



Section 5 – Alternatives Development and Evaluation

Airport Master Plan | Salinas Municipal Airport

Draft
Prepared by:





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5.1 Introduction

The master plan process inventories existing conditions and environmental considerations (Sections 1 and 2, respectively), develops a forecast of anticipated operational activity (Section 3), and identifies the facilities needed to accommodate future demand (Section 4). Next, a series of alternative solutions to satisfy the gap analysis are developed. Finally, the alternatives are evaluated using criteria developed by the Airport.

This section includes proposed development alternatives and evaluates the recommended plan. Alternatives were developed specifically for each major functional area of the Airport, including various airfield, landside, and support facility elements. The alternatives were evaluated and ranked based on criteria to choose recommended alternatives. The recommended alternatives for each major functional area are combined into a preferred airport-wide development plan and further evaluated in the implementation, phasing, and financial planning section of the master plan, Section 6, respectively.

5.2 Process for Evaluation of Alternatives

The alternatives developed for each functional area went through a comparative analysis process consisting of various criteria established in coordination with the Airport. The criteria are generally grouped into the following:

- ◆ Operational Performance – Will it positively effect the capacity and capability of the Airport? Will it improve operational efficiency? Does it adequately meet the projected demand?
- ◆ Environmental Factors – What are the potential impacts to the environment? What is the long-term sustainability of the project?
- ◆ Best Planning Tenets - Does the alternative meet FAA design standards? Is it technically feasible? Does it allow future flexibility?
- ◆ Financial Feasibility – Is the development cost reasonable? Is the project financially sustainable?

The details of how these factors are specific to each airport functional area is defined within the functional area and the evaluation of their alternatives. Each criterion is qualitatively analyzed using the following rating system, adjusted, and modified to meet the airport functional area being evaluated. Below is an example:

■ Negative impacts ■ No Impact ■ Positive impacts

Each alternative is ranked using this evaluation. These alternative rankings along with input from the Airport, PAC members, and the public are used to select a recommended alternative. Then, the recommended alternative for each functional area is combined to create the preferred airport-wide development plan.

5.3 Airspace and NAVAID Alternatives

The Facility Requirements section identified two potential improvements to increase the capability and capacity of SNS. They are each discussed below.

5.3.1 Relocate VORTAC

As discussed in the Facility Requirements section, due to the availability of an ILS approach, RNAV approach, and LOC approach, the VORTAC does not provide a significant benefit to the Airport. It is recommended that the VORTAC be relocated off of SNS property to enable development on the east side of the airfield. The remainder of the alternatives found in this section make the assumption that the VORTAC will be relocated and the area currently within the protected area surrounding the VORTAC will be made available for development.

5.3.2 Update VASI to PAPI

SNS currently has Visual Approach Slope Indicator (VASI) systems at the Runway 8, 26, and 13 ends. These systems are aging, but are still functional. It is recommended that the VASI lights be maintained until the end of their useful life. At that point it is anticipated that they will be replaced with the newer Precision Approach Path Indicator (PAPI) lights. It is preferred that the FAA maintains ownership and maintenance responsibilities for the future PAPI lights.

5.4 Runway Alternatives

The development of airfield alternatives focused on maintaining safe and efficient operations and meeting current airfield design standards, while preserving general aviation expansion opportunities.

5.4.1 Runway 8/26 Alternatives

At 6,004 ft long, Runway 8/26 is the longest runway available at SNS. However, rising terrain to the east of the airport prevents the addition of an ILS approach to the Runway 26 end. The proximity of homes and infrequency of wind coverage mean that it would not be feasible to add an ILS approach to the Runway 8 end. Due to these complications Runway 8/26 is most often

used for departures or during fair weather conditions. For operations in inclement weather when an ILS approach is required, aircraft will utilize Runway 13/31 instead.

The following alternatives explore the range of possibility of improvements to Runway 8/26. These alternatives seek to find a balance between providing a longer runway and the handicap of lacking an ILS approach.

5.4.1.1 Runway 8/26 – Alternative 1: Extension to 7,000', B-II Classification

This alternative proposes a 997 ft runway extension on the Runway 26 end, bringing the total length of Runway 8/26 to 7,000 ft. The runway extension would be accompanied by extensions to Taxiway C and Taxiway B, although the construction of these could be phased to reduce the short-term financial burden. The terrain on the Runway 26 drops off and a runway extension in this direction will require a significant amount of fill in order to meet FAA grading requirements. It was noted by local SNS pilots that the approach path to Runway 26 already brings aircraft into relatively close proximity with the mountains approximately 4 miles to the east. An extension on this runway end would effectively place aircraft even closer to terrain. The construction of physical runways and taxiways in this alternative would remain on airport property, but property acquisition would be required to protect the RSA, ROFA, and RPZ. Additionally, this alternative would cause the Runway 26 end RPZs to extend over East Alisal Road.

This alternative can be seen in **Figure 5.1** below and is further evaluated and ranked in **Table 5.1**.

5.4.1.2 Runway 8/26 – Alternative 2: Extension to 7,000 ft, 396 ft Shift, B-II Classification

Alternative 2 consists of shifting Runway 8/26 by 396 ft to the east and extending the Runway 26 end by 1,392 ft. This still results in the same ultimate runway length of 7,000 ft as proposed in Alternative 1. The main difference with this alternative is that the shift will correct the non-standard RPZ issue on the Runway 8 end. As noted in the Facility Requirements section, the RPZ currently extends over public roads and residential areas. This shift would remove the residential areas from the RPZ, but the roads would remain. The increase in the length of the extension on the Runway 26 end would exacerbate several items noted in the previous alternative. It would increase the cost of construction due to the additional material needed for both construction and for fill to bring the area up to grade, as well as the amount of property acquisition required. It would also shift aircraft approach patterns closer to the mountains on the Runway 26 approach.

This alternative can be seen in **Figure 5.2** below and is further evaluated and ranked in **Table 5.1**.

5.4.1.3 Runway 8/26 – Alternative 3: Extension to 7,000 ft, 1,009 ft Shift, C-II Classification

Alternative 3 further continues the trend presented in Alternative 2 of shifting the runway to the east. As discussed in the Forecast section, it is anticipated that the number of C-II aircraft operating at SNS will continue to increase and in the outer years of the planning period, it is expected that the critical aircraft will become a C-II aircraft. Among other things, this jump from a B-II to C-II classification will result in an increase in the length of the RPZs. The increase in amount of runway shift in this alternative is designed to keep the larger C-II RPZ clear of residential areas on the Runway 8 end. As with Alternative 2, this alternative increases in cost and complexity as the length of the runway shift increases.

This alternative can be seen in **Figure 5.3** below and is further evaluated and ranked in **Table 5.1**.

5.4.1.4 Runway 8/26 – Alternative 4: Reduction to 5,608 ft, B-II Classification

The previous three alternatives considered various ways to extend and improve Runway 8/26 and have it become the Airport's primary runway. Alternative 4 proposes a reduction in runway length rather than an extension. This alternative is only recommended if combined with a Runway 13/31 extension to at least 6,000 ft to maintain the existing capacity of the runway system. The purpose of the reduction in length is to address the non-standard RPZ on the Runway 8 end as well as to reduce future maintenance costs and free up more money to invest in Runway 13/31. This alternative would be the least expensive by far because it does not include any new runway construction. However, it should be considered that this alternative would not be recommended unless Runway 13/31 were extended which would incur significant cost.

This alternative can be seen in **Figure 5.4** below and is further evaluated and ranked in **Table 5.1**.

5.4.1.5 Runway 8/26 Alternative 5: Maintain 6,004 ft, 396 ft Shift, B-II Classification

Alternative 5 is the alternative shown on the current SNS airport layout plan (ALP). This alternative would mitigate the Runway 8 end RPZ issues by shifting the runway 396 ft. It would then extend the Runway 26 end by 396 ft in order to account for the loss on the opposite side.

This alternative maintains the status quo of the runway system while still seeking to make improvements to the RPZ. With the exception of Alternative 4, this alternative is the most cost effective as it has the shortest proposed runway extension.

This alternative can be seen in **Figure 5.5** below and is further evaluated and ranked in **Table 5.1**.

5.4.1.6 Recommended Preferred Alternative - Alternative 4

Alternative 4 is recommended as the preferred alternative for Runway 8/26. This alternative aligns with the Airport's decision to classify Runway 13/31 as the primary runway and focus future improvement projects on increasing the capability of the primary runway. It should be noted that a reduction in the length of Runway 8/26 should only be considered if Runway 13/31 has already been lengthened to at least 6,000 ft in order to prevent a loss in airport capability.

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Table 5.1 - Runway 8/26 Alternatives Evaluation

Evaluation Criteria	Alternative 1: Extension to 7,000 FT B-II Classification	Alternative 2: Extension to 7,000 FT 396 FT Shift, B-II Classification	Alternative 3: Extension to 7,000 FT 1,009 FT Shift, C-II Classification	Alternative 4: Reduction to 5,608 FT B-II Classification	Alternative 5: Maintain 6,004 FT 396 FT Shift, B-II Classification
Operational Performance	■ <u>Positive Impact</u> Increases Runway 8-26 length to 7,000'.	■ <u>Positive Impact</u> Increases Runway 8-26 length to 7,000'.	■ <u>Positive Impact</u> Increases Runway 8-26 length to 7,000'.	■ <u>Negative Impact</u> Reduces the runway length of the longest runway at SNS. This alternative should only be considered if Runway 13/31 is first lengthened to at least 6,000'.	■ <u>Lesser or No Impact</u> This alternative would maintain the existing length of Runway 8/26.
Environmental Factors	■ <u>Negative Impact</u> Significant amount of fill required to meet grading requirements. Significant amount of new runway/taxiway construction.	■ <u>Negative Impact</u> Significant amount of fill required to meet grading requirements. Significant amount of new runway/taxiway construction.	■ <u>Negative Impact</u> Significant amount of fill required to meet grading requirements. Significant amount of new runway/taxiway construction.	■ <u>Positive Impact</u> Reduces the length of the runway which results in long-term material savings and reduction in environmental impact.	■ <u>Lesser or No Impact</u> Would require significantly less grading and construction than Alternatives 1-3.
Best Planning Tenets	■ <u>Lesser or No Impact</u> Does not mitigate Runway 8 end RPZ issues, but does nothing to make them worse than existing condition.	■ <u>Positive Impact</u> Addresses Runway 8 end RPZ and non-standard taxiway geometry issues.	■ <u>Positive Impact</u> Addresses Runway 8 end RPZ and non-standard taxiway geometry issues.	■ <u>Positive Impact</u> Addresses Runway 8 end RPZ and non-standard taxiway geometry issues.	■ <u>Positive Impact</u> Addresses Runway 8 end RPZ and non-standard taxiway geometry issues.
Financial Sustainability	■ <u>Negative Impact</u> Increased financial burden in both short-term for construction and long-term for additional maintenance.	■ <u>Negative Impact</u> Increased financial burden in both short-term for construction and long-term for additional maintenance.	■ <u>Negative Impact</u> Increased financial burden in both short-term for construction and long-term for additional maintenance.	■ <u>Positive Impact</u> Reduces the length of the runway which results in long-term savings.	■ <u>Lesser or No Impact</u> Up front cost for project construction, but significantly less than Alternatives 1-3. Ongoing maintenance costs would be similar to existing condition.
Score	3	4	4	6	5
Ranking	4 th	3 rd (Tie)	3 rd (Tie)	1 st	2 nd

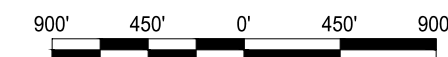
Legend: ■ Positive Impact = 2, ■ Lesser or No Impact = 1, ■ Negative Impact = 0



Figure 5.1

Runway 8/26: Alt. 1 Extension to 7,000' B-II Classification

- Airport Property Line
- Existing Buildings
- Existing Pavement
- Existing Fence
- Existing NAVAID
- Proposed Pavement
- Proposed Demolition
- RSA
- ROFA
- RVZ
- Runway Protection Zone



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Source: C&S Engineers, Inc.

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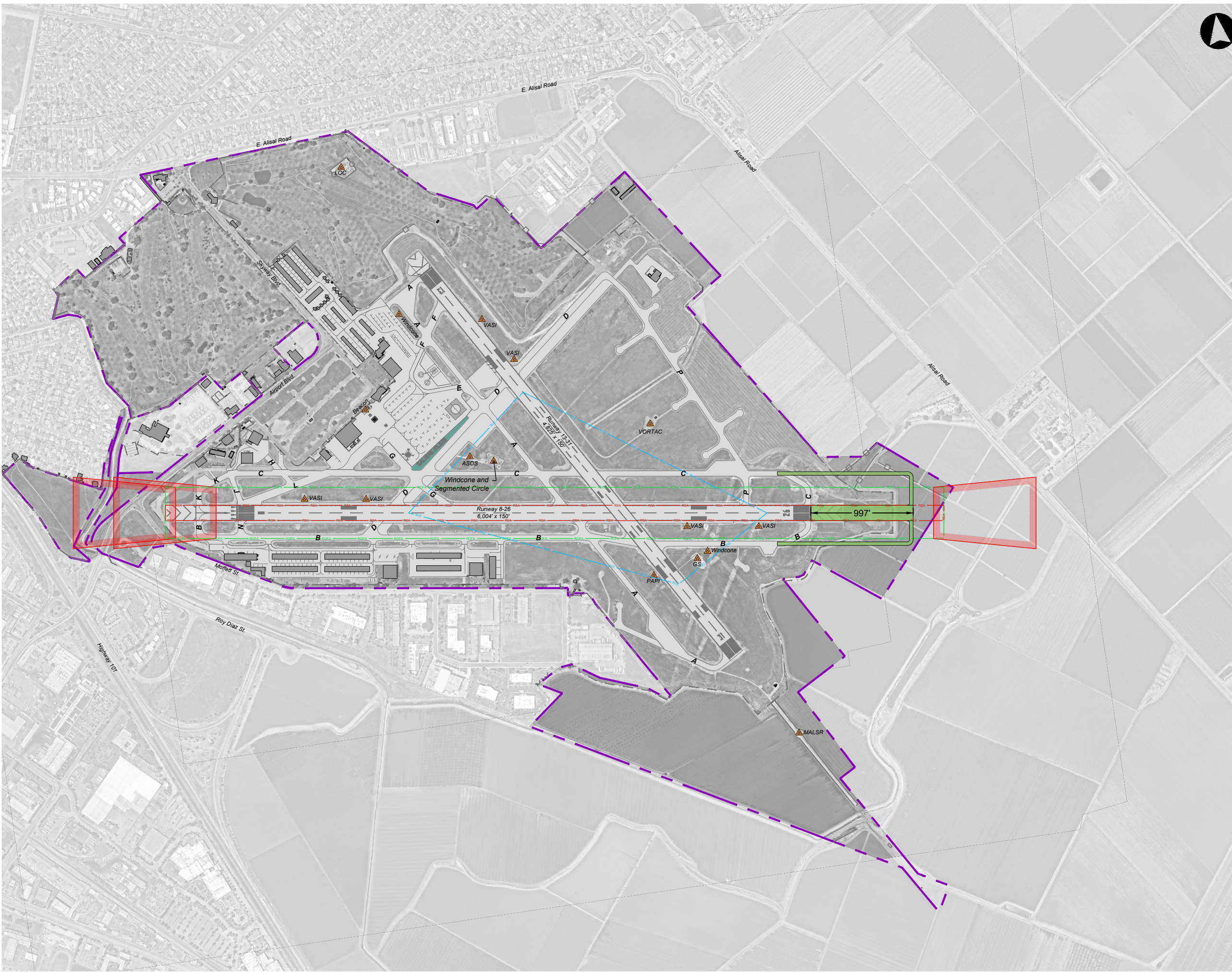
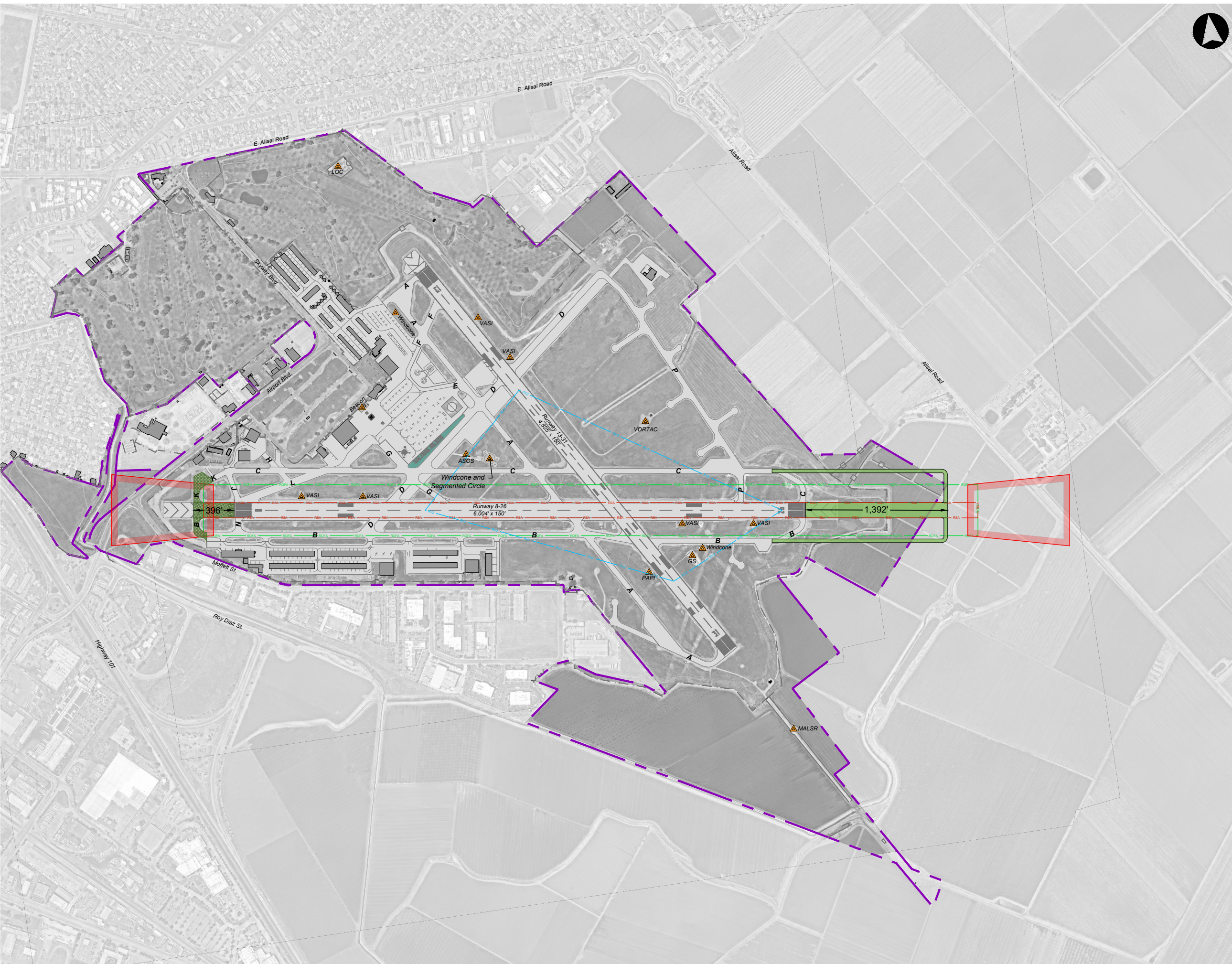
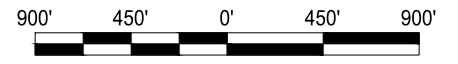




