for four gates is based on a model in which aircraft turnaround time is maximized. Under the current utilization levels, the airport should consider regular utilization of the third gate within the next few years.

FAA AC 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities*, was also consulted. The AC provides three methodologies: one is based on the peak hour utilization rate, the second utilizes the daily departure for a daily utilization rate, and the third considers an annual utilization rate. Each of these methods was found to be consistent with the ACRP methodology.

As the airport enters the design phase of its terminal expansion project, consideration should be given to equipping its passenger gates with PLBs. If the commercial fleet mix transitions to include more narrowbody aircraft (Airbus A319/A320 and Boeing 737), PLBs would provide a higher level of security and passenger protection from adverse weather conditions, as well as improved access for passengers using wheelchairs.

TERMINAL APRON

Four primary considerations govern efficient aircraft apron design:

- Movement and physical characteristics of the aircraft to be served
- Maneuvering, staging, and location of ground servicing equipment and underground utilities
- Dimensional relationships of parked aircraft
- Safety, security, and operational practices related to apron control

The optimal design will depend on available space, aircraft mix, and terminal configuration.

The existing commercial terminal apron is 15,900 square yards (sy) in size and is marked with three gate positions. As previously mentioned, only two of the gates are utilized regularly, and the third gate is utilized during times of overflow. When planning for future commercial apron needs, there is not a single size or shape that is dictated by activity levels. Instead, FAA design guidelines provide basic safety considerations based on typical usage. Beginning in 2026 (and anticipated to continue through the planning period), the commercial fleet is anticipated to transition to include more flights by narrowbody aircraft, including the A319/320 and Boeing 737. With these larger/longer aircraft, apron depth will need to be an area of consideration. The current depth from the nose gear marking to the edge of the Taxiway A TOFA (85.5 feet from the taxiway centerline) is approximately 161 feet. The length of the existing commercial fleet (Embraer E175: 103 feet, CRJ700: 106 feet) allows for these aircraft to typically push back without wingtip penetrations into the TOFA; however, the A319, A320, and Boeing 737 Max 8 have

lengths of 111 feet (A319), 123 feet (A320), and 129 feet (Boeing 737 Max 8), which would result in pushing back directly onto the Taxiway A TOFA, potentially causing taxi delays for other aircraft. The terminal expansion and associated ramp alternatives should consider expansion options to provide greater apron depth to avoid pushback into the active taxiway, if possible.

TERMINAL BUILDING REQUIREMENTS

Determining the requirements for the passenger terminal building begins with a demand/capacity analysis of the existing facilities. This analysis identifies the current capacity of key processing areas for comparison to passenger demand at the airport. The purpose of the analysis is to quantify and qualify the ability of the existing terminal facilities to satisfy the current demand of the traveling public.

A model based on industry standards and calibrated for SAF, based on observations of passenger activities and terminal operations and design, was used in this analysis. The model utilizes the standard queuing theory, which can be defined as “passengers arriving minus passengers processed equals passengers in queue.” The evaluation of individual processing elements is based on industry standards and formulas.

The model considers the level of service standards established by the IATA. Level of service (LOS) defines the comfort and quality of the passenger experience. Some LOS standards are related to crowding in queuing areas, while others define the amount of time a passenger must wait for processing. **Table 3U** outlines the basic level of service standards and **Exhibit 3G** outlines space requirements for each functional element of the passenger terminal building.

In general, LOS C is a typical design goal for most airports. LOS B would be a preferred goal if the budget allows. LOS A is generally too expensive to achieve and is therefore prohibitive to implement. For the purposes of this analysis, LOS C+ was used to represent a median between LOS B and C.

TABLE 3U | Level of Service Standards (IATA)

Level of Service (LOS) Standards	Area per Occupant (feet ²)							
	A	B	C+	C	C-	D	E	F
Check-In Queue Area	19.4	17.2	16.1	15.1	14	12.9	10.8	–
Wait/Circulate	29.1	24.8	22.6	20.4	18.3	16.1	12.8	–
Holdroom	15.1	13.5	12.8	12	11.3	10.5	8	–
Baggage Claim Area (excl. claim device)	21.5	19.4	18.3	17.2	16.1	15.1	12.9	–
Federal Inspection Services	15.1	12.9	11.8	10.8	9.7	8.6	6.5	–
A = excellent levels of comfort and service; conditions of free flow B = high levels of comfort and service; conditions of stable flow; very few delays C = good levels of comfort and service; conditions of stable flow; acceptable delay D = adequate levels of comfort and service; conditions of unstable flow; acceptable delays for short periods E = inadequate levels of comfort and service; conditions of unstable flow; unacceptable delays F = unacceptable levels of comfort and service; conditions of cross flows; system breakdown and unacceptable delays; applies to areas below LOS E								

Calculations of terminal building capacity by functional area are general in nature and intended for long-term planning purposes. More detailed analysis in the form of a terminal master plan or terminal-focused planning study can be undertaken to provide specific clarity for the needs of each functional area.

