FRIEDMAN MEMORIAL AIRPORT

RUNWAY SAFETY AREA IMPROVEMENTS PROJECT FORMULATION

FINAL SUMMARY REPORT

NOVEMBER 2014

Friedman Memorial Airport / T-O Engineers

Friedman Memorial Airport (SUN)
Hailey, Idaho
RSA Improvements – Project Formulation
Final Summary Report

November 2014

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June 2, 2014

Introduction

The Friedman Memorial Airport is located in Hailey, Idaho. This airport serves the Wood River Valley region of Idaho, including the Sun Valley resort area. The Airport is currently served by three commercial service air carriers: Delta, United and Horizon Air. A large number of corporate jets and other general aviation aircraft also use the airfield for business, recreation and travel to and from the large number of second homes in the area. The Friedman Memorial Airport Authority (FMAA) governs and manages the airport under a joint powers agreement between the City of Hailey and Blaine County, who co-sponsor the airport.

The airport does not meet current FAA design standards in several critical areas. Traffic by aircraft such as the Bombardier Q400, operated by Horizon Air, and several models of large GA aircraft (e.g., Gulfstream G-V and Bombardier Global Express) dictates that the Runway Design Code for the airport is C-III. Due to the geometry and spatial limitations of the existing site, the airport does not meet standards for many criteria, most critically the Runway Safety Area (RSA). Additionally, Delta and United operate the Canadair Regional Jet 700 (CRJ700) at SUN. The CRJ700 is a C-II aircraft, and the airport does not meet C-II design standards either.

Currently, an operational agreement between the Federal Aviation Administration (FAA), FMAA and air traffic control tower management allows commercial air carrier operations with the Q400 and CRJ700 at the airport, but this agreement was intended as a temporary measure. Until recently, the planned solution to meet standards was to relocate the airport to a new site south of the existing airport and away from the valley cities. The FAA was conducting an Environmental Impact Statement (EIS) study for a new location until the decision was made to suspend the study in August 2011, due to financial and environmental concerns with the final two sites under consideration.

Following the suspension of the EIS, FMAA completed a Technical Analysis of available alternatives for improving the airport to meet standards where practical and to identify required Modifications of Standards, where standards cannot be met. This analysis identified seven alternative airport configurations and the costs and possible environmental impacts associated with each. Upon review of the Analysis, the conclusion of the community and the FAA was that Alternative 6 would be pursued, with additional future planning to consider elements of Alternative 7 that are necessary to accommodate airport uses displaced by construction of Alternative 6. The initial construction priority will be only the elements of Alternative 6 related to the Runway Safety Area. For example, the air traffic control tower will not be relocated at this time, as this building impacts the Runway Object Free Area, but not the Safety Area. See Exhibit 1 for a graphic of Alternative 6. Detailed information regarding the development of this

Alternative and the analysis conducted is included in a report entitled *Friedman Memorial Airport – Airport Alternatives Technical Analysis*, dated January 2013.

Alternative 6 identifies projects within the existing perimeter fence at SUN that will accomplish the following:

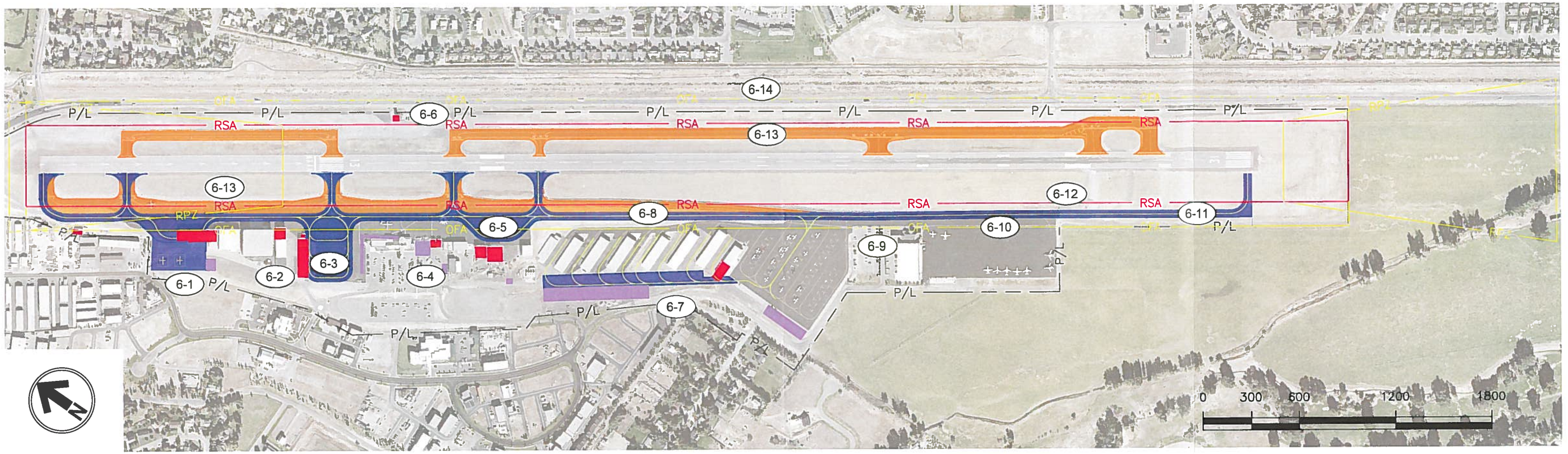
1. Full compliance with C-III RSA dimensions.
2. Minimum runway to parallel taxiway separation of 320'.
3. All aircraft parking outside of the Runway OFA.

In order to accomplish this, a large amount of construction must be done, including relocation and extension of the primary parallel taxiway on the west side of Runway 13/31 (Taxiway B), removal of a secondary parallel taxiway on the east side of the runway (Taxiway A), relocation of multiple hangars and various other improvements. All of these improvements must be completed prior to December 31, 2015. By Congressional mandate, all commercial service airports must have compliant Runway Safety Areas by that date.