Figure 5.2
 Runway 8/26: Alt. 2
 Extension to 7,000'
 396' Shift
 B-II Classification



- Airport Property Line
- Existing Buildings
- Existing Pavement
- Existing Fence
- Existing NAVAID
- Proposed Pavement
- Proposed Demolition
- RSA Runway Safety Area
- ROFA Runway Object Free Area
- RVZ Runway Visibility Zone
- Runway Protection Zone



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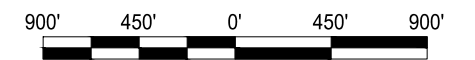
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Figure 5.3
 Runway 8/26: Alt. 3
 Extension to 7,000'
 and 1,009' Shift
 C-II Classification

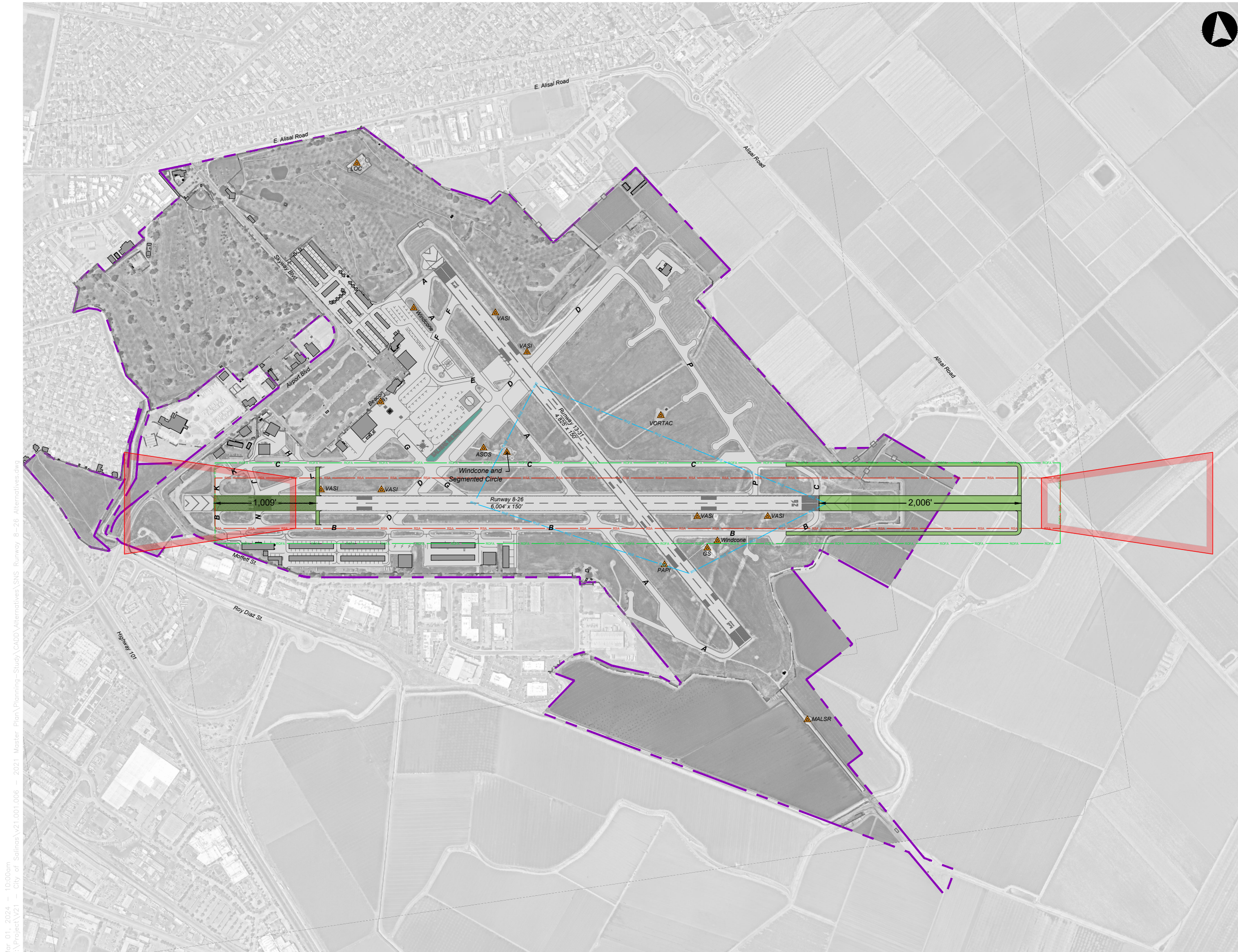
- Airport Property Line
- Existing Buildings
- Existing Pavement
- Existing Fence
- Existing NAVAID
- Proposed Pavement
- Proposed Demolition
- Runway Safety Area
- Runway Object Free Area
- Runway Visibility Zone
- Runway Protection Zone



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Source: C&S Engineers, Inc.

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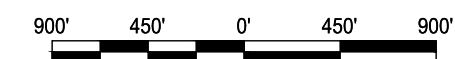


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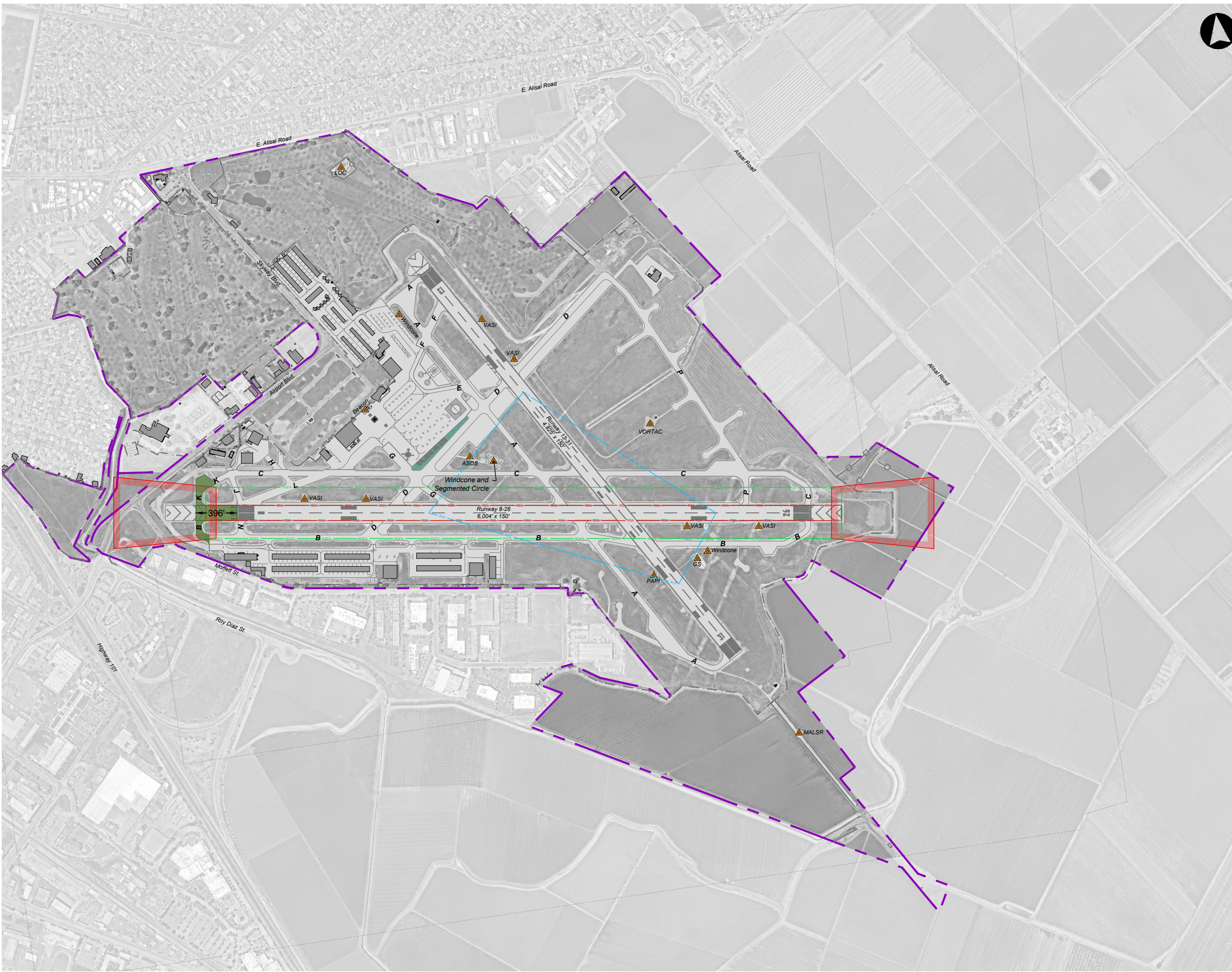


Figure 5.4
Runway 8/26: Alt 4.
Reduction to 5,608'
B-II Classification

- Airport Property Line
- Existing Buildings
- Existing Pavement
- Existing Fence
- Existing NAVAID
- Proposed Pavement
- Proposed Demolition
- RSA
- ROFA
- RVZ
- Runway Protection Zone



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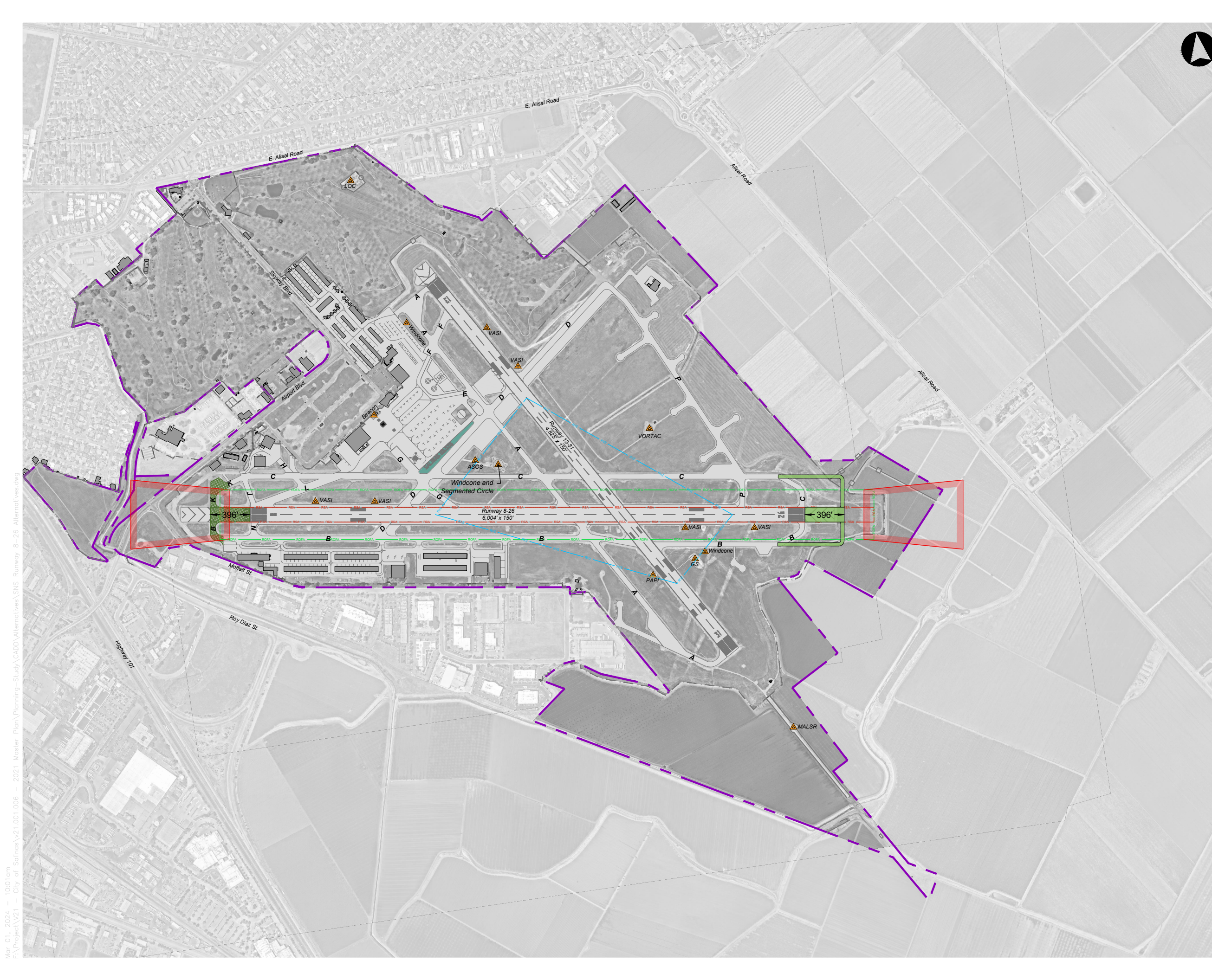
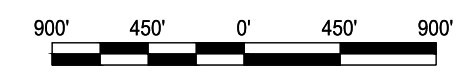


Figure 5.5
 Runway 8/26: Alt. 5
 Shift to East &
 Remain at 6,004'
 B-II Classification

- Airport Property Line
- Existing Buildings
- Existing Pavement
- Existing Fence
- Existing NAVAID
- Proposed Pavement
- Proposed Demolition
- RSA
- ROFA
- RVZ
- Runway Protection Zone



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5.4.2 Runway 13/31 Alternatives

Runway 13/31 is the shorter of the two runways at SNS, but the Runway 31 end boasts the only ILS approach available at the Airport. This runway is often used for arrivals in inclement weather because of this reason. Due to the close proximity of residential areas on the north end of the runway, any potential runway shifts or extensions are all to the south. It should also be noted that shortly beyond the Runway 31 end, the terrain drops sharply by approximately 30 ft. The ground elevation remains relatively flat at this level for about 1,800 ft before rising back up to the level of the Runway 31 end. Significant improvements would be required in this area in order to bring the grading within FAA standards to support a runway extension.

5.4.2.1 Runway 13/31 – Alternative 1: Extension to 7,000 ft, B-II Classification

The first Runway 13/31 alternative proposes to extend the runway to 7,000 ft to meet the needs identified in the Facility Requirements section. Because Runway 13/31 is shorter than Runway 8/26, all of the proposed runway extensions are significantly longer in order to reach the 7,000 ft mark. This alternative would require an extension of approximately 2,176 ft in order to meet the recommended length. The majority of the physical improvements would be within the existing airport property boundary, however some additional land acquisition would be required in order to protect the RSA, ROFA, and RPZs.

This alternative only shows a future parallel taxiway on the west side of the runway. If at some point in the future the VORTAC is relocated allowing for aeronautical development on the east side of the runway, then the necessity of a parallel taxiway on that side should be readdressed.

This alternative can be seen in **Figure 5.6** below and is further evaluated and ranked in **Table 5.2**.

5.4.2.2 Runway 13/31 – Alternative 2: Extension to 7,000 ft, Raise Runway 13 Approach Minimums to 1 SM, B-II Classification

The second alternative involves the same physical modifications to the runway, but also proposes to raise the Runway 13 instrument approach minimums to 1 statute mile (SM). The current Runway 13 visibility minimum is $\frac{3}{4}$ SM which results in a larger approach RPZ. The difference in size between the two RPZ is as follows:

- ◆ B-II, 1 SM Visibility Minimums = 500 ft inner width, 700 ft outer width, 1,000 ft length
- ◆ B-II, $\frac{3}{4}$ SM Visibility Minimums = 1,000 ft inner width, 1,510 ft outer width, 1,700 ft length

The purpose of raising the Runway 13 minimums to 1 SM is to reduce the size of the RPZ and prevent the RPZ from extending off airport property.

