Chapter 5 – DRAFT Demand / Capacity and Facility Requirements

Airport Master Plan | Salinas Municipal Airport

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Table of Contents

5.1 Introduction 1

5.1.1 Forecast Summary 1
5.1.2 Critical Aircraft 2
5.1.3 Runway Design Code (RDC) 1
5.1.4 Taxiway Design Group (TDG) 1

5.2 Airspace and NAVAID Requirements 3

5.2.1 Navigational Aids (NAVAID) 3
5.2.2 Instrument Approaches 3
5.2.3 Airspace Protection 7

5.3 Airfield Requirements 8

5.3.1 Hourly Capacity and Annual Service Volume 8
5.3.2 Runway Requirements 12
5.3.3 Runway Protective Surfaces 18
5.3.4 Taxiway/Taxilane Requirements 29
5.3.5 Taxiway Access Factors 35
5.3.6 Airfield Pavement 35
5.3.7 Airfield Lighting 39
5.3.8 Signage 39
5.3.9 Airfield Markings 40

5.4 Landside Facility Requirements 41

5.4.1 Vehicle Access 41
5.4.2 Vehicle Parking 41
5.4.3 Perimeter / Security Fencing and Access Gates 43
5.4.4 Land Use 44
5.4.5 Terminal / Airport Administration Building 45

5.5 General Aviation 46

5.5.1 Aircraft Hangars 46
5.5.2 Aircraft Parking Apron 48

5.6 Airport Support Facilities and Equipment 51

5.6.1 ARFF & Other Emergency Services 51
5.6.2 City Maintenance & Equipment Building 51
5.6.3 Fueling Facilities 51
5.6.4 Airport Traffic Control Tower 52

5.7 Utilities and Infrastructure 53
5.7.1 Airfield Electrical Vault 53
5.8 Sustainability Workshop Input 54
5.8.1 Airside Facility Requirements Feedback 54
5.8.2 Landside Facility Requirements Feedback 55
5.8.3 Summary 56
5.9 Requirements Summary 57
5.9.1 Airspace Requirements 57
5.9.2 Airfield Requirements 57
5.9.3 Landside Requirements 58
5.9.4 Access, Circulation, and Parking Facility Requirements 58
5.9.5 Airport Support Facility Requirements 58

(Click the header at any point to return to the Table of Contents)

Figures

Figure 5.1 - Taxiway Design Groups 2
Figure 5.2 - 100 Percent of Fleet at 60 or 90 Percent Useful Load 15
Figure 5.3 - Example RSA, ROFA, and RPZ 19
Figure 5.4 - Runway 8 End RSA/ROFA Penetrations 22
Figure 5.5 - Runway 26 End RSA/ROFA Penetrations 22
Figure 5.6 - Runway 13 End RSA/ROFA Penetrations 23
Figure 5.7 - Runway 31 End RSA/ROFA Penetrations 23
Figure 5.8 - Runway 8 End RPZ Penetrations 25
Figure 5.9 - Runway 13 End RPZ Penetrations 26
Figure 5.10 - B-II to C-II: RSA and ROFA Impacts 27
Figure 5.11 - B-II to C-II: RPZ Impacts 28
Figure 5.12 - Problematic Taxiway Geometry 33
Figure 5.13 - Run Up Areas 34
Figure 5.14 - PCI 36
Figure 5.15 - Airfield Pavement Major Work Projections 38
Figure 5.16 - Enhanced Centerline (Typical) 40
Figure 5.17 - Markings Directional and Mandatory Hold (Typical) 40
Figure 5.18 - Airfield Fencing 44
Figure 5.19 - Apron Area 50
Figure 5.20 - Fuel Sales by Year 52

Tables

Table 5.1 - SNS Demand Forecast Summary 1
Table 5.2 - Critical Aircraft Characteristics 2
Table 5.3 - Visibility Minimums 1
Table 5.4 - SNS Runway Design Codes 1
Table 5.5 – Electronic and Visual NAVAIDs 3
Table 5.6 - NAVAID Facility Requirements 3
Table 5.7 - Lowest IAP Minimums 5
Table 5.8 - Criteria to Support Instrument Flight Procedure Development 6
Table 5.9 – ACDM Aircraft Classification System 10
Table 5.10 – Hourly Capacity 11
Table 5.11 – Annual Service Volume 12
Table 5.12 – Runway Width Requirements 12
Table 5.13 – Existing and Future Critical Aircraft Characteristics 14
Table 5.14 – Runway Length Requirements 17
Table 5.15 - Runway Designation Requirements 17
Table 5.16 - Runway Strength 18
Table 5.17 – Runway Safety Area Dimensions 20
Table 5.18 – Runway Safety Area Requirements 20
Table 5.19 – Runway Object Free Area Dimensions 21
Table 5.20 – Runway Object Free Area Requirements 21
Table 5.21 - Runway Protection Zones (RPZs) 24
Table 5.22 - Runway Protection Zone Requirements 25
Table 5.23 - Taxiway Width Requirements 30
Table 5.24 - Taxiway/Taxilane Separation Requirements 30
Table 5.25 - Taxiway/Taxilane Safety Area and Object Free Area Dimensions 31
Table 5.26 - Taxilane Protective Surface Requirements 31
Table 5.27 - Non-Standard Taxiway Geometry Requirements 32
Table 5.28 - Taxiway Exit Ranges 35
Table 5.29 – Fair to Serious Pavement Sections 39

Table 5.30 - Public Vehicle Parking Requirements 42
Table 5.31 - General Aviation Terminal Space Requirements 46
Table 5.32 - Average Aircraft Space Requirements 47
Table 5.33 - Existing Hangar and Demand Summary 47
Table 5.34 - Northside Hangar Useful Life Analysis 48
Table 5.35 - Apron Area Demand Summary 50

5.1 Introduction

The Requirements Chapter of the Airport Master Plan is intended to determine Salinas Airport's (SNS) ability to accommodate future aeronautical and non-aeronautical demand throughout the planning period. The requirements are developed using the **Existing Conditions & Inventory Chapter**, as well as the **Forecast of Aviation Demand Chapter**. This chapter will identify the specific types and quantities of infrastructure and facilities needed at SNS to meet the FAA's approved forecasted aviation demand. These requirements will guide the alternative development process by examining projected perceived needs of the following major components: airspace, airfield, landside, general aviation, airport support facilities and equipment, as well as utilities and infrastructure.

The 20-year planning period for the Airport Master Plan, beginning in the year 2022, extends through 2042. Development throughout the planning period is broken down into three planning periods: short-term (1-5 years), mid-term (6-10 years), and long-term (11-20 years). Short-term planning is focused on the immediate needs of the airport, mid-term planning focuses on a more detailed and in-depth evaluation of airport needs, long-term planning is focused on the ultimate needs of the Airport. It is important to note that the needs of the Airport may vary throughout the 20-year planning period. However, the City of Salinas can make an informed decision regarding forecasted demand-based development using the three planning periods.

This chapter provides a review of the facility needs for the following:

- Airspace
- Airfield Capacity and Facilities
- Landside and General Aviation Facilities
- Support Facilities
- Utilities and Infrastructure

5.1.1 Forecast Summary

A summary of the FAA-approved aviation demand forecast, based on the three planning periods, is provided in **Table 5.1**. Additional information on the forecast can be found in the **Forecast of Aviation Demand Chapter**.

Table 5.1 - SNS Demand Forecast Summary

	2022 Existing	5 Year	10 Year	15 Year	20 Year
Based Aircraft	163	173	183	193	203
Annual Operations	62,335	82,688	83,737	84,801	85,879

Source: C&S Engineers, Inc., 2024 (Forecast of Aviation Demand)

5.1.2 Critical Aircraft

The Airport's critical aircraft, or design aircraft, represents the largest or most demanding aircraft anticipated to make regular use of the airport facilities for at least 500 operations annually. An airport's critical aircraft affects key aspects of design, such as the sizing of runways and taxiways/lanes, the location of aircraft parking areas, number and size of hangar facilities, and protected airspace surfaces. As indicated in FAA AC 150/5300-13B, *Airport Design* and described in the **Forecast of Aviation Demand Chapter**, an airport's critical aircraft determines the Aircraft Approach Category (AAC) and Aircraft Design Group (ADG).

The FAA requires a critical aircraft designation for each runway at an airport. At Salinas, Runway 13/31 is 4,825 feet long and considered the primary runway as it is equipped with an instrument landing system including approach lights. Runway 8/26 is 6,004 feet long and classified as the secondary runway due to the lack of precision instrument approach. Due to the primary runway having superior approach minimums and the secondary runway being longer it is assumed that both runways will see similar numbers of operations. For this reason, both runways share the same critical aircraft.

The existing and future critical aircraft are a family of aircraft and are presented in the table below.

Table 5.2 - Critical Aircraft Characteristics

	Runway	Critical Aircraft	AAC	ADG	TDG
Existing	8/26	Beech 200 Super King Air, Cessna Citation CJ4, and Cessna Citation II/Bravo	B	II	2A
	13/31 **(Primary)**	Beech 200 Super King Air, Cessna Citation CJ4, and Cessna Citation II/Bravo	B	II	2A
Future	8/26	Learjet 75, Beech 200 Super King Air	C	II	2A
	13/31 **(Primary)**	Learjet 75, Beech 200 Super King Air	C	II	2A

Source: Aircraft Characteristics Data, Appendix 1 of AC 150-5300-13B, effective 03/31/2022; https://cessna.txtav.com/en/turboprop/caravan; https://www.globalair.com/. Discussion justifying Runway 13/31 as the primary runway is included in the Inventory Chapter.

5.1.3 Runway Design Code (RDC)

The RDC signifies standards to which the runway is to be built and maintained. The AAC and ADG along with approach visibility minimums are combined to form the RDC of a specific runway. The final component of the RDC relates to the Runway Visibility Range (RVR) minimums for the instrument approaches into each runway as depicted in **Table 5.3**. The Runway Design Code (RDC) of each runway at SNS differs due to varying visibility minimums. **Table 5.4** outlines the existing and future RDC components for each runway.

Table 5.3 - Visibility Minimums

RVR (FT)	Instrument Flight Visibility Category (statute mile)
Visual	Visual Approach
5,000	Not lower than 1 mile
4,000	Lower than 1 mile but not lower than ¾ mile
2,400	Lower than ¾ mile but not lower than ½ mile
1,600	Lower than ½ mile but not lower than ¼ mile
1,200	Lower than ¼ mile

Source: FAA AC 150/5300-13B, Table 1-3. Visibility minimums

Table 5.4 - SNS Runway Design Codes

	Runway End	Critical Aircraft	AAC	ADG	Visibility Minimums (RVR) (FT)
Existing	8/ 26	Beech 200 Super King Air, Cessna Citation CJ4, and Cessna Citation II/Bravo	B B	II II	5,000 Visual
	13/ 31	Beech 200 Super King Air, Cessna Citation CJ4, and Cessna Citation II/Bravo	B B	II II	4,000 2,400
Future	8/ 26	Learjet 75, Beech 200 Super King Air	C C	II II	5,000 Visual
	13/ 31	Learjet 75, Beech 200 Super King Air	C C	II II	4,000 2,400

Source: FAA AC 150/5300-13B, C&S Engineers, Inc.

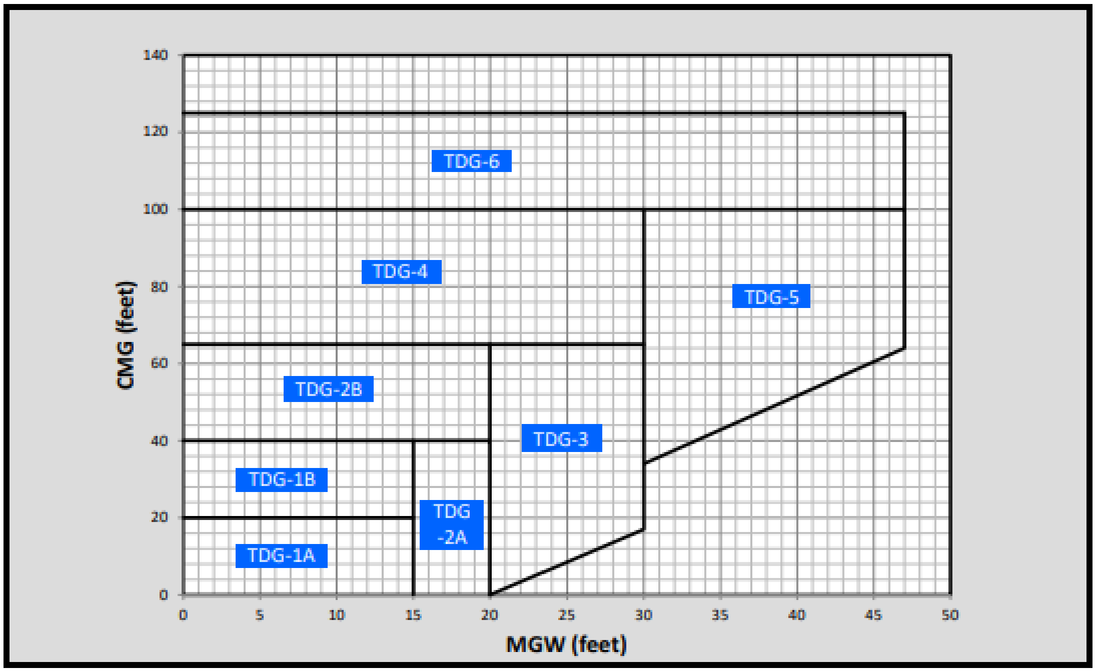
5.1.4 Taxiway Design Group (TDG)

A critical aircraft is also used to determine the Taxiway Design Group (TDG) at an airport. The TDG dictates the taxiway/taxilane width and fillet standards (radius of curvature at the intersection of two taxiways or a taxiway and a runway), as well as separation requirements. A

TDG is determined by plotting the design aircraft's main gear width (MGW) to its cockpit to main gear distance (CMG) on the graph shown in **Figure 5.1**.

For both he existing and future critical aircraft, the Beech 200 is the most demanding from a TDG perspective. With a MGW of 17.17 ft and a CMG of 15 ft, as noted in the FAA Aircraft Characteristics Database, dated 2/7/2023 (https://www.faa.gov/airports/engineering/aircraft_char_database), it falls within the TDG 2A category.

Figure 5.1 - Taxiway Design Groups



Source: FAA AC 150/5300-13B, Figure 1-1, Taxiway Design Groups (TDGs)
Notes: 1.) Values in the graph are rounded to the nearest foot. 1 foot = 0.305 meters.
2.) CMG = Cockpit to Main Gear Distance: The distance from the pilot's eye to the main gear turn center.
3.) MGW = Main Gear Width: The distance from the outer edge to outer edge of the widest set of main gear tires.

5.2 Airspace and NAVAID Requirements

5.2.1 Navigational Aids (NAVAID)

As discussed in **Existing Conditions & Inventory**, the electronic navigational aids at the Airport include a glideslope, localizer, VORTAC, and ASOS. The visual navigational aids include a four-light VASI on the Runway 13 end, a two-light PAPI on the Runway 31 end, two-light VASI's on both ends of Runway 8/26, wind cones, and a rotating beacon.

Table 5.5 – Electronic and Visual NAVAIDs

Electronic NAVAIDs	Visual NAVAIDs
RWY 31: Glideslope and Localizer (ILS) VORTAC RNAV (GPS)	RWY 13: VASI-4L, REIL RWY 13/31: HIRL RWY 31: PAPI-2L, MALSR RWY 8: VASI-2L RWY 8/26: MIRL RWY 26: VASI-2L, REIL Misc: Beacon, MITL, Segmented Circle, Lighted Wind Cones

Source: C&S Engineers, Inc.

FAA AC 150/5300-13B, *Airport Design*; AC 150/5340-30J, *Design and Installation Details for Airport Visual Aids*; Order 7031.2C, *Airway Planning Standard Number One – Terminal Air Navigation Facilities and Air Traffic Control Services*; and the *Aeronautical Information Manual* (AIM) offer guidance on the types of visual and electronic NAVAIDs that should be present at an airport. Based on a review of these documents, and the conditions detailed in Section 1, the Airport should address the following navigational aid needs:

Table 5.6 - NAVAID Facility Requirements

NAVAID	Requirement
VASI	Replace VASIs on Runway Ends 13, 8, and 26 with PAPI equipment.
VORTAC	The VORTAC is aging and with the availability of ILS, RNAV, and LOC approaches it does not significantly benefit the Airport. It is recommended that the VORTAC be relocated to free up the east side of the airfield for future development.

Source: C&S Engineers, Inc.

5.2.2 Instrument Approaches

Instrument approach procedures to a runway end are used by landing aircraft to navigate to the airport when the cloud ceiling is less than 1,000 feet above ground level and/or visibility is less than three statute miles. Establishing approaches with the lowest possible weather minimums allow the airport to maximize its operational utility. Each approach type requires differing infrastructure and navigational aids. This section discusses possible instrument procedure upgrades/options that can be explored for SNS. FAA airport design standards must be met as shown in **Table 5.8**. Further coordination with the FAA Flight Procedures Office is recommended to review the feasibility of implementing any new approach procedure and/or improvements to existing instrument approaches.

Runway 8/26

Runway 8/26 currently offers a single RNAV (GPS) approach to the Runway 8 end. The Runway 26 end would benefit from an instrument approach because it is aligned with the prevailing winds and is longer than Runway 13/31. The possibility of creating an instrument approach for the Runway 26 has been explored by both the FAA design group, the Airport, and the FAA Flight Procedures group. It was determined that due to the mountainous terrain approximately three miles to the east of the Airport, a standard instrument approach would not be pursued. While it would likely be possible to create a non-standard approach with a steep descent, the resulting approach minimums would be high enough that they would negate the benefit of having the approach in the first place. In lieu of publishing a new approach to the Runway 26 end, aircraft can utilize the existing "Circle to Land" procedure that is available on the approaches to all the other runway ends. It should be noted that due to the safety concerns from the rising terrain to the east and west of the Airport as well as the general limitations of a circling approach, minimums for these approaches will always be higher than that of a straight in approach and will not provide the same level of service.

Runway 13/31

Runway 13/31 is served by RNAV (GPS) approaches to both ends of the runway, a VOR approach to Runway 13, and an ILS and LOC approach to Runway 31. These approaches currently provide sufficient coverage to both ends of the runway. It is possible that the approach minimums for the Runway 13 RNAV procedure could be lowered to below ¾ SM visibility to further increase the capability of this runway end. However, as stated in **Table 5.8** below, this would require the addition of an approach lighting system to this runway end. It is unlikely that the marginal decrease in visibility minimums on this runway end would benefit the Airport and its users enough to warrant the cost of installing the additional instrumentation required.

A summary of the available instrument approach procedures and the lowest available minimums is found in **Table 5.7** below. A full list of all the current Instrument Approach Procedures (IAPs) can be found in the **Existing Conditions & Inventory Chapter**.