The purpose of the Technical Analysis was to evaluate the basic feasibility of alternatives, not to address each issue that will be encountered in implementation of the proposed projects. As described in a Scope of Work dated March13, 2013, FMAA retained T-O Engineers to complete a project formulation study to verify and refine assumptions made during the conceptual work done as part of the Technical Analysis and to further analyze and develop the projects necessary to construct Alternative 6.

This report summarizes and documents the findings of this formulation study. During the course of this study, Alternative 6 was refined based on the results of this analysis. The refined concept, which will be carried forward into design and construction is included as Exhibit 2.

It should be noted that certain elements of the Scope of Work were modified during completion of the project. Due to the fast-paced schedule necessary to complete the required construction projects before the end of Calendar Year 2015, construction of some phases of the work began before the formulation was completed. Development of the designs of these construction projects influenced the formulation effort, both in terms of schedule and the analysis completed.



ITEM	DESCRIPTION
6-1	RELOCATE AIRCRAFT PARKING/HANGARS, RECONSTRUCT BUS ROUTE ACCESS ROAD, CLOSE WINTER BUS ROUTE
6-2	REMOVE HANGARS, RELOCATE ELECTRICAL VAULT
6-3	TERMINAL AIRCRAFT PARKING
6-4	RELOCATE AIRPORT OFFICES, AND HANGAR
6-5	REMOVE HANGARS, RELOCATE DE-CONFLICTION
6-6	RELOCATE AIR TRAFFIC CONTROL TOWER
6-7	NEW TAXILANE TO ACCESS T-HANGARS
6-8	RELOCATE TAXIWAY B

ITEM	DESCRIPTION
6-9	RELOCATE EXISTING FBO FENCE AND PORTION OF PARKING LOT OUTSIDE OF TAXIWAY OFA
6-10	LOSS OF PARKING DURING HIGH DEMAND: 79,000 SF
6-11	EXTEND TAXIWAY B
6-12	RELOCATE AWOS
6-13	REMOVE PAVEMENT AND GRADE RSA
6-14	HIGHWAY 75 ALIGNMENT REMAINS THE SAME

AIRCRAFT PARKING IMPACTS

FBO:	-39,000 SF
GENERAL AVIATION:	-95,000 SF
TERMINAL APRON:	+41,200 SF
AIR CARGO APRON:	-88,500 SF
NET DIFFERENCE:	-181,300 SF

LEGEND

- 6-1 KEY NUMBER
- NEW AIRFIELD PAVEMENT
- NEW BUILDING / HANGAR / STRUCTURE AREA
- BUILDING / HANGAR / STRUCTURE REMOVAL
- PAVEMENT REMOVAL

POTENTIAL MODIFICATIONS REQUIRED

AIRPORT DESIGN STANDARD	STANDARD DIMENSIONS	POTENTIAL MODIFICATIONS REQUIRED AS SHOWN
RUNWAY TO PARALLEL TAXIWAY SEPARATION	400'	320'
RUNWAY TO AIRCRAFT PARKING	500'	400'
RUNWAY OFA GRADING	10:1	4:1
RUNWAY OFA CLEARING	NO FIXED OBJECTS	HWY 75/BUILDINGS AT NE CORNER
TAXIWAY OBJECT FREE AREA	186'	160'

NOTES

1. THIS ALTERNATIVE RESULTS IN A NET LOSS OF 2 HANGARS.
2. OPERATIONAL CHALLENGES (SNOW REMOVAL/DISPOSAL, ETC.) WILL BE CREATED BY THIS ALTERNATIVE.
3. EXISTING STORM DRAINAGE DISPOSAL SYSTEM WILL REQUIRE EXTENSIVE MODIFICATION.

EXHIBIT 5-6
ALTERNATIVE 6 - NO LAND ACQUISITION

1. Survey

The project included two survey elements: topographic survey and Airports Geographic Information System (AGIS) survey. These were accomplished as separate efforts that overlapped in some areas. Both efforts are described below.

1.1 Topographic Survey

Topographical survey information was collected from areas comprising nearly the entire existing airfield and surrounding areas. The graphic below identifies the approximate areas where survey was completed. Topographical information was used in this formulation effort, but is also intended for use to complete subsequent design efforts for specific projects. Survey included edges of pavement, pavement centerlines, building corners, fences, existing utilities and all other topographical elements in the areas shown. All survey was completed according to the accuracy requirements and procedures found in Advisory Circulars 150/5300-16, -17, and -18. Data collected under this survey effort was used where applicable (e.g., light locations, pavement markings, etc.) to complete the AGIS survey.

Dioptra Geomatics of Pocatello, Idaho was retained to survey and completed the survey in May of 2013. The survey was completed using ground based laser scanning. Laser scanning collects more data more quickly than traditional survey, but does not provide precise enough data in areas where there is vegetation. For this reason, the Dioptra's survey was completed on all of the paved surfaces at the airport. Gordon Williams, a surveyor local to Hailey, was retained to collect survey data at the infields and other areas where laser scanning was ineffective. Survey data is not presented in this report, but is on file at the T-O Engineers office in Boise.