This alternative can be seen in **Figure 5.7** below and is further evaluated and ranked in **Table 5.2**.

5.4.2.3 Runway 13/31 – Alternative 3: Extension to 7,000 ft, 1,019 ft Shift, Raise Runway 13 Approach Minimums to 1 SM, C-II Classification

The third Runway 13/31 alternative looks to preserve the long-term future of SNS by both preserving safety areas and further separating aircraft traffic from residential areas. As described in the Forecast section, it is anticipated that the future aircraft operations will increase and the critical aircraft falls into the C-II classification. When this change occurs, the Runway 13 RPZ will increase in length from 1,000 ft to 1,700 ft. A runway shift is recommended in order to keep the future C-II RPZ off of the residential areas to the north of the Airport. A shift of approximately 1,019 ft is required in order to keep the RPZ off of existing structures.

The length of this shift would then be added on to the Runway 31 end extension for a total extension length of 3,205 ft to bring the runway up to 7,000 ft. It is anticipated that this project would occur as a later phase of the Alternative 1 or 2 extensions. It is expected that the additional extension proposed in Alternative 3 would be notably cheaper than the extension in Alternative 1 and 2 because the terrain under the Alternative 3 extension rises back up to the grade of the Runway 31 end so grading costs would be reduced dramatically. However, the additional length of the Alternative 3 extension would require more land acquisition and easements than the previous two alternatives

This alternative can be seen in **Figure 5.8** below and is further evaluated and ranked in **Table 5.2**.

5.4.2.4 Recommended Preferred Alternative – Alternative 2

The second runway alternative was selected as the preferred alternative because it addressed the inadequate length while also mitigating the RPZ issue on the north side of the airfield. It also is much more cost effective than the third alternative because it does not require as long of an extension.

Table 5.2 - Runway 13/31 Alternatives Evaluation

Evaluation Criteria	Alternative 1: Extension to 7,000 FT B-II Classification	Alternative 2: Extension to 7,000 FT Raise Runway 13 Approach Minimums to 1 SM, B-II Classification	Alternative 3: Extension to 7,000 FT 1,019 FT Shift, Raise Runway 13 Approach Minimums to 1 SM, C- II Classification
Operational Performance	Positive Impact Increases runway length to 7,000'.	Positive Impact Increases runway length to 7,000'.	Lesser or No Impact Increases runway length to 7,000'. Slightly reduced operational efficiency due to the long taxi times required for a Runway 13 departure.
Environmental Factors	Negative Impact Requires significant amount of grading in an environmentally sensitive area.	Negative Impact Requires significant amount of grading in an environmentally sensitive area.	Negative Impact Requires significant amount of grading in an environmentally sensitive area.
Best Planning Tenets	Lesser or No Impact Does not address Runway 13 end RPZ issues	Positive Impact Corrects the Runway 13 end RPZ issues.	Lesser or No Impact Corrects the Runway 13 end RPZ issues. Potential to create runway visibility zone issues with the airport traffic control tower unless the Runway 8 end is shortened.
Financial Sustainability	Negative Impact Significant expense in new pavement construction, grading, and property acquisition/easements.	Negative Impact Significant expense in new pavement construction, grading, and property acquisition/easements.	Negative Impact Significant expense in new pavement construction, grading, and property acquisition/easements.
Score	3	4	2
Ranking	2 nd	1 st	3 rd

Legend: Positive Impact = 2, Lesser or No Impact = 1, Negative Impact = 0

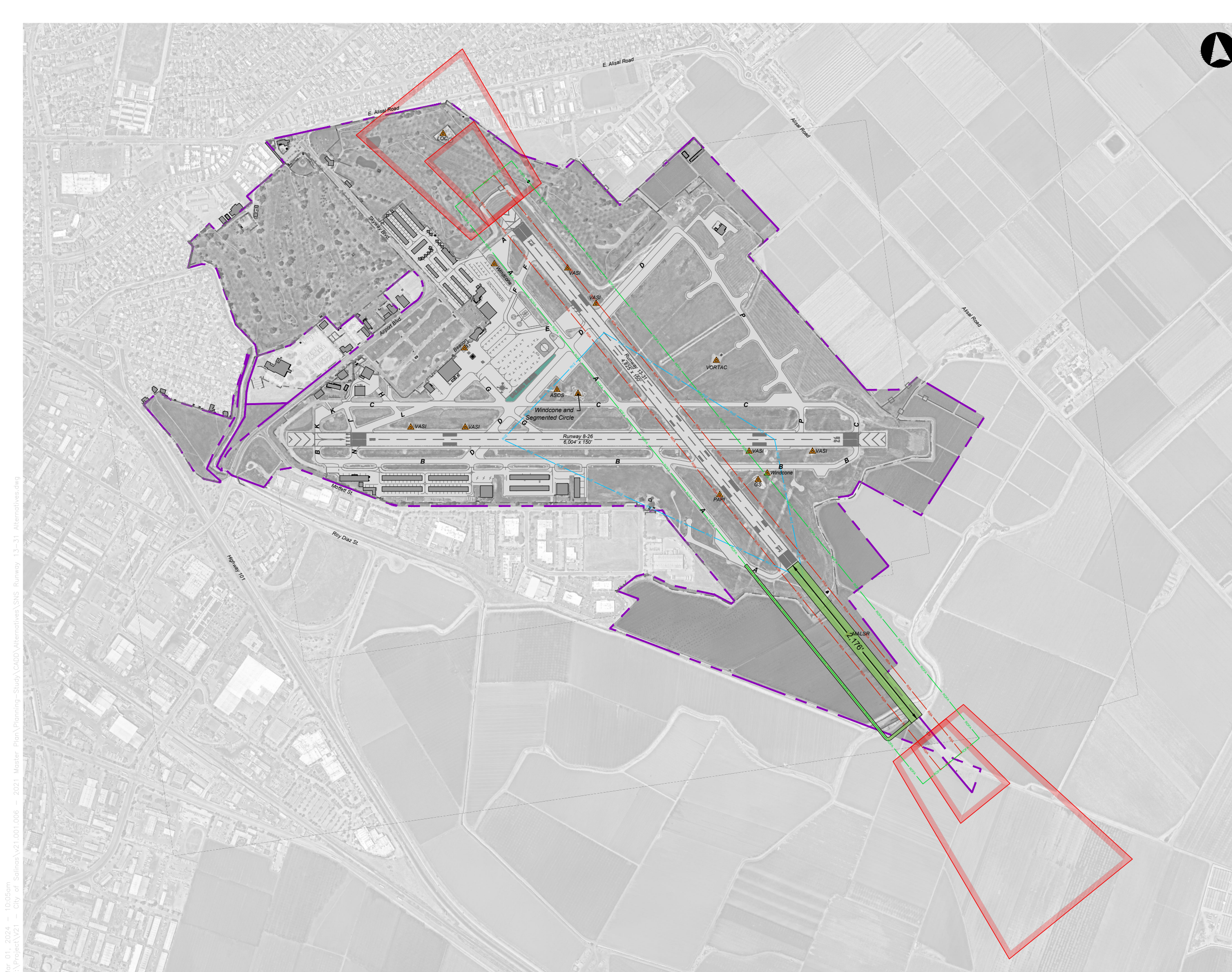











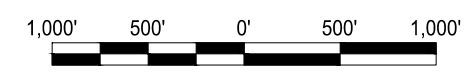


Figure 5.6
 Runway 13/31: Alt. 1
 Extension to 7,000'
 B-II Classification

-  Airport Property Line
-  Existing Buildings
-  Existing Pavement
-  Existing Fence
-  Existing NAVAID
-  Proposed Pavement
-  Proposed Demolition
-  RSA Runway Safety Area
-  ROFA Runway Object Free Area
-  RVZ Runway Visibility Zone
-  Runway Protection Zone



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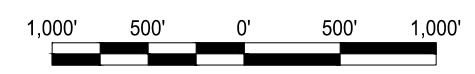
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Figure 5.7

Runway 13/31: Alt. 2
 Extension to 7,000'
 Raise Runway 13
 Minimums to 1SM
 B-II Classification

- - - Airport Property Line
- Existing Buildings
- Existing Pavement
- Existing Fence
- ▲ Existing NAVAID
- Proposed Pavement
- Proposed Demolition
- RSA — Runway Safety Area
- ROFA — Runway Object Free Area
- RVZ — Runway Visibility Zone
- Runway Protection Zone



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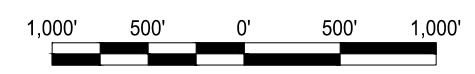
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Figure 5.8

Runway 13/31: Alt. 3
 Extension to 7,000'
 1,019' Shift, Raise RW
 13 Mins to 1 SM
 C-II Classification

- Airport Property Line
- Existing Buildings
- Existing Pavement
- Existing Fence
- Existing NAVAID
- Proposed Pavement
- Proposed Demolition
- RSA
- ROFA
- RVZ
- Runway Protection Zone



Salinas Municipal Airport
 Master Plan Update

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5.5 Runway Protective Surfaces Improvement Alternatives

The majority of the runway protective surface issues identified have already been analyzed and a preferred mitigation plan selected as a part of the previous ALP update project. This master plan restates these alternatives and, in most cases, makes the same recommendations as are shown on the current ALP.

5.5.1 Runway Safety Area (RSA)

The analysis for the RSA completed in the Facility Requirements section revealed several non-standard conditions. These non-standard conditions are detailed in **Table 5.3**.

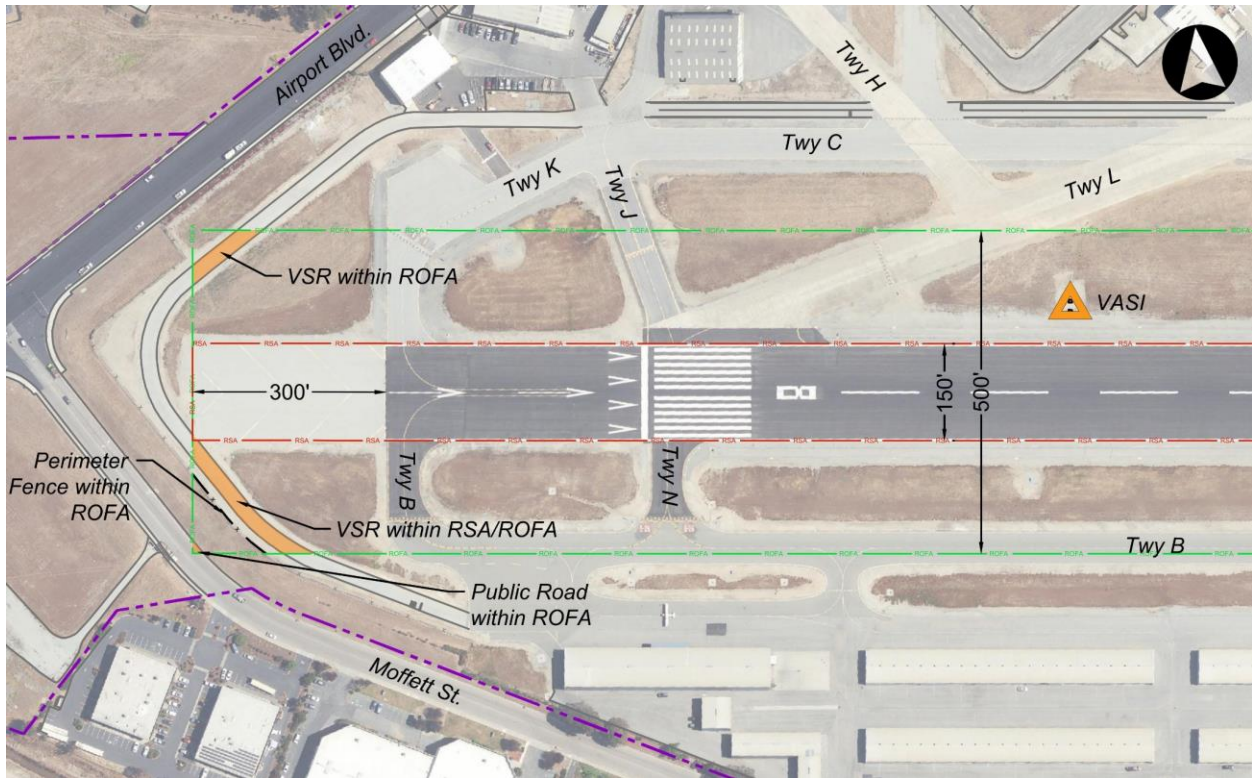
Table 5.3 - Runway Safety Area: Non-Standard Conditions

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

Source: C&S Engineers, Inc.

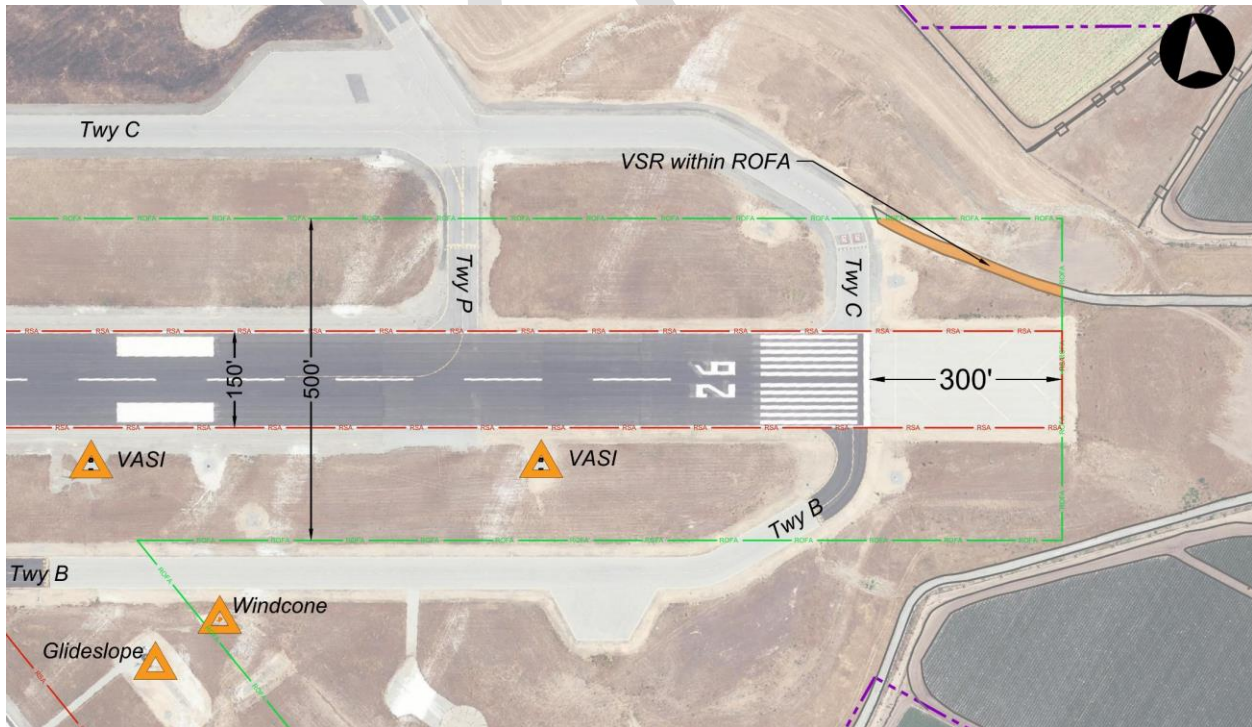
Figure 5.9 through **Figure 5.12** give a detailed representation of the Runway Safety Areas (RSA) and Runway Object Free Areas (ROFA) penetrations for the Runway ends at SNS.

Figure 5.9 - Runway 8 End RSA/ROFA Penetrations



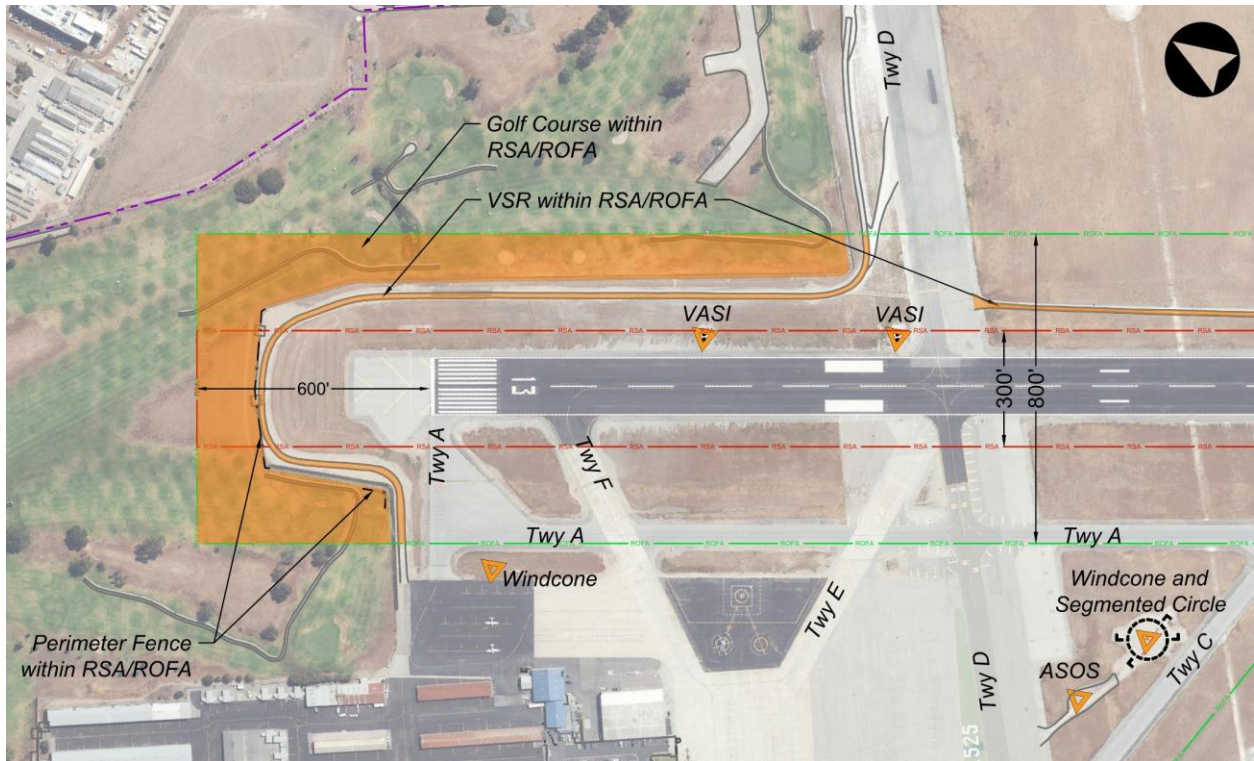
Source: C&S Engineers, Inc.