Table 5.7 - Lowest IAP Minimums

Runway End	Instrument Approach Procedures Available	Lowest Available Visibility Minimums
Runway 8	RNAV (GPS)	684 FT, 1 SM: RNAV
Runway 26	Visual Only	456 FT, 1 SM: Circling Approach from RWY 31
Runway 13	RNAV (GPS) VOR	250 FT, ¾ SM: RNAV (GPS)
Runway 31	ILS LOC RNAV (GPS)	220 FT, 2400 RVR: ILS or RNAV (GPS)

Source: AirNav Instrument Approach Procedures SNS (14 July 2022 – 11 August 2022)

Table 5.8 - Criteria to Support Instrument Flight Procedure Development

Standards[1]	Visibility Minimums[1] < 3/4 Statute Mile	3/4 to < 1 Statute Mile	≥ 1 Statute Mile, Straight-In	Circling[2], ≥ 1 Statue Mile
HAT[3]	≤ 250 FT	≥ 250 FT	≥ 250 FT	≥ 350 FT
POFZ (PA and APV Only)	Required	Not Required	Not Required	Not Required
IT-OFZ	Required	Not Required	Not Required	Not Required
ALP[4]	Required	Required	Required	Required
Minimum Runway Length	4,200 FT	3,200 FT [5]	3,200 FT [5]	3,200 FT [5]
Paved Surface	Required	Recommended[6]	Recommended[6]	Recommended[6]
Runway Markings (AC 150/5340-1)	Precision	Non-precision	Non-precision	Visual
Holding Position Signs and Markings (AC 150/5340-1, AC 150/5340-18)	Required	Required	Required	Required
Runway Edge Lights[7]	HIRL or MIRL	HIRL or MIRL	MIRL or LIRL	MIRL or LIRL (Required only for night minimums)
Parallel Taxiway[8]	Required	Required	Recommended	Recommended
Approach Lights[9]	Required	Recommended[10]	Recommended[10]	Not Required
VGSI[11]	Recommended	Recommended	Recommended	Recommended
Applicable Runway Design Standards	Lower than 3/4-mile visibility minimums	Not lower than 3/4-mile visibility minimums	Not lower than 1-mile visibility minimums	Not lower than 1-mile visibility minimums
Approach or Departure Surface to be Met (AC 150/5300-13B, Paragraph 3.6.1)	See Table 3-3 or Table 3-4	See Table 3-3 or Table 3-4	See Table 3-3 or Table 3-4	Table 3-3
Optimum Survey Type[12]	VGS	VGS	NVGS	NVGS

Source: FAA AC 150/5300-13B, Appendix K, Table K-1

Numbered Notes for Table K-1:

Note 1: Visibility minimums and described standards are subject to the application of FAA Order 8260.3 (TERPS) and associated orders. For each level of visibility, meet or exceed the optimum conditions within the column.

Note 2: For runways authorized for circling, meet requirements for threshold siting (reference paragraph 3.5) and OFZ (reference paragraph 3.11).

Note 3: HAA for circling. The HAT/HAA indicated is for planning purposes; actual obtainable HAT/HAA is determined by TERPS and may be higher due to obstacles or other requirements.

Note 4: An ALP is only required for obligated airports in the NPIAS; it is recommended for all others.

Note 5: Runways less than 3,200 FT are protected by 14 CFR Part 77 to a lesser extent. However, runways as short as 2,400 FT could support an instrument approach provided the lowest HAT is based on clearing any 200 FT obstacle within the final approach segment.
Note 6: Unpaved runways require case-by-case evaluation by the IFP Validation Team (IVT).
Note 7: Runway edge lighting is required for night approach minimums. High intensity lights and an RVR touchdown zone sensor are required for RVR-based minimums.
Note 8: A full-length parallel taxiway leading to and from the thresholds is advisable to achieve the lowest possible minimums, and minimizes the time aircraft are on the runway. Refer to the minimum visibility requirements on airport conditions in FAA Order 8260.3. Construction of a parallel taxiway, while advisable, is not a requirement for publication of an IFP with visibility minima ≥ 1 statute mile.
Note 9: Not applicable to Performance Based Navigation procedures. The following standards are applicable to conventional, ground-based procedures. A full approach light system (ALSF-1, ALSF-2, Simplified Short Approach Light System with Runway Alignment (SSALR), or MALSR) is required for visibility < 3/4 statute mile. Intermediate (MALSF, MALS, SSALF, SSALS, Short Approach Lighting System (SALS)/SALSF) or Basic (ODALs) systems will result in higher visibility minimums. An ALSF-1 or ALSF-2 is required for CAT II/III ILS. HAT < 250 FT without MALSR, SSALR, or ALSF is permitted with visibility not less than 3/4 statute mile.
Note 10: ODALS, MALS, SSALS, and SALS are acceptable. Approach lights are recommended where a visibility minima improvement of at least 1/4 statute mile can be achieved.
Note 11: To preclude a non-standard IFP, it is critical the instrument approach vertical descent angle (VDA) or glidepath angle (GPA) is coincident with the VGSI angle.
Note 12: See AC 150/5300-18 for VGS and non-Vertically Guided Survey (NVGS) requirements. When an AC 150/5300-18 VGS is not available, the equivalent legacy vertically guided (VG) surveys are area navigation approach precision vertical landing (ANAPV)/ localizer performance with vertical guidance (LPV)/PC, and PIR.
Note 13: Absence of a survey does not preclude authorization to establish circling to a runway but may result in the procedure being restricted to daytime only operations.

5.2.3 Airspace Protection

An analysis was conducted to identify obstructions to airspace surfaces utilizing aeronautical survey data collected in May 2022 by Martinez Geospatial. Initial results have identified a number of obstructions on the approach end of Runway 8 and Runway 13. These obstructions include trees, light poles, roads and buildings. See **Appendix 10-A** of the full Airport Layout Plan drawing set for detailed obstruction data as well as proposed dispositions for each obstruction. Obstructions should be addressed in near-term (years 1 to 5) of the planning period as this is a top priority safety item with the FAA.

5.3 Airfield Requirements

FAA standards are utilized in this analysis for developing airport facilities capable of meeting both existing and forecasted levels of aviation activity. FAA AC 150/5300-13B, *Airport Design*, uses coding systems to relate airport design criteria to the operational and physical characteristics of the aircraft that operate or are projected to operate, at an airport. These airport design criteria will further dictate the future need for expanded airfield infrastructure and operational parameters to best plan and meet the forecasted future operations.

5.3.1 Hourly Capacity and Annual Service Volume

Airfield capacity, as it applies to the Airport, is a measure of terminal area airspace and airfield saturation. It is defined as the maximum rate at which aircraft can arrive and depart an airfield with an acceptable level of delay. Measures of capacity include the following:

- **Hourly Capacity of Runway** – The maximum number of aircraft operations that can take place on the runway system in one hour
- **Annual Service Volume (ASV)** – The annual capacity or a maximum level of annual aircraft operations that can be accommodated on the runway system with an acceptable level of delay

Airport Hourly Capacity and Annual Service Volume are important metrics used in aviation to determine the efficiency and capacity of an airport. Although there are a variety of techniques that can be used to analyze airfield capacity, the current technique accepted by the FAA is described in FAA AC 150/5060-5 (Consolidated), *Airport Capacity and Delay*. The Airport Capacity and Delay Model (ACDM) uses the following inputs to derive an estimated airport capacity.

- Airfield layout and runway use
- Meteorological conditions
- Navigational aids
- Aircraft operational fleet mix
- Touch-and-Go operations

The hourly capacity refers to the maximum number of aircraft operations that an airport can handle in a single hour, considering factors such as runway length, taxiway layout, air traffic control capabilities, and weather conditions. It is calculated by dividing the total available runway capacity (in terms of takeoff and landing movements) by the minimum required separation time between aircraft. The annual service volume refers to the total number of passengers and cargo that an airport can handle in a year. These calculations are useful in determining if the airport can handle an increasing number of flights and useful in planning infrastructure upgrades and improvements to meet future demand.

5.3.1.1 Airfield Layout and Runway Use

The airfield layout refers to the location and orientation of runways, taxiways, and other facilities. The Airport has two intersecting runways, Runway 8/26 and Runway 13/31, with full-length parallel taxiways serving both runways.

5.3.1.2 Meteorological Conditions

Wind conditions are of prime importance in determining runway use and orientation. The prevailing wind and visibility conditions determine the direction takeoffs and landings may be conducted.

The terms Visual Flight Rules (VFR) and Instrument Flight Rules (IFR) are used to define the current weather conditions and operating rules for these associated conditions. VFR conditions occur when the cloud ceiling is at least 1,000 feet and visibility is three statute miles or greater. During these conditions, pilots fly on a see-and-be-seen basis. IFR conditions occur when the ceiling is less than 1,000 feet or visibility drops below three miles. In IFR conditions the air traffic control system assumes responsibility for safe separation between aircraft.

An analysis of the previous 10-years of ASOS data from SNS indicated that VFR conditions are present at the Airport 85% of the time and IFR conditions 15% of the time. For comparison, information obtained from Master Plans at the Marina Airport (OAR)[1] and Monterey Regional Airport (MRY)[2] indicate that VFR conditions are present 72% of the time at both fields.

5.3.1.3 Aircraft Operational Fleet Mix

The FAA's ACDM also requires the total annual operations to be converted to operations by specific aircraft classification category. The capacity model identifies an airport's aircraft fleet mix in terms of four classifications ranging from A (small, single engine with gross weights of 12,500 lbs. or less) to D (large aircraft with gross weights over 300,000 lbs.). These classifications and examples of each are identified in **Table 4.8**.

[1] Information derived from Marina Airport Master Plan p.103 Exhibit 3A Airfield Capacity Factors https://www.cityofmarina.org/DocumentCenter/View/10126/OAR-Complete-Final-Master-Plan-June-2018

[2] Information derived from Monterey Regional Airport Masterplan p.191 Exhibit 3A Airfield Capacity Factors https://montereyairport.specialdistrict.org/files/ee95f8536/Complete+Vol+I+%26+II_MRY-Volume-1-Final-012420-r_Part1-5_MRY-Volume-2-Final-012420-r_Part+1-4.pdf

Table 5.9 – ACDM Aircraft Classification System

Class	Description	Examples
A	Single-engine, gross weight 12,500 lbs. or less	Cessna 172/182 Cirrus SR20/22 Piper Cherokee/Warrior
B	Twin-engine, gross weight 12,500 lbs. or less	Beechcraft Baron Cessna Citation I Piper Navajo
C	Gross weight 12,500 lbs. to 300,000 lbs.	Beech 200 Super King Air Cessna Citation CJ4 Cessna Citation II/Bravo Learjet 75
D	Gross weight more than 300,000 lbs.	Boeing 747/777 Airbus A330

Source: FAA AC 140/5060-5 (Consolidated), *Airport Capacity and Delay*

According to the ACDM classification system, the existing and future critical aircraft are Class C aircraft. The operational fleet mix at SNS is made up of the following percentages:

- Class A = 43.4%
- Class B = 46.3%
- Class C = 8.9%
- Class D = 1.4%

5.3.1.4 Touch and Go Operations

A touch and go operation occur when an aircraft lands and then makes an immediate takeoff with coming to a full stop. The primary purpose of touch and go operations is for the training of student pilots. Typically, touch and go operations occur in greater numbers at general aviation airports with flight schools. In order to use Figure 2-1, ACDM assumes touch and go operations are below 50% of the total operations.

5.3.1.5 Hourly Capacity

The FAA's ACDM combines information concerning runway configuration, runway usage, meteorology, operation fleet mix, and touch and go operations to produce an hourly capacity of the airfield. A weighted hourly capacity combines the input data to determine a base for each VFR and IFR operational runway use configuration at the Airport. Each hourly capacity base is assigned a proportionate weight (based on the time each is used) to determine the weighted hourly capacity of the entire airfield.

According to “Figure 2-1 Capacity and ASV for long range planning” of FAA AC 150/5060-5 (Consolidated), *Airport Capacity and Delay*, which identifies the capacity of the airport based on runway alignment, the VFR and IFR capacities for the Airport are estimated to be 98 and 59 operations per hour, respectively. Values used in the determination of this hourly capacity included runway configuration “#9” as indicated in “Figure 2-1 Capacity and ASV for long range planning”.

The below estimation of 98 VFR and 59 IFR operations per hour were compared to the peak design hour operations forecast developed in the **Forecast of Aviation Demand Chapter**, to determine the adequacy of the airfield to meet hourly capacity demands through 2042. As seen in **Table 4.9**, the airfield will have sufficient hourly capacity to meet design hour demand under both VFR and IFR conditions.

Table 5.10 – Hourly Capacity

Year	Peak Hour at ADPM[1]	VFR Hourly Capacity[2]	IFR Hourly Capacity[2]	VFR Capacity Ratio	IFR Capacity Ratio
2022	26	98	59	26.5%	44.1%
5 Year	34	98	59	34.7%	57.6%
10 Year	35	98	59	35.7%	59.3%
15 Year	35	98	59	35.7%	59.3%
20 Year	36	98	59	36.7%	61.0%

[1]Presented in Forecasts of Aviation Demand
[2]Capacities form FAA Advisory Circular 150/5060-5 (Consolidated), Airport Capacity and Delay. C&S Engineers, Inc. analysis for Runway-use Configuration 9 and Fleet Mix Index of less than 20 for 2022-2042.
Source: C&S Engineers, Inc.

5.3.1.6 Annual Service Volume

Annual Service Volume (ASV) is an indicator of relative annual operating capacity at an airport that accounts for differences in various airfield conditions such as runway use, aircraft mix, and weather conditions. As the level of operations at an airport approaches its ASV, additional increases in air traffic movements result in disproportionate increases in aircraft delays. Although many airports commonly exceed their ASV, typical guidance indicates that when an airport reaches 60% of its ASV, planning efforts should begin to remediate aircraft delays and as an airport approaches 80% of its ASV, it should start the design process to prevent aircraft delays from becoming unmanageable. FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*, provides guidance for calculating ASV. A demand-capacity analysis using this ASV is presented in **Table 4.10**.

Table 5.11 – Annual Service Volume

Year	Annual Operations[1]	Annual Capacity[2]	ASV Ratio
2022 Existing	62,335	230,000	27.1%
5 Year	82,688	230,000	36.0%
10 Year	83,737	230,000	36.4%
15 Year	84,801	230,000	36.9%
20 Year	85,879	230,000	37.3%

[1]Presented in Forecasts of Aviation Demand

[2]Capacities form FAA Advisory Circular 150/5060-5 (Consolidated), Airport Capacity and Delay. C&S Engineers, Inc. analysis for Runway-use Configuration 9 and Fleet Mix Index of less than 20 for 2022-204.

Source: C&S Engineers, Inc.

SNS's is anticipated to reach 37.3% of its ASV by 2042. This indicates that no action needs to be taken during the planning period for the Airport to maintain an acceptable level of relative annual operating capacity as far as the number of runways is concerned.

5.3.2 Runway Requirements

This portion of the **Demand/ Capacity and Facility Requirements Chapter** will look at SNS's two runways and examine whether they meet both existing and future requirements. Specifically, the runways' general characteristics will be analyzed with respect to FAA design and safety requirements and conformance with the runway length recommendations. Runway designation and length requirements will also be reviewed.

5.3.2.1 Runway Width

Runway width standards are established in FAA AC 150/5300-13B and are based on RDC criteria. **Table 4.11** outlines the FAA runway width standards, and the existing runway facilities at SNS. Currently, SNS exceeds the existing and future FAA requirements for runway width on all runways.

Table 5.12 – Runway Width Requirements

	Runway	RDC	FAA Requirement Width (FT)	Existing Width (FT)
Existing	8/26	B-II-5000	75	150
	13/31	B-II-2400	100	150
Future	8/26	C-II-5000	100	150
	13/31	C-II-2400	100	150

Source: FAA AC 150/5300-13B, C&S Engineers, Inc.

5.3.2.2 Runway Length

Runway length requirements are based on a variety of factors, the most notable of which is the takeoff distance of the critical aircraft operating on the runway. The departure requirements are often the most critical for measuring runway length needed since aircraft typically require more runway length for takeoff than they do for landing. Average high temperatures and the elevation of the runway are other factors that affect runway length requirements. The mild temperatures and low elevation of SNS make these factors less consequential.

The existing and future runway length requirements for both runways were determined using FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*. This AC outlines the process to determine recommended runway length using the following five steps:

1. Identify the critical design aircraft that will make regular use of the proposed runway for an established planning period of at least five years.
2. Identify the airplanes that will require the longest runway lengths at maximum take-off weight (MTOW).
3. Use *Table 1-1*, *Airplane Weight Categorization for Runway Length Requirements* from FAA AC 150/5325-4B and the airplanes identified in step #2 to determine the method that will be used for establishing the recommended runway length. Except for regional jets, when the MTOW of listed airplanes is 60,000 lbs. or less, the recommended runway length is determined according to a family grouping of airplanes having similar performance characteristics and operating weights. When the MTOW of listed airplanes is over 60,000 lbs., the recommended runway length is determined according to individual airplanes.
4. Select the recommended runway length from among the various runway lengths generated by step #3 per the process identified in chapters 2, 3, or 4, as applicable.
5. Apply any necessary adjustment to the obtained runway length, when instructed by the applicable chapter of this AC, to the runway length generated by step #4 to obtain a final recommended runway length.

Step 1: Identify the Critical Aircraft

The selection of appropriate FAA airport design criteria is based primarily upon the critical aircraft that will be utilizing the Airport. As noted previously, the existing critical aircraft family for both runways consist of the Beech 200 Super King Air, Cessna Citation CJ4, and Cessna Citation II/Bravo (RDC B-II) and future critical aircraft is the Learjet 75 (RDC C-II). The runway length requirement associated with the future critical aircraft will need to be justified with at least 500 annual operations of that or similar aircraft but is noted here for planning purposes.

Step 2: Identify the aircraft that require the longest runway lengths at MTOW

In this step, Maximum Takeoff Weight (MTOW) is used to define the airplane group for the runway length analysis by identifying the airplanes that will require the longest runway lengths at MTOW. Relevant design characteristics of the critical aircraft are included in **Table 4.12**.

Table 5.13 – Existing and Future Critical Aircraft Characteristics

Aircraft	Engine Type	MTOW (lbs.)	Approach Speed (knots)	Wingspan	AAC + ADG	TDG	Number of Passengers (max)
Beech 200 Super King Air	Turboprop	12,500	98	54.50 FT	B-II	2A	8
Cessna Citation CJ4	Jet	17,110	111	50.83 FT	B-II	1B	10
Cessna Citation II/Bravo	Jet	14,800	112	52.17 FT	B-II	1A	10
Learjet 75	Jet	21,500	125	50.92 FT	C-II	1B	10

Source: Aircraft Characteristics, Appendix 1 of AC 150/5300-13B, last revision date [2/7/2023]

Step 3 – Determine the method that will be used for establishing recommended runway length

FAA AC 150/5325-4B, Table 1-1 *Airplane Weight Categorization for Runway Length Requirements*, indicates that when determining runway length requirements, the design approach differs depending on the characteristics of the critical aircraft. The existing and future critical aircraft fall within the "Over 12,500 pounds but less than 60,000 pounds" category, so the runway length design approach used for SNS will be the "Family grouping of large airplanes" indicated in Chapter 3 of FAA AC 150/4325-4B.