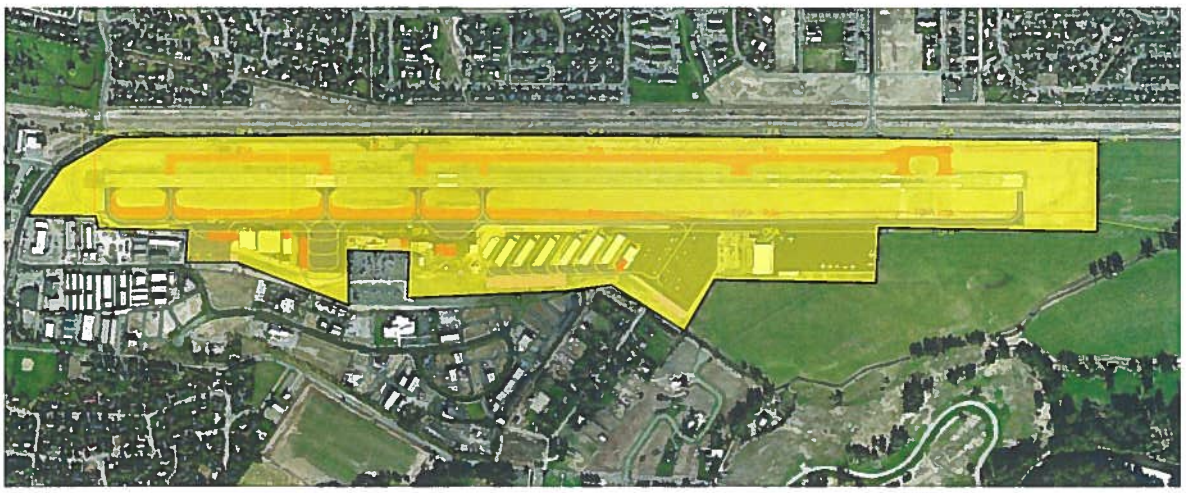


Figure 1.1. Approximate Survey Limits

1.2 AGIS Survey

In addition to topographic survey required for formulation and design, the airport was surveyed according to Airports Geographic Information System (AGIS) requirements. These survey tasks include setting a new Primary Airport Control Station (PACS) and two new Secondary Airport Control Stations (SACS), as

the existing PACS and SACS are located in areas where they would be disturbed during construction projects.

All AGIS survey and data processing was completed according to the requirements found in Advisory Circulars 150/5300-16, -17, and -18. Specific elements of this task included:

- Meet with FAA via conference call to discuss the scope of required survey.
- Coordinate with the National Geodetic Survey (NGS) to establish three separate AGIS projects and obtain approval for Statements of Work and Quality Control Plans for each, as described in the Advisory Circulars. The three separate projects were:
  1. Set PACS and SACS
  2. Design/Construction of proposed improvements
  3. Airspace analysis
- Set PACS and SACS, complete required field survey and submit data for NGS approval.
- Complete survey and other tasks necessary to collect data required in Table 2-1 of AC 150/5300-18, including aerial imagery and airspace analysis.
- Coordinate with NGS and FAA to complete projects and submit data.

Data was submitted electronically to FAA and NGS, as required in the AGIS process and was provided to the Owner.

2. Geometry

One of the major efforts in this formulation project was evaluation of the proposed airfield geometry shown in Alternative 6. Geometry was evaluated in four major areas:

1. Overall Taxiways
2. North Bypass Taxilane/Apron
3. Central Bypass Taxilane/Apron
4. Hangar Taxilane/GA Apron

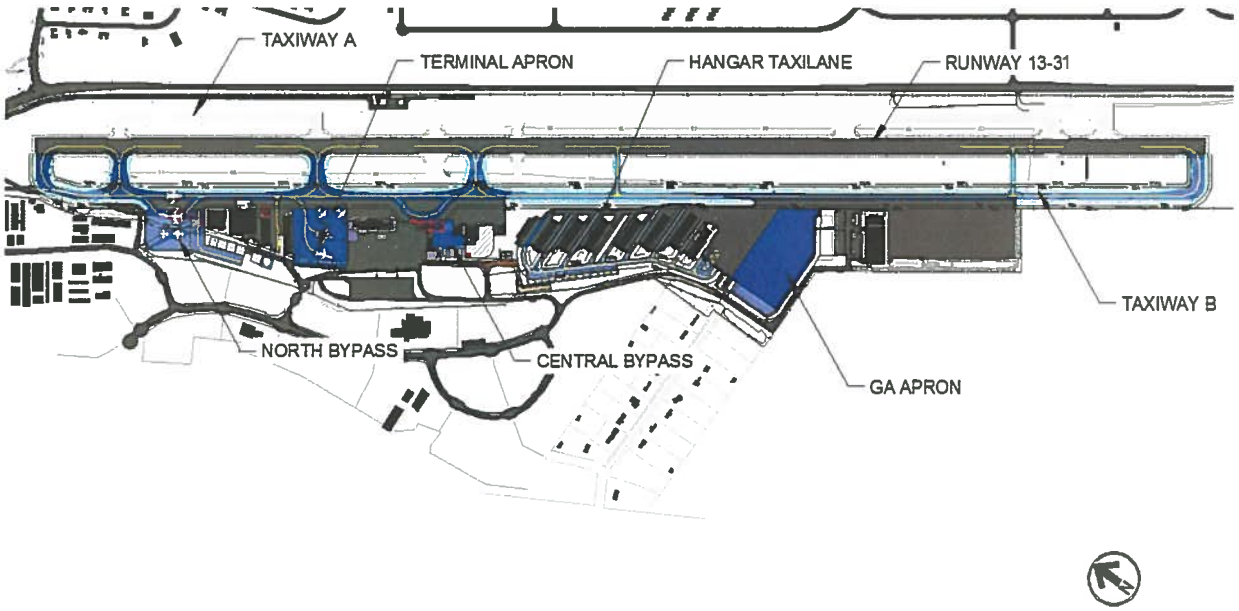


***Figure 2.1**. Composite of proposed SUN Improvements.*

Overall Taxiway Geometry

Parallel Taxiway (Taxiway B)

In order to provide a Runway Safety Area that complies with FAA standards, Taxiway B will be shifted from 250' of taxiway to runway centerline separation to 320' rather than the standard 400'. This difference was approved by the FAA in a Modification of Standards (MOS), as discussed in Chapter 11. Shifting Taxiway B 70' to the west creates significant impacts on parking areas, bypass taxilanes and existing facilities. These effects are discussed in more detail below.