Figure 5.10 - Runway 26 End RSA/ROFA Penetrations



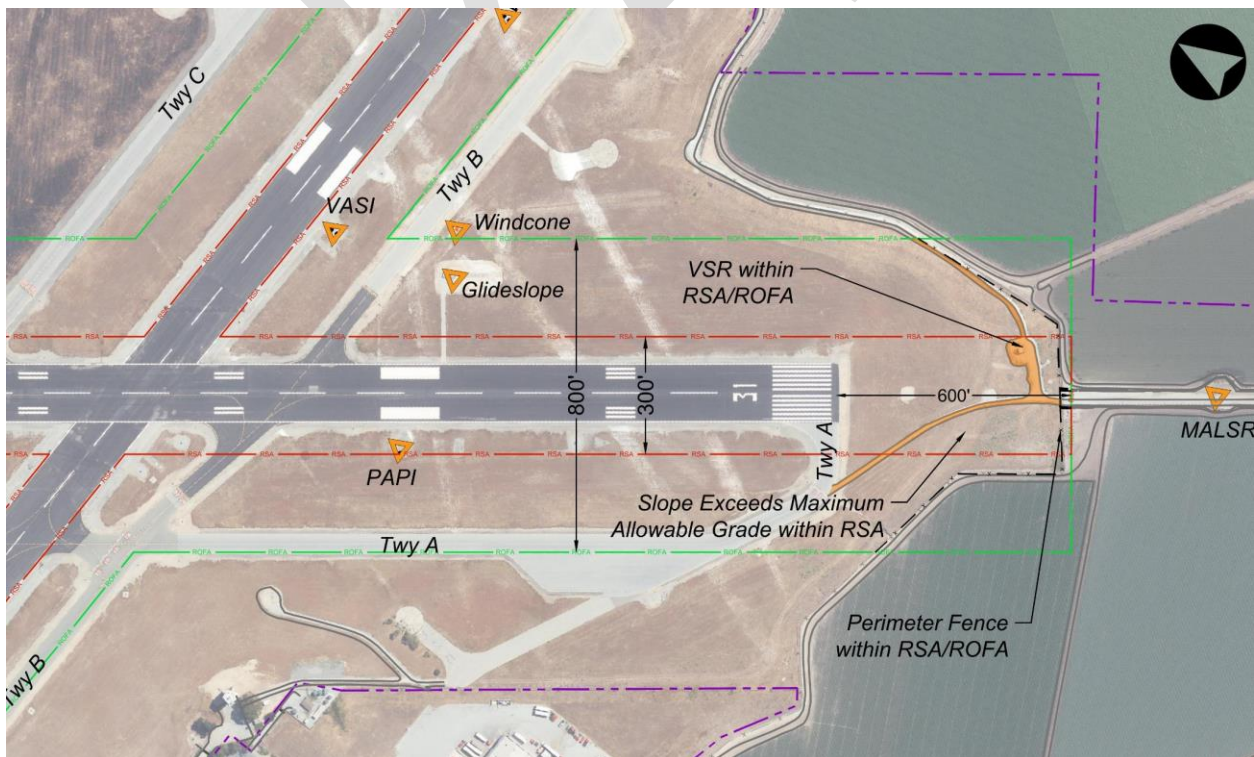
Source: C&S Engineers, Inc.

Figure 5.11 - Runway 13 End RSA/ROFA Penetrations



Source: C&S Engineers, Inc.

Figure 5.12 - Runway 31 End RSA/ROFA Penetrations



Source: C&S Engineers, Inc.

5.5.1.1 Runway 8 End RSA Alternatives

A small portion of the VSR is within the Runway 8 end RSA. This small penetration is not enough by itself to warrant a realignment of the road. Additionally, this service road also traverses the Runway 8 end ROFA. The final recommendation to mitigate the issue for the ROFA will also mitigate this issue within the RSA.

5.5.1.2 Runway 13 End RSA Alternatives

The airport perimeter fence and VSR traverse the RSA. Additionally, a portion of the RSA is within a public golf course.

- ◆ **Relocate Fence and VSR Outside of RSA (Recommended)**
 - ◆ Relocate both the fence and VSR outside of the limits of the RSA would impact the golf course, but the single hole impacted would likely be able to remain in place and playable. The golf course is already owned by the City of Salinas so it would not require any land acquisition. This alternative would comply with FAA requirements and provide the highest level of safety.
- ◆ **Raise Instrument Approach Procedure Visibility Minimums**
 - ◆ Raising the instrument approach visibility minimums would reduce the length of the RSA enough that the fence and VSR are no longer within the protected area. This alternative is not recommended as it would reduce the capability of the only precision instrument approach procedure at SNS which would impact operations on poor weather days.
- ◆ **Implement Declared Distances and Displaced Threshold**
 - ◆ Displacing the Runway 13 threshold and implementing declared distances would shorten the length of the RSA and clear it of both the fence and VSR. This alternative is not recommended as it would reduce the usable length of the only precision instrument approach capable runway at SNS. This would potentially result in a loss of operational capability during poor weather conditions.
- ◆ **Shorten Runway**
 - ◆ Physically shortening the runway by approximately 230 ft would clear the obstructions from the RSA. For the same reasons listed above, this is not recommended due to the potential impact on operations.

5.5.1.3 Runway 31 End RSA Alternatives

The airport perimeter fence and VSR traverse the RSA. Additionally, a portion of the RSA grade exceeds the 5% limit. Due to the fact that the VSR leads to the FAA owned and maintained approach lighting system, it is assumed that it is fixed by function and must remain in its current alignment. The alternatives below explore potential mitigations for the identified non-standard grading.

- ◆ **Grade RSA to Standard (Recommended)**
 - ◆ This alternative would involve bringing in enough fill to raise the grade within the RSA to meet the standard.
- ◆ **Shorten Runway**
 - ◆ Shortening the runway by closing a portion of the Runway 31 end would shift the RSA limits north and off of the steeper grades. This would result in a loss of approximately 242 ft of runway length. As discussed previously, any loss in length to Runway 13/31 should be avoided as it would negatively impact operations to the only instrument approach capable runway at SNS.
- ◆ **Implement Declared Distances**
 - ◆ Implementing declared distances would accomplish the same goal as shortening the runway but would not require any physical changes. For the same reasons listed above, this alternative is not recommended.
- ◆ **Raise Instrument Approach Procedure Visibility Minimums**
 - ◆ As with the Runway 13 RSA alternative, raising the visibility minimums would reduce the dimensions of the RSA and bring all the grades within FAA compliance. However, as discussed earlier, this would negatively impact operations during poor weather conditions as the Runway 31 ILS is the most utilized instrument approach procedure during inclement weather.

5.5.2 Runway Object Free Area (ROFA)

An analysis of the Runway Object Free Areas was completed as a part of the Facility Requirements section of this master plan. The results are listed in **Table 5.4** below.

Table 5.4 - Runway Object Free Area: Non-Standard Conditions

Runway End	Non-Standard Condition
Runway 8 End	The airport perimeter fence VSR, and small portion of public road are within the ROFA.
Runway 26 End	A VSR is located within the ROFA.
Runway 13 End and East Side	The airport perimeter fence, VSR, and public golf course are located within the ROFA. Additionally, a VSR 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.
Runway 31 End	The airport perimeter fence and VSR are within the ROFA.

Source: C&S Engineers, Inc.

A detailed representation of these issues are presented above on **Figure 5.9** through **Figure 5.12**.

5.5.2.1 Runway 8 End ROFA Alternatives

Several potential alternatives to mitigate the obstructions within the Runway 8 end ROFA were considered including shortening the runway, implementing declared distances, and relocating the fence and VSR. Ultimately shortening the runway was selected as the recommended alternative because the shortening project is already the recommended future action for Runway 8/26. Shortening the Runway 8 end by 396 ft would clear the RSA and ROFA of the public road and fencing and would leave only a small portion of the VSR within the ROFA.

5.5.2.2 Runway 26 End ROFA Alternatives

The current alignment of the VSR on the Runway 26 end traverses a portion of the ROFA. There is ample room within existing airport property boundaries to re-route the VSR outside of the ROFA. Any other mitigation for this item would require impacts to the capability of Runway 8/26. Therefore, it is recommended that the VSR be realigned so that it is clear of the ROFA.

5.5.2.3 Runway 13 End ROFA Alternatives

The Runway 13 End ROFA has several incompatible objects including airport perimeter fencing, a VSR, and a golf course. Several potential mitigations for these issues are described below.

◆ **Relocate VSR and Fence Outside of ROFA (Recommended)**

- ◆ The golf course directly to the north of the Runway 13 end is owned by the City of Salinas. Both the VSR and the fencing could be relocated farther to the north with minimal impacts to the golf course. The VSR and the fencing would be shifted far enough to the north to clear the end of the RSA/ROFA, but on either side of the RSA they would still be within the ROFA. The reason for this is because in order to completely clear the ROFA, the VSR and fence would have a much greater impact on the golf course and would require closure of several holes. This alternative is recommended to be combined with filing a modification of standards (MOS) for the remaining non-standard conditions that will exist after the relocation.

◆ **Implement Declared Distances**

- ◆ Implementing declared distances would effectively shorten the length of the available runway back to the point when the full width of the RSA is available. Because of the separation of the runway centerline and the VSR on the east side, this would mean that nearly the entire section of runway from the Runway 13 end to the intersection with Taxiway D would become unusable. This would severely limit arrivals on Runway 31 and would have a negative impact to operations at SNS.

◆ **Shorten Runway**

- ◆ Much like the declared distances alternative discussed above, shortening the runway would clear the ROFA by removing the portion of runway that does not have the full 800 ft ROFA width. As with the previous alternative, this would result in removal of

over 1,700 ft of runway and would severely negatively impact operations at SNS. For this reason, this alternative is not recommended.

- ◆ **Raise Instrument Approach Procedure Visibility Minimums**
 - ◆ Raising the instrument approach procedure visibility minimums on the Runway 31 ILS approach from ½ SM to ¾ SM would reduce the ROFA width from 800 ft to 500 ft. This would remove both the fencing and golf course from the ROFA, however a portion of the VSR would still be within the ROFA on both sides of the runway. This reduction in instrument approach procedure capability would also negatively impact the capability of SNS.
- ◆ **File a Modification of Standards (MOS) (Recommended)**
 - ◆ A MOS could be filed to receive a waiver for the non-standard conditions. The issues identified have been existing at the Airport for decades without incident. It is recommended that filing a MOS is done in conjunction with a relocation of the fence and VSR. The relocation of the fence and VSR would clear the RSA and the MOS would be for the remainder of the VSR and golf course still within the ROFA.

5.5.2.4 Runway 31 End ROFA Alternatives

Analysis in the Facility Requirements section revealed that a portion of the airport perimeter fencing and VSR traverse the Runway 31 end ROFA. While a portion of these items are obstructions, it is only for a limited time as the terrain drops off rapidly and causes the fence and VSR to be under the level of the ROFA. Due to this reason, it is recommended that no improvements are made in this area. It should however be noted that any future improvements to the Runway 31 end such as runway extension, would raise the grade in the area and then would require the fence and VSR to be moved out of the ROFA.

5.5.3 Runway Protection Zones (RPZs)

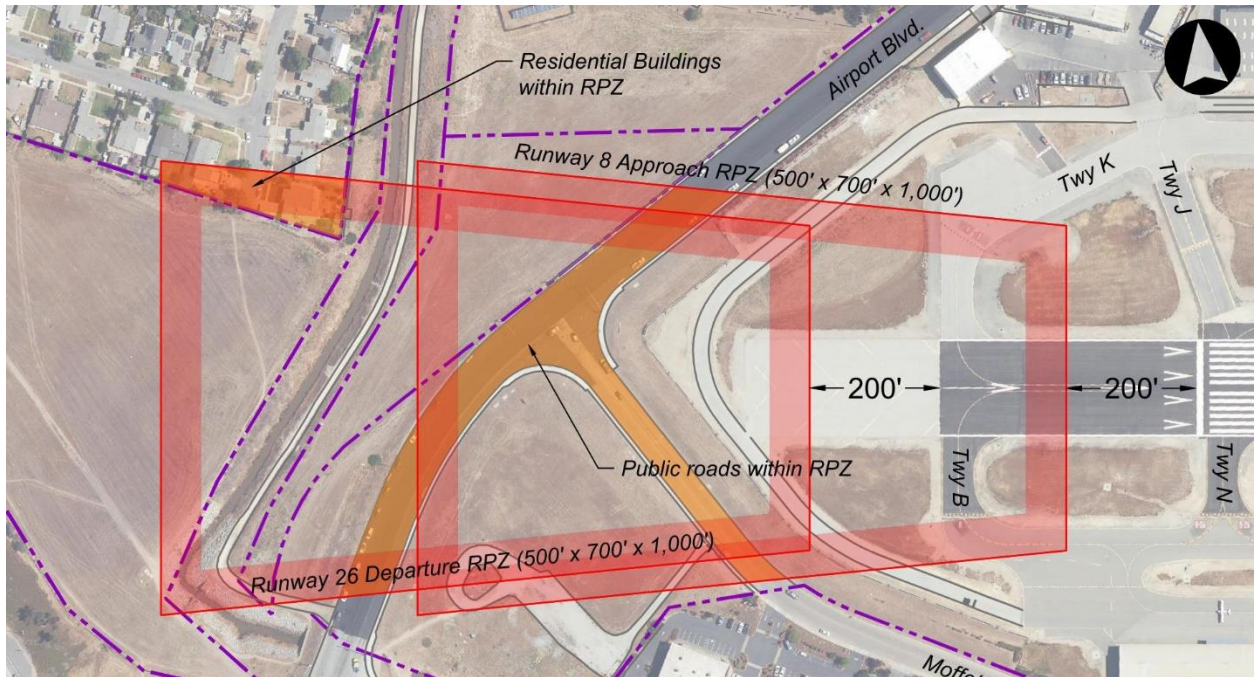
Analysis of the RPZs revealed several non-standard conditions. These non-standard conditions are listed in **Table 5.5** and depicted in **Figure 5.13** and **Figure 5.14**.

Table 5.5 - Runway Protection Zone: Non-Standard Conditions

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

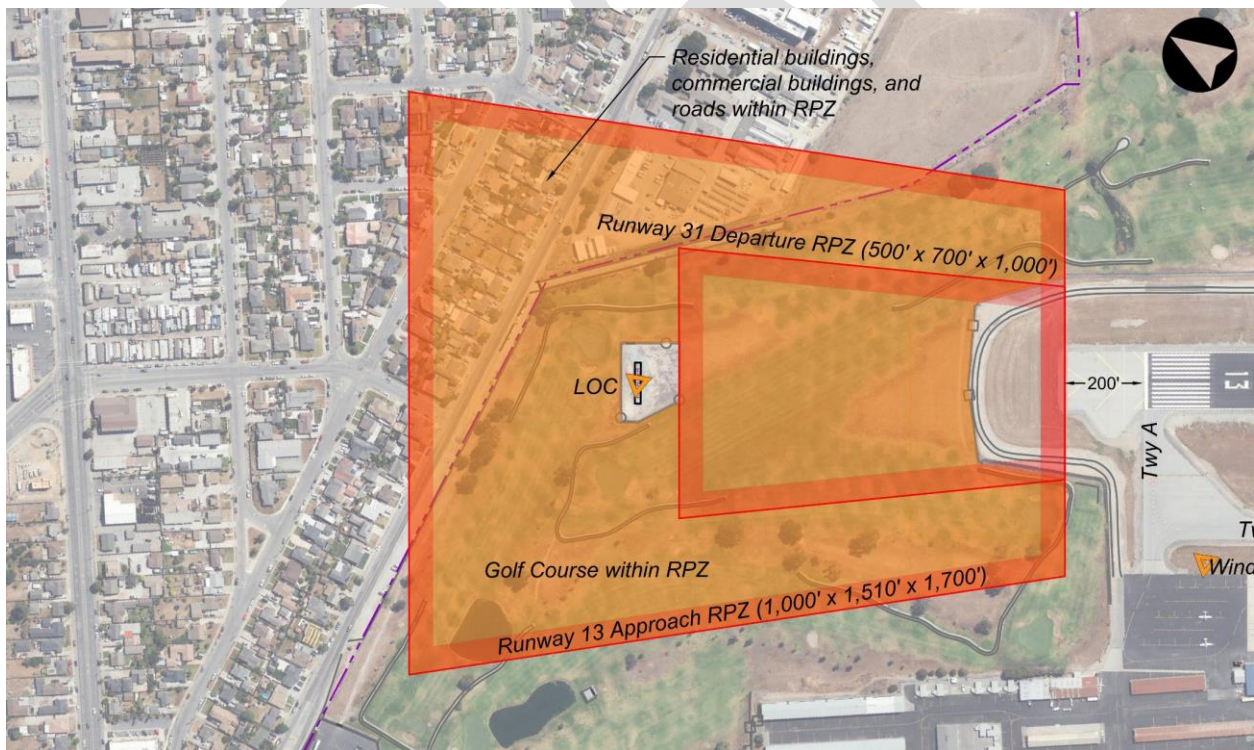
Source: C&S Engineers, Inc.