Step 4 – Select the recommended runway length

The design method indicated above includes the application of the following information specific to SNS:

- Airport elevation: 84.3 FT above mean sea level (MSL).[3]
- Mean Daily Maximum Temperature (MDMT) of the Hottest Month of the Year: 74.4° F (September).[4]
- Percentage of fleet category applicable: Figure 3-2, 100 Percent of Fleet (detailed below).

3 FAA. Airport Data and Information Portal (ADIP). Accessible at: https://adip.faa.gov/agis/public/#/airportData/SNS (Accessed 3/14/2023).

4 NOAA NCEI U.S. Climate Normals Quick Access (Accessed 3/14/2023)

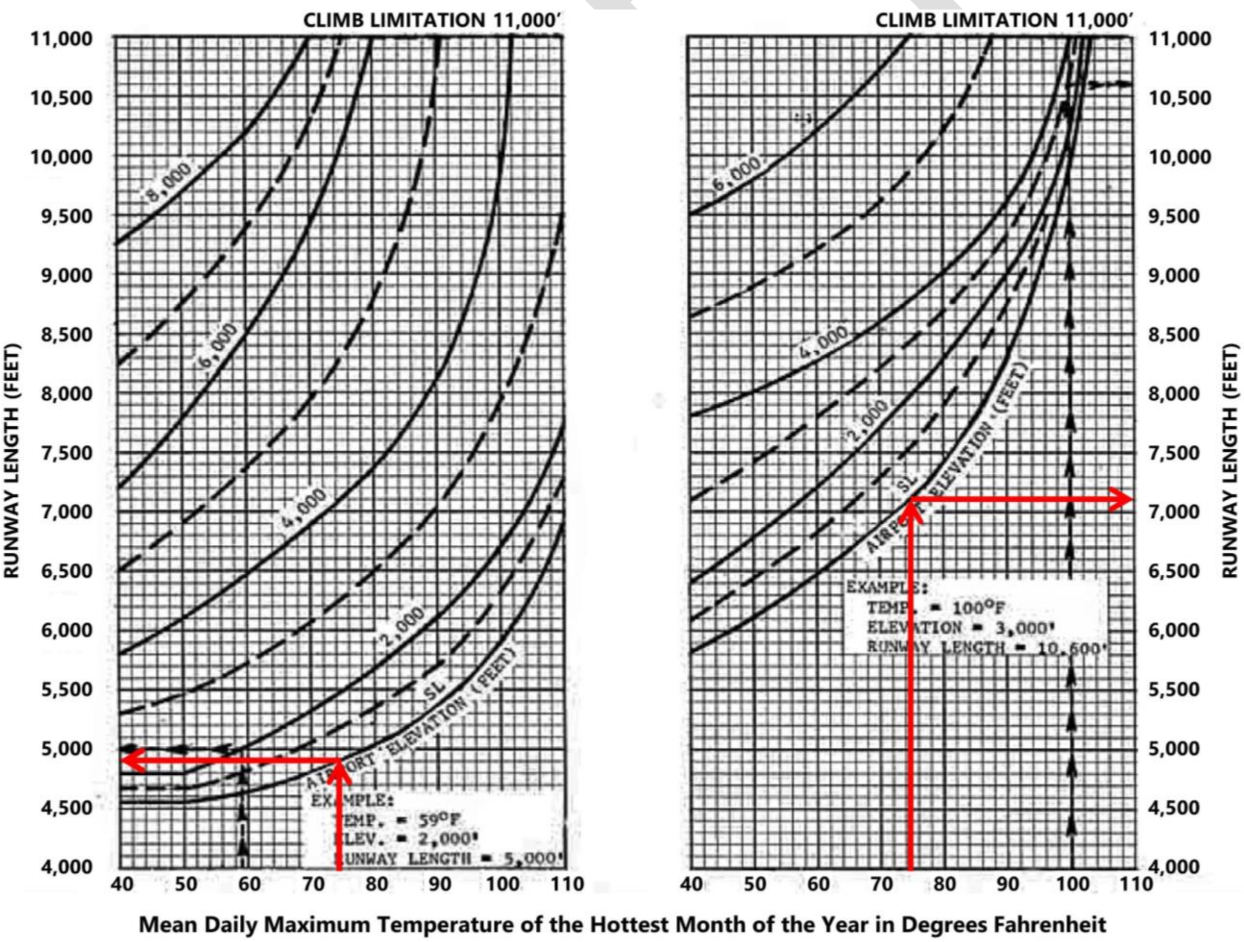
Percentage of Fleet

Since one of the existing critical aircraft at SNS (Citation II/Bravo) is specifically referenced in the Advisory Circular, (Table 3-2 in AC 150/5325-4B), Figure 3-2 was used to determine the base runway length. While the future critical aircraft is not listed on Table 3-2, it is assumed that the future critical aircraft will have the same runway length requirement as the existing family of aircraft.

Application of SNS-specific information

Application of the above information to the Figure 3-2, 100 Percent of Fleet curve at 60% useful load indicates that the runway length required is 4,900 ft and is 7,100 ft at 90% useful load (see **Figure 5.2** below).

Figure 5.2 - 100 Percent of Fleet at 60 or 90 Percent Useful Load



100 percent of fleet at 60 percent useful load **100 percent of fleet at 90 percent useful load**

Source: FAA AC 150/5325-4B, Runway Length Requirements for Airport Design, C&S Engineers, Inc.

Anecdotal information provided by the Airport and the FBO indicate that aircraft have been diverted to nearby airports because they were not able to take off from SNS to travel to locations like Chicago or other points east because of the runway lengths available at the Airport. For this reason, runway lengths for aircraft at both 60% and 90% of their useful load will be considered.

Step 5 – Apply any necessary adjustments

Effective Runway Gradient (takeoff only): The runway lengths obtained from the figure above are increased at the rate of 10 feet for each foot of elevation difference between the high and low points of the runway centerline. For SNS, the effective runway gradient adjustment on Runway 13/31 is 5.27 ft x 10 = 52.7 ft or rounded to 53 ft and is 14.2 ft x 10 = 142 ft for Runway 8/26. This adjustment added to the base length would provide the required takeoff runway length requirement.

Wet and Slippery Runways (applicable only to landing operations of turbojet-powered airplanes): By regulation, the runway length for turbojet-powered aircraft obtained from the 60% useful load curves are increased by 15% or up to 5,500 ft, whichever is less. The runway length adjustment for the 90% load consideration is also increased by 15% or up to 7,000 ft, whichever is less. This adjustment added to the base length would provide the required landing runway length.

Runway Length: Summary

The existing and future runway length analysis for Runways 13/31 and 8/26 was analyzed using the design method for aircraft in the "Over 12,500 pounds but less than 60,000 pounds" category indicated in Chapter 3 of FAA AC 150/5325-4B. Currently, the longest runway available at SNS is Runway 8/26 measuring 6,004 ft with a 396 ft displacement on the Runway 8 end due to the proximity of public roadways. To accommodate the existing and future critical family of aircraft at 90% useful load, Runway 13/31 should be extended to approximately 7,155 ft and Runway 8/26 should be 7,245 ft (see **Table 4.13** below).

These calculations assume that runway gradient remains the same as existing with an extension. If the runway gradient is expected to change with an extension, the required runway length may vary.

Table 5.14 – Runway Length Requirements

		Existing Length (FT)	Length Required (FT)	Effective Runway Gradient Adjustment (FT)	Wet & Slippery Runway Adjustment (FT)	Recommended Length (FT) (+Surplus/ -Deficiency)
Existing/ Future	**Runway 13/31**	4,825	4,900 (60%) 7,100 (90%)	53	735 1,065	5,500 (-675) 7,153 (-2,328)
	Runway 8/26	6,004	4,900 (60%) 7,100 (90%)	142	735 1,065	5,500 (+504) 7,242 (-1,238)

Source: FAA AC 150/5325-4B, C&S Engineers, Inc.

5.3.2.3 Runway Designations

At an airport, each runway is named and referred to by a specific number. At SNS the runways are 13/31 and 8/26, a plane might land on the 8 end of a runway and take off on the 26 end of the same runway. A runway designation is represented by two numbers that indicate the direction in which the runway is aligned with the Earth's magnetic field or magnetic azimuth, oriented by the runway centerline. The numbers used for runway designations are based on the degrees of a compass. Runways are numbered from 01 to 036, representing each 10 degree segment of a full circle. If the magnetic azimuth ends in the number 5 then the runway designator marking may be rounded either up or down. Magnetic azimuth is determined by adjusting the geodetic azimuth associated with a runway to compensate for magnetic declination. Magnetic declination is defined as the difference between true north and magnetic north. The value of magnetic declination varies over time and global location. Magnetic declination is a natural process and periodically requires the re-designation of runways. **Table 4.14** shows the runway's true and magnetic bearing, along with the current magnetic declination.

Table 5.15 - Runway Designation Requirements

Runway End	True Bearing	Magnetic Declination	Annual Change	2023 Magnetic Bearing	2023 Runway Designation Required	2042 Magnetic Bearing	2042 Runway Designation Required
8	96.82°	12.75°E	0.083°W	84.07	8	85.65	8
26	276.82°	12.75°E	0.083°W	264.07°	26	265.65	26
13	147.82°	12.75°E	0.083°W	135.07°	13 or 14	136.65	**14**
31	327.82°	12.75°E	0.083°W	315.07°	31 or 32	316.65	**32**

Source: FAA AC 150/5300-13B, C&S Engineers, Inc.

The magnetic bearing of Runway 13/31 is such that the runway can remain as 13/31 or be renamed as 14/32. The current rate of change is 0° 5′ W (0.083°w) per year according to the NOAA National Centers for Environmental Information (NECI). Based on this rate of change, Runway 13/31 will be required to be re-designated to Runway 14/32 around 2035. It is recommended that the runway designation is changed closer to this time and occurring with a pavement rehabilitation or reconstruction project. It is not expected that the Runway 8/26 designation will be required to change through the extents of the planning period, but it is important to note that magnetic declination can vary over time due to fluctuations in the Earth's magnetic fields. It is critical that the declination be reviewed on a semi-annual basis and before any runway work requiring marking modifications.

5.3.2.4 Runway Strength

Runway pavement strength data is available for SNS on the FAA ADIP portal. The existing strength of the runways is provided in **Table 4.15**. As indicated, both runways can accommodate activity by the existing and future family of critical aircraft.

Table 5.16 - Runway Strength

Runway	Single Wheel (lbs)	Double Wheel (lbs)	Double Tandem (lbs)	Dual Double Tandem (lbs)
8/26	80,000	136,000	244,000	N/A
13/31	120,000	235,000	401,000	935,000

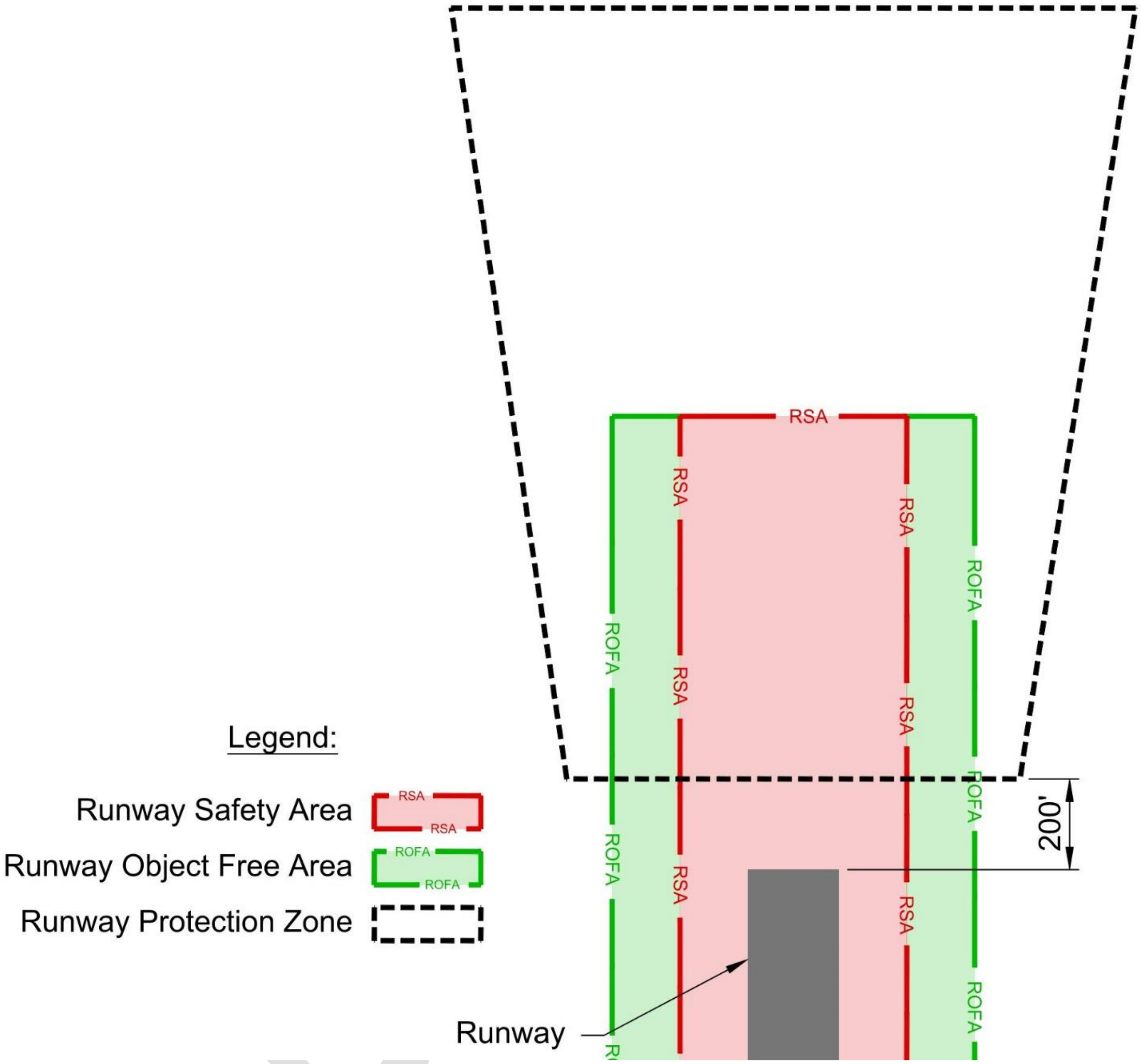
Source: SNS Airport Pavement Management System Update (APMS), 2023

5.3.3 Runway Protective Surfaces

Runway protective surfaces such as the Runway Safety Area, Runway Object Free Area, and Runway Protection Zone aim to protect aircraft, people, and property in the case of an aircraft deviating from its intended course while conducting conventional runway operations. The following sections outline the existing and future criteria for the runway protective surfaces at SNS. The state of future protective surfaces will be dependent on the final runway geometry; therefore, this section focuses on any deficiencies in the existing surfaces and may highlight potential deficiencies for the future.

Figure 5.3 shows the safety areas as discussed in this section.

Figure 5.3 - Example RSA, ROFA, and RPZ



Source: C&S Engineers, Inc.

5.3.3.1 Runway Safety Area (RSA)

An RSA is a graded surface centered on a runway that is required to be free of all objects except for those that are 'fixed by function' such as runway lights and certain NAVAIDS. The purpose of the RSA is to protect aircraft in the event of an under-shoot or overrun from a runway during landing or takeoff operations. The area must be able to support emergency vehicle operations and maintenance vehicles and is required to be graded to slope away from the runway at 1.5 to 5.0 percent. The width and length of an RSA depend upon an airport's RDC and approach visibility minimums. Meeting RSA requirements is one of the FAA's highest priorities in maintaining safety at the nation's airports.

Table 5.17 lists the Airport's existing and future RSA requirements if approach minimums are not changed.

Table 5.17 – Runway Safety Area Dimensions

	Runway	RDC	RSA Width (FT)	Length Beyond/Prior Runway End (FT)
Existing	8/26	B-II-5000	150	300/300
	13/31	B-II-2400	300	600/600
Future	8/26	C-II-5000	500	1,000/600
	13/31	C-II-2400	500	1,000/600

Source: FAA AC 150/5300-13B, C&S Engineers, Inc.

Analysis of the RSA revealed several non-standard conditions. These non-standard conditions are detailed in **Table 4.17**.

Table 5.18 – Runway Safety Area Requirements

Runway End	Non-Standard Condition
Runway 8 End	A vehicle service road crosses through the corner of the RSA
Runway 26 End	N/A
Runway 13 End	The airport perimeter fence and vehicle service road traverse the RSA. Additionally, a portion of the RSA is within a public golf course.
Runway 31 End	The airport perimeter fence and vehicle service road traverse the RSA. Additionally, a portion of the RSA grade exceeds the 5% limit.

Source: C&S Engineers, Inc.

5.3.3.2 Runway Object Free Area (ROFA)

Similar to the RSA, the ROFA must be free of objects except those required to support air navigation and ground maneuvering operations. The function of the ROFA, also centered on the runway, is to enhance the safety of aircraft operating on the runway. It is not permissible to park an airplane within the ROFA. The width and length of the ROFA depend upon an airport's specific RDC and approach visibility minima. The ROFA does not have specific slope requirements, but the terrain within the ROFA must be relatively smooth and graded to be at or below the edge of the RSA. **Table 4.18** notes the existing and future ROFA dimensions for SNS:

Table 5.19 – Runway Object Free Area Dimensions

	Runway	RDC	ROFA Width (FT)	Length Beyond/Prior Runway End (FT)
Existing	8/26	B-II-5000	500	300/300
	13/31	B-II-2400	800	600/600
Future	8/26	C-II-5000	800	1,000/600
	13/31	C-II-2400	800	1,000/600

Source: FAA AC 150/5300-13B, C&S Engineers, Inc.

Analysis of the ROFA revealed several non-standard conditions. These non-standard conditions are detailed in **Table 4.19**.