The Taxiway Object Free Area (TOFA) for Airplane Design Group (ADG) III is 186' or 93' each side of the taxiway centerline (AC 150/5300-13A Table 4-1). This standard is based on aircraft with wingspans from 79' to less than 118'. Currently the aircraft with the largest wingspan that operate at SUN are the Gulfstream G550 and Bombardier Global 5000, both with wingspans of 94.0'. The size of aircraft is not anticipated to increase substantially, as the runway capacity at the airport is 95,000 pounds and there are no aircraft in the current fleet of all available aircraft that exceed 100' wingspan and weigh less than 95,000 lbs. In order to provide a compliant RSA without greatly increasing the impact of the project on

airport facilities, an "aircraft specific" TOFA for a design aircraft with a 100' wingspan was developed. This was done with the following formula found in Paragraph 404.a.3 of Advisory Circular (AC) 150/5300-13A, *Airport Design:* TOFA = 1.4(Wingspan) + 20'. Using a wingspan of 100' in this formula reduces the TOFA to 160' (80' either side of centerline). This modification was also documented and approved in an MOS, as discussed in Chapter 11.

The Bombardier Q400 is classified in AC 150/5300-13A as a Taxiway Design Group (TDG) 5 aircraft, which requires a taxiway width of 75'. At this width with a runway to parallel taxiway separation of 320', it is possible for part of an aircraft taxiing at the edge of the taxiway to penetrate the Runway Safety Area. Another MOS was developed, which reduces the required taxiway width to 50', with paved shoulders.

These parameters were used to develop the Taxiway B geometry which will be used in the design of the taxiway relocation.

Connecting Taxiways

There are six existing connecting taxiways between Taxiway B and Runway 13-31 at SUN. The removal of Taxiway A will create significant changes to operations on the ground at the airport, and an analysis of the connecting taxiway system was completed as part of this effort. This analysis is included in detail in a report attached as Appendix 1. The changes to the connecting taxiway system are summarized briefly below.

Three of the existing taxiways will be maintained with minor shaping and vertical geometry changes, three will be demolished and moved, and one new connecting taxiway at the south end of Runway 13-31 will be constructed.

Taxiways B1, B2 and B3 will be maintained in their current locations. During construction, these will be cut back, re-graded, and repaved to transition into the relocated taxiway B. The geometry of the new intersection at Taxiway B will meet the requirements for TDG 5 geometry, but the geometry at the runway intersection will not be changed. All proposed centerline fillet radii are TDG 5.

Taxiway B4 will be removed and relocated approximately 350' to the south to more efficiently accommodate aircraft traffic.

Taxiway B5 will also be removed and relocated. A new Taxiway B6 will be constructed (existing abandoned Taxiway B7 will be removed). These two taxiways are designed for use only by small aircraft and will be designed to TDG 2 standards. Nearly all arrivals are from the south, but on occasion small aircraft arrive from the north. It will be difficult, if not impossible, for an aircraft arriving from the north to exit the runway on the first four connecting taxiways. Without these two additional taxiways, the aircraft would be required to taxi the remaining length of the runway and exit on the connecting taxiway at the south end, delaying queued aircraft operations. These taxiways are designed for small aircraft only for two reasons: they are primarily needed to efficiently get small aircraft off of the runway; and the grade difference between Taxiway B and Runway 13-31 exceeds the maximum slope for taxiways designed for larger aircraft.

The last taxiway to be constructed is Taxiway B7 at the south end of Runway 13-31. Taxiway B currently ends at the south end of the FBO apron, but will be extended to the end of the runway with the removal of Taxiway A. Taxiway B7 will connect Taxiway B and to the Runway 31 end.