Figure 5.13 - Runway 8 End RPZ Penetrations



Source: C&S Engineers, Inc.

Figure 5.14 - Runway 13 End RPZ Penetrations



Source: C&S Engineers, Inc.

5.5.3.1 Runway 8 End RPZ Alternatives

Currently the RPZ on the Runway 8 end, but associated with a Runway 26 departure, has four residential properties in the northwest corner. The following alternatives present potential improvements to mitigate this issue.

- ◆ **File a Modification of Standards (MOS)**
 - ◆ The houses are on the outer limit of the RPZ and it is possible that the FAA would approve a MOS for this non-standard condition. If approved, the houses and existing runway condition would be able to remain without any changes.
- ◆ **Implement Declared Distances**
 - ◆ Declared distances could be implemented to effectively limit the length of runway available for a Runway 26 departure.
- ◆ **Shorten Runway 8 (Recommended)**
 - ◆ The recommended future Runway 8/26 alternative would shorten Runway 8 from the edge of pavement back to the existing displaced threshold. This would shift the RPZ approximately 396 ft to the east and would remove the homes from the RPZ.

5.5.3.2 Runway 13 End RPZ Alternatives

Since the approval of the previous ALP, the instrument approach minimums for the Runway 13 approach were lowered. The lower minimums increased the size of the RPZ associated with the Runway 13 approach and consequently introduced a number of residential and commercial buildings to the Runway 13 approach RPZ. The alternatives below explore ways to mitigate this issue.

- ◆ **File a Modification of Standards (MOS)**
 - ◆ A MOS would allow the Airport to maintain existing conditions without requiring any physical improvements. FAA approval is less likely in this instance due to the larger number of buildings within the RPZ as compared to the Runway 8 end.
- ◆ **Displace Runway 13 Threshold**
 - ◆ The Runway 13 landing threshold could be moved farther down the runway which would move the starting point of the RPZ farther away from the buildings. This alternative is not considered viable as it would significantly reduce the runway length available when landing on Runway 13.
- ◆ **Raise the Runway 13 Instrument Approach Visibility Minimums (Recommended)**
 - ◆ Raising the Runway 13 instrument approach visibility minimums from $\frac{3}{4}$ SM to 1 SM would trigger a reduction in the size of the RPZ. This reduction would clear all buildings from the RPZ. Discussion with local pilots and Airport staff indicated that while it would be preferred to maintain the lower approach minimums, that the small increase would not significantly impact operations.

5.6 Taxiway Alternatives

The analysis of the taxiway system at SNS identified several areas for improvement. The main deficiencies noted were several areas that did not meet FAA runway to taxiway separation standards and areas that lack of compliance with best practices for taxiway geometry design. Potential projects to address these deficiencies are discussed below.

5.6.1 Runway Centerline to Taxiway Centerline Separation

As noted in the Facility Requirements section, in its existing condition, 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. However, when SNS becomes classified as a C-II airport, then there will be a couple locations where the taxiways are not sufficiently separated from the runways. These locations as well as potential mitigations are discussed below.

5.6.1.1 Runway 13/31 to Taxiway A

The future C-II classification would require a runway to taxiway separation of 400 ft, which exceeds the current separation by 15 ft. Several potential solutions to this situation are assessed below.

- ◆ **Alternative 1- Modification of Standards:** In the history of the Airport, SNS has not had an issue arise due to the Runway 13/31 to Taxiway A separation. There are currently C-II aircraft operating at SNS and they have done so without issue. Leaving the taxiway in its place and applying for a MOS is the simplest and most reasonable approach.
- ◆ **Alternative 2 - Operational Restrictions:** If the FAA will not approve a MOS for the separation, then operational restrictions can be put into effect that would limit the size of aircraft taxiing on Taxiway A when there is a C-II or greater aircraft landing on Runway 13/31 in inclement weather. This option would not require any physical modifications, only changes in practice by the air traffic controllers.
- ◆ **Alternative 3 – Raise Runway 31 Minimums to $\frac{3}{4}$ SM:** This alternative would raise the Runway 31 instrument approach minimums from $\frac{1}{2}$ SM to $\frac{3}{4}$ SM. This change would reduce the runway to taxiway separation requirement from 400 ft to 300 ft. This alternative is advised against as the Runway 31 instrument approach is the only precision approach available at SNS and raising the approach minimums would limit the capability of the Airport in inclement weather.
- ◆ **Alternative 3 – Shift Taxiway A:** This alternative would shift Taxiway A 15 ft to the west in order to achieve the 400 ft requirement. This alternative would require a significant amount

of physical modifications to Taxiway A including regrading and shifting taxiway edge lighting.

Recommended Preferred Alternative – Alternative 1: Alternatives 2, 3, and 4 would all reduce the capability of the Airport or create an unnecessary expense for a minor deviation from standard that has a proven track record of being a non-issue.

5.6.1.2 Runway 8/26 to Taxiway B

The portion of Taxiway B from the intersection with Runway 13/31 to the Runway 8 end is 240 ft from the Runway 8/26 centerline. This meets the FAA required separation for existing conditions but falls 60 ft short of the 300 ft requirement for a C-II airport. Several potential solutions to this situation are assessed below.

- ◆ **Alternative 1 – Modification of Standards:** A similar approach to the Runway 13/31 to Taxiway A separation could be taken and apply for a MOS. However, being that the lack of separation in this instance is significantly greater than in the previous example, it is less likely that the FAA would approve this modification.
- ◆ **Alternative 2 – Reduce Capability of Runway 8/26 and Classify as B-II:** The preferred runway alternatives move in the direction of reducing the future investment in Runway 8/26 and instead focusing expansion projects on Runway 13/31. If in the future Runway 8/26 is shortened and Runway 13/31 lengthened, then it is likely that Runway 8/26 will never see the level of C-II operations to classify it as a C-II runway. In that case the existing separation will meet standards.
- ◆ **Alternative 3 – Shift Taxiway B:** This alternative would shift Taxiway B 60 ft to the south to meet the required 300 ft separation. This alternative involves extensive physical modifications to the taxiway and would require the closure of the taxilane to the south of Taxiway B. This would create congestion anytime an aircraft is entering or exiting the hangars that are along the current taxilane while an aircraft is taxiing on the relocated Taxiway B.

Recommended Preferred Alternative – Alternative 2: Considering the Airport's plans to invest in future development of Runway 13/31 rather than Runway 8/26, it is likely that the number of C-II operations on Runway 8/26 will never exceed the level that would trigger a C-II classification. In this case, the existing separation will continue to meet FAA standards.

5.6.1.3 Taxiway/Taxilane Protective Surfaces

The Facility Requirements section identified several areas in which the Taxilane Safety Area (TSA) and Taxilane Object Free Area (TLOFA) do not meet the FAA requirements. These areas are all in between hangar rows and tiedowns in the general aviation aircraft storage aprons. Non-standard taxilane widths between aircraft hangars is a common situation found at nearly all

general aviation airports in the United States. Attempting to widen these taxilanes without removing hangars or tie-downs is usually impossible as the width is fixed by the position of the buildings or parking areas. Additionally, if existing parking areas have less than the FAA standard taxilane widths, then increasing the width of the taxilane safety will result in an overall reduction of the apron capacity.

It is recommended that the taxilane widths remain unchanged until such time as a hangar demolition and reconstruction project when the area can be considered as a whole and re-designed to comply with FAA standards.

5.6.1.4 Taxiway Width Alternatives

As discussed in the Facility Requirements section, the FAA required taxiway width for the TDG 2A classification of the design aircraft is 35 ft. Most of the taxiways at SNS are 50 ft and some are even wider. In recent years, the FAA has been taking a more critical look at taxiway width requirements and encouraging airports to right-size their facilities to match the requirements of the design aircraft. This usually results in the FAA requesting a taxiway width justification study as a part of any taxiway rehabilitation or reconstruction projects. This study is generally a part of the taxiway design project and includes taking a detailed look at the current aircraft operations, re-validating the design aircraft, and assessing the requirements of based aircraft. It is common, but not guaranteed that the FAA will fund a taxiway rehabilitation project for the existing taxiway width even if it exceeds the requirements. For a reconstruction project, there are many factors to consider when determining whether or not to maintain the existing width if it exceeds requirements. Often times cost estimates for a width reduction will not be significantly lower than a full width reconstruction due to the increased amount of grading, taxiway edge light relocation, and other ancillary tasks to reduce the width.

Considering the variety of factors discussed above, the recommended preferred approach for taxiway width is to pursue rehabilitation or reconstruction projects at the existing taxiway width. Because these widths exceed the FAA requirement, it is likely to delay design projects while the justification for the non-standard width is prepared. Approval for non-standard taxiway width will be on a case-by-case basis and is not guaranteed. However, it is in the Airport's best interest to maintain the existing pavement to enable operations by aircraft larger than the design aircraft, especially during special occasions such as the annual airshow or other events that draw in a large number of transient aircraft.

5.6.2 Overall Taxiway Geometry Improvements

Taxiway design should keep basic concepts in mind to reduce the probability of runway incursions through proper design. Several locations at the Airport do not meet the latest FAA guidance on best practices for taxiway design. The areas identified for improvements are listed below.

- ◆ **Location:** Taxiway K at Runway 8 End
 - ◆ Issues: Entrance to Runway 8 is not 90-degrees.
 - ◆ Recommendation: Shorten Runway 8 back to the existing displaced threshold. Partially close Taxiway K and Taxiway B. The new taxiway access to the Runway 8 end will be through Taxiway J and Taxiway N. It is recommended that a new aircraft run-up area be constructed along Taxiway K to replace the one that would be lost as a result of this project.
- ◆ **Location:** Taxiway J at Runway 8 Displaced Threshold
 - ◆ Issues: entrance to Runway 8 is not 90-degrees. Direct access from aircraft apron to Runway 8/26.
 - ◆ Recommendation: Realign Taxiway J to 90-degrees.
- ◆ **Location:** Taxiway L and Runway 8 Displaced Threshold
 - ◆ Issue: Entrance to Runway 8 is not 90-degrees. Direct access from aircraft apron to Runway 8/26.
 - ◆ Recommendation: Permanently close and remove Taxiway L. It is not necessary from a capacity or efficiency standpoint.
- ◆ **Location:** Runway 8 Displaced Threshold
 - ◆ Issue: Complex runway – taxiway intersection. The co-location of the intersection of Taxiway J and Taxiway L at the Runway 8 displaced threshold can be a source of confusion.
 - ◆ Recommendation: This issue will be addressed with the realignment of Taxiway J and closure of Taxiway L.
- ◆ **Location:** Taxiway D and Runway 8/26
 - ◆ Issue: Direct access from aircraft apron to Runway 8/26. Taxiway D intersects Runway 8/26 at a less than 75-degree angle.
 - ◆ Recommendation: Realign Taxiway D so that it crosses Runway 8/26 at a 90-degree angle. The new alignment will shift to prevent direct access from the aircraft apron to Runway 8/26. The majority of the previous Taxiway D pavement will be permanently closed and removed.
- ◆ **Location:** Intersection of Taxiway C, Taxiway D, and Taxiway G
 - ◆ Issue: This convergence of three taxiways results in an intersection with five potential options. The FAA recommends limiting intersections to three potential options.
 - ◆ Recommendation: Permanently close the portion of Taxiway G between Taxiway C and Runway 8/26. Realign the portion of Taxiway D between Taxiway C and Runway 8/26 to 90-degrees as described in the previous bullet point.
- ◆ **Location:** Taxiway C Intersection with Runway 13/31. Taxiway A Intersection with Runway 8/26.
 - ◆ Issue: High-energy intersection. Taxiways cross runways within the middle-third section of the runway. Taxiways intersect runways at less than a 75-degree angle.
 - ◆ Recommendation: Changing the alignment of either Taxiway C or Taxiway A would significantly impact the efficiency of the airfield and result in longer taxi times. Neither of these locations have been identified as hot spots and have been existing conditions for years. It is recommended that they remain as is.

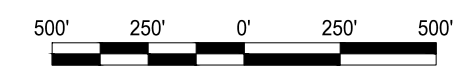
- ◆ **Location:** Taxiway A and Runway 13 End.
 - ◆ Issue: Direct access from aircraft apron to runway. Holding bay on Taxiway A is considered a wide expanse of pavement.
 - ◆ Recommendations: A low-cost solution for the direct access to the Runway 13 end is to paint a “no-taxi” island on the apron that will require aircraft to make a turn before entering onto Taxiway A. Additionally, the hold bay at Taxiway A can be improved through the use of centerline markings and non-movement area markings to clearly show aircraft the extents of the Taxiway A TOFA.
- ◆ **Location:** Runway 31 End and Taxiway A
 - ◆ Issue: Entrance to Runway 31 is not 90-degrees.
 - ◆ Recommendation: Realign Taxiway A to enter the Runway 31 end at 90-degrees.
- ◆ **Location:** Runway 26 End, Taxiway C, and Taxiway B
 - ◆ Issue: Entrance from Taxiway C and Taxiway B are not 90-degrees.
 - ◆ Recommendation: Realign Taxiway C and Taxiway B to enter Runway 31 end at 90-degrees.
- ◆ **Location:** Runway 13 and Taxiway F
 - ◆ Issue: Taxiway F provides direct access from an apron area to Runway 13.
 - ◆ Recommendation: Close Taxiway F. It is understood that because this Taxiway is so close to the Taxiway A entrance to the Runway 13 end that it provides minimal benefit.
- ◆ **Location:** Taxiway P
 - ◆ Issue: Taxiway P is infrequently used and is not worth the expense to maintain it.
 - ◆ Recommendation: Close Taxiway P. Closure of this taxiway also opens developable space once the VORTAC is relocated.
- ◆ **Location:** Runway 13/31 East Side Parallel Taxiway (Proposed Taxiway J)
 - ◆ Issue: The east side of the airfield is not efficiently designed to support future aeronautical development.
 - ◆ Recommendation: Construct a parallel taxiway on the east side of Runway 13/31. This taxiway would extend from Taxiway D to the Runway 31 end. It would support future aeronautical development in this area once the VORTAC is relocated.

Each of these improvements are presented on **Figure 5.15** below.

Figure 5.15
Proposed Taxiway Improvements



- Airport Property Line
- Existing Buildings
- Existing Pavement
- Existing Fence
- Existing NAVAID
- Proposed Buildings
- Proposed Pavement
- Proposed Pavement



Salinas Municipal Airport
Master Plan Update

Source: C&S Engineers, Inc.

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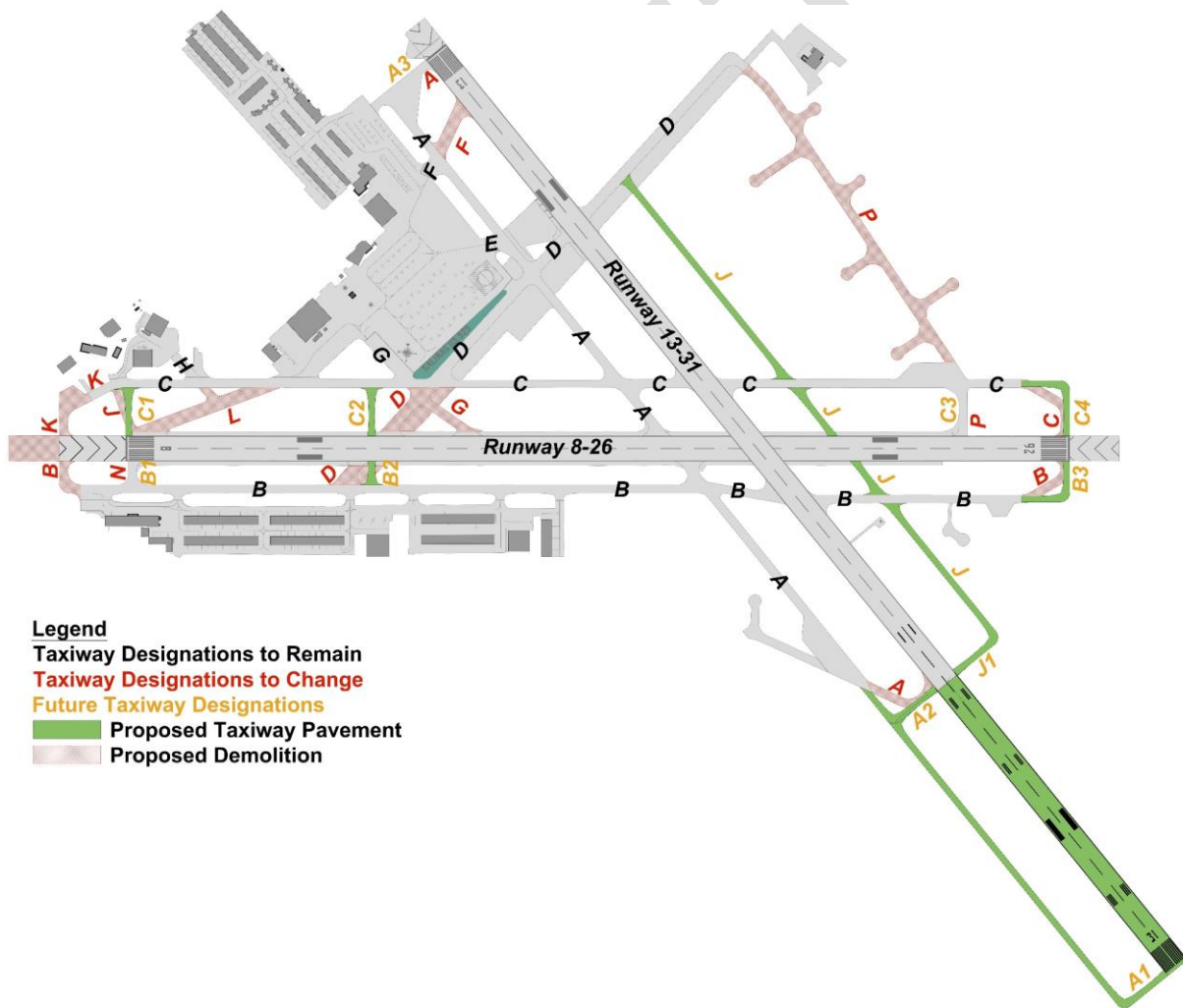
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5.6.3 Non-Standard Taxiway Nomenclature

In addition to the physical design of the taxiways, the naming or nomenclature of a taxiway system is equally important to avoid confusion between pilots and controllers as they relay taxi instructions. FAA *Engineering Brief No. 89A, Taxiway Nomenclature Convention*, provides guidance on how to establish taxiway designations. These recommendations have been applied to the future taxiway system at SNS and the proposed taxiway nomenclature is presented below on **Figure 5.16**. It is recommended that these changes are timed with taxiway rehabilitation or reconstruction projects.