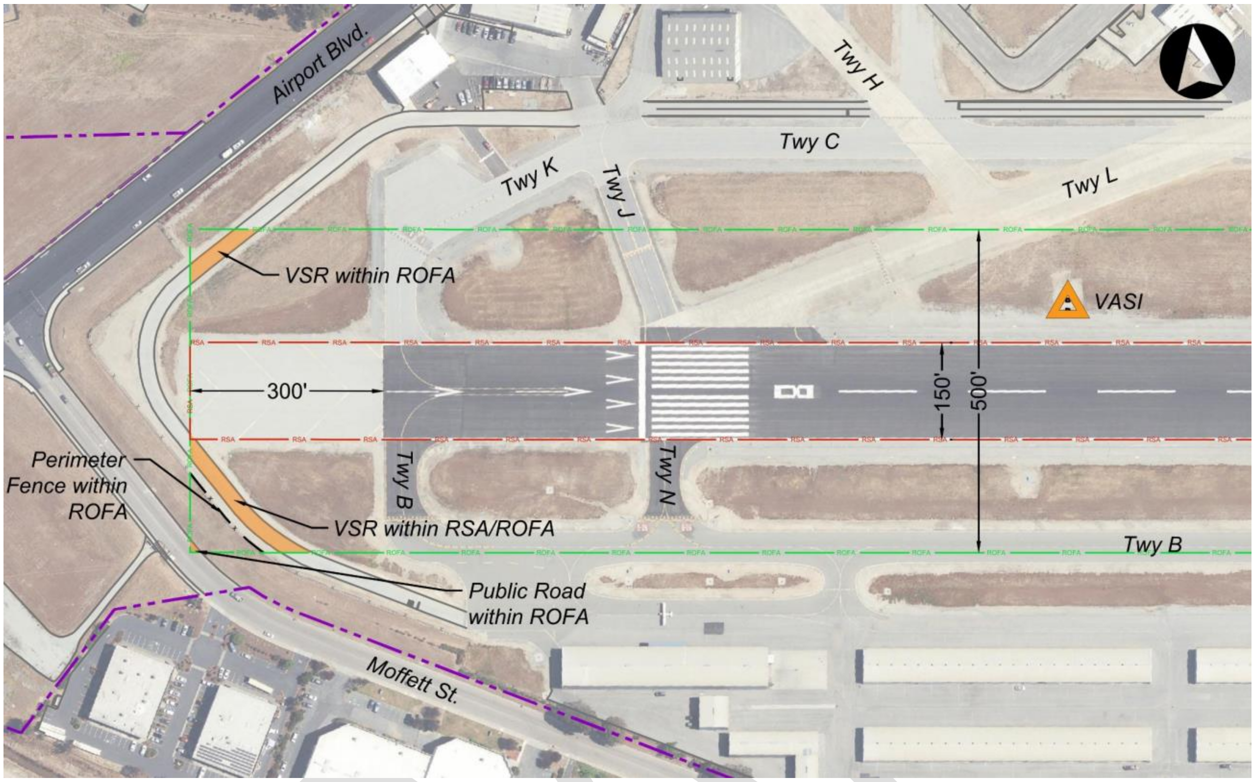
Table 5.20 – Runway Object Free Area Requirements

Runway End	Non-Standard Condition
Runway 8 End	The airport perimeter fence and vehicle service road are within the ROFA (Figure 5.4)
Runway 26 End	A vehicle service road is located within the ROFA (Figure 5.5)
Runway 13 End	The airport perimeter fence, vehicle service road, and public golf course are located within the ROFA (Figure 5.6)
Runway 13 East Side	A vehicle service road within the ROFA runs parallel to the runway for approximately half of its length. The golf course extends into the ROFA for approximately 1/3 of the length of the runway. (Figure 5.6)
Runway 31 End	The airport perimeter fence and vehicle service road are within the ROFA (Figure 5.7)

Source: C&S Engineers, Inc.

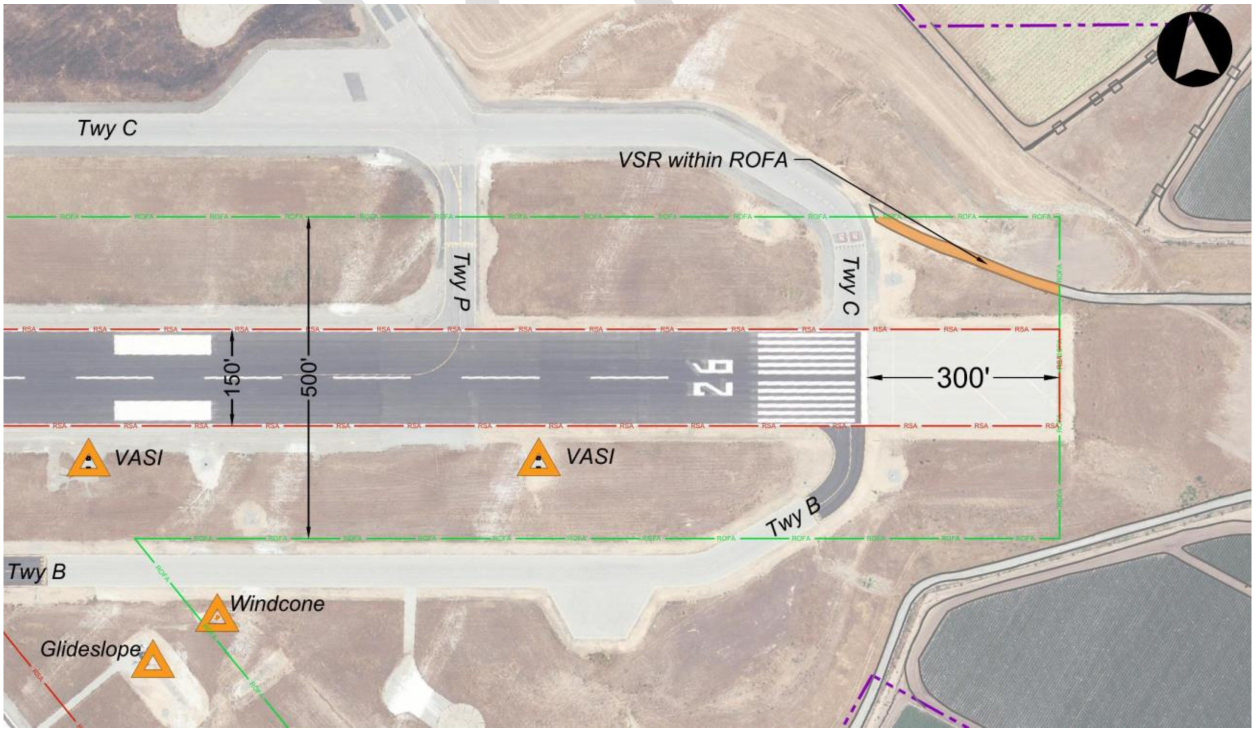
Figures 5.4-5.7 give a detailed representation of the Runway Safety Areas (RSA) and Runway Object Free Areas (ROFA) penetration zones for Runway ends at SNS.

Figure 5.4 - Runway 8 End RSA/ROFA Penetrations



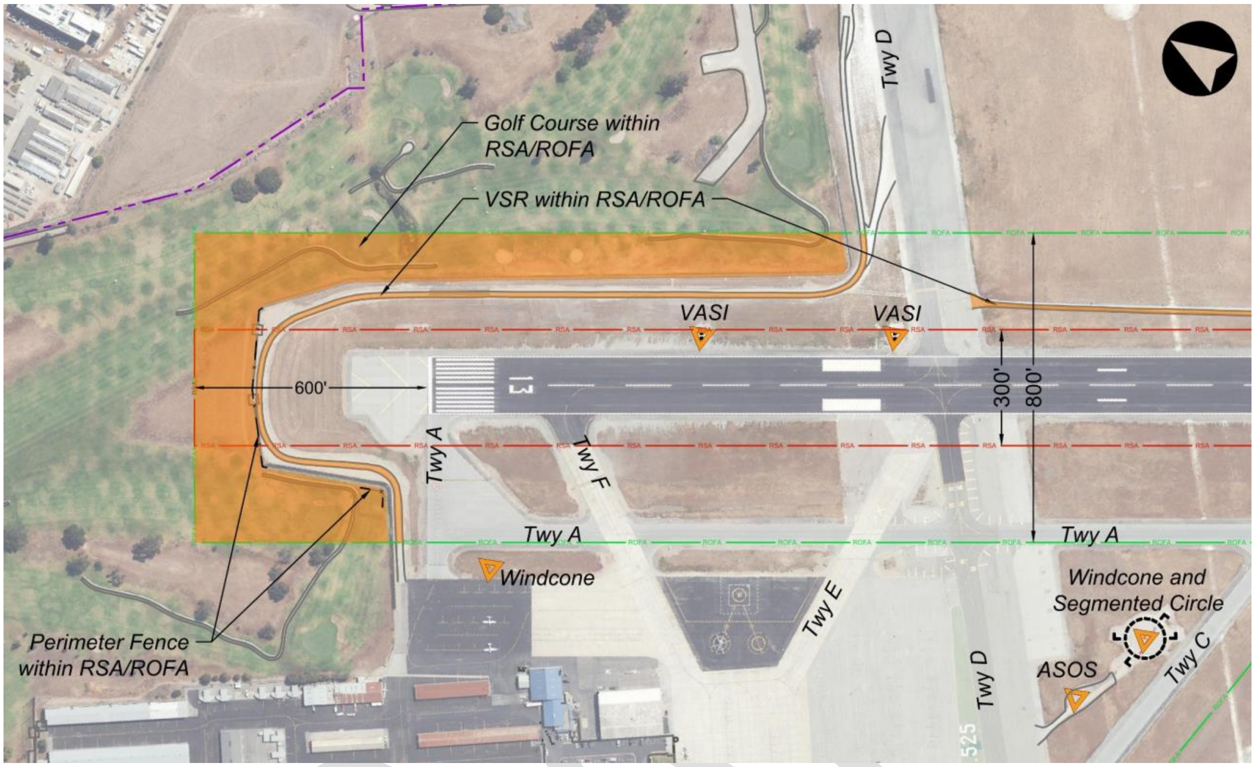
Source: C&S Engineers, Inc.

Figure 5.5 - Runway 26 End RSA/ROFA Penetrations



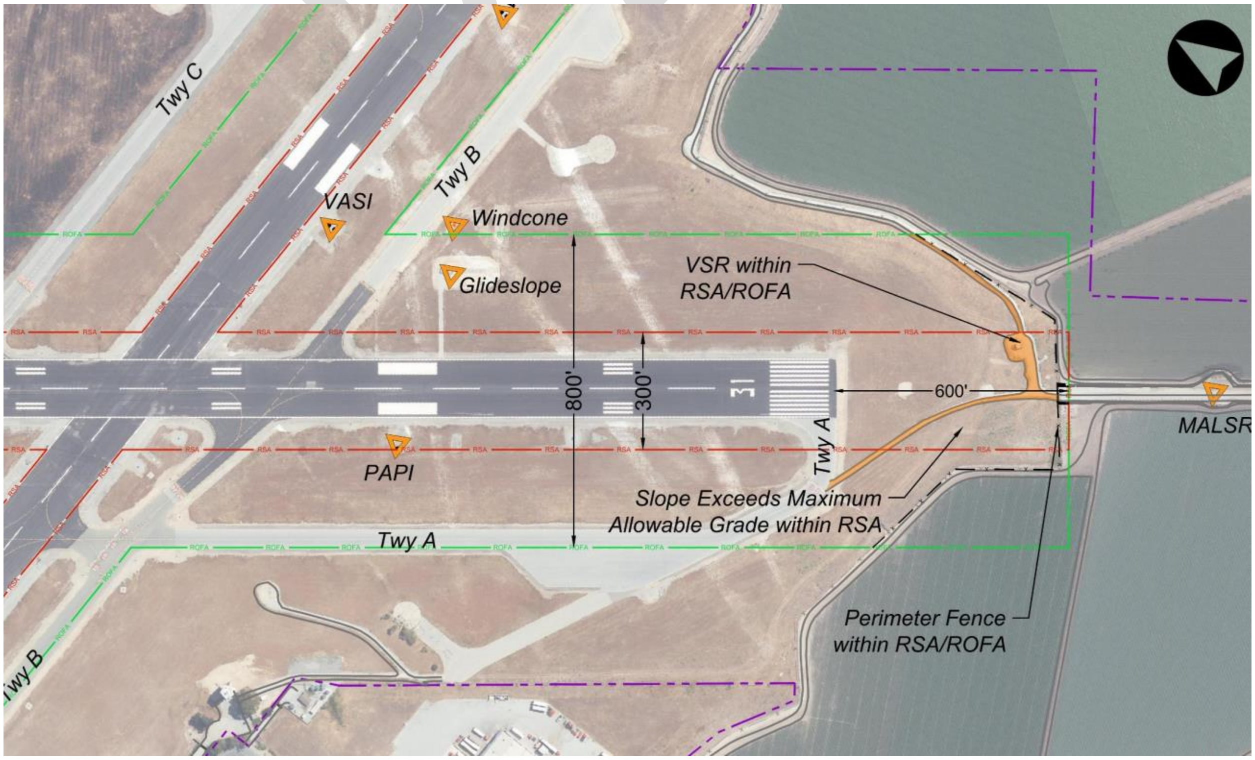
Source: C&S Engineers, Inc.

Figure 5.6 - Runway 13 End RSA/ROFA Penetrations



Source: C&S Engineers, Inc.

Figure 5.7 - Runway 31 End RSA/ROFA Penetrations



Source: C&S Engineers, Inc.

5.3.3.3 Runway Protection Zones (RPZs)

A RPZ is an area centered symmetrically on an extended runway centerline. The RPZ has a trapezoidal shape and extends prior to each runway end. The RPZ is aimed at enhancing the safety of people and property on the ground by limiting and/or restricting the construction of certain structures within its bounds. This area should be free of land uses that create glare, smoke, or other hazards to air navigation. Additionally, the FAA requires that no vertical structures are constructed within the extents of the RPZ.

The dimensions of an RPZ depend on each runway's RDC. **Table 4.20** illustrates the existing and future RPZ requirements.

Table 5.21 - Runway Protection Zones (RPZs)

		RDC	Length (FT)	Inner Width (FT)	Outer Width (FT)
Existing	**Approach RPZ**				
	8/ 26	B-II-5000/ B-II-VIS	1,000/ 1,000	500/ 500	700/ 700
	13/ 31	B-II-4000/ B-II-2400	1,700/ 2,500	1,000/ 1,000	1,510/ 1,750
	Departure RPZ				
	8/ 26	B-II-5000/ B-II-VIS	1,000/ 1,000	500/ 500	700/ 700
	13/ 31	B-II-4000/ B-II-2400	1,000/ 1,000	500/ 500	700/ 700
Future	**Approach RPZ**				
	8/ 26	C-II-5000/ C-II-VIS	1,700/ 1,700	500/ 500	1,010/ 1,010
	13/ 31	C-II-4000/ C-II-2400	1,700/ 2,500	500/ 1,000	1,010/ 1,750
	Departure RPZ				
	8/ 26	C-II-5000/ C-II-VIS	1,700/ 1,700	500/ 500	1,010/ 1,010
	13/ 31	C-II-4000/ C-II-2400	1,700/ 1,700	500/ 500	1,010/ 1,010

Source: FAA AC 150/5300-13B, C&S Engineers, Inc.

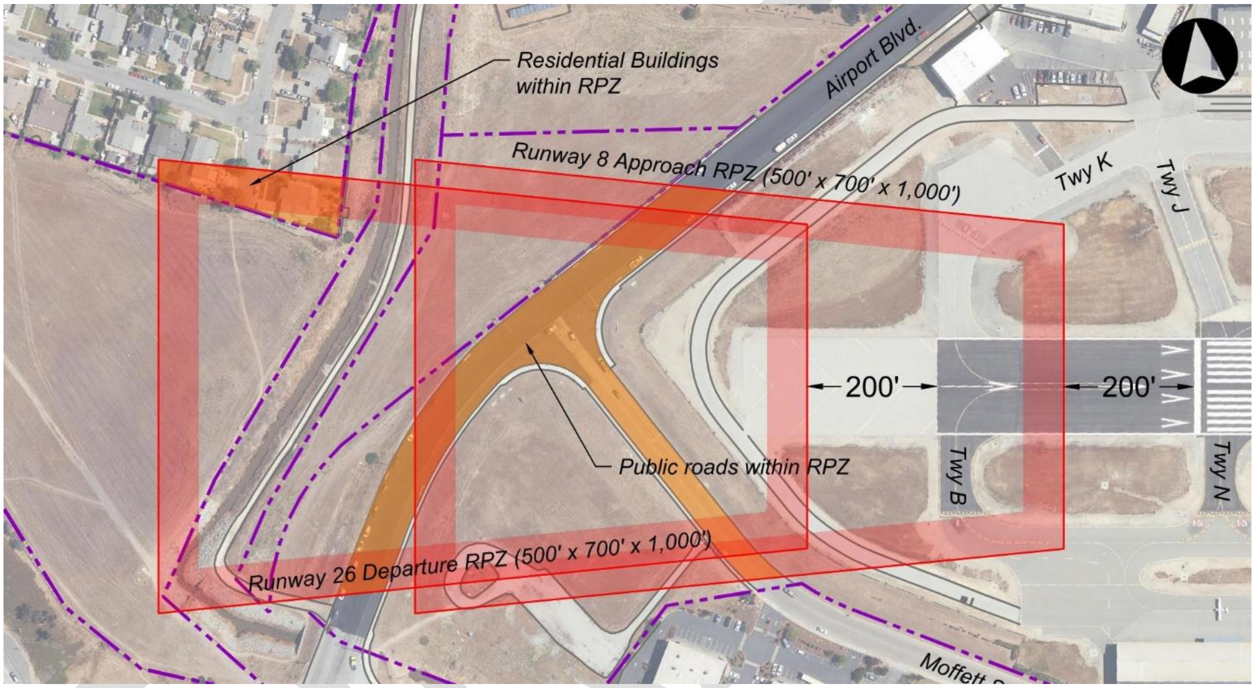
Analysis of the RPZ revealed several non-standard conditions.