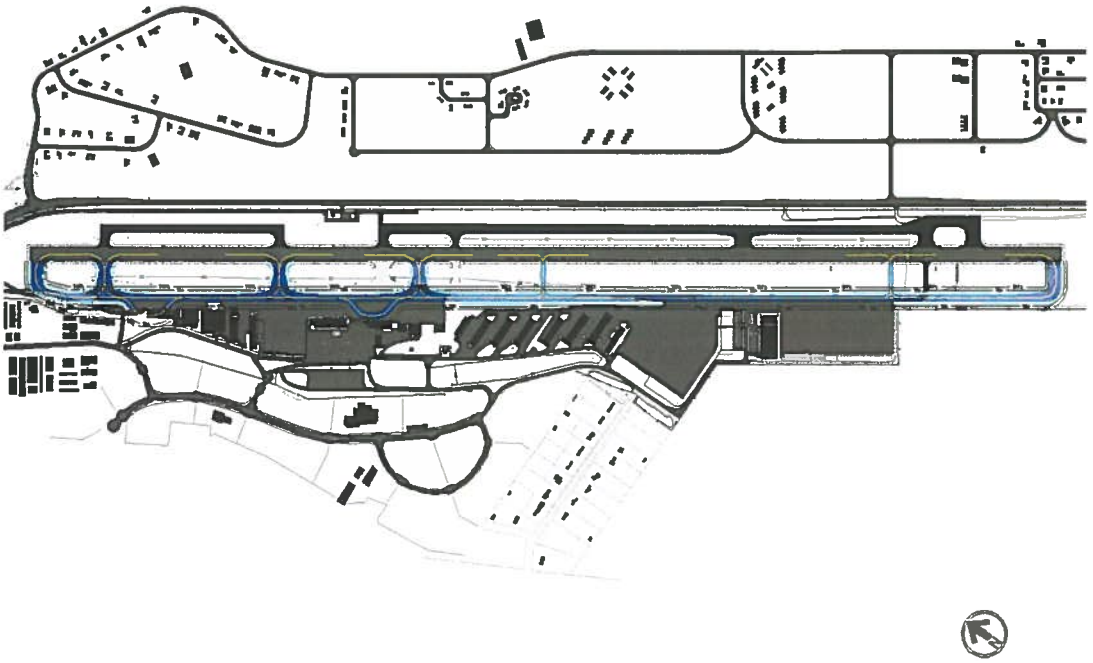


***Figure 2.2**. Proposed Taxiway B Shift.*

Vertical geometry of all of the taxiways was largely based off of the RSA grading. The maximum RSA grade is 3% (A/C 150/5300-13A, Figure 3-23) but the existing RSA exceeds this maximum in many locations, up to 5%. To decrease the RSA grade, Taxiway B will be raised at locations where the RSA is steeper than maximum. The vertical geometry was also limited to a maximum longitudinal slope of 1.5% (AC 150/5300-13A, Paragraph 418.b.(1)).

North Bypass, Apron, and Taxilane

As discussed previously, the relocation of Taxiway B creates significant impacts on other areas of the airfield. One of those areas is the North Bypass Taxilane and apron area.

Traffic at SUN is fairly unique: nearly all aircraft traffic arrives from the south and departs to the south. The creates "head-to-head" operations both in the air and on the ground, with aircraft taxiing from the FBO and other areas of the airport to the north end of the runway for takeoff. This conflict between aircraft taxiing north and south is alleviated with two bypass taxilanes: one at the north end of the airfield and one at approximately midfield. The relocation of Taxiway B will require the relocation of both bypass taxilanes.

Relocation of the North Bypass Taxilane will require relocation of several hangars and construction of a new apron area and taxilane.

To compensate for loss of aircraft parking as a result of the relocation of Taxiway B, a new apron will be constructed under the demolished hangars and extend toward the property line. This apron will also be used by FedEx and UPS.

The geometry of the bypass remained relatively consistent between all of the considered options. The geometry consists of a 60 degree angle with 110' centerline curve radii (AC 150/5300-13A, Table 4-6) to a 60' straight section, separated from the taxiway centerline by 130'. The 130' of separation is specific to

a design aircraft with a 100' wingspan, and is 1.2 * wingspan + 10' (AC 150/530-13A Paragraph 404.a.(1)). Steeper angles and shorter straight sections were considered to minimize the number of relocated hangars, but analysis determined that the resulting geometries were too tight to gain proper wingtip separation between the design aircraft on Taxiway B and on the bypass.

Option 1

Option 1 (Figure 2.3) proposes the construction of new hangars along a new taxilane that is designed to allow access to the hangars from the new apron or off of Taxiway B through existing buildings. This option increases the total amount of existing hangar space and has no hangars on the new apron resulting in more apron for parking aircraft, and room to fit the Forest Service heliport. The option was primarily discarded because, with the size of aircraft that use these hangars, there is not enough room to fit a properly sized taxilane between the existing buildings. Additionally, vehicle access to the hangars and the Forest Service heliport facility would be very difficult.

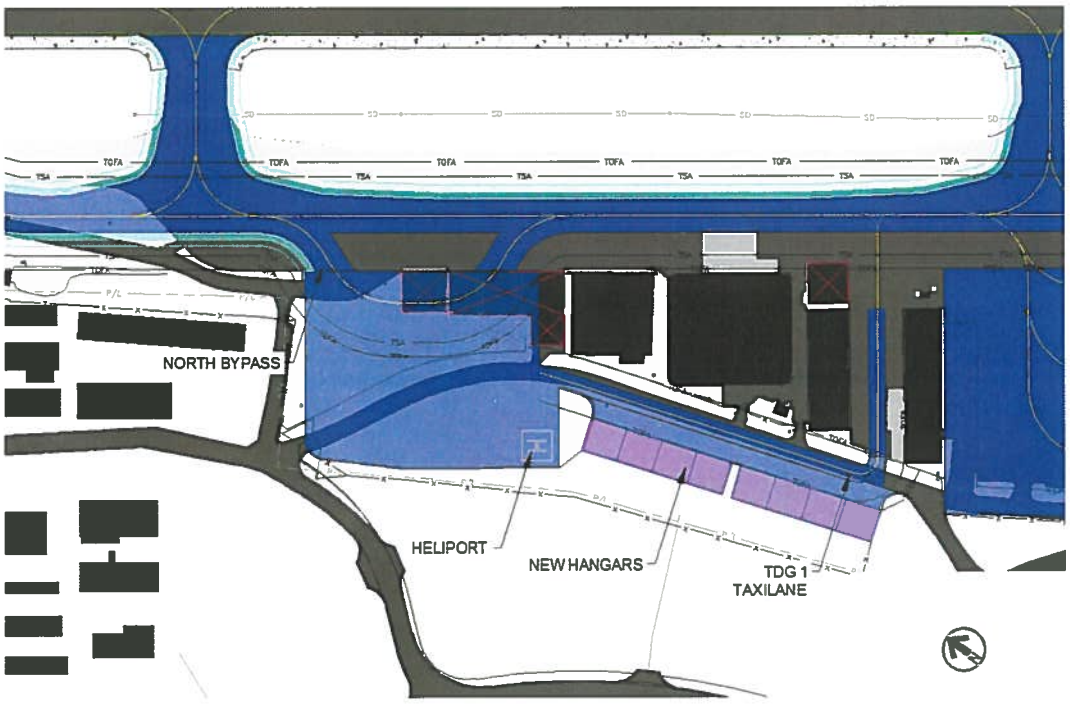


Figure 2.3. *North Bypass, Apron, and Taxilane Option 1.*

Option 2

Option 2 (Figure 2.4) was designed to increase the design group of the hangar taxilane and add additional vehicle parking. To increase the taxilane design group an additional hangar needs to be demolished. To compensate for the loss of space, more hangars will be built on the new apron. Although the wider taxilane does allow larger aircraft to access the relocated hangars, the airport manager expressed concern with the demolition of additional hangars. There is also the drawback of less space to park aircraft on the new apron. Furthermore, FedEx, UPS, and the forest service heliport would have to be relocated eleswhere.