The functional space estimates presented here are based on the current configuration as of May 2026. **The airport is starting a terminal expansion project, which will presumably address current deficiencies.**

			Planning Activity Levels				
			Enplanements				
			Existing	Current Need	Short	Intermediate	Long
			197,702	197,702	233,900	259,500	357,000
Ticketing/Check-In							
Utilization Factor	90%	0	69	82	91	125	
Agent Positions	#	4	3	3	4	5	
Frontage	LF	42	18	18	24	30	
Ticket Counter Area	SF	530	200	200	260	330	
Ticket Lobby Queuing Area	SF	732	780	920	1,020	1,410	
Ticket Lobby Circulation	SF	0	2,740	3,230	3,590	4,930	
Airline Operations (AO)	SF	1,407	1,080	1,080	1,440	1,800	
Outbound Baggage (AO)	SF	629	1,080	1,080	1,440	1,800	
Inbound Baggage (AO) (External)	SF	108	540	540	720	900	
Rental Car Counter Frontage	LF	150	15	18	20	28	
Rental Car Office Area	SF	402	230	270	300	420	
Rental Car Counter Queuing Area	SF	217	120	150	160	220	
Subtotal Ticketing/Check-In Functions		3,917	6,230	6,930	8,210	10,910	
Security Stations							
Number of Lanes	#	1	1	1	1	2	
Station Area	SF	870	360	360	360	720	
Queuing Area	SF	294	1,240	1,470	1,630	2,240	
TSA Administration/Operations	SF	0	700	700	700	1,400	
Subtotal Security Station Functions		1,164	2,300	2,530	2,690	4,360	
Passenger Holdrooms							
Gates	#	3	3	3	3	4	
Holdroom Area	SF	2,510	1,130	1,340	1,490	2,050	
Gate Area/Loading	SF	1,372	1,050	1,050	1,050	1,400	
Circulation Area	SF	1,085	3,480	4,113	4,565	6,283	
Subtotal Passenger Holdroom Functions		4,967	5,660	6,503	7,105	9,733	
Baggage Claim							
Passengers Claiming Bags	85%	65	65	77	86	118	
Claim Display Frontage	LF	20	30	40	40	50	
Claim Device Floor Area	SF	81	240	320	320	400	
Claim Device Frontage	SF	80	120	160	160	200	
Bag Claim Circulation Area	SF	816	940	1,110	1,230	1,690	
Baggage Service Office	SF	0	60	80	80	100	
Subtotal Baggage Claim Functions		977	1,360	1,670	1,790	2,390	
Concessions							
Food & Beverage	SF	671	2,370	2,810	3,110	4,280	
Retail	SF	0	990	1,170	1,300	1,790	
Support/Storage	SF	238	670	800	880	1,210	
Subtotal Concession Functions		909	4,030	4,780	5,290	7,280	
Airport Administration							
Administration Offices	SF	1,260	900	1,100	1,200	1,700	
Conference Room/Entrance	SF	985	297	351	389	536	
Employee Facilities	SF	282	198	234	260	357	
Subtotal Administration Functions		2,527	1,394	1,685	1,849	2,593	
General Public Areas							
Circulation	SF	2,407	2,780	3,290	3,650	5,030	
Other Public Areas	SF	1,183	99	117	130	179	
Restrooms	SF	966	740	870	970	1,330	
Subtotal General Public Area Functions		4,556	3,619	4,277	4,750	6,539	
FUNCTIONAL AREA TOTAL							
Total Functional Area	SF	19,289	24,594	28,375	31,684	43,804	
BUILDING SYSTEMS/SUPPORT							
Mechanical/HVAC	SF	1,753	1,970	2,270	2,530	3,500	
Vertical Circulation/Structural Space/General Storage	SF	272	2,460	2,840	3,170	4,380	
TOTAL TERMINAL							
Gross Building Area	SF	21,042	29,024	33,485	37,384	51,684	

Note: Level of Service C+ is applied

Ticketing/Check-In

The first destination for most enplaning passengers in the terminal building is the ticket counters or check-in kiosks. The ticketing area includes the counters, queueing area and lobby, ticket offices, kiosks, and bag screening and processing. Security screening is also included in the departures processing element.

Ticket Counters/Kiosks

The percentage of the departing passenger peak hour demand that checks in at the ticket lobby is estimated at 90 percent. The remaining percentage is assumed to check in prior to arriving at SAF and does not have checked baggage. The capacity at the ticket counters was calculated based on the passenger processing rate derived from IATA averages (LOS C+). The ticket counter functions appear to be adequate through the long-term planning period. The ticket counter area is adequately sized through the 20-year planning horizon based on the available terminal capacity models; nevertheless, operational changes, such as the entry of a new carrier, could lead to constraints.