Table 5.22 - Runway Protection Zone Requirements

Runway End	Non-Standard Condition
Runway 8 End	Residential buildings and public roads within the RPZ
Runway 13 End	Residential/commercial buildings, public roads, and a golf course within the RPZ

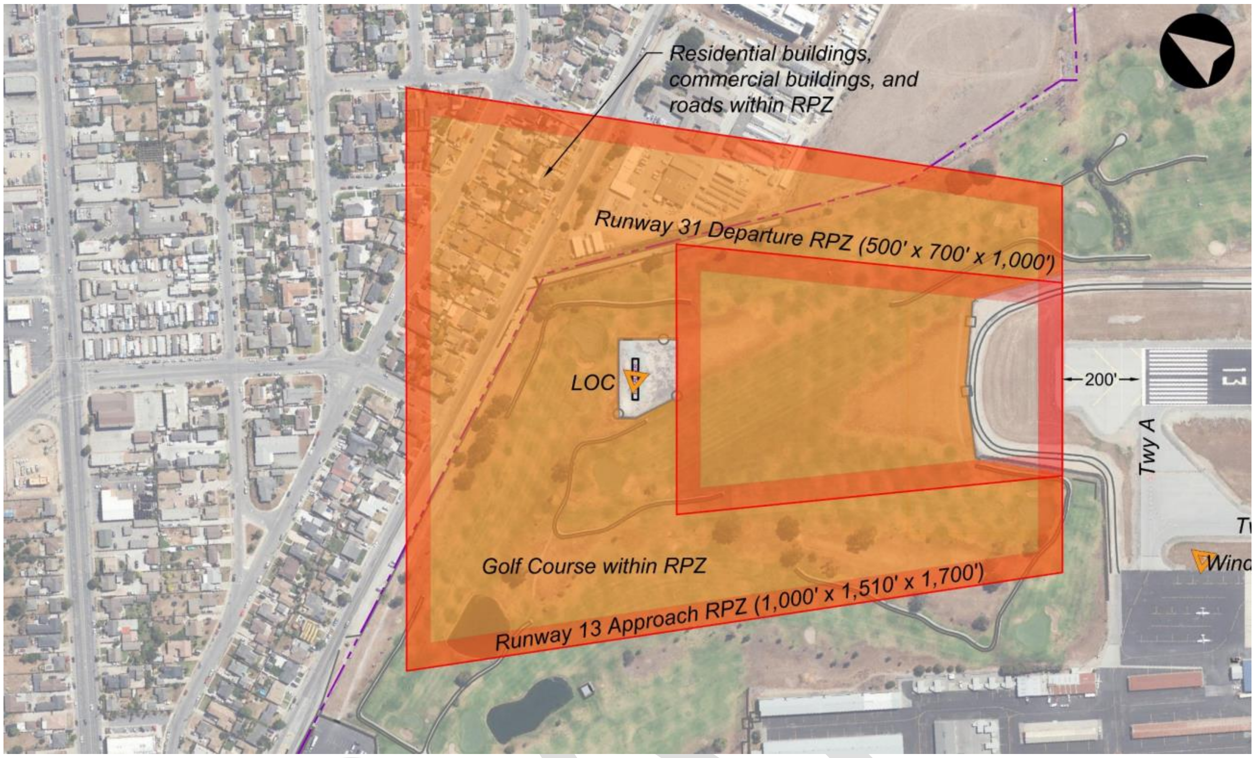
Source: C&S Engineers, Inc.

Figure 5.8 - Runway 8 End RPZ Penetrations



Source: C&S Engineers, Inc.

Figure 5.9 - Runway 13 End RPZ Penetrations

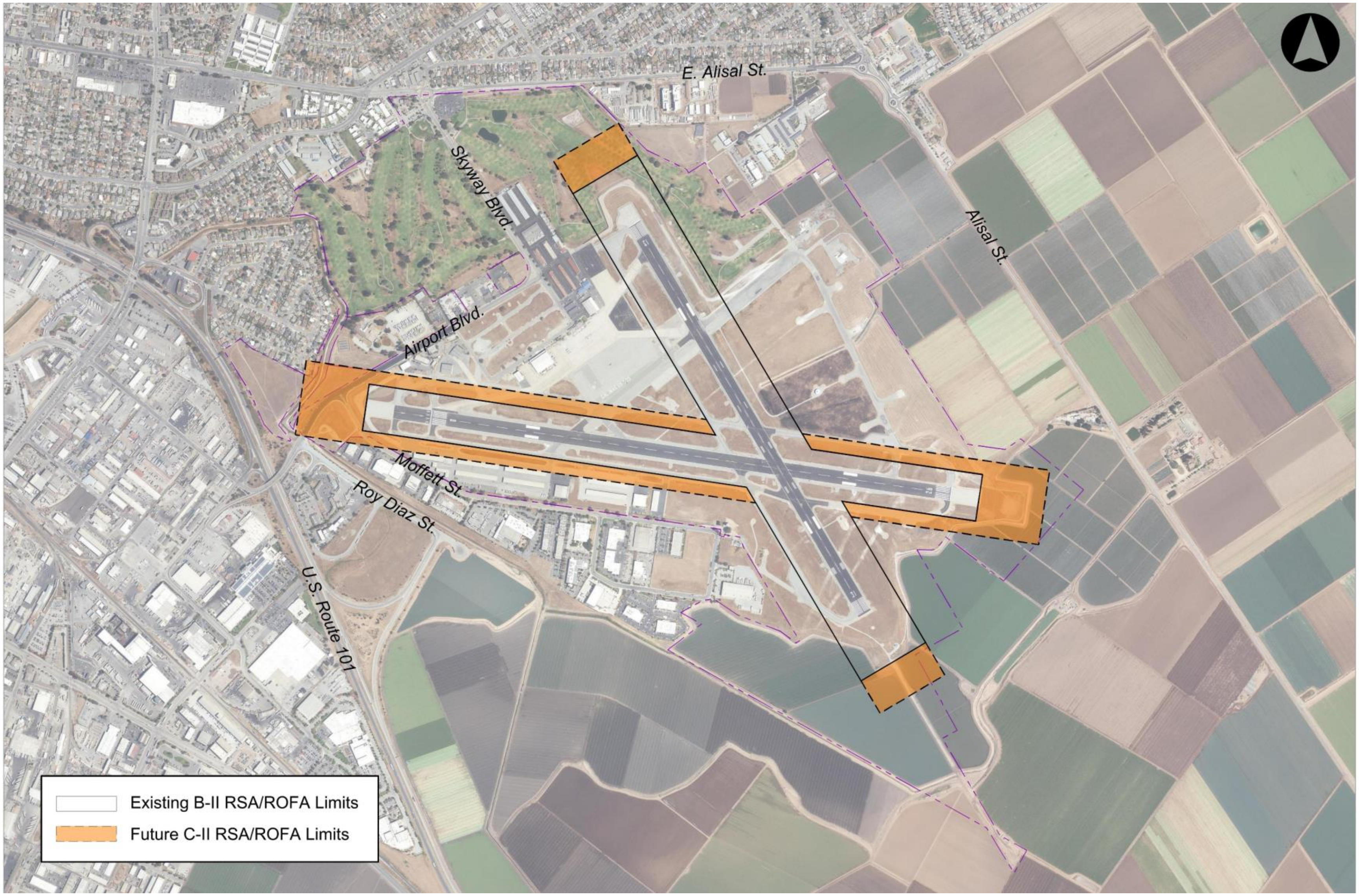


Source: C&S Engineers, Inc.

5.3.3.4 B-II to C-II Impacts on RSAs, ROFAs, and RPZs

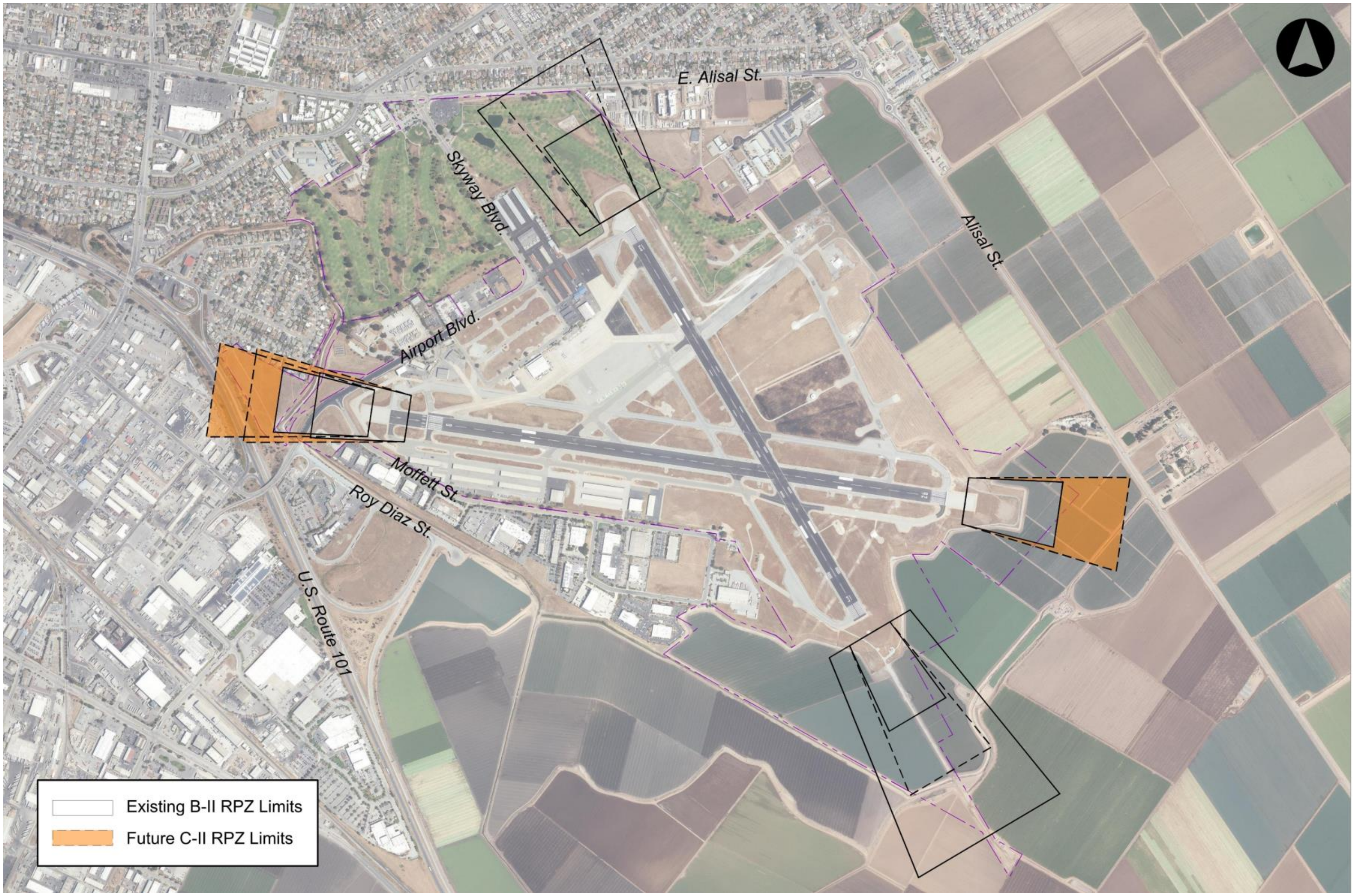
As discussed in previous sections, the future critical aircraft classification as C-II will affect a change in dimension of the RSAs, ROFAs, and RPZs. The impact of these changes is likely significant enough that it will require changes to the runway thresholds to mitigate the number of incompatible objects. The following figures depict the increase in these surfaces if there are no changes to runway threshold. As seen below there is a significant increase in the number of incompatible objects within the protected areas.

Figure 5.10 - B-II to C-II: RSA and ROFA Impacts



Source: C&S Engineers, Inc.

Figure 5.11 - B-II to C-II: RPZ Impacts



Source: C&S Engineers, Inc.

5.3.3.5 Runway Visibility Zone

The runway visibility zone (RVZ) ensures nothing blocks a pilot's view on an intersecting runway. A clear RVZ has no objects except those fixed by function. The Airport's RVZ is clear but would need to be re-evaluated as alternative runway lengths are considered.

5.3.3.6 Tower Line of Sight

The FAA requires that a clear line of sight be maintained from the Air Traffic Control Tower (ATCT) to all movement areas on the airfield. The purpose of this requirement is to ensure that air traffic controllers can maintain visual contact with all aircraft, vehicles, and persons on the airfield that are within their control.

The existing tower at SNS has a blind spot-on Taxiway B due to the row of T-hangars to the south of the taxiway. This has been an existing condition for over 20 years and has not impacted the controller's ability to safely accommodate operations in this area. However, any future construction will be planned to completely avoid impacts to the ATCT line of sight.

5.3.4 Taxiway/Taxilane Requirements

Taxiway systems should provide safe and efficient routes for aircraft ground movement to and from an airports runways and apron areas. The type and location of taxiways in relation to a runway system have a significant impact on airfield capacity. As traffic increases, the taxiway system can limit an airport's overall capacity, especially if the configuration results in frequent runway crossings by taxiing aircraft or does not provide sufficient access to airport facilities.

A taxiway is a defined path established for the taxiing of aircraft from one part of an airport to another. If an ATCT is present the taxiways are all within the movement area and under the control of the tower.

A taxilane is used by aircraft for low speed and precise taxiing. They are generally located outside of the movement area, meaning that aircraft may navigate on them without receiving clearance from the air traffic control tower. SNS has several taxilanes coming off Taxiways A, B, C and D that lead to the aircraft parking aprons and hangars.

FAA guidance found in FAA AC 150/5300-13B, recommends that a taxiway system should:

- Provide each runway with a full-length parallel taxiway
- Have as many bypasses, multiple accesses, or connector taxiways as possible to each runway end
- Provide taxiway run-up / holding bay areas for each runway end
- Have the most direct routes possible
- Have adequate curve and fillet radii

- Avoid areas where ground congestion may occur

5.3.4.1 Taxiway/Taxilane Width

The required taxiway width is determined by the TDG of the critical aircraft. In the case of SNS, the highest TDG of the composite critical aircraft is TDG 2A which specifies a required taxiway width of 35 FT. The existing taxiway system at SNS exceeds these standards. Because the width of the existing taxiways is not justified by the TDG of the critical aircraft, the decision to maintain the width of the taxiways will need to be made at the time of each taxiway reconstruction project. **Table 4.22** analyzes taxiway widths at SNS.

Table 5.23 - Taxiway Width Requirements

	Existing Taxiway Width (FT)	FAA Requirement Width (FT)
Width	50+	35

Source: FAA AC 150/5300-13B, C&S Engineers, Inc.

5.3.4.2 Taxiway/Taxilane Separation Requirements

As illustrated in **Table 4.23** below, each parallel runway meets or exceeds the existing separation requirements for each runway – 300 ft for Runway 13/31 and 240 ft for Runway 8/26. The separation between Taxiway C and Runway 8/26 exceeds the 300 ft future requirements, but most of Taxiway B (from Runway 13/31 to the Runway 8 end) is only 240 ft from Runway 8/26, 60 ft short of the 300 ft requirement. Taxiway A is currently 385 ft from Runway 13/31 which is short 15 ft from the 400 ft separation required for the future.

Table 5.24 - Taxiway/Taxilane Separation Requirements

	Existing Separation	Existing Requirement (B-II)	Future Requirement (C-II)
Runway 13/31 to Taxiway A	385 FT	300 FT	400 FT (Existing is 15 FT short of standard)
Runway 8/26 to Taxiway B	240 FT West of RWY 13/31 300 FT East of RWY 13/31	240 FT	300 FT (Existing west of RWY 13/31 is 60 FT short of standard)
Runway 8/26 to Taxiway C	385 FT	240 FT	300 FT

Source: FAA AC 150/5300-13B, C&S Engineers, Inc.

5.3.4.3 Taxiway/Taxilane Protective Surfaces

To ensure safety for aircraft during taxi operations the FAA has designated protected areas that surround each taxiway and taxilane. These areas are known as the Taxiway/Taxilane Safety Area (TSA) and Taxiway/Taxilane Object Free Area (TOFA/TLOFA). They are centered on the taxiway/taxilane centerline and are a set width that is determined by the ADG of the critical aircraft. **Table 4.24** below lists the required widths of the taxiway protective surfaces per FAA guidelines.

Table 5.25 - Taxiway/Taxilane Safety Area and Object Free Area Dimensions

Surface	Width	In Compliance with Standards?
Taxilane Safety Area	79 FT	No
Taxiway Safety Area	79 FT	Yes
Taxilane Object Free Area (TLOFA)	110 FT	No
Taxiway Object Free Area (TOFA)	124 FT	Yes

Source: FAA AC 150/5300-13B

Several taxilanes at SNS do not meet the FAA established TLOFA requirements. General aviation airports often do not meet the full FAA design standards in regard to taxilane safety areas as they are frequently designed with hangar rows and taxilanes that are specifically intended for use by an aircraft significantly smaller than the design aircraft. Additionally, the FAA will often allow non-compliant taxilanes to remain but will require full compliance on any newly constructed taxilanes that accept FAA funding. While it may not be necessary to correct all the TSA and TOFA issues, the feasibility of this action and the impact it would have on Airport circulation and capacity are discussed in the **Alternatives Development Chapter**. **Table 4.25** details the non-standard condition of taxilane protected surfaces at SNS.

Table 5.26 - Taxilane Protective Surface Requirements

Protective Surface	Non-Standard Condition
Taxilane Safety Area and Taxilane Object Free Area	Existing taxilanes between hangar rows do not meet current taxilane safety area and taxilane object free area requirements

Source: C&S Engineers, Inc.

5.3.4.4 Non-Standard Taxiway Geometry

With the most recent release of FAA 150/5300-13B, the taxiway fillet designed standards were updated and reduced to a single standard that ensures a better margin of safety from the aircraft wheels to the edge of taxiway pavement. The airfield at SNS was constructed prior to this recent update and considering this new standard there are deficiencies noted at all runway/taxiway and taxiway/taxiway intersections. As a result, all airfield fillets should be upgraded to comply with current FAA design standards regarding taxiway fillets. These upgrades are recommended to be made at the time of the next full reconstruction of each taxiway. A stand-alone project to modify taxiway filet geometry is not economically feasible and not required by the FAA. **Table 4.26** details all non-standard taxiway geometry.