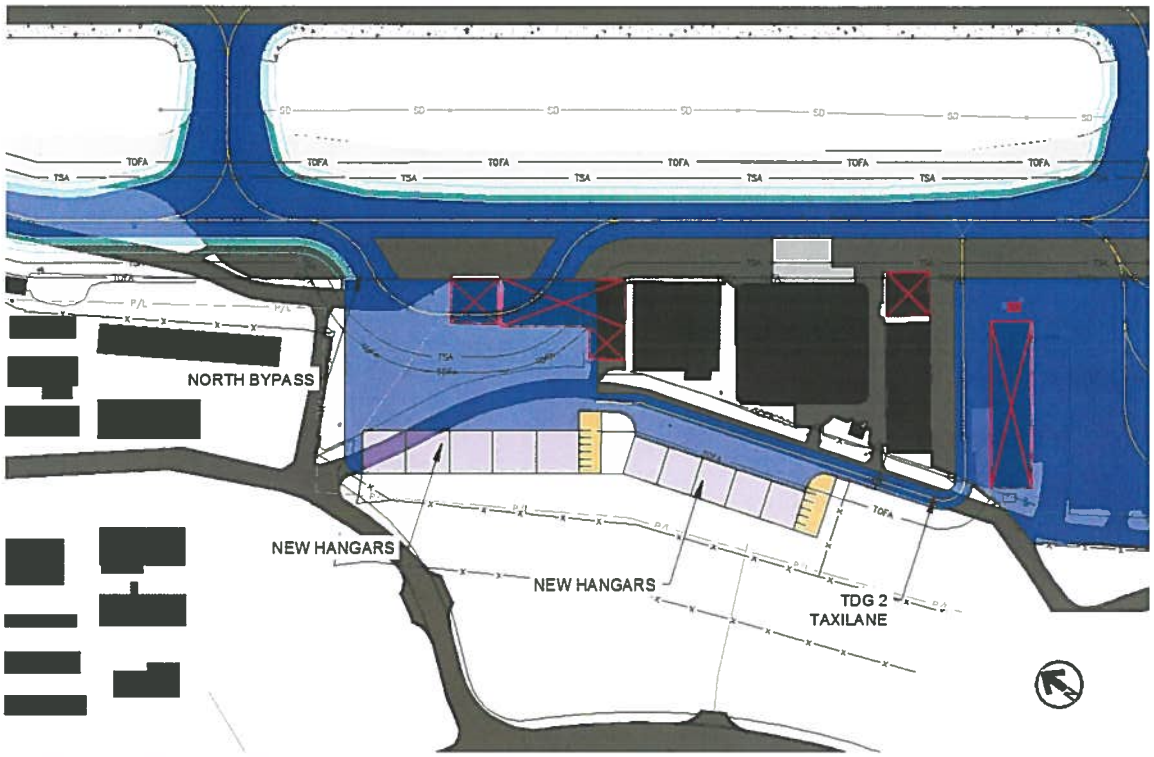


***Figure 2.4**. North Bypass, Apron, and Taxilane Option 2.*

Option 3 (Preferred Option)

Option 3 (Figure 2.5) is the preferred option and incorporates a large taxilane, minimal hangar demolition, and maximum aircraft parking. The hangar taxilane in Option 3 does not connect to Taxiway B through the existing buildings, but rather only by way of the new apron. Configuring the taxilane in this manner allows for the construction of a larger taxilane without the need to demolish more hangars. Without demolishing the extra hangars, additional hangars will not need to be constructed on the new apron, leaving enough room for FedEx and UPS as well as additional parking during peak events. Option 3 includes a building for the forest service and a helistop off of the new apron that can be accessed by hover taxiing where the taxilane connected to Taxiway B in Options 1 and 2.