Figure 5.16 - Proposed Taxiway Nomenclature



Source: C&S Engineers, Inc.

5.7 Heliport Relocation Alternatives

Airport staff indicated a desire to look at alternative locations for the existing heliport and helicopter parking areas. The existing location is to the east of the terminal building and shown on **Figure 5.17** below. The main reason for looking at alternative locations is that the existing location is in an area that would be better suited to parking mid to large size transient jet aircraft due to the proximity to the terminal and the Jet West FBO.

Figure 5.17 - Existing Heliport and Helicopter Parking Location



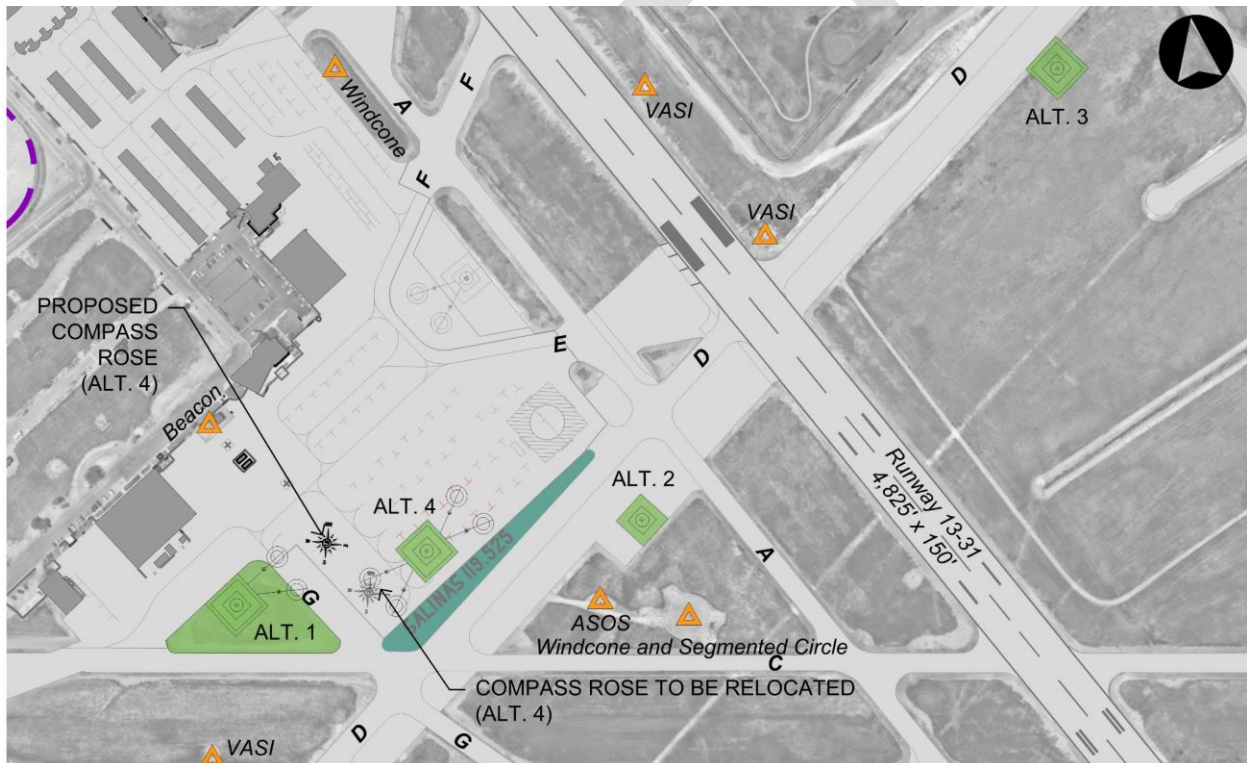
Source: All EagleView Technology Corporation, Imagery Date 10/21/2021

Four potential alternatives were analyzed for relocation. They are described below.

- ◆ **Alternative 1:** This alternative would relocate the heliport to the currently undeveloped triangle area bounded by Taxiway G, Taxiway C, and the apron taxiway to the northwest of the triangle.
 - ◆ **Pros:** Provides sufficient space for the heliport as well as several parking positions, it is relatively close to the terminal building, and it does not require crossing any active taxiways to access from the landside.
 - ◆ **Cons:** This alternative is in a currently undeveloped area and would require new pavement construction.
- ◆ **Alternative 2:** This alternative proposes to relocate the heliport to the southeast side of Taxiway D.
 - ◆ **Pros:** Could be placed on existing pavement, does not displace any existing apron uses.
 - ◆ **Cons:** Requires crossing of an active taxiway (Taxiway D) to access from the landside. Is relatively far from the terminal building and vehicle parking areas.
- ◆ **Alternative 3:** Proposes to relocate the heliport to the eastern side of the airfield, adjacent to Taxiway D.

- ◆ **Pros:** Would not impact any existing airport uses.
- ◆ **Cons:** This alternative is in a currently undeveloped area and would require new pavement construction. Requires crossing an active runway to access from the main vehicle parking areas. It is far away from the general aviation terminal building.
- ◆ **Alternative 4:** Alternative 4 proposes to relocate the heliport and parking areas to the southern portion of the transient aircraft apron.
 - ◆ **Pros:** This location is close the general aviation terminal building, vehicle parking areas, and does not require crossing any movement areas to access.
 - ◆ **Cons:** Requires closure of approximately 12 aircraft tie-downs and would require relocation of the compass rose.

Figure 5.18 - Heliport Relocation Alternatives



Source: C&S Engineers, Inc.

Alternative 4 was chosen as the recommended relocation alternative.

5.8 Airfield Pavement Projects

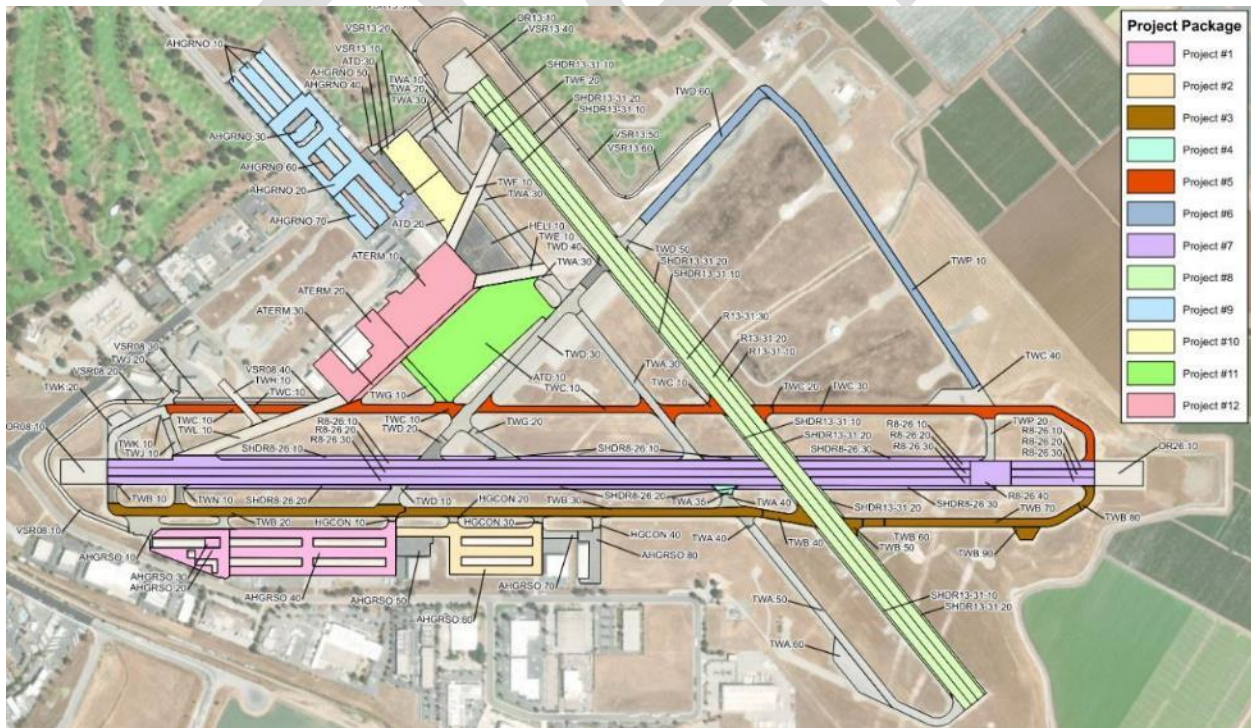
The 2023 Airport Pavement Management System (APMS) Update studied the strength and condition of the SNS airfield. It identified which areas are in need of rehabilitation or reconstruction and laid out a plan to complete these projects. The recommended upcoming pavement projects per the 2023 APMS are presented in below. Proposed phasing and cost estimates are presented in the Phasing, Implementation, and Financial Planning Section.

Table 5.6 - 2023 APMS Proposed Projects

#	Project Description	#	Project Description
1	South Hangar Taxilane Improvements	7	Runway 8/26 Improvements
2	South Hangar Taxilane Improvements	8	Runway 13/31 Improvements
3	Taxiway B Improvements	9	North Hangar Taxilane Improvements
4	Taxiway A Improvements	10	Tie Down Apron Improvements
5	Taxiway C Improvements	11	Taxiway G and Tie Down Apron Improvements
6	Taxiway D and P Improvements	12	Terminal Apron Improvements

Source: 2023 Airport Pavement Management System

Figure 5.19 - 2023 APMS Proposed Project Locations



Source: 2023 Airport Pavement Management System

5.9 Hangar Development Alternatives

As identified in the Facility Requirements section, the Airport does not have a significant need for new hangars, but there is aging infrastructure that will need to be replaced within the 20-year planning period. The hangars that are approaching the end of their useful life are located west of the Runway 13 end and accessed via Taxiway A. This area will be referred to as the "Northside" and several potential redevelopment alternatives are explored in the section below. A second area was considered for hangar development in the event that SNS sees a greater than anticipated increase in hangar demand. This area is directly west of the airport traffic control tower and accessed via Taxiway B. This area will be referred to as the "Southside" and potential hangar configurations are discussed in the section below.

5.9.1 Northside Hangar Development Alternatives

The table below lists the hangars on the Northside that are expected to reach the end of useful life within the planning period.

Table 5.7 - Northside Hangar Useful Life Analysis

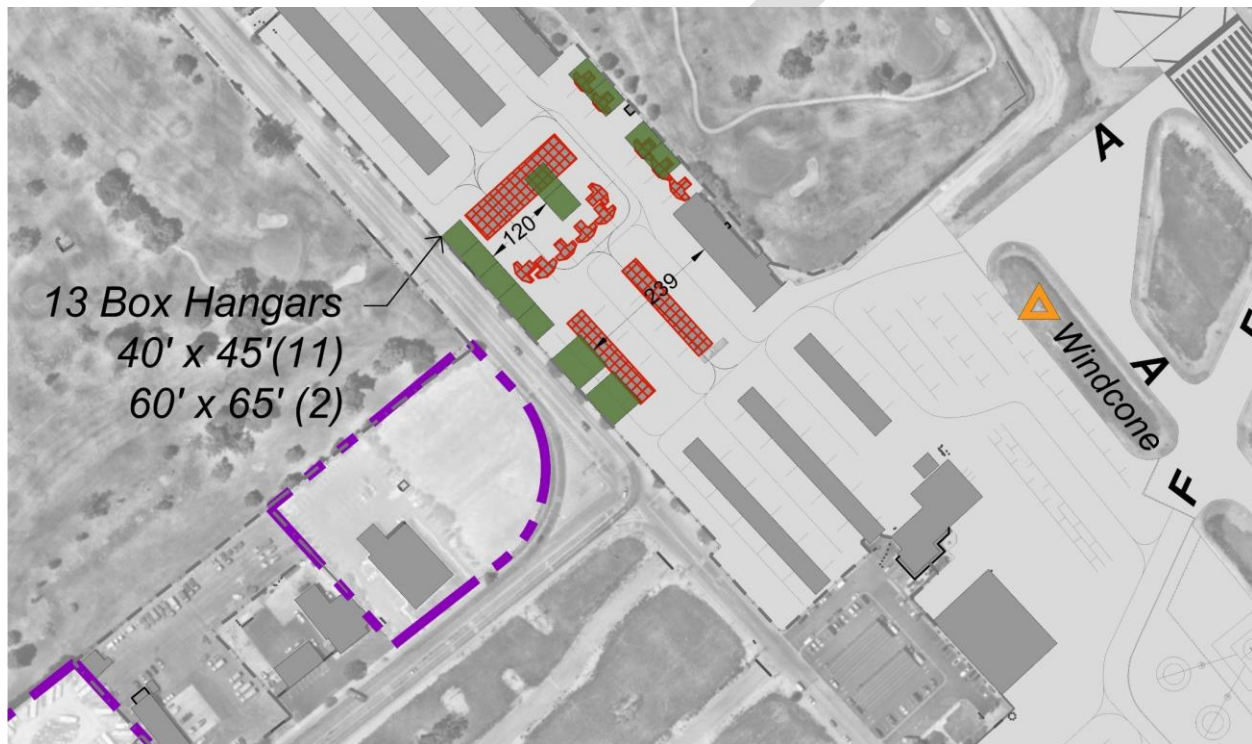
Hangars Location (Northside)	Square Footage	Remaining Useful Life
Short Term Loss		
Echo Row	7,800	10 Years
Port-a-Ports	15,600	10 Years
Medium Term Loss		
Delta Row	7,800	10-15 Years
Long Term Loss		
Alpha Row	11,500	15-20 Years
Bravo Row	11,500	15-20 Years
Charlie Row	11,500	15-20 Years

Source: C&S Engineers, Inc.

The following alternatives present different hangar configurations to redevelop the space that will be available once the hangars listed above reach the end of their useful life and are demolished. However, any of these alternatives could be constructed sooner if there is interest from the City or a developer. The alternatives range from constructing mainly smaller single aircraft box hangars to constructing larger executive hangars that would hold multiple aircraft. All of these alternatives seek to address several needs and issues that were previously identified.