Ticket Lobby Queue and Circulation

The adequacy of the ticket lobby floor area was also evaluated to determine whether demand levels result in an acceptable level of service. Typically, the ticket lobby demand would include a percentage of well-wishers in addition to the passengers. Well-wishers are estimated at 50 percent of design hour passengers. The evaluation was based on a service goal of a 2.5-minute maximum wait in queue and a LOS C+ of 16.1 square feet per person with baggage. The ticket lobby circulation was based on a LOS C+ of 22.6 square feet per person.

With the current layout of this area in the terminal building, the ticket lobby queue and ticket lobby circulation area have been combined. Due to this factor, the ticket lobby queueing area calculations, when combined, show that this area is currently undersized.

Outbound Bag Screening and Processing

The Transportation Security Administration (TSA) must inspect every checked bag that is to be put on an aircraft. Checked bags are transported by a conveyor belt system to screening equipment, which is located in a separate room adjacent to the ticket counters. The bag screening system is fully automated and up to modern standards. The checked bag screening system is currently undersized.

Inbound Baggage Processing

This element is the area where deplaning baggage is processed and put on the baggage carousel. This area does not need to be as large as the outbound baggage area because there is no dwell time or screening process for these bags. Sizing of this area is a function of peak hour deplaning passengers and the available frontage of the baggage carousels. The inbound baggage area is currently undersized.

Airline Operations

This function area includes the ticket counters and office space. Airline operations space is heavily dependent on the needs of each airline and its respective flight schedules. A general model is applied to calculate overall airline operations area needs, which is a function of the total ticket counter frontage, multiplied by 30 square feet, plus the area calculated for inbound baggage. The results show that airline operations space is adequate through the short term; however, in the intermediate and long-term planning periods, additional space will be needed. Moreover, if a new carrier or multiple new carriers enter service, more additional space may be needed.

Security Stations

Space is necessary for the TSA to provide security screening services. The primary input to calculating the area needed is the enplanement design hour.

Number of Lanes

There is currently one passenger screening lane. The volume of passengers processed through each security lane is referred to as throughput. Throughput volume is a function of the enplanement design hour and is estimated at 150 people per hour. Based on this model, the single existing lane is currently adequate through the intermediate term. In the long term, an additional screening lane would be needed.

Security Station Area

The station area is the floor space that includes the screening machines and the post-screening collection areas. The station area is calculated by providing 360 square feet per screening station. The overall station area is adequately sized.

Security Station Queue Area

The security queue area is the line area that forms immediately prior to the screening machines. The security queue area is calculated based on the C+ LOS, which is 16.1 square feet per occupant with a maximum wait time of 10 minutes as applied to the enplanement design hour. The current security queue area is undersized for current activity; the queue area regularly backs up into the lobby area, causing congestion.

TSA Administration/Operations

The TSA office space, which includes private security screening rooms, is calculated as 700 square feet per screening station. Currently, there is no TSA office space present in the terminal building; therefore, dedicated TSA office space should be considered as a part of the terminal expansion project.

Passenger Holdrooms

Passenger holdrooms entail the space and seating capacity needed to accommodate people waiting to board aircraft. The circulation area past the security checkpoint is the concourse.

Aircraft Boarding Gates

There are currently three active gates in the terminal building. As previously discussed, additional gates should be considered as part of the terminal expansion project.

Holdroom Area

Holdroom area is calculated at 115 percent of the enplanement design hour, multiplied by 12.8 square feet per person.

Gate Area/Loading

The gate/loading area includes space around the gate access door, podium areas, and space where passengers line up to board the aircraft. This is calculated as 350 square feet per gate.

Circulation (Concourse)

The concourse circulation areas are important for enplaned and deplaned passenger movement throughout the concourse. The concourse circulation area can also provide overflow areas when gate areas are busy. This area is calculated by multiplying design hour passengers by 22.6 square feet per person.

Currently, the passenger holdrooms and concourse on the secure side of the terminal building are undersized and should be expanded as part of the terminal expansion project.

Baggage Claim Area

The baggage claim area is where arriving passengers pick up their checked bags. It includes the floor area immediately in front of the claim device, the circulation areas, and the baggage claim office space. Baggage claim calculations are a function of the estimated number of passengers who check bags, which is estimated at 85 percent. Certain area calculations also consider the claim display frontage (i.e., the linear feet of the claim display). The existing baggage claim area at SAF is in a detached facility immediately south of the terminal building. It is anticipated that the terminal expansion project will create a dedicated space for all baggage claim functions within the expanded building.