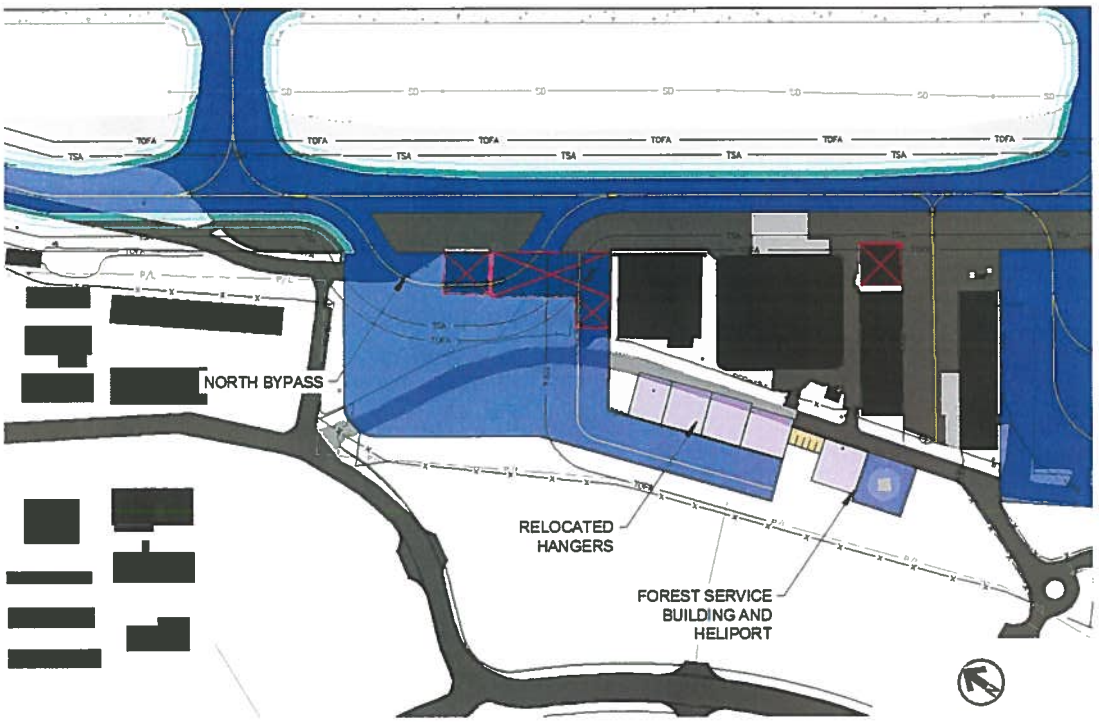


***Figure 2.5**. North Bypass, Apron, and Taxilane Option 3 (Preferred Option).*

Central Bypass

The Central Bypass is located at approximately the midpoint of the airfield. The existing bypass will be moved north in order to avoid conflict with the new location of Taxiway B4. In order to construct this bypass, several buildings including the ARRF buildings, shop, and airport administrative offices will be demolished and rebuilt west of their current location. The location of the Central Bypass is consistent between all three options. The options considered different configurations for the new facilities, as described below.

Option 1

Option 1 proposes to relocate the three demolished buildings which include the shop, manager's office, and ARFF. The relocation of the buildings requires the realignment of an existing vehicle access road shown in orange (Figure 2.6). New vehicle parking is proposed just west of the relocated buildings. A small new apron is proposed to be constructed east of the new buildings to provide additional aircraft parking. The drawback of this proposal stems from steep grades west of the proposed apron. The current elevation where the vehicle parking is proposed is over 15' lower than that of the proposed apron. Additionally, this configuration does not allow for public access to the manager's office, which is necessary.

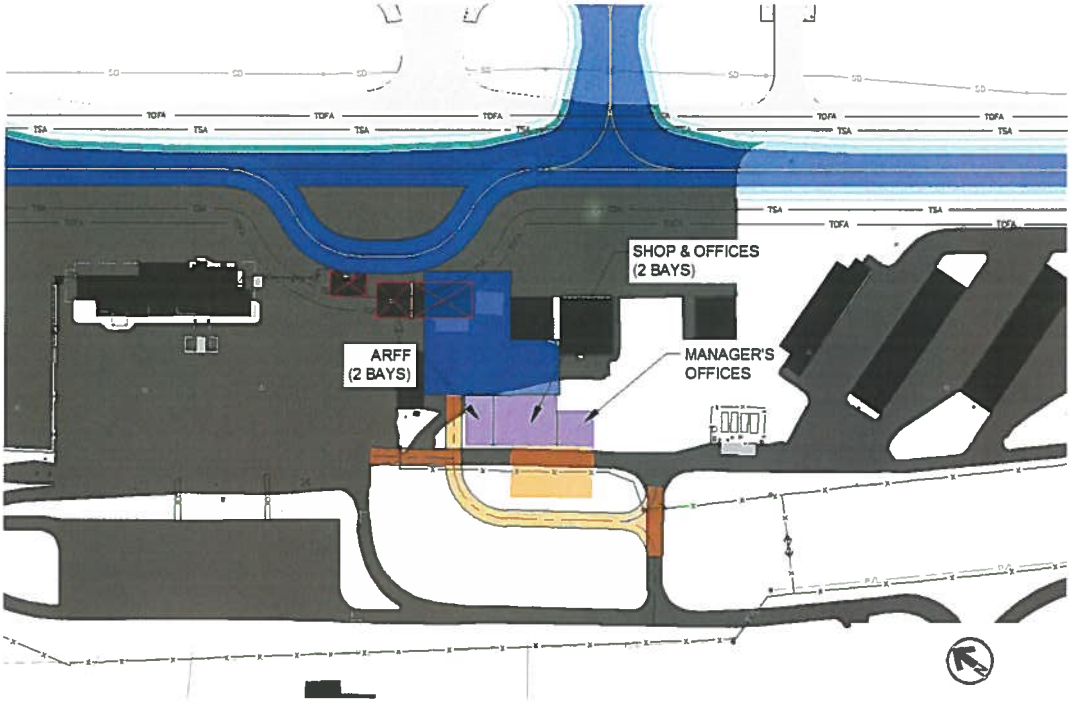


Figure 2.6. *Central Bypass Option 1.*

Option 2

Option 2 is the most ambitious proposal of the three. A TDG 2 taxilane is proposed that will provide access to 18 new hangars. This alternative requires the demolition of an additional building, and proposes that the demolished buildings be moved elsewhere. The advantage of this alternative is the addition of multiple hangars that can be leased and create revenue. The obvious disadvantage is the upfront cost, and this option was eliminated primarily due to budgetary limitations. This option also does not include a location for the new ARFF/SRE/administrative facility.