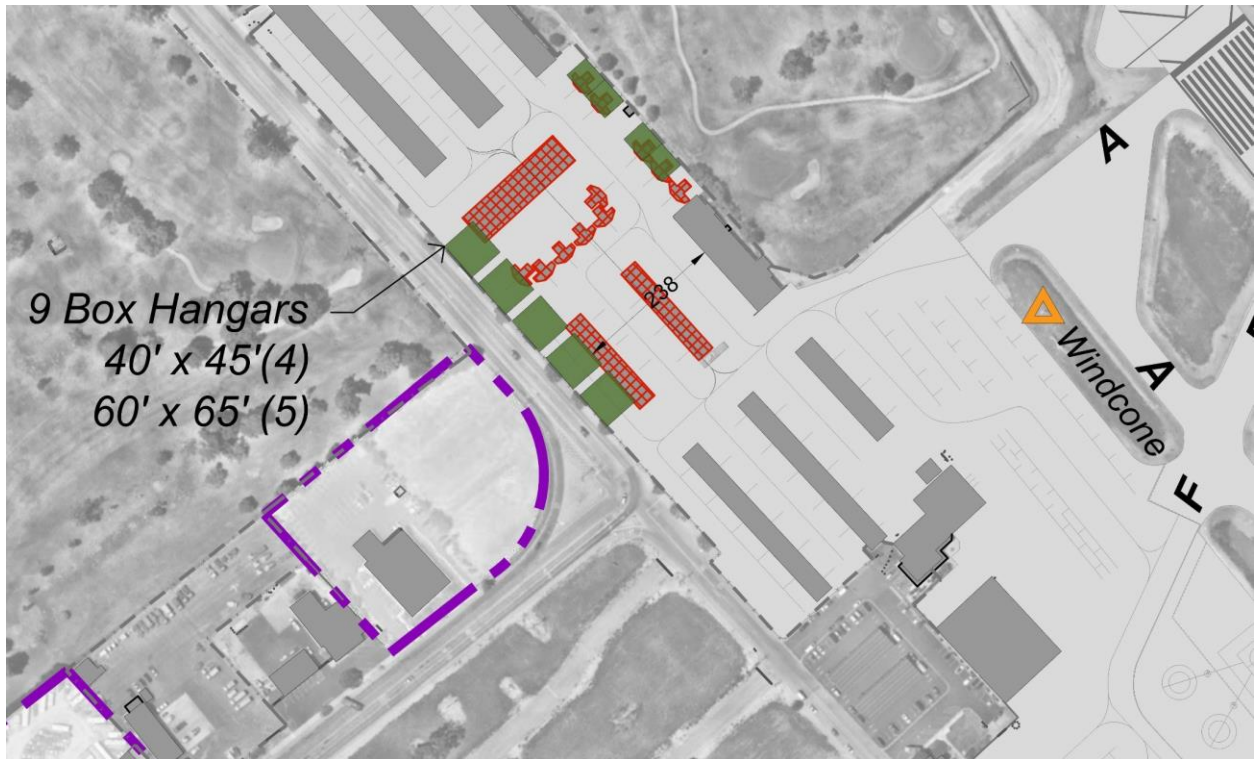
- ◆ Widen aircraft taxilanes between hangar rows to meet FAA standards
- ◆ Replace aging infrastructure as it reaches the end of useful life and is no longer economically viable to continue to maintain
- ◆ Eliminate the bottle neck created by existing hangars on Taxilane A
 - ◆ Alternatives 1 and 2 do not show a project to remove this bottle neck, but it could be corrected in a later phase with a hangar as shown in Alternative 3 or 4
- ◆ Replace the older-style T-hangars with box hangars that are in high demand

Figure 5.20 - Northside Hangar Development: Alternative 1



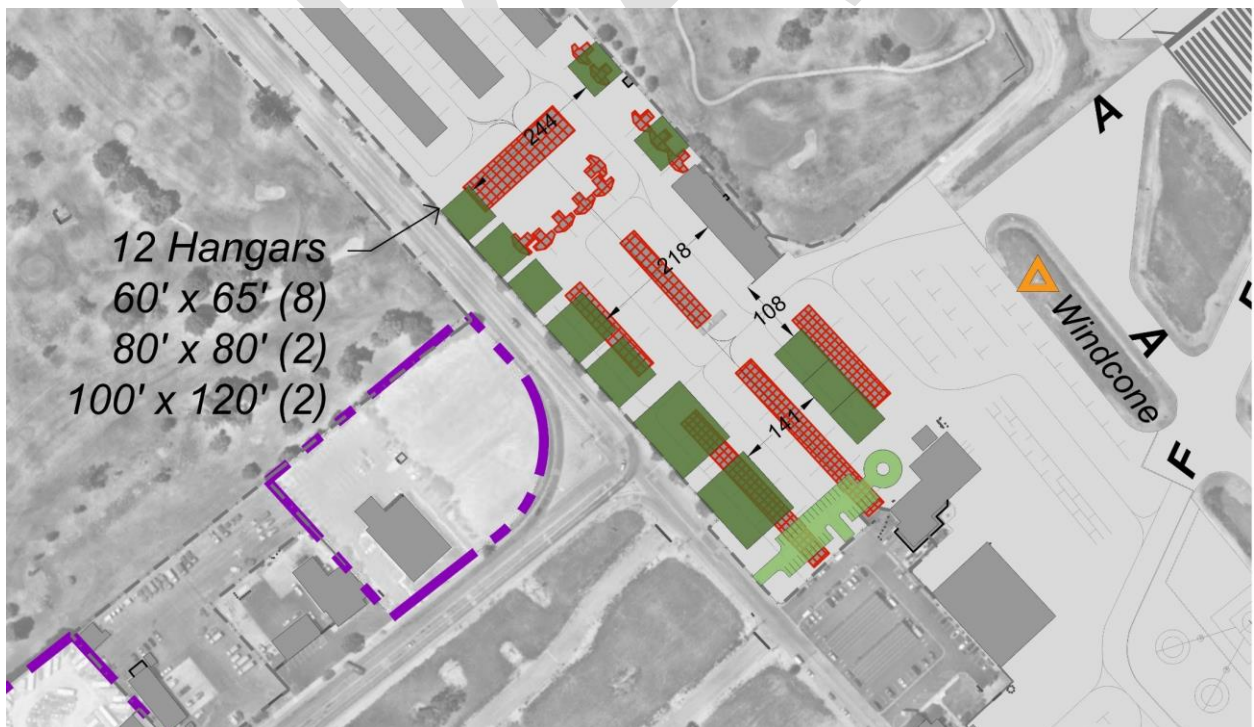
Source: C&S Engineers, Inc.

Figure 5.21 - Northside Hangar Development: Alternative 2



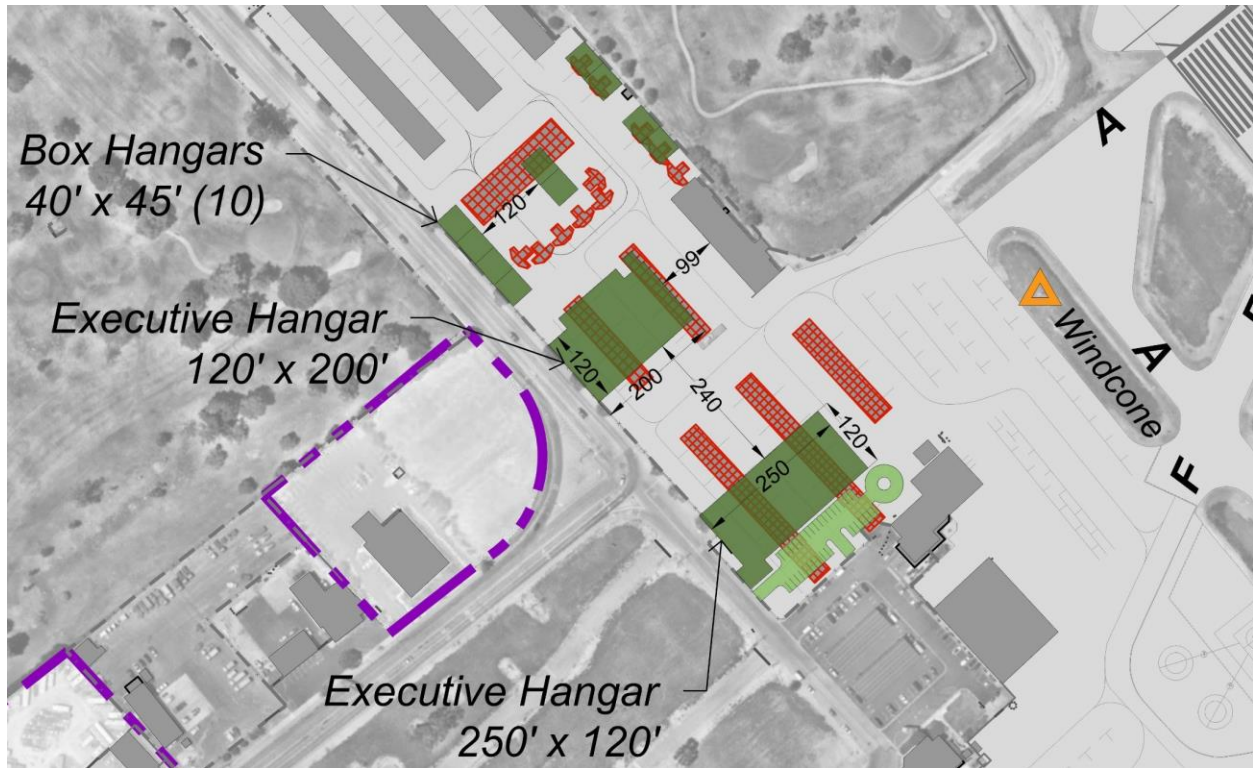
Source: C&S Engineers, Inc.

Figure 5.22 - Northside Hangar Development: Alternative 3



Source: C&S Engineers, Inc.

Figure 5.23 - Northside Hangar Development: Alternative 4



Source: C&S Engineers, Inc.

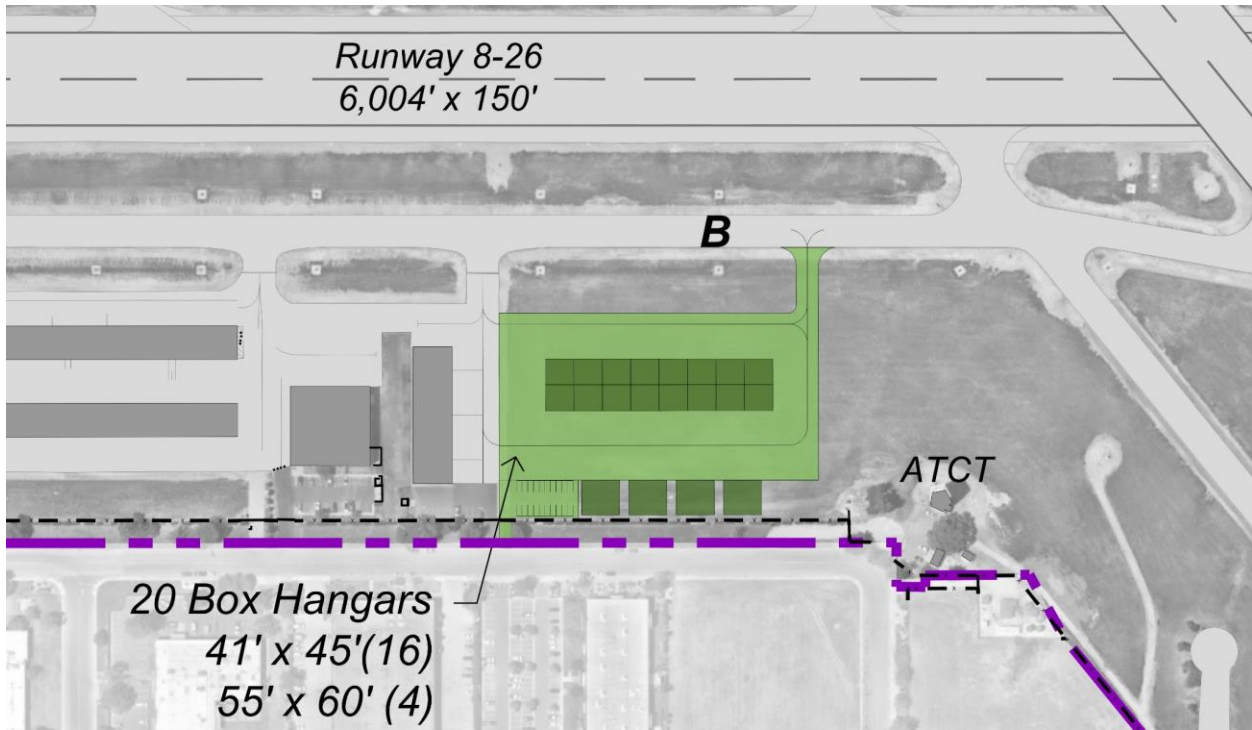
5.9.1.1 Preferred Northside Hangar Development – Alternative 4

The Northside Hangar Development Alternatives were reviewed with Airport staff, the Planning Advisory Committee, and airport tenants. This review revealed a common consensus that Alternative 4 was the preferred development alternative. This alternative provides a mix of large and small box hangars that enhance the Airports flexibility to accommodate a variety of aircraft.

5.9.2 Southside Hangar Development Alternatives

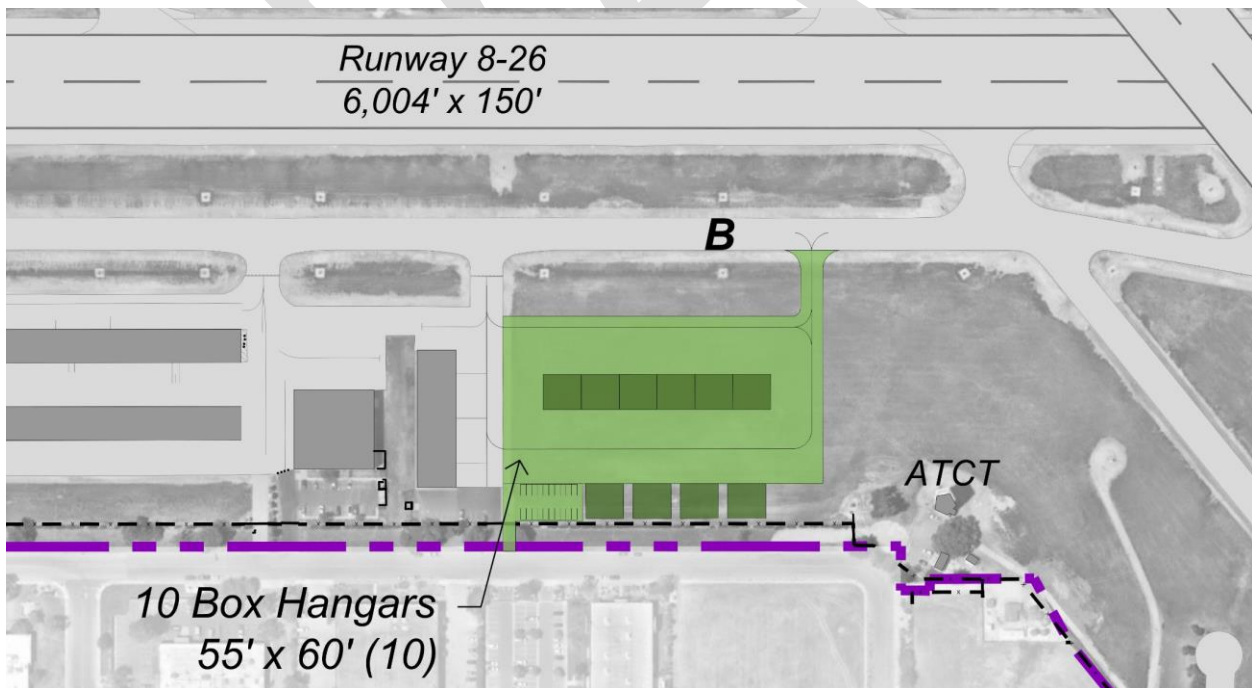
The south side hangar development alternatives considered potential layouts in the area west of the Airport Traffic Control Tower (ATCT) and south of Taxiway B. This area is roughly five acres and is currently undeveloped. This area is well positioned for hangar development as it has direct access to Taxiway B and has vehicular access provided by Moffett St. One major constraint impacting any development in this location is the proximity of the ATCT. FAA standards require that the air traffic controllers have an unobstructed view to all airport movement areas, which includes runways and taxiways. The ATCT is directly to the southeast of this area and maintaining a clear line of site to Taxiway B is the limiting factor for how large and how many hangars could potentially be constructed in this area. The following alternatives looked at several potential configurations or small to medium sized box hangars that would remain clear of the ATCT line-of-site.

Figure 5.24 - Southside Hangar Development: Alternative 1



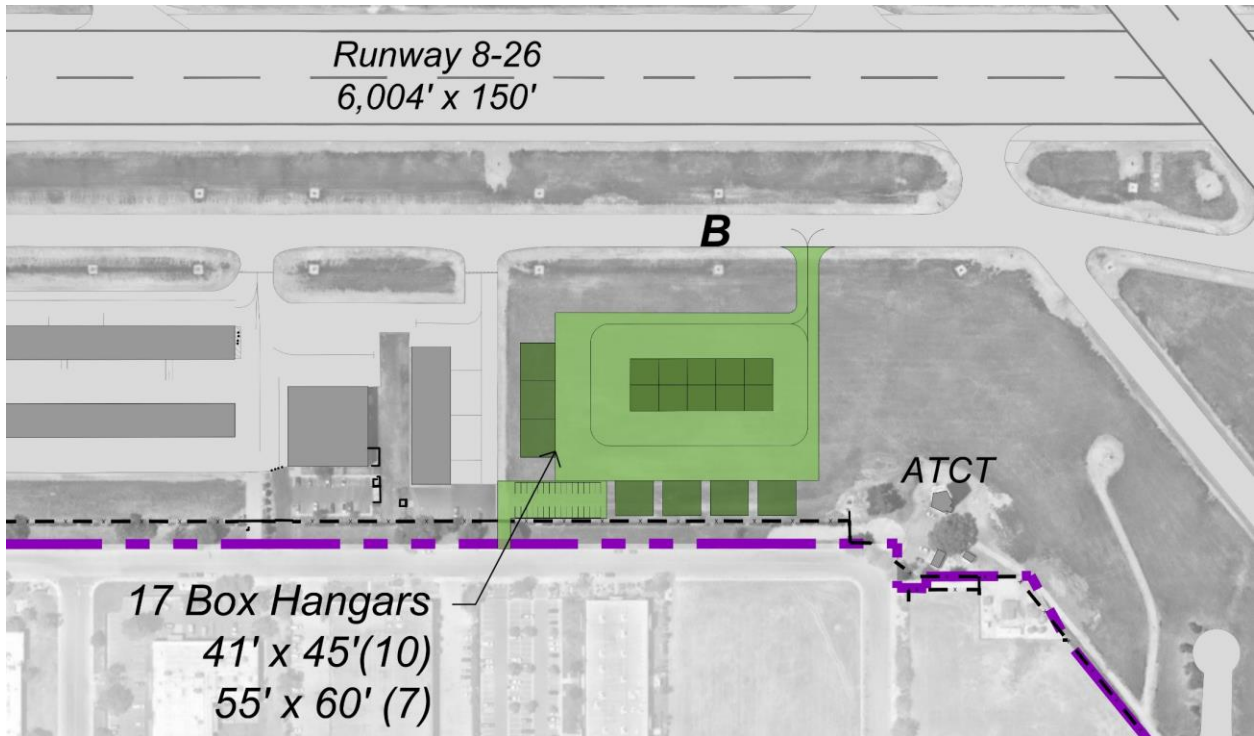
Source: C&S Engineers, Inc.