Claim Display Frontage (Linear Feet)

Currently, the baggage claim device has a linear frontage of 20 feet. When calculating the size of baggage claim facilities, an industry standard of 1.3 checked bags per passenger is utilized. The calculation of the size of the claim display is a function of the design hour for deplaning passengers, the number of bags

checked, and the assumption that 35 percent of bags can be displayed at one time. Based on these factors, the current size of the claim display is constrained; therefore, additional linear frontage or a second, equally sized claim device is needed.

Claim Device Floor Area

The baggage claim device floor area is the physical footprint of the claim device. The size of the visible baggage claim device is a function of the claim display in linear feet times eight feet. This calculation also results in a need for additional area, or an additional carousel, in the immediate future.

Claim Device Frontage

The baggage claim capacity is based on the device frontage per person to a depth of four feet. Based on analysis, this area is currently constrained.

Baggage Claim Circulation Area

The baggage claim circulation area is calculated to a C+ LOS. It is calculated as 11 square feet per occupant and includes an increase of 30 percent, representing those picking up arriving passengers. The circulation area is currently constrained; thus, additional space is needed.

Baggage Service Office

The baggage claim area does not currently have a service office. Future office space needs are calculated as two square feet multiplied by claim display frontage.

Concessions and Retail

Food and Beverage

While planning standards and demand are important considerations in the adequacy of concessions in a terminal, there are marketing considerations that determine the capacity and economic viability of airport food/beverage services and retail concessions. As a general rule, 12 square feet of food and beverage space is estimated per 1,000 annual enplanements.

Retail

Retail space is calculated as five square feet per 1,000 annual enplanements. Currently, SAF does not possess retail space in the terminal building.

Support/Storage

Those offering concessions need storage space for inventory. The storage needs are estimated at 20 percent of the combined total for food and beverage retail.

Available concessions/retail functional spaces in the SAF terminal are currently undersized.

Airport Administration Space

It is common for airport administration offices to be in the terminal building, which is the case at SAF. The administrative offices are located in the northern portion of the terminal building.

Administration Offices

The administrative offices in the terminal building encompass approximately 2,527 square feet of space. A planning standard is that the calculation of administration space as six times the design hour for total passengers.

Conference Room

A common feature of airport administration spaces is a conference room. This area is utilized for various reasons, including (but not limited to) administrative/operational meetings and public meetings, per the discretion of the airport. Conference room space is calculated as 15 square feet per 10,000 annual enplanements.

Employee Facilities

Employee facilities can include breakroom space, lockers, or any other space to accommodate terminal building employees. Employee facilities are calculated as 10 square feet per 10,000 enplanements.

General Public Areas

General Circulation, Including Vestibules

General circulation is additional space within terminal buildings that facilitates movement of people. General circulation is calculated as 22.6 square feet of space per design hour passenger, which equates to an LOS C+. This calculation shows that the existing circulation areas in the SAF terminal are undersized.

Other Public Areas

Modern airport terminals often include additional public spaces to enhance the passenger experience, such as a children's play space, nursing station, or pet relief area. These types of spaces are hard to estimate and are at the discretion of airport management. Currently, SAF has an outdoor observation area on the secure side of the terminal building that can be accessed from the waiting area beyond the security checkpoint. For the purposes of this analysis, other public areas are estimated at five square feet per 10,000 annual enplanements.

Restrooms

Restrooms are strategically located throughout the terminal building on both the public and secure sides. Restroom capacity is calculated based on square footage per peak hour passenger, resulting in an estimated 4.8 square feet per peak hour passenger. Total restroom facilities are currently adequate; however, by the long-term planning period, additional restroom space will be needed.

Building Systems and Support

The systems and support functions include mechanical rooms, heating, ventilation, and air conditioning (HVAC), storage, and stairwells. These elements are necessary for the continued efficiency of the terminal building and are estimated at four percent of the total building size.

Mechanical/HVAC

The mechanical and HVAC elements of a terminal building are a function of actual needs. The existing calculation includes the HVAC equipment, which is located in an uncovered portion of the terminal. Generally, an additional eight percent of the total functional area is considered for these elements.

Vertical Circulation/Structural Space/General Storage

Estimates for other vertical circulation space, various structural space, and general storage space are captured by adding an additional 10 percent of space to the functional area subtotal.

Terminal Building Requirements Summary

Over the last several years, the SAF terminal building has been serving passenger levels that continue to rise annually and are projected to continue increasing over the planning period. In general, the existing terminal building is undersized to efficiently serve current passenger levels. From a functional area perspective, several elements are currently constrained or will become constrained in the near future as passenger levels continue to rise in line with the forecasts. This is a known issue and the airport has hired a terminal architect to begin the design process for a terminal expansion that will address the identified deficiencies.

The terminal calculations are general in nature. When one area becomes constrained, it is common for adjacent areas to accommodate overflow passengers. For example, if one of the gate areas is full, people naturally flow to adjacent areas.