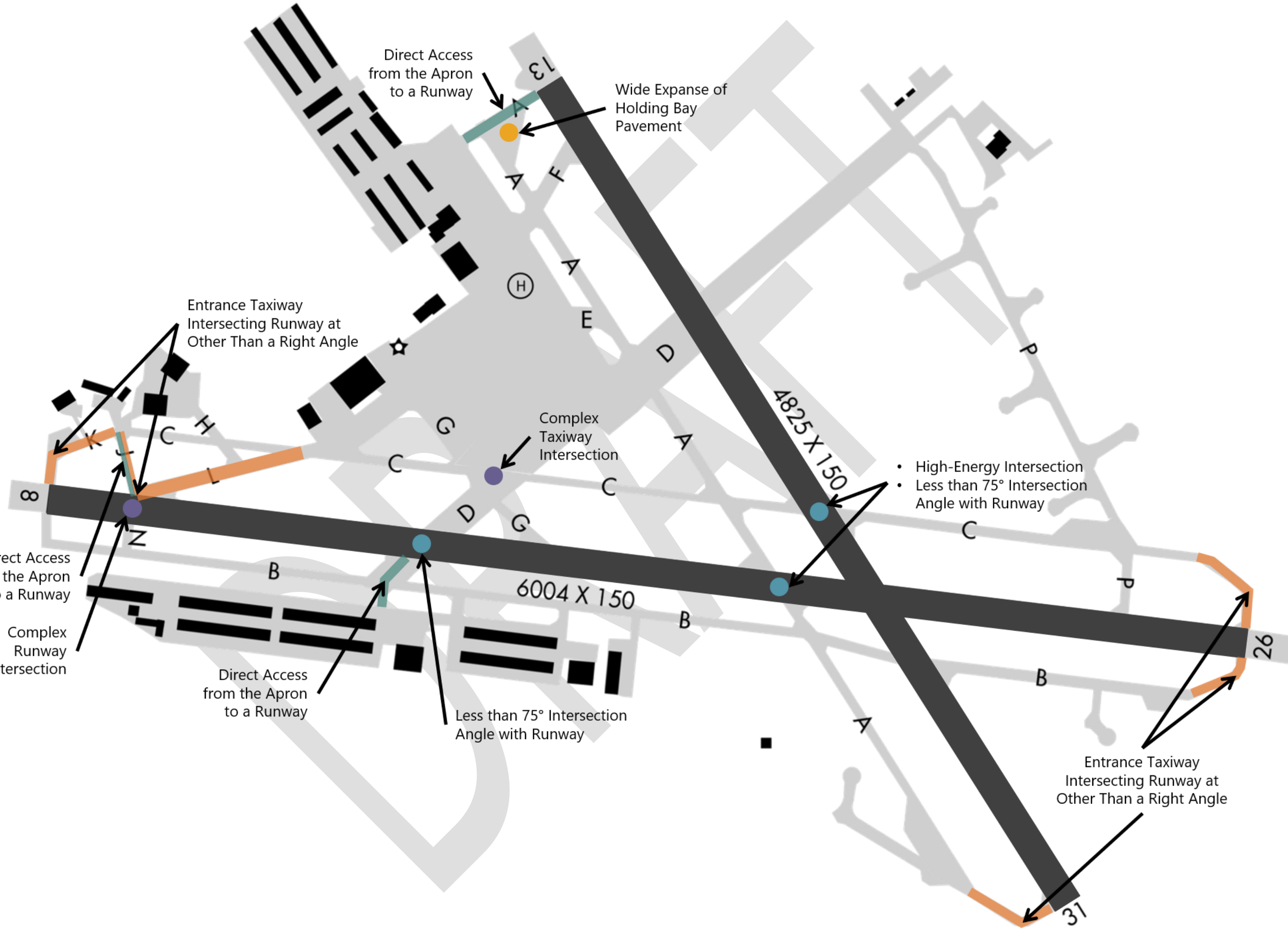
In addition to taxiway intersection geometry, the FAA gives general guidelines to drive design of taxiway systems at airports. There are several locations on the airfield where these guidelines could be implemented to improve the taxiway system (see **Figure 5.12)**:

Table 5.27 - Non-Standard Taxiway Geometry Requirements

Non-Standard Conditions
Direct access to the Runway 13 end from the apron (Taxiway A) should be eliminated
Holding bay pavement at the Runway 13 end should be minimized
Realign taxiways intersecting a runway end at other than a right angle (Runway ends 8, 26, and 31)
Realign high-energy and low-angle intersections at the Taxiway C/Runway 13/31 and Taxiway A/Runway 8/26 intersections
Realign complex taxiway intersection with Taxiways C, D, and G
Realign low-angle intersection of Taxiway D and Runway 8/26
Eliminate direct access to Runway 8/26 from the apron via Taxiway D
Realign complex intersection with Runway 8/26 and Taxiways N, J, and L

Source: C&S Engineers, Inc.

Figure 5.12 - Problematic Taxiway Geometry



Source: C&S Engineers, Inc., FAA Airport Diagram

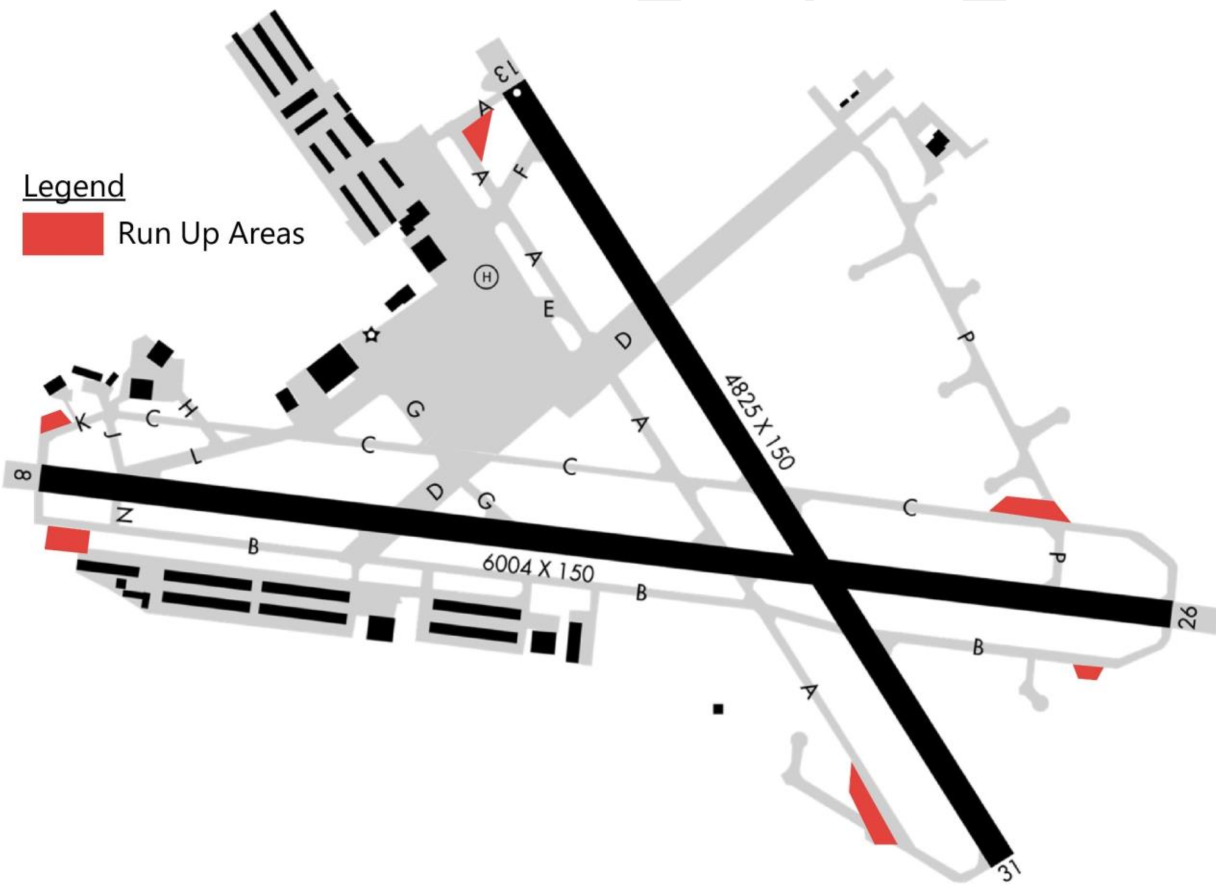
5.3.4.5 Full Length Parallel Taxiway

Currently, Runway 13/31 has a full-length parallel taxiway (Taxiway A) on the west side of the runway while Runway 8/26 has a full parallel taxiway on each side (Taxiway B to the south and Taxiway C to the north). If future aeronautical development is proposed on the east side of Runway 13/31 then it is recommended to construct a parallel taxiway on this side of the runway.

5.3.4.6 Aircraft Run Up Areas

At SNS, there are currently six locations that can serve as run up areas. These are used by pilots to preform pre-takeoff procedures including instrument and engine performance checks as well as to hold while waiting for clearance from ATC. Ideally the aircraft run up areas should be designed to provide a clearly marked area for pilots to park that will keep their aircraft clear of the active taxiway. The run-up areas are depicted in **Figure 5.13** below.

Figure 5.13 - Run Up Areas



Source: C&S Engineers, Inc., FAA Airport Diagram

Ideally, run-up areas are located at the runway ends directly off the taxiway and clear of any protected runway or taxiway areas. General design of holding bays include assured wingtip clearance of established critical aircraft and proper markings to guide pilots safely. Markings should be labeled to have a specified area where aircraft can turn within the holding bays to not line up nose to tail with other aircraft. This will allow for aircraft to quickly enter and exit the holding bay without interfering with other aircraft in the same holding bay.

5.3.5 Taxiway Access Factors

Taxiway entrance and exit locations are an important factor in determining the capacity of an airport's runway system. Runway capacities are highest when there are full-length parallel taxiways, ample runway entrance and exit taxiways, and no active runway crossings available. All of these components reduce the amount of time an aircraft remains on the runway. FAA AC 150/5060-5, *Airport Capacity and Delay*, identifies the criteria for determining taxiway exit factors at an airport. The criteria for exit factors are generally based on the mix index and the distance the taxiway exits are from the runway threshold and other taxiway connections. Taxiway exits were evaluated for operations in both directions on the two runways. **Table 5.28** depicts these findings. All runways have accessible taxiway exits between 2,000 feet and 4,000 feet of the landing threshold.

Table 5.28 - Taxiway Exit Ranges

Runway	Number of Exits within Optimal Range (2,000 FT to 4,000 FT)
8	3
26	4
13	4
31	4

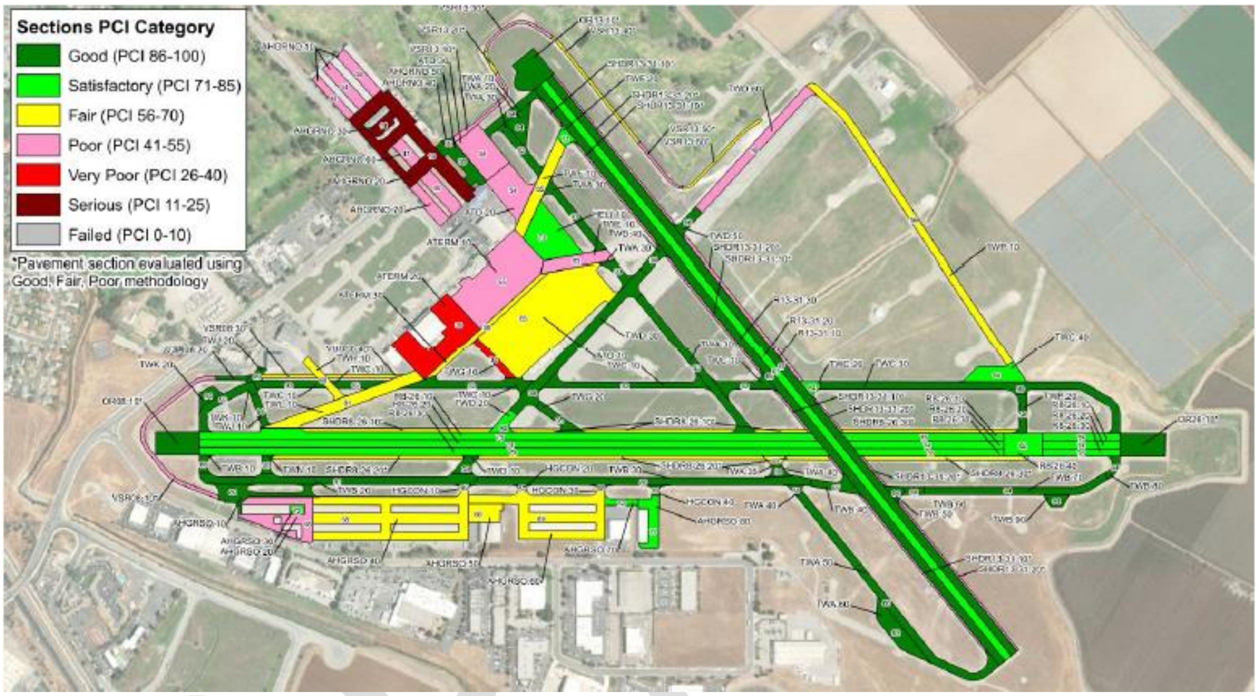
Source: C&S Engineers, Inc.

The taxiway system located at SNS has multiple access points available for both Runway 8/26 and Runway 13/31. Runway 8/26 has two dedicated full-length parallel taxiways, one on each side of the runway. Aircraft must cross Runway 13/31 to get from both the GA hangars, located on the west side of the airport property, and the airport terminal, located on the north portion of the airport property, to reach the Runway 26 end. Runway 13/31 has one full parallel taxiway with connections to the airport terminal apron from the Runway 13 end, and the GA hangars from the Runway 31 end.

5.3.6 Airfield Pavement

An airfield pavement condition analysis was conducted as part of the Pavement Management System Report completed in 2023 for SNS. The intent of the study was to present comprehensive classifications for all airfield pavement sections utilizing the industry standard Pavement Condition Index (PCI) metric. In this method, pavement sections are inspected for distress types and their severities. The inspection data is evaluated to determine the PCI of the pavement. Pavement is then classified using its PCI in categories of good, fair, or poor. The pavement condition findings are depicted in **Figure 5.14**. It is recommended during capital improvement program development efforts that pavement condition be utilized as a factor in prioritizing future pavement rehabilitation projects. **Table 5.29** lists the pavement sections that have been classified as having a “fair”, “poor”, “very poor”, or “serious” condition in the Pavement Investigation Study findings.

Figure 5.14 - PCI



Source: SNS Airport Pavement Management System (APMS) Update, 2023

5.3.6.1 Runway Pavement

The data for the pavement condition analysis shows that Runway 13/31 has a listed outer pavement condition of “good, the middle of the pavement is “satisfactory”, but the shoulders are “poor”. Runway 8/26 is listed as “satisfactory” across the extents of the runway, but its shoulders are rated “fair”.

As identified in the 2023 APMS Update, Maintenance and Reconstruction Projections, runway 13/31, outer extents do not require rehab within the next 10 years; however, the internal extents will require rehab within 7-10 years. Runway 8/26 will require rehab within 4-6 years.

5.3.6.2 Taxiway Pavement

The data for the Pavement Management System Report shows that portions of the taxiway pavement are currently in need of rehabilitation. Taxiway G from the terminal apron to the intersection of Taxiway C has been rated “very poor” and Taxiway E and portions of Taxiway D have been rated “poor”.

As identified in the 2023 APMS Update, Maintenance and Reconstruction Projections, taxiways A, B, C, J, K, N portions of D, G, P require no rehab in the next 10 years. The helipad as well as a portion of taxiway F will require rehab in 1-3 years. Portions of taxiway F and taxiway H are currently eligible for rehab. Taxiway L will be eligible for reconstruction in 7-10 years. Taxiway P as well as a portion of taxiway A south of runway 8/26 at the A/B intersection will be due for reconstruction in 4- 6 years. Taxiway E as well as a portion of taxiway D is currently eligible for reconstruction.

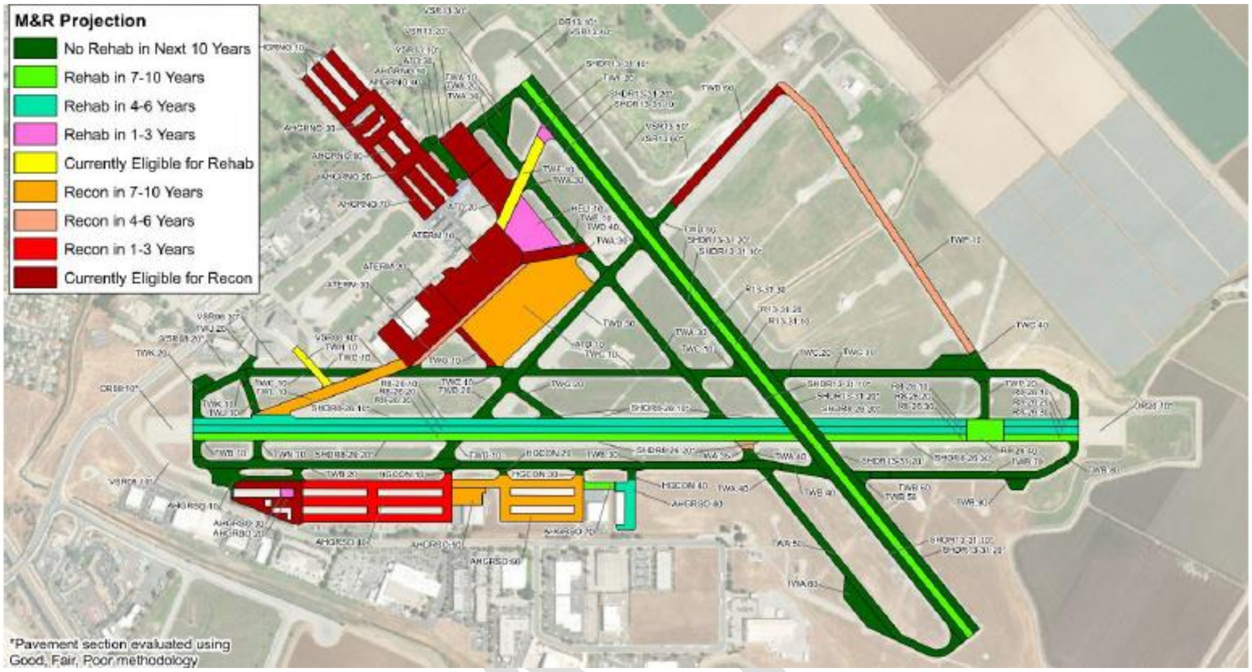
5.3.6.3 Apron Pavement

The data for the pavement condition analysis shows that surveyed SNS's apron area has been classified as having a "poor", "very poor", or "serious" PCI rating. This includes the sections of:

- North apron area surrounding hangars west of Runway 13 (serious and poor)
- North apron area between Taxiway F and service road parallel to Taxiway A (poor)
- Apron area around the terminal between Taxiway G and L (very poor)
- Apron area between the terminal and the end of Taxiways E and F (poor)
- South apron area south of Runway 8 (poor)

As identified in the 2023 APMS Update, Maintenance and Reconstruction Projections, there are several apron areas that are currently eligible for reconstruction, those areas include the north apron area surrounding the hangars as well as the north apron between taxiway F and A, the Terminal Apron, the south hangar apron near taxiway B, as well as a portion of taxiway G. Additionally, the south hangar apron area will be eligible for reconstruction in 1-3 years. There are several apron areas that will be eligible for reconstruction in 7-10 years including the south apron area at the midpoint of taxiway bravo and the southern portion of the terminal ramp.