Figure 5.25 - Southside Hangar Development: Alternative 2



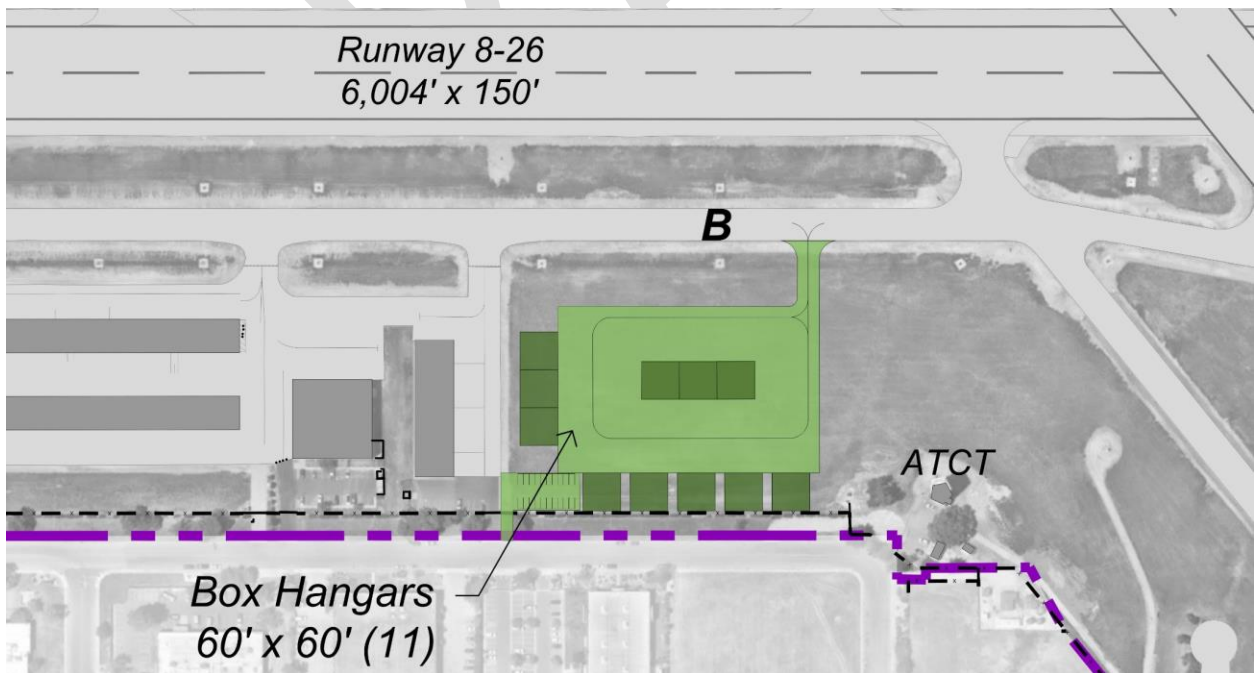
Source: C&S Engineers, Inc.

Figure 5.26 - Southside Hangar Development: Alternative 3



Source: C&S Engineers, Inc.

Figure 5.27 - Southside Hangar Development: Alternative 4

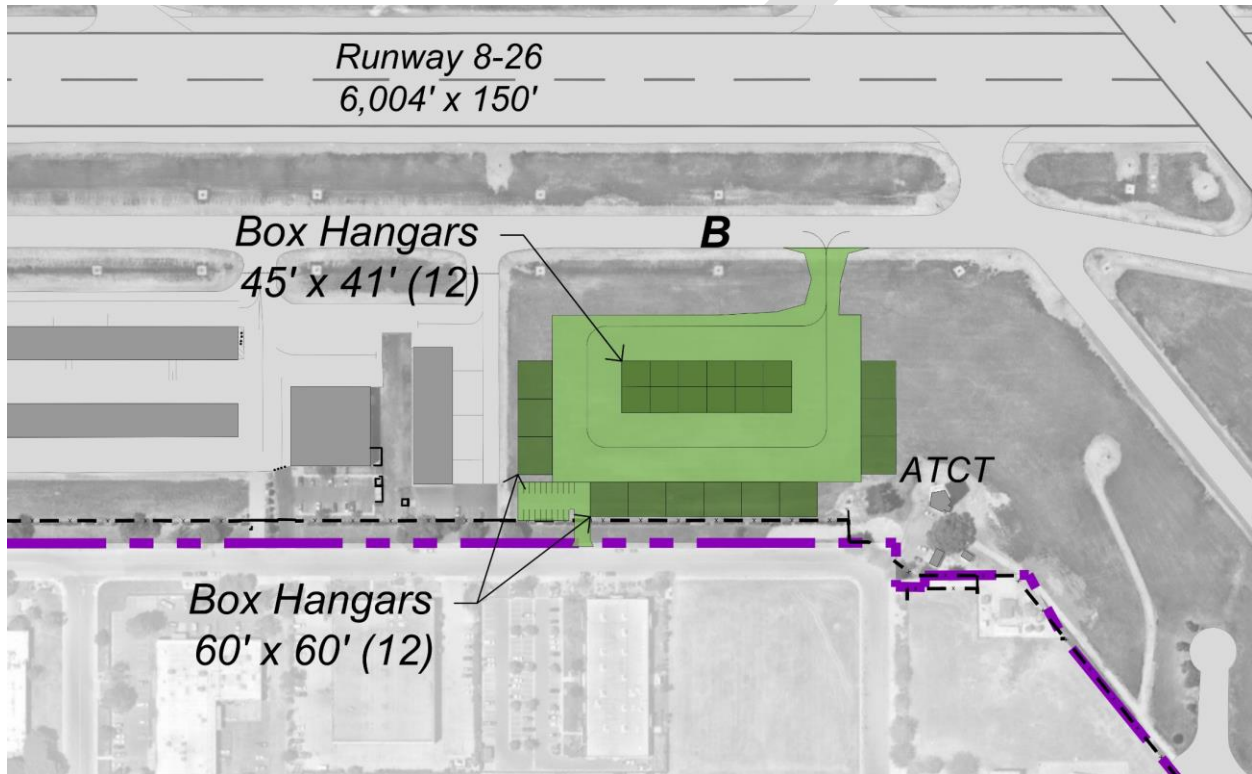


Source: C&S Engineers, Inc.

5.9.2.1 Preferred Southside Hangar Development – Alternative 4

The preferred hangar development alternative is a variation of Alternative 4. The Airport staff and PAC members were supportive of this option, but wanted to see if any more hangars could be squeezed into the area. This resulted in some slight modifications to the alternative which can be seen in **Figure 5.28** below. This alternative provides vehicle parking for airport users, remains clear of the ATCT line-of-site, and maximizes the potential development in this area.

Figure 5.28 - Preferred Southside Hangar Development



Source: C&S Engineers, Inc.

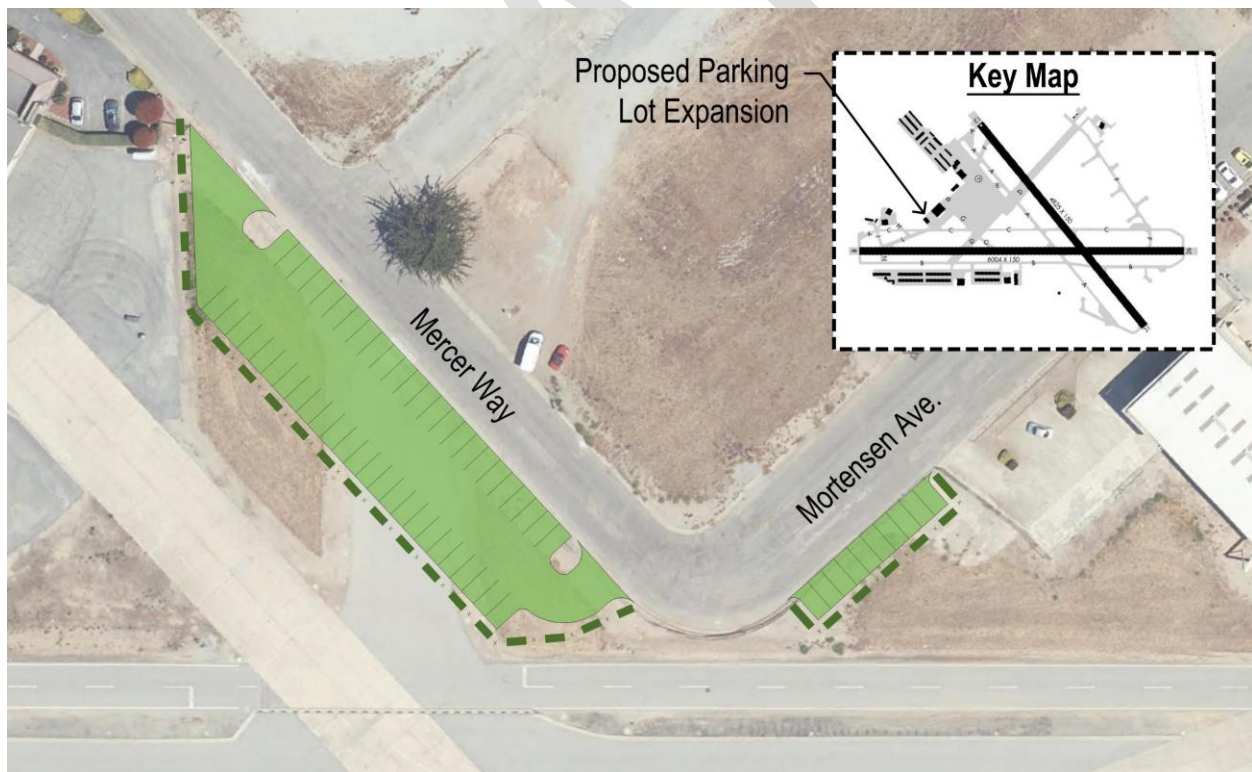
5.10 Access, Circulation, and Parking Facility Alternatives

Due to the limited space available and simplicity of the recommended projects, in the following areas do not go into a detailed alternatives analysis. Instead there are recommended projects to consider for inclusion in the recommended development plan.

5.10.1 Vehicle Parking

The Facility Requirements section noted that there was a need for additional vehicle parking areas. The lot adjacent to the terminal building was sufficient for the pilot/passenger demand, but the other types of uses utilizing the same lot including restaurant parking, rental car parking, and staff parking, mean that the lot can become congested. It is recommended that SNS utilize some of the space along Mercer Way and Mortensen Ave. to expand vehicle parking.

Figure 5.29 - Proposed Parking Lot Expansion



Source: C&S Engineers, Inc.

5.10.2 Perimeter/Security Fencing

As noted in the Facility Requirements section, there is a portion of the perimeter fence that is incomplete on the north end of the airfield, by the Runway 13 end. It should be noted that the FAA does not require a general aviation airport to have a complete perimeter fence, but it is common for airports to install fencing in areas that would be especially prone to potential incursions. In lieu of a complete fence in this area, SNS has utilized a water filled ditch, or moat, to prevent golf course users from accidentally wandering onto the airfield. Unlike a conventional fence, it is depressed and therefore below the ROFA and in compliance with ROFA clearing requirements. The moat has fallen into disrepair and the portion on the eastern side of the runway no longer holds water. It is recommended that this portion be repaired so that it is once more in a functional condition.

5.11 Airport Support Facility Alternatives

5.11.1 Electrical Infrastructure

The existing airfield electrical vault meets current demands but is at capacity and will require replacement to accommodate any future airfield lighting improvements.

5.11.2 Fueling Facility

Recent years have seen big strides in the development of an unleaded aviation fuel for use in piston-engine aircraft. With a 100-octane unleaded fuel finally approved by the FAA, the remaining hurdles to implementation are ramping up production to bring down cost and meet current supply for 100LL. The FAA approved General Aviation Modifications, Inc. (GAMI) G100UL fuel is fully mixable with 100LL meaning that as soon as the fuel becomes available the existing 100LL tanks can start to be filled with G100UL. It is recommended that SNS coordinate with their FBO and fuel providers to make G100UL available as soon as practical. Because this fuel will mix in existing 100LL tanks, there are no physical modifications required to begin storing and selling this fuel.

5.12 Refinement of Recommended Development Plan

Each of the projects discussed in the previous pages have been included on the Recommended Development Plan and can be seen on **Figure 5.30** and **Figure 5.31** below. Cost estimates, potential funding sources, and phasing will be discussed in the Financial Planning and Implementation sections of this master plan.

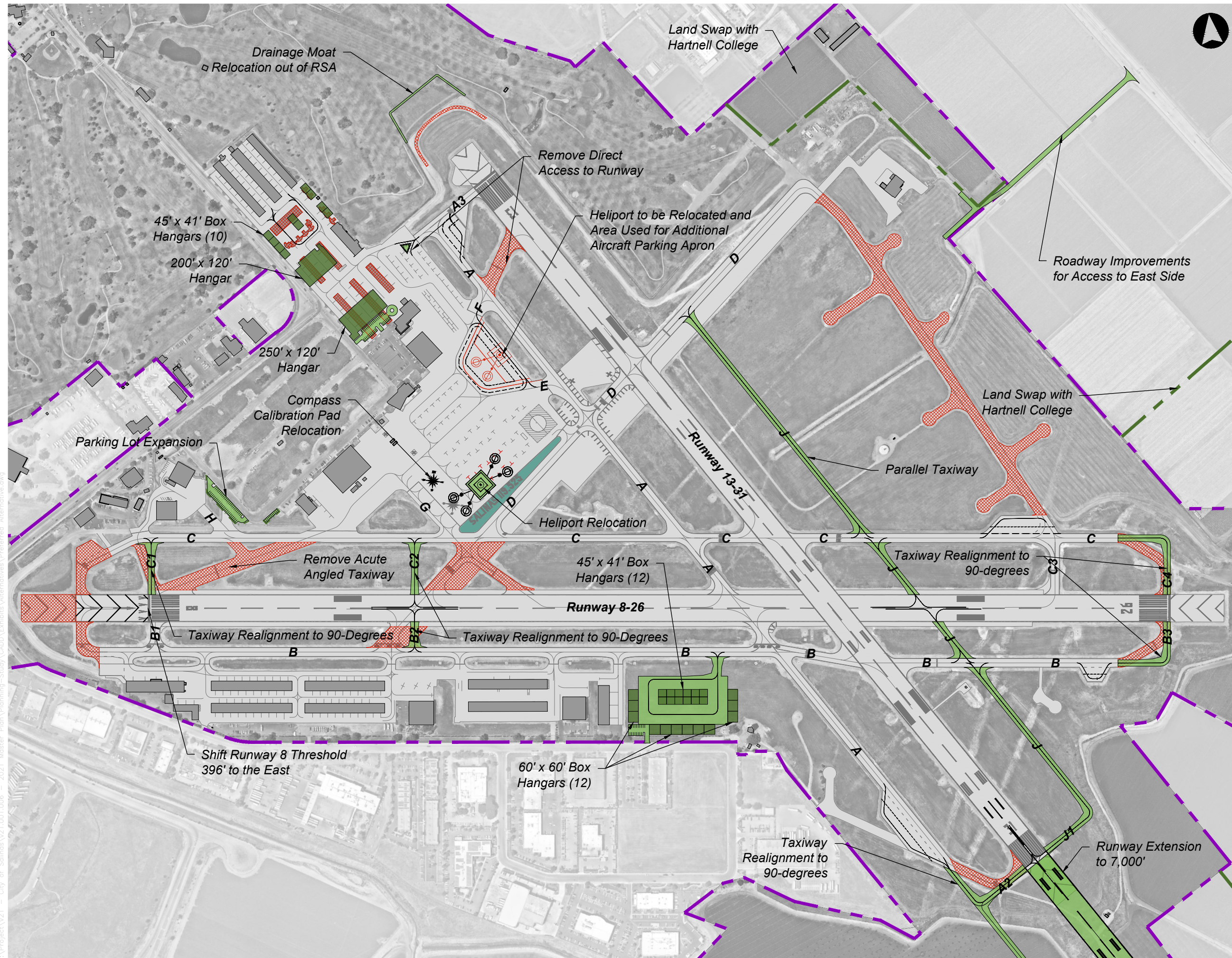
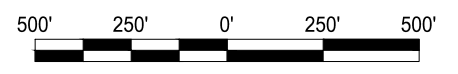


Figure 5.30
 Recommended
 Development Plan
 1:500 Scale

- - - Airport Property Line
- Existing Buildings
- Existing Pavement
- Proposed Pavement
- Proposed Building
- Proposed Pavement Demolition
- Proposed Marking Demolition
- - - Proposed Airport Property Line












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Figure 5.31

Recommended
Development Plan
1:1000 Scale



-  Airport Property Line
-  Existing Buildings
-  Existing Pavement
-  Proposed Pavement
-  Proposed Building
-  Proposed Pavement Demolition
-  Proposed Marking Demolition
-  Proposed Airport Property Line
-  Runway Protection Zone