TERMINAL ROADWAY, CURB, AND PARKING

The capacity of the airport access road and terminal area roadways is the maximum number of vehicles that can pass over a given section of a lane or roadway during a given time period. It is normally preferred for a roadway to operate below capacity to provide reasonable flow and minimize delay for the vehicles using it. The existing terminal roadway is a one-way loop design that provides ready access to the front of the terminal building and parking lots.

The curb directly in front of the terminal building is approximately 170 feet long. There is one through lane and one designated loading/unloading lane. There is a second curb area, which is separated by a median and is also approximately 170 feet long. The second curb area consists of two lanes that can be utilized for loading/unloading or as a through lane. This area is primarily utilized by personal vehicles or ground transportation services (shuttles/buses). In total, there are approximately 340 linear feet of terminal curb for loading and unloading.

Estimation of current and future terminal curb length is a function of the vehicle length, average dwell time, curb volume based on 15-minute increments of the peak enplanement/deplanement hour, and the modal split among vehicles, shuttles, and buses. Based on the curb length analysis, the existing curb length is adequate through the long term.

Vehicle parking associated with SAF includes spaces utilized by passengers, visitors, employees, rental car companies, public transit, and taxis/shuttles. Parking needs are generally established by taking into consideration peak hour passengers, peak hour visitors, and the travel mode split. **Table 3V** presents the terminal curb and vehicle parking estimates.

TABLE 3V | Terminal Curb and Parking

	Existing	Current Need	Short Term	Intermediate Term	Long Term
Terminal Curb					
Enplanement Curb	–	50'	50'	50'	70'
Deplanement Curb	–	70'	110'	110'	150'
Total Curb:	340'	120'	160'	160'	220'
Auto Parking					
Short-Term	70	395	468	519	714
Long-Term	563	700	829	919	1,265
Employee	54	40	47	52	71
Subtotal:	687	1,135	1,344	1,490	2,050
Rental Car Parking					
Rental Car	20	84	99	110	152
Total All Parking:	707	1,219	1,443	1,600	2,202

In accordance with airport master plan and airport parking industry standards, short-term parking is estimated as one spot per 500 annual passenger enplanements. Long-term parking needs are estimated at one spot per design day enplanements. Employee parking is estimated to be 200 spaces per one million enplaned passengers. Rental car parking is estimated at 12 percent of design day enplanements.

SAF needs additional parking infrastructure. Demand is such that overflow parking routinely extends to gravel areas to the east of the paved long-term lot. The alternatives in the next chapter will consider expansion of the vehicle parking capacity at SAF, including the potential for a parking garage.

TERMINAL COMPLEX SUMMARY

The terminal building, aircraft ramp, and vehicle parking lots have served the airport effectively for many years; however, continued growth in passenger activity and increasing demand for terminal services have placed greater demands on these facilities and existing capacity has become constrained during peak periods. To accommodate projected future activity and maintain an acceptable level of service, improvements will be needed throughout the terminal area. Expansion of the apron, terminal building, and vehicle parking facilities will provide the additional capacity necessary to support forecasted demand and ensure the terminal area can continue to meet the airport's operational needs over the long term.

GENERAL AVIATION FACILITIES

General aviation facilities include aircraft hangars, aircraft parking aprons, auto parking and access, and general aviation terminal services. The capacities of the various components of each area were examined in relation to projected demand to identify future general aviation facility needs.

AIRCRAFT HANGARS

Owning an aircraft represents a significant investment. Most aircraft owners prefer to store their aircraft in enclosed hangar space, as opposed to utilizing outside aircraft tiedown positions. This is especially true in climates with frequent precipitation and/or changes in the weather. Enclosed hangar space provides protection from the elements and an increased level of security.

SAF has an existing total hangar capacity of 469,200 square feet for 179 based aircraft. The based aircraft forecast projected 34 new aircraft over the next 20 years. Assuming each of these aircraft is to be stored in a hangar, an additional 194,600 square feet of hangar space is estimated to be needed.

Hangar space requirements are general in nature and are based on standard hangar size estimates and typical user preferences. If a private developer desires to construct or lease a large hangar to house one aircraft, any extra space in that hangar may not be available for other aircraft. The actual hangar area needs will be dependent on the usage within each hangar.

GENERAL AVIATION AIRCRAFT APRONS

As mentioned in previous chapters, three general aviation aprons are present at SAF: the east aircraft parking apron, the north aircraft parking apron, and the far north aircraft parking apron. In total, GA apron space accounts for approximately 129,300 square yards. It should be noted that all three aprons are currently undergoing reconstruction (previously depicted on Exhibit 1F). The GA aprons front numerous aircraft hangars and FBO facilities. General aviation aircraft apron area is a critical feature for any airport. Apron areas should be in proximity to airport services or fixed based operator (FBO) services.