Figure 5.15 - Airfield Pavement Major Work Projections



Source: SNS Airport Pavement Management System Update, 2023

Table 5.29 – Fair to Serious Pavement Sections

Type of Area	Section Code	PCI Rating
Runway 8/26 Shoulders	SHDR8-26:10/20/30	Fair
Runway 13/31 Shoulders	SHDR13-31:10/20	Poor
Taxiway D	TWD:60	Poor
Taxiway E	TWE:10	Poor
Taxiway F	TWF:10	Fair
Taxiway G	TWG:10	Very Poor
Taxiway H	TWH:10	Fair
Taxiway L	TWL:10	Fair
Taxiway P	TWP:10	Fair
Apron	ATERM:30	Fair
Apron	ATERM:20	Very Poor
Apron	ATERM:10	Poor
Apron	ATD:20/30	Poor
Apron	ATD:10	Fair
North Apron (Hangar)	AHGRNO:20/30	Serious
North Apron (Hangar)	AHGRNO:10/60/70	Poor
South Apron (Hangar)	AHGRSO:20	Poor
South Apron (Hangar)	AHGRSO:40/50/60	Fair

Source: SNS Airport Pavement Management System Update (2023)

5.3.7 Airfield Lighting

The **Existing Conditions & Inventory Chapter** describes the existing condition of airfield lighting equipment at SNS. Currently, SNS has appropriate lighting equipment including a Medium Intensity Approach Lighting System (MALSR), Runway End Identifier Lights (REIL), and Runway and Taxiway Edge Lighting where required. Therefore, no major lighting deficiencies currently exist at SNS. Finally, any future improvements to or implementation of lighting equipment should feature energy-saving LED technologies where able and when practical.

5.3.8 Signage

The **Existing Conditions & Inventory Chapter** describes existing conditions of airfield signage at SNS. While no specific recommendations for signage improvement are identified, airfield signage should be expanded and updated as necessary in conjunction with any airfield improvement projects.

5.3.9 Airfield Markings

The **Existing Conditions & Inventory Chapter** describes existing conditions of airfield markings at SNS. While no specific recommendations for marking improvements are identified, airfield markings should be expanded and updated as necessary in conjunction with any airfield improvement projects.

Figure 5.16 - Enhanced Centerline (Typical)

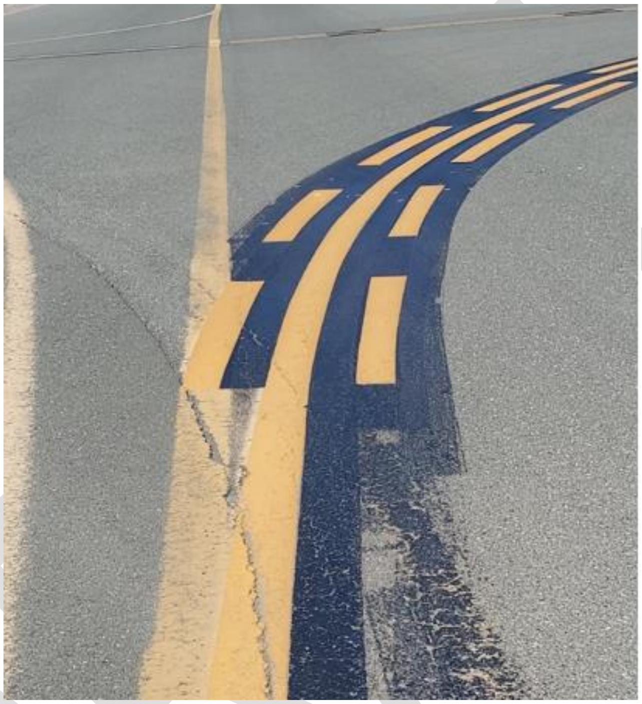


Figure 5.17 - Markings Directional and Mandatory Hold (Typical)

5.4 Landside Facility Requirements

The planning of landside facilities is based on the capacity of both the airside and landside areas. The requirements for terminal and support area facilities have been determined for a 20-year planning period. The principal operating elements covered under these analyses for general aviation requirements include:

- Vehicle Access
- Vehicle Parking
- Perimeter/Security Fencing and Access Gates
- Land Use
- Terminal/Airport Administration Building

These elements are essential for the safe an efficient operation of an airport. By planning for these elements in advance, airports can ensure that they have the capacity to meet the needs of their users.

5.4.1 Vehicle Access

Access to the airport is available via Airport Boulevard or Skyway Boulevard. Several tenant facilities are accessible on the south side of Moffett Street. Airport Boulevard is accessible from Veterans Memorial Highway (US-101) via Roy Diaz Street. The airport does not have wayfinding signs to guide vehicles, but the terminal building and hangars are clearly visible from primary roads. The Airport is not currently experiencing any congestion or access issues. It is not anticipated that the level of demand forecasted over the 20-year period will impact the capacity of area roadways. There are no recommended changes in vehicle access.

5.4.2 Vehicle Parking

The Airport has several parking lots for tenant, employee, and visitor vehicles. The terminal parking area is the most frequently used section of SNS. Other parking areas are available near tenant facilities, including most larger hangar facilities. Many general aviation (GA) tenants park their vehicles at the tie-down or hangar where they base their aircraft.

The Airport has identified that parking needs for business tenants are a concern. These needs will be analyzed further in the development of alternatives. Included in this section are calculations for public vehicle parking needs over the course of the 20-year planning period.

The **Existing Conditions & Inventory Chapter** indicates that a total of 262 vehicle parking spaces are available at SNS contained within eight specific areas. Most of the spaces are at the terminal building and along Mortensen Avenue in front of the large hangar (161 of the 262 spaces are located between these two areas). The approximate square yardage (SY) of the 161 spaces used for terminal parking is 6,261 SY. The remainder of the parking spaces are in smaller lots associated with private facilities. Since the majority of parking spaces are associated with the terminal building, the parking requirements will be in regards to that specific area. It is assumed that individual business will expand their private parking areas as necessary.

The required vehicle parking needs for SNS were calculated using a combination of the design hour operations, the restaurant, rental car parking, and airport employees. This design hour and the standard 2.5 pilots and passengers per design hour operation determined the vehicle parking space requirements for pilots and passenger. It is assumed that the parking demand of restaurant patrons, rental car parking, and airport employees is 90% of the demand for pilots and passengers alone. **Table 5.30** summarizes the results of these findings.

Table 5.30 - Public Vehicle Parking Requirements

Year	Design Hour Operations	Parking Spaces Requires for Pilots and Passengers	Parking Spaces Required for Rental Cars, Restaurant, and Airport Employees	Approx. Size (SY)
2022 Existing	26	65	59	4,803
5 Year	34	85	77	6,281
10 Year	35	88	79	6,465
15 Year	35	88	79	6,465
20 Year	36	90	81	6,650

Source: C&S Engineers, Inc

Based on the existing 161 public parking spaces at the SNS terminal, no additional spaces are needed to accommodate demand with the short-term planning period. However, around the 5 to 10 year planning period it is estimated that the terminal area parking lot will require an expansion to accommodate demand. Therefore, the city should continue to monitor the public vehicle parking needs throughout the planning horizon and consider expansion as the need arises.

If new facilities or tenants seek to use the parking area for a customer driven function, such as, eVTOL, Cargo Operations or other Logistical Business Sectors located at Salinas, parking may be impacted. It is recommended that the appropriate number of spots be added based on the square footage of buildings proposed at the Airport. For example, industry standard is to add 4 spaces per 1,000 square feet of building. California building code (Title 24, Part 3) may require the inclusion of Electric Vehicle (EV) charging stations for new construction and major renovations.

5.4.3 Perimeter / Security Fencing and Access Gates

General Aviation airport security fencing is designed to prevent unauthorized access to the airport's air operations area, which includes runways, taxiways, and aprons. The security perimeter fence acts as the first line of defense against potential security breaches and unauthorized access to the airport.

The Federal Aviation Administration (FAA) recommends that general aviation airports install perimeter fencing that meets the requirements outlined in FAA Advisory Circular (AC) 150/5370-10H, *Standards for Specifications for Construction of Airports*. The FAA advises that the fencing be at least six feet in height and capable of preventing unauthorized access. Perimeter fencing materials can include chain-link, welded wire mesh, wood, and other materials that meet the FAA's standards for strength and durability. The perimeter fence should also be equipped with access gates that are lockable for security purposes.

Access gates are an essential component of general aviation airport security perimeter fencing. Access gates provide a secure point of entry and exit for authorized personnel and vehicles, while preventing unauthorized access to the air operations area. Access gates should be equipped with locking mechanisms that prevent unauthorized entry. The FAA recommends that access gates be designed to allow easy inspection by airport maintenance and security personnel and that the gate should be monitored by security cameras or other surveillance methods.

The Salinas Airport is a general aviation airport that is not subject to 14 CFR Part 139, and therefore is not required to comply with the same security regulations as commercial service airports. However, the Airport must still ensure that adequate security measures are in place to protect the Airport's facilities, aircraft, and personnel.

The Salinas Airport currently has fencing and access control measures in place that provide a layer of security and safety for its users and the public. Overall, the 22,008 ft, six-foot high, galvanized chain-link perimeter fencing is in good condition. However, the Airport does lack about 2,269 ft of fencing on its northeast border with the golf course. The need for additional airport fencing will be analyzed in the **Alternatives Development Chapter**. An update to the Airport's Wildlife Hazard Assessment (WHA) will be able to further inform the airport of where other vulnerabilities exist in the perimeter fencing that allow wildlife to breach the perimeter and suggest measures to correct or prevent future breaches. The need for additional fencing is further illustrated by past airport security issues involving fencing or lack thereof. **Figure 5.18** illustrates current airport fencing.

Figure 5.18 - Airfield Fencing

5.4.4 Land Use

Identifying the types and distribution of land uses and zoning designations on, adjacent to, and in the close proximity of an airport is an important task for municipal airport owners. Typical land use compatibility considerations include safety, height hazards, noise exposure, and alignment with established community planning - all of which the owner should consider relative to projects, both on- and off-airport property.

In the State of California, these topics are addressed in the Airport Land Use Compatibility Plan (ALUCP), which ensures that incompatible development does not occur on land surrounding an airport (non-airport property). To meet these objectives, the ALUCP addresses potential airport compatibility impacts related to four specific airport-related factors. These include:

- Noise – Exposure to aircraft noise.
- Safety – Land use that affects safety both for people on the ground and in aircraft.
- Airspace protection – Protection of airport airspace.
- Overflight – Annoyance and other general concerns related to aircraft overflights.

The Airport's current ALUCP, which was formally referred to as a Comprehensive Land Use Plan (CLUP), was last amended in March 1982. Any proposed development surrounding the airport (not on airport property) would need to conform to the guidelines as outlined by the Land Use Plan. It is imperative that the Airport continue to work in conjunction with other City departments and the surrounding community on controlling the land uses and development formats surrounding the Airport via zoning and other measures, such as avigation easements and airport overlay zones, in order to meet the ALUCP requirements.

5.4.5 Terminal / Airport Administration Building

The terminal building at the Airport is a multi-functional building. The terminal was intended for commercial passenger use. The building is approximately 11,398 square-feet in size.

The methodology used to determine the terminal building facility requirements for general aviation airports is based on the number of airport users anticipated to use the facility during the design hour operations. The design hour is defined as the peak hour of an average day of the peak month. The design hour can be used to determine the number of passengers and pilots departing or arriving on an aircraft in an elapsed hour of a typical busy day (design day). In the case of SNS, given that the design hour operations measure the activities for the Airport as a whole, this methodology may not reflect the most accurate way to calculate the size requirements of the facility; the reasoning is the flight school and FBO customers do not routinely use the terminal building. Therefore, a modified design hour derived from the total itinerant operations during the peak month was calculated for the Airport over the course of the planning period.

In order to accommodate the peak-hour traffic and to determine the building size requirements, conventional planning practices use a factor of 2.5 people (passengers and pilots) per peak-hour (design hour) and an average area of 100 square-feet of space per person for airports similar in size and activity as SNS. For SNS, applying these standards to the itinerant operations design hour produced the terminal size requirements for each planning period. **Table 5.31** summarizes the GA terminal requirements for SNS using the methodologies described herein.

Table 5.31 - General Aviation Terminal Space Requirements

Year	Itinerant Design Hour Operations	Peak-Hour Pilot & Passengers	Terminal Size Required
2021 (Existing)	9	23	3,412
2026	12	30	4,462
2031	12	30	4,462
2036	12	31	4,594
2041	13	31	4,724

Source: C&S Engineers, Inc.

According to the calculated requirements above, the existing 11,398-sq. ft. terminal building meets the space requirements. The terminal appears to have a significant excess of space , however it is occupied by other uses that are not impacted by design hour operations including the airport restaurant and leased office spaces. Although the terminal building appears to be in overall good condition, it is dated. Energy and water efficiency improvements are needed, such as mechanical, electrical, and plumbing upgrades.

The Airport Administration building is located across the street from the airport terminal. This building consists of 8,502 sq. ft. of usable space. The space is further divided into 3,062 sq. ft. of office space and 3,200 sq. ft. of garage storage space. The facility has adequate parking and storage for airport personnel.

5.5 General Aviation

5.5.1 Aircraft Hangars

Hangar requirements for a GA facility are determined by the number of based aircraft, the type of aircraft to be accommodated, owner preferences, and area climate. Furthermore, it is common when calculating the hangar size of a facility to use an average size requirement for the various types of aircraft, meaning that each type of aircraft will require a different amount of space (usually measured in square-feet) within a specific type of storage facility (e.g., T-hangar, single-aircraft box hangar, large multi-aircraft conventional hangar). **Table 5.32** illustrates the average aircraft space requirements based on aircraft type for the Airport.

Table 5.32 - Average Aircraft Space Requirements

Aircraft Storage Type	Space Required (SF)
Conventional/Box Hangar	
SE Piston	1,200
ME Piston	1,400
Turboprop/Jet	1,800
Rotorcraft	800
T-Hangar	
SE/ME (piston/turboprop)	1,400

Acronyms: Square feet (SF), single-engine (SF), multi-engine (ME). Source: C&S Engineers, Inc., 2022

The average space requirements for the various aircraft in the Airport's based aircraft fleet mix was applied to the based aircraft forecasts to estimate hangar area requirements for each aircraft type. Of note in this analysis, there are 250 storage bays at the Airport, but the number of based aircraft will not exceed 250 during the 20-year planning period. The data analysis in this section will use the assumption that 100% of the fleet will continue to use hangar storage. The existing based aircraft data provided by airport management, along with the current aircraft storage conditions as they exist on the airfield today, were used in this analysis. Finally, using these averages and assumptions, combined with the forecasted fleet mix, **Table 5.33** depicts the calculated demand requirements for hangar space at the Airport for each of the aircraft types located on the field.

Table 5.33 - Existing Hangar and Demand Summary

Aircraft Type	2021 (Existing)	2026 Forecast	2031 Forecast	2036 Forecast	2041 Forecast
Single-Engine	159,600	169,200	177,600	187,200	196,800
Multi-Engine	19,800	19,800	22,000	22,000	22,000
Jet	6,600	6,600	8,800	11,000	13,200
Rotorcraft	17,600	19,800	19,800	22,000	24,200
Total Hangar Area (SF)	**203,600**	**215,400**	**228,200**	**242,200**	**256,200**

Source: C&S Engineers, Inc.

The results of the hangar demand analysis illustrated in **Table 5.33** above indicate that the Airport has sufficient hangar storage space for the 20-year planning period. This is inconsistent with input received from airport management, tenants, and users at the Airport. The airport manager has identified several T-Hangar structures that will see the end of their useful life during the 20-year planning period. All of the ageing infrastructure is located on the Northside of the Airport. It is expected that over the 20-year planning period approximately 50 storage units will exceed their useful life. Based on the hangar demand analysis and the existing number of T-hangars present today, the Airport has excess space in the amount of 58,000 sq. ft. However, the loss of 50 individual storage units would equate to a loss approximately 65,000 sq. ft. of hangar space.

Table 5.34 - Northside Hangar Useful Life Analysis

Hangars Location (Northside)	Square Footage	Remaining Useful Life
Short Term Loss		
Echo Row	7,800	10 Years
Port-a-Ports	15,600	10 Years
Medium Term Loss		
Delta Row	7,800	10-15 Years
Long Term Loss		
Alpha Row	11,500	15-20 Years
Bravo Row	11,500	15-20 Years
Charlie Row	11,500	15-20 Years

Source: C&S Engineers, Inc.

According to airport management, users, and tenants there is a need for additional corporate hangars or large box hangars. The Salinas Airport is already home to an eVTOL research and developer, the storage space and amenities required of these aircraft of the future are different than what is currently in the marketplace. As the hangars in **Table 5.34** come to the end of their useful life, the Airport should consider replacing them with more flexible storage options to meet the needs of a wider range of aircraft. This is consistent with industry practices.

Therefore, recommendations for additional flexible corporate or box hangars will be explored in the **Alternatives Development Chapter** analysis and ultimately displayed on the Airport Layout Plan (ALP). It is important to note that hangars of all types are normally not eligible for FAA Airport Improvement Plan (AIP) funding and therefore are usually funded by the sponsor, private investor, or a combination thereof. Thus, it is also recommended that the City continue to monitor the actual demand for hangars at the Airport and make adjustments in the types and number of hangars as needed over the course of the planning horizon.

5.5.2 Aircraft Parking Apron

There are multiple aircraft parking areas are located at the SNS with approximately 44 apron-tie-down positions and 68,100 square yards of aircraft parking apron available. In order to identify the required parking space needed for based aircraft not stored in a hangar, as well as transient aircraft requiring temporary parking, a demand analysis was conducted. Demand for these parking areas is broken up into based aircraft parking and transient aircraft apron. **Figure 5.19** depicts the apron and tie-down areas at SNS.

5.5.2.1 Based Aircraft Apron

Each airport is different with regard to its needs for based aircraft apron parking. At most airports, the majority of based aircraft that utilize apron tie-downs are single-engine piston and small multi-engine piston aircraft since owners of larger, more expense aircraft usually prefer to store their aircraft in a hangar. Most airports report that 75-100 of based aircraft are stored within hangars. For tie-down requirements for SNS, 10 percent of based aircraft are assumed to require an apron tie-down.

Forecast Year	Total Based Aircraft	Tie-Downs Required	Based Aircraft Apron Required (SY)
Existing 2022	163	16	7,300
5 Year	173	17	7,800
10 Year	183	18	8,200
15 Year	193	19	8,700
20 Year	203	20	9,100

Using a standard of 450 square-yards per tie-down space, a total of 9,135 square-yards of based aircraft apron will be required by the end of the planning period. SNS currently exceeds the anticipated numbers of tie-downs as well as apron area.