The general aviation apron serves both transient and locally based operators. To determine future apron needs, the FAA-recommended planning criterion of 360 square yards was used for ADG I aircraft (single-engine and multi-engine piston aircraft), while a planning criterion of 490 square yards was used for larger ADG II aircraft (turboprops and jets). A parking apron should also provide space for locally based aircraft that require temporary tiedown storage. Locally based tiedowns are typically utilized by smaller single-engine aircraft; thus, a planning standard of 360 square yards per position was utilized in the analysis.

The total general aviation apron parking requirements are presented in **Table 3W**. Existing apron pavement area at SAF encompasses approximately 129,300 square yards. Using the planning standards described above and factoring in assumptions regarding operational and based aircraft growth, the existing apron area exceeds the recommended square yardage in the long term, based on the FAA design criteria. Generally, as any additional general aviation hangars are constructed, additional associated aircraft aprons should be considered at the same time.

TABLE 3W | General Aviation Aircraft Parking Apron Requirements

	Currently Available	Short-Term Need	Intermediate-Term Need	Long-Term Need
Aircraft Parking Area (square yards)				
Based/Local Aircraft	129,300	3,700	3,900	4,600
Transient Small Aircraft		23,800	24,500	26,300
Transient Jet Aircraft		500	1,000	1,500
Total Apron Area:	129,300	28,000	29,400	32,400

Source: Coffman Associates analysis

GENERAL AVIATION VEHICLE ACCESS AND PARKING

General aviation parking needs are attributable to locally based users, transient airport users, and aviation businesses. Locally based users primarily include those attending to their based aircraft. As with many airports with a significant general aviation component, most based aircraft owners will park their vehicles in or adjacent to their hangars when attending to or flying their aircraft. Current planning standards suggest that dedicated vehicle parking lots and access roads should be made available to hangar owners/occupants, where feasible. This has the positive effect of removing vehicular traffic from aircraft movement areas. Vehicle parking needs for locally based aircraft operators are estimated at half the total number of based aircraft. If dedicated vehicle parking were made available for local aircraft owners, there would be a current need for 90 spaces and a need for 107 spaces in the long term.

Transient users require vehicle parking lots, as they are short-term (often same-day) visitors. This space is typically provided by airport businesses and FBOs. Calculations of future transient vehicle parking needs are a function of the number of potential general aviation passengers during the design hour. The number of design hour itinerant general aviation passengers is multiplied by 2.0 (average vehicle occupants), which results in a total number of vehicle parking spaces needed. Calculations for itinerant general aviation vehicle parking spaces are estimated at 32 spaces for the current need and 96 spaces for the long-term need. Calculations of the number of spaces needed for airport businesses are estimated at one space per 1,000 general aviation operations.

Table 3X summarizes the general aviation vehicle parking needs for airport users. The physical count of vehicle parking spaces dedicated for general aviation, surrounding the terminal building, is approximately 74. In addition, GA users are able to utilize the short-term and long-term parking lots adjacent to the terminal building, which provide over 700 vehicle parking positions. The capacity of GA parking spaces needs to be expanded to meet long-term needs. As new GA landside facilities are developed, consideration should be given to the construction of dedicated vehicle parking positions for GA users.

TABLE 3X | GA Vehicle Parking Requirements

	Existing	Current Need	Short Term	Intermediate Term	Long Term
Design Hour GA Itinerant Passengers	—	16	28	30	32
GA Vehicle Parking Spaces					
GA Itinerant Spaces	—	32	56	60	64
GA Local Spaces	—	90	94	98	107
General Aviation Business Spaces	74	41	60	61	66
Total GA Spaces:	74	163	210	219	237

GENERAL AVIATION TERMINAL SERVICES

Typically, certain services will be made available to general aviation users. These may include a pilots' lounge, flight planning station, line services, conference room, and restrooms. These facilities may be provided by a dedicated facility and/or shared with FBO facilities. At SAF, the FBOs provide these spaces for general aviation users. Currently, the Atlantic Aviation FBO offers approximately 2,900 square feet of space and the Signature Aviation FBO offers approximately 2,250 square feet, totaling approximately 5,150 square feet available for general aviation users. In anticipation of the passenger terminal expansion project, Signature Aviation is in the process of developing a new FBO terminal facility at the east end of the GA apron.

General aviation terminal needs are a function of the average number of general aviation passengers who may use the facilities during the design hour. Assuming two people per design hour operation, it is estimated that there is a need to accommodate at least two people within any single hour in the long term. Calculating 120 square feet of space per person results in the general aviation terminal building space requirements of 1,900 square feet currently and 3,800 square feet in the long term. **Table 3Y** presents the calculation for GA terminal space needs at the airport.

TABLE 3Y | General Aviation Terminal Area Facilities

	Current Need	Short Term	Intermediate Term	Long Term
Design Hour GA Itinerant Operations	8	14	15	16
Multiplier	2	2	2	2
Total Design Hour Itinerant Passengers	16	28	30	32
GA Terminal Building Public Space*	1,900 sf	3,400 sf	3,600 sf	3,800 sf
*To be provided by FBOs sf = square feet				

GENERAL AVIATION LANDSIDE REQUIREMENTS SUMMARY

To meet the projected needs of general aviation activity, approximately 194,600 square feet of additional hangar area is anticipated to be needed. This estimate is based on projected growth in based aircraft. The type of hangar needed is based on the needs of any specific developer. The most common hangar facilities being constructed today are executive box or conventional hangars.

As previously mentioned, the current general aviation aprons (east aircraft parking apron, north aircraft parking apron, and far north aircraft parking apron) offer approximately 129,300 square yards of apron space, including approximately 175 tiedown parking positions. Through the analysis conducted in this chapter, the results proved the current sizes of the aprons and number of parking positions are adequate to support the projected growth through the long-term planning horizon; therefore, there is no need for additional general aviation apron space, but with new hangar construction, additional apron space supporting these developments should still be considered.

Some based aircraft owners with hangars will park their vehicles in their hangars when they are using their aircraft. Optimal planning will provide enough dedicated parking for both based aircraft owners and transient users. The general aviation vehicle parking model indicates that no additional vehicle parking lots are needed; however, each hangar constructed should include its own dedicated vehicle parking lots.

General aviation terminal services are provided by the FBOs. It is the responsibility of the FBOs to determine if additional space is needed for their clients. The general aviation terminal space model indicates that additional space may be needed in the future; however, as part of a potential expansion of the passenger terminal building, Signature Aviation is relocating its FBO facility to the east end of the GA apron. The relocation will include the development of a new facility, which is anticipated to include GA terminal service spaces.

The landside facilities necessary to meet current and future demand should be maintained to a high standard. To this end, the airport should prioritize ongoing maintenance needs and pay attention to aesthetics, as the airport is an important entrance to the community.

AIRPORT SUPPORT REQUIREMENTS

Various facilities that do not logically fall within the classifications of airside or landside facilities have also been analyzed for their adequacy through the long-term planning period. These other areas provide certain support functions related to the overall operation of the airport.

MAINTENANCE AND SNOW REMOVAL EQUIPMENT (SRE) BUILDINGS

The maintenance/SRE facilities are located perpendicular to the east aircraft parking apron on the south side of Runway 10-28. Most equipment should be stored in enclosed space, especially in a climate like that of Santa Fe, where winters are cold and snowy and summers are hot. The maintenance facilities consist of two separate buildings, encompassing an approximate total of 7,500 square feet of space.

The location of the maintenance facilities is ideal, as they are separated from the commercial and general aviation operational activities but still have direct access to the airfield system. As the airport grows, there is room for additional maintenance facilities, should the needs and demands of the airport dictate.

FAA AC 150/5200-30D, *Airport Field Condition Assessments and Winter Operations Safety*, and AC 150/5220-20A, *Airport Snow and Ice Control Equipment*, provide guidance and recommended equipment for snow-related events to clear priority surfaces in a reasonable time. The recommended SRE for commercial service airports includes the following:

- One high-speed rotary plow
- Two snowplows with equal snow removal capacity
- One towed or self-propelled runway broom with air-blast
- One solid material spreader
- One liquid deicing/anti-icing chemical spraying vehicle

In Chapter One, a list of the SRE currently at the airport was provided, which included the following:

- 1990 Oshkosh PA6 22-inch Frink plow
- 1993 Oshkosh PA6 22-inch Frink plow
- 2003 John Deere 544J loader with plow attachment

- 2012 Ford F-250 truck with six-foot Myers plow attachment
- 2019 MB snowplow and broom
- 2001 spreader for deicer

Based on FAA guidance, SAF should continue to update its SRE on a regular schedule and ensure it meets the minimum recommended equipment.

AIRCRAFT RESCUE AND FIREFIGHTING (ARFF)

Part 139 airports are required to have ARFF services during air carrier operations. Each certified airport maintains equipment and personnel based on an ARFF index that is established according to the length of aircraft and the frequency of scheduled flights. An ARFF index is determined by the longest aircraft that conducts at least five or more daily departures. There are five indices based on aircraft length: A through E.

The current ARFF equipment and staffing meet ARFF Index B, based on operations by aircraft with lengths of 90 feet or longer but less than 126 feet. The current ARFF index for SAF is expected to increase to Index C through the short-term planning period due to the ultimate critical aircraft determination (Airbus A319/A320 and Boeing 737) established in Chapter Two, and the anticipation of the A319 to begin operating at SAF in the near term; therefore, it is recommended that ARFF equipment and staffing be upgraded to satisfy the requirements of Index C.