5.5.2.2 Transient Aircraft Apron

Transient aircraft are those that are visiting an airport on a temporary basis and do not remain at an airport for an extended period of time. Areas designated for the parking of transient aircraft are usually identified as "itinerant aprons." These aprons are also used by based aircraft for loading, fueling, and other activities. The size of apron required to meet itinerant demand was calculated using the following methodology:

1. Calculate the ADPM itinerant operations using the 65% ratio of itinerant to local operations
2. Assume 450 square-yards of apron required for each daily itinerant operation

Forecast Year	Average Day Peak Month Operations	Average Day Peak Month Itinerant Operations	Itinerant Aircraft Apron Required (SY)
Existing 2022	208	135	60,840
5 Year	276	179	80,730
10 Year	279	181	81,608
15 Year	283	184	82,778
20 Year	286	186	83,655

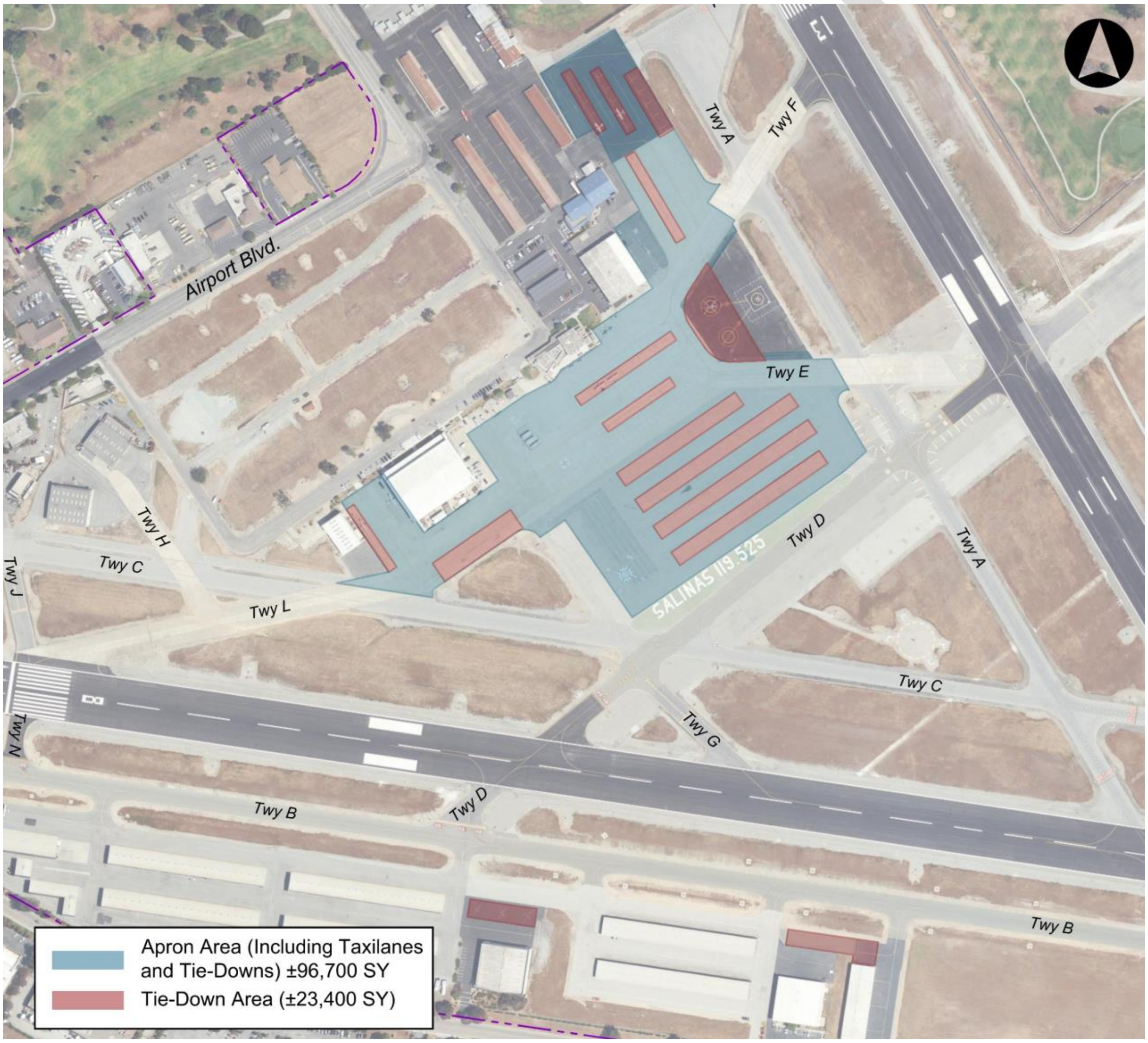
The results of the apron area demand analysis indicate that the Airport has sufficient itinerant and based aircraft apron area over the course of the 20-year planning period and is consistent with reports by Airport management, flight schools, fixed base operators (FBOs), and other tenants. The results of the analysis are presented in **Table 5.35** below.

Table 5.35 - Apron Area Demand Summary

	Existing Area (SY)	Estimate of Apron Area Needed (SY)			
	2022	5 Year	10 Year	15 Year	20 Year
Based Apron	7,300	7,800	8,200	8,700	9,100
Itinerant Apron	60,800	80,700	81,600	82,800	83,700
Total Apron	**68,100**	**88,500**	**89,800**	**91,500**	**92,800**

Source: C&S Engineers, Inc.

Figure 5.19 - Apron Area



Source: C&S Engineers, Inc.

5.6 Airport Support Facilities and Equipment

5.6.1 ARFF & Other Emergency Services

Although SNS does not have an Aircraft Rescue and Firefighting (ARFF) station on property, there is an ARFF vehicle that is housed at the Airport and is operated by city firefighters. Salinas Fire Station 4 located approximately 1-mile northwest of the airfield, aids with both fire and emergency medical services as needed. This location also holds the Department's dry-chemical unit as well as a specialized firefighting unit for airport responses. FAA AC 150/5210-6D, *Aircraft Fire and Rescue Facilities and Extinguisher Agents*, recommends general aviation airports have 190-gallons of aqueous film forming foam (AFFF) supplemented with 300- pounds of dry chemical, in addition to aviation rated fire extinguishers immediately available in the vicinity of the aircraft apron and fueling facilities. Thus, it is recommended that the City continue its agreement with the local Station 4 as long as they are able to provide the recommended minimum protection as outlined above. If the Airport decides to pursue Part 139 certification, the agreement with local Station 4 will not be sufficient to meet the ARFF requirements as detailed in the **Part 139 Feasibility Chapter**.

5.6.2 City Maintenance & Equipment Building

Maintenance of the Airport is handled in limited capacity by Airport staff using City-owned equipment. Airport management retains a dedicated administration and maintenance building, much of the maintenance equipment is stored in the administration building garage. The garage area is approximately 3,200 sq. ft. and houses all equipment with the exception of one tractor. Airport management stated that the storage space allotted adequately satisfies the storage needs of the Airport.

5.6.3 Fueling Facilities

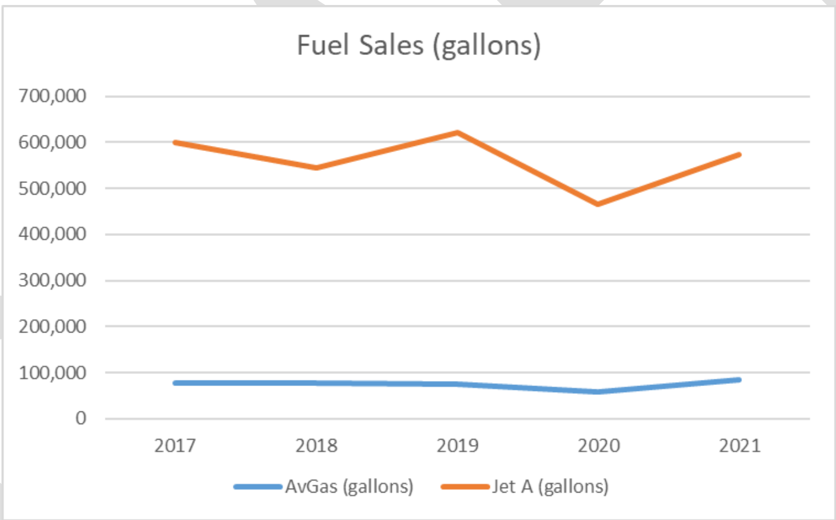
As previously discussed in the **Existing Conditions & Inventory Chapter**, there is not a City-owned or operated aircraft fueling station at the Airport. Instead, fueling services are provided by Jet West, the Airports primary FBO. Jet West currently has three fueling trucks: a 1,000-gallon truck, a 3,000-gallon truck, and a 5,000-gallon truck. The Airport has a fuel farm consisting of two 12,000-gallon above ground storage tanks, one containing 100LL (one hundred low lead) and the other containing Jet A fuel. Each fuel storage tank is equipped with self-service fuel hoses at one end arranged in opposite directions.

A review of the fuel sales data from 2017-2021 indicates that the FBO sells on average approximately 11,000 gallons of Jet A and 1,600 gallons of 100LL on a weekly basis. Thus, the existing aircraft fueling facilities at the Airport appear to be adequate for existing demand.

However, it is likely that the fueling capacity at the Airport may need to increase, especially for 100LL fuel, to accommodate future demand. 100LL is the only remaining lead-containing transportation fuel and it is relied on by owners and operators of more 167,000 piston-engine aircraft in the United States to power their aircraft.

The FAA is currently working with aircraft and engine manufacturers, fuel producers, the EPA and industry associations to overcome technical and logistical challenges to developing and deploying a new unleaded fuel[5]. There is one existing approved unleaded alternative to 100LL named UL94, however this fuel is not universally compatible with the piston-engine fleet. UL94 also requires dedicated storage tanks and would require new infrastructure in order for it to be offered at the Airport[6]. Efforts to develop an alternative that meets the requirements of the entire piston-engine aircraft fleet are ongoing. The Airport has expressed interest in unleaded aviation fuel, but the decision to stock and sell the fuel ultimately lies with the fuel providers at SNS when it becomes readily available.

Figure 5.20 - Fuel Sales by Year



Source: C&S Engineers, Inc.

5.6.4 Airport Traffic Control Tower

The FAA currently maintains, and SERCO operates the ATCT located on the southeast corner of the airfield. Although the structure itself is outdated, it remains functional. Discussion with the Airport Manager indicate that the building may not be compliant with the Americans with Disabilities Act. Further discussion with the Tower Facility Manager confirmed the buildings lack of ADA compliance and need for elevators. Continued dialogue indicated that FAA has updated to the best extent possible the HVAC and electrical components and have plans to replace the tower cab. Tower Facility Manager feels that the tower in addition to the buildings that house the localizer and the glideslope need to be replaced, being that they were both installed in the

5 "Aviation Gasoline," faa.gov (Federal Aviation Administration, August 21, 2020), https://www.faa.gov/about/initiatives/avgas/.

6 "Swift Fuels Unleaded Avgas," Swift Fuels Avgas, accessed June 3, 2021, https://www.swiftfuelsavgas.com/faq.

late 60's-early 70's all the buildings are beginning to show their age and limitations. Efforts have been made to secure funding by the FAA facility team, but the Facility Manager suggests a reimbursable agreement with the airport and AIP funding may be the best way to achieve system updates.

The ATCT is 470 feet above mean sea level (MSL). Airport Management has identified one line-of-sight issues at the Airport. The ATCT is anticipated to remain in its current location over the course of the planning period.

5.7 Utilities and Infrastructure

The current capacity for all utilities discussed in the **Existing Conditions & Inventory Chapter** is adequate for present day demands. However, future development may require additional electrical or water capacity to meet the power needs of the operation or to meet fire codes (usually for new hangar developments). As such, during the planning phase of all future proposed development, coordination with the local utility providers should occur to ensure sufficient capacity exists.

As mentioned earlier in this section, as well as throughout the Master Plan documents, the presence of eVTOL operations at the field have been well noted. As the eVTOL fleet grows in the area considerable demand may be placed on the electrical infrastructure of the Airport. Furthermore, to determine the adequacy of the existing infrastructure at SNS, it is recommended that a general utility study be performed to gauge the Airport's current systems, especially electrical systems, which in turn should assist in estimating the future utility demands needed to support the proposed future development contained in this Master Plan update.

As part of the Airport Master Plan, a waste audit was conducted to understand current waste management practices and performance. Refer to **Appendix 11-A** for additional audit information. Future consideration should be given to waste infrastructure as the airport is further developed.

5.7.1 Airfield Electrical Vault

As noted in the **Existing Conditions & Inventory Chapter**, the airfield electrical vault is located south of the ATCT, along the southeastern edge of the airport boundary. The current size of the building and the equipment inside are adequate to meet the Airport's current demand. However, the vault is at capacity and would require replacement if any improvements are made to the lighting at the Airport.

5.8 Sustainability Workshop Input

Sustainability is becoming increasingly important in the aviation industry, and general aviation airports are no exception. Sustainability is a broad concept that encompasses a variety of practices that aim to reduce environmental impacts of human activity and enhance the resilience of the airport. As part of the outreach for the Master Plan project, a Sustainability Workshop was held. During the workshop, participants learned about industry best practices; discussed, identified, and prioritized sustainability strategies for the master plan project, based on their feasibility of implementation and their ability to make an impact to the Airport, the environment, and the surrounding communities. These ideas and strategies were then evaluated in further detail to provide guidance on the integration of high-priority and value-driven short-term strategies, which have little or no impact to capital or operating costs and will contribute to the Airport's overarching sustainability goals.

5.8.1 Airside Facility Requirements Feedback

On the airside of general aviation airports, one of the best practices for sustainability is to implement environmentally friendly operations. This includes using electric or hybrid aircraft and ground vehicles, which significantly reduce carbon emissions and noise pollution. Another best practice is to promote efficient air traffic management, which can reduce fuel consumption and improve air quality. Additionally, encouraging pilots to practice efficient flying techniques, such as maintaining optimal altitudes and speeds, can help reduce fuel consumption and minimize the airport's carbon footprint. Some of the sustainability initiatives identified during the workshop that pertain to the Airside are listed below.

Sustainability Initiatives

Airside

- Prioritize growth of airport facilities to promote eVTOL uptake, investment by eVTOL companies and Part 139 Airport Certification for eVTOL technologies.
- Implement an airport-wide transition to energy-efficient lighting fixtures. Install LEDs on any new or renovated facilities.
- Establish building design standards for new construction and renovations, which encourage infrastructure projects to prioritize resource (water, energy, carbon, etc.) neutrality.
- Conduct an operational audit to determine specific improvement measures for optimizing airport operations. This should include evaluating water use and determining the need for water use metering, and the potential for transitioning to a digital airfield inspection tool to enhance AOA inspections. Based on the findings of the audit, develop minimum standards for airport policies and procedures.

5.8.2 Landside Facility Requirements Feedback

On the landside of general aviation airports, one of the best practices for sustainability is to adopt eco-friendly infrastructure and building design. Using solar panels, LED lighting, and energy-efficient HVAC systems can significantly reduce energy consumption and costs. Another best practice is to implement sustainable transportation solutions for passengers and employees, such as electric or hybrid shuttles and bike sharing programs. The use of recycled materials and the promotion of waste reduction and recycling programs can also help reduce the airport's environmental impact. Finally, promoting education and awareness campaigns on sustainable practices can encourage the aviation community to adopt environmentally friendly behaviors and habits. Some of the sustainability initiatives identified during the workshop that pertain to the Landside are listed below.

Landside	Sustainability Initiatives
	Americans with Disability Act (ADA) alterations in the terminal building and across airport facilities to improve usability
	Build sustainability initiatives, such as food composting and reusable water bottles, into public events. Promote the airport's responsible resource practices and other initiatives by requiring event hosts to highlight these activities during community events.
	Conduct a renewable energy study to evaluate on-site potential for installing more solar panels and/or geothermal.
	Establish building design standards for new construction and renovations, which encourage infrastructure projects to prioritize resource (water, energy, carbon, etc.) neutrality.

5.8.3 Summary

As SNS progresses with its Capital Improvement Program and development according to the Airport Master Plan, it is advisable to prioritize sustainability initiatives. While the primary focus of the five-year program is on airfield enhancements like pavement rehabilitation and lighting upgrades, future capital projects can incorporate sustainability recommendations. These recommendations encompass various aspects such as maximizing stormwater capture, utilizing green stormwater infrastructure, conserving energy and water resources, and reducing waste and carbon emissions. As lighting, signage, and other equipment are replaced and upgraded, it is recommended to opt for more energy-efficient fixtures or equipment.

To promote sustainability throughout the Airport Master Plan's development, daily operations, and future design and construction projects, the integration of sustainability initiatives should be pursued whenever possible. Additionally, the following approaches should be considered to enhance sustainability:

- Provide opportunities for public engagement and outreach to incorporate sustainability best practices.

- Train and educate staff and tenants on recommended sustainability initiatives.
- Implement sustainable design and construction principles using recognized rating systems like LEED, Envision, and Building Research Establishment Environmental Assessment Method (BREEAM).
- Consider City and County sustainability goals and targets as they become more defined under the General Plan.

5.9 Requirements Summary

This section summarizes the facility requirements that should be considered as alternatives to Airport development.

5.9.1 Airspace Requirements

- **PAPI:** Replace aging VASIs on Runway Ends 13, 8, and 26 with PAPIs
- **VORTAC:** Relocate the VORTAC to enable development on the east side of the airfield
- **Airspace Obstructions:** Address obstructions to airspace surfaces as detailed in the ALP

5.9.2 Airfield Requirements

- **Runway Length:** Requires an extension to fully accommodate the existing fleet mix
- **Runway Designation:** Update designation of Runway 13/31 to 14/32 in long-term
- **Runway Safety Areas:** Non-standard conditions including perimeter fencing, vehicle service road, golf course, and grading
- **Runway Object Free Areas:** Non-standard conditions including perimeter fencing, vehicle service road, and golf course
- **Runway Protection Zones:** Non-standard conditions include public roads, residential/commercial buildings, and a golf course within the RPZ
- **B-II to C-II Change:** The future change in critical aircraft will increase the impacts to the RSA, ROFA, and RPZ
- **Future Runway to Taxiway Separation:** Future C-II classification will require an increase in runway to taxiway separation from Runway 13/31 to Taxiway A and Runway 8/26 to Taxiway B
- **Taxilane Safety Area and Taxilane Object Free Areas:** Existing TSA and TLOFA between hangar rows do not meet standards
- **Non-Standard Taxiway Geometry:** Several areas of the taxiway system do not meet current FAA guidelines on taxiway design
- **Aircraft Run Up Areas:** Add additional markings to run up areas to more clearly define movement vs. non-movement areas

- **Airfield Pavement:** Address rehabilitation and reconstruction projects as identified in the PMP

5.9.3 Landside Requirements

- **Fencing:** Increase perimeter fence by 2,269 feet
- **Land Use:** Update ALUCP to protect development around the Airport
- **Hangar Storage:** Replace ageing hangar infrastructure with more desirable hangar configuration or types

5.9.4 Access, Circulation, and Parking Facility Requirements

- **Vehicle Parking:** Increase vehicle parking in tenant areas as well as segregating parking for restaurant patrons and rental car users

5.9.5 Airport Support Facility Requirements

- **Electrical Infrastructure:** Conduct utility study be performed to gauge the Airport's current systems
- **Fueling Facility:** Additional storage for future unleaded fuel