FAA design standards recommend that ARFF station facilities and equipment be located so they can reach the center point of any runway within three minutes and respond to emergencies on the terminal apron without having to cross an active runway. The ARFF facility is co-located with the maintenance/SRE facilities and has immediate access to Taxiway C.

FUEL STORAGE

SAF accommodates a diverse range of aviation fuel types and storage facilities, all of which are managed and supplied by the airport's FBOs. Fuel is stored on-airport in a variety of tanks that range from small individual containers to large bulk storage tanks. The airport currently has a total storage capacity of approximately 95,000 gallons of Jet A fuel and 29,000 gallons of 100LL fuel. Through the planning period, the FBOs will be responsible for monitoring fuel storage capacity and adjusting supply levels as necessary to accommodate changes in demand.

PERIMETER FENCING

Perimeter fencing is used at airports primarily to secure the aircraft operational area and reduce wildlife incursions. The physical barrier of perimeter fencing serves the following purposes:

- Gives notice of the legal boundary of the outermost limits of a facility or security-sensitive area
- Assists in controlling and screening authorized entries into a secured area by deterring entry elsewhere along the boundary

- Supports surveillance, detection, assessment, and other security functions by providing a zone for installing intrusion-detection equipment and closed-circuit television (CCTV)
- Deters casual intruders from penetrating a secured area by presenting a barrier that requires an overt action to enter
- Demonstrates the intent of an intruder by their overt action of gaining entry
- Causes a delay to obtain access to a facility, thereby increasing the possibility of detection
- Creates a psychological deterrent
- Optimizes the use of security personnel while enhancing capabilities for detection and apprehension of unauthorized individuals
- Demonstrates a corporate concern for facility security
- Limits inadvertent access to the aircraft operations area by wildlife

The airport's perimeter is enclosed with six-foot-tall chain-link perimeter security fencing with three strands of barbed/razor wire. The perimeter fencing, which is regularly inspected, serves as operational security and as a deterrent to wildlife accessing the airfield movement areas. This fencing should be maintained.

GENERAL AVIATION AND SUPPORT FACILITIES SUMMARY

Table 3Z summarizes the general aviation and other support facility requirements. Based on the traditional models for estimating future hangar needs, the airport will need approximately 194,600 square feet of new hangar space over the next 20 years. It is anticipated that most of the new hangar space will be conventional hangar space or executive box hangar space; however, that decision typically lies with the developer. With each new hangar constructed, additional aircraft apron and vehicle parking space should be included.

TABLE 3Z | General Aviation and Support Facilities Summary

Parameter	Available	Short Term	Intermediate Term	Long Term
Based Aircraft	179	187	195	213
General Aviation Hangar Space	469,200 sf	547,200 sf	596,200 sf	663,800 sf
Aircraft Parking Apron	129,300 sy	Existing capacity meets long-term need		
GA Vehicle Parking	74 spaces*	210 spaces	219 spaces	237 spaces
GA Terminal Services	5,150 sf	Existing capacity meets long-term need		
Fuel Storage Capacity	124,000 gallons	Vendor responsibility		
Perimeter Fencing	Approx. 48,000 lf	Maintain and Replace as Needed		
ARFF Building/Vehicles	Index B	Transitioning to Index C		
Maintenance Facilities	—	Expand as needed		
Snow Removal Equipment	—	Upgrade on a regular schedule		
*GA users can also utilize the short-term and long-term parking lots.				
lf = linear feet				
sf = square feet				
sy = square yards				

The FBOs provide the general aviation terminal service space. It will be an FBO business decision to provide additional space for these functions as necessary. The airport is not planning to provide a general aviation terminal space element and will leave those services to the FBOs. Fuel storage capacity is another element that is left to the FBOs to manage.

As previously mentioned, the current ARFF facility at SAF maintains required equipment and staffing to satisfy Index B; however, due to the critical aircraft determination and the anticipation of A319 and larger aircraft operations in the future, it is recommended that the ARFF equipment and staffing be upgraded to satisfy the requirements of Index C.

The airport has dedicated maintenance/SRE facilities located perpendicular to the east aircraft parking apron, on the southern side of Runway 10-28. These facilities house the necessary/required equipment and are appropriately sized for existing operational levels. Should operational levels increase to a point at which the current equipment and facility size no longer efficiently support the airport, there is room for these facilities to expand. It should also be noted that SRE is eligible for FAA funding; therefore, it is recommended that equipment be replaced on a regular schedule, as needed.

SUMMARY

This chapter has outlined the facilities required to meet potential aviation demands projected for the airport for the next 20 years. The next chapter examines potential improvements to the airfield system and the landside area. Most of the discussion focuses on capital improvements that would be eligible for federal grant funds. Several facility layouts that meet the forecasted demands over the next 20 years are presented and an overall ALP that presents a long-term vision will ultimately be developed.