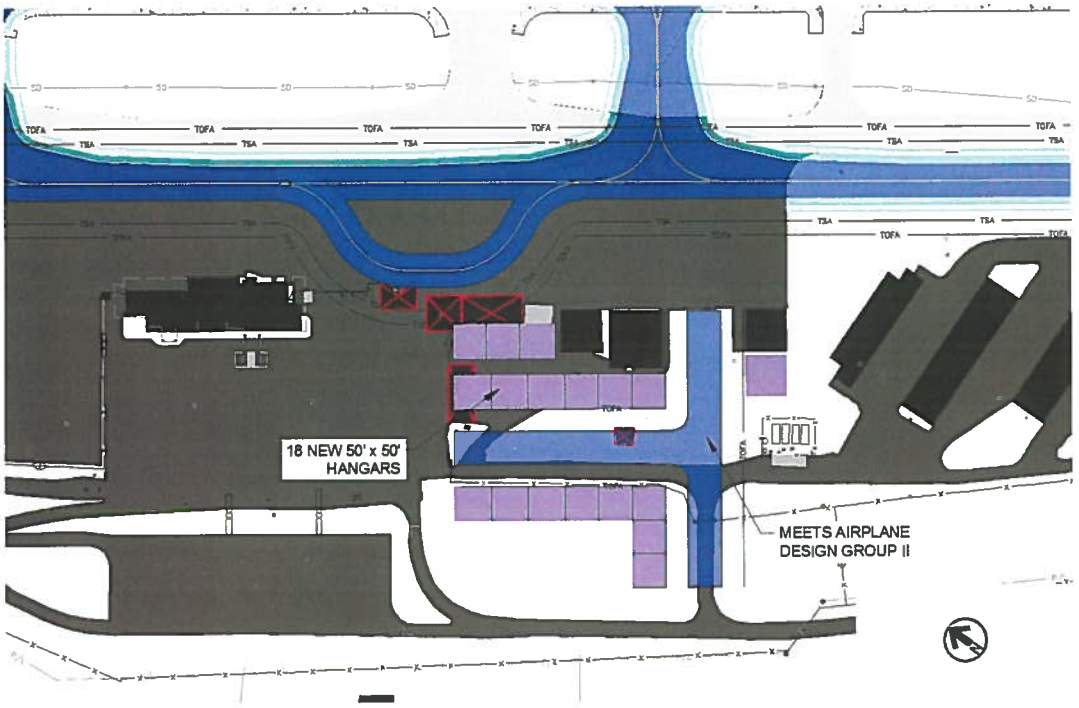


Figure 2.7. *Central Bypass Option 2.*

Option 3 (Preferred Option)

Option 3 (Figure 2.8) resembles Option 1 with a few important differences. The vehicle parking behind the proposed shop and ARFF buildings is relocated south, reducing the amount of fill required to complete this phase. The horizontal alignment of the vehicle access road will not change, but because fill is still required under the relocated buildings, a portion of this access road will also be raised in elevation. Option 3 is the preferred option because it is cheaper and more practical than Option 2 and it achieves similar results as Option 1, but requires less earthwork than and a smaller impact on the vehicle access road. It also provides public access to the administrative offices.

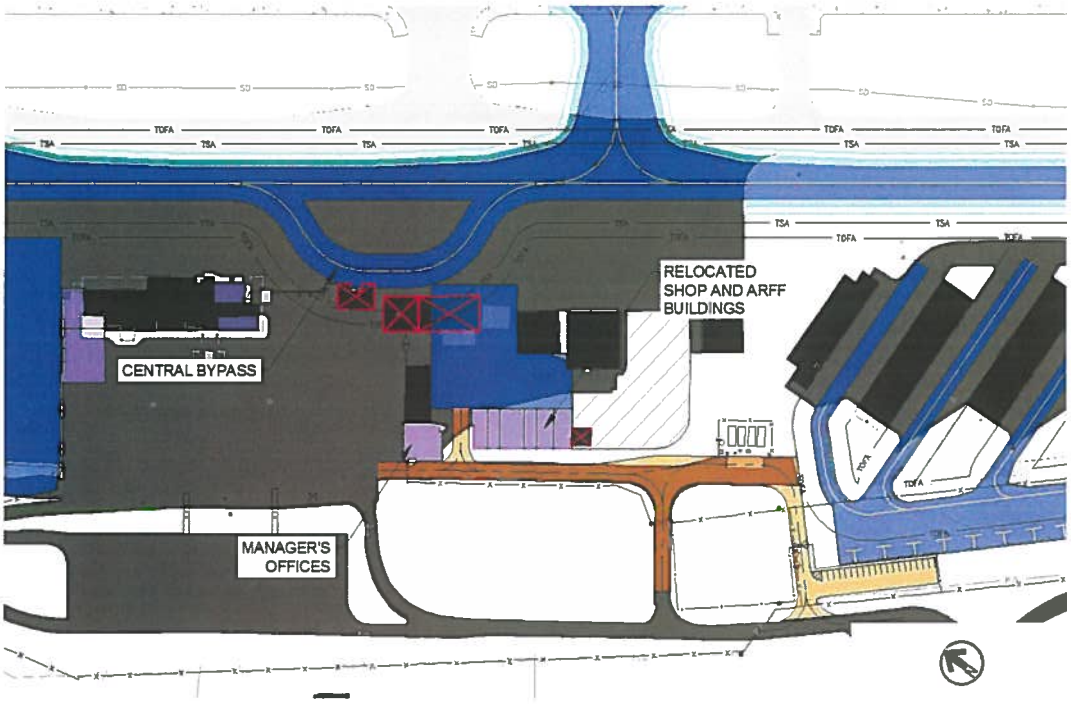


Figure 2.8. *Central Bypass Option 3 (Preferred).*

Hangar Taxilane Relocation and GA Apron Overlay

Eight multi-unit hangar buildings are located near the south end of the airport, accessed by a taxilane east of the hangars and west of Taxiway B. When Taxiway B is shifted west, the taxilane will be inside the TOFA and in order to maintain hangar access, the taxilane will be relocated to the west side of the hangars.

Relocating Taxiway B will also affect the pavement space available for GA parking. In order to adequately meet the demand for parking larger aircraft during peak events, multiple tie downs will be removed from the GA Apron, the apron will then be overlaid to provide the strength needed to support larger aircraft, and expanded to compensate for lost parking. Three options for the configuration of this area of the airport were considered:

Option 1

Option 1 (Figure 2.9) was designed to place the taxilane geometrically as close as possible to the hangars. Airport Way is a vehicle access road located west of the hangars. At the completion of the hangar taxiway, a section of Airport Way will fall inside the taxilane object free area. The solution is to realign Airport Way, shown in orange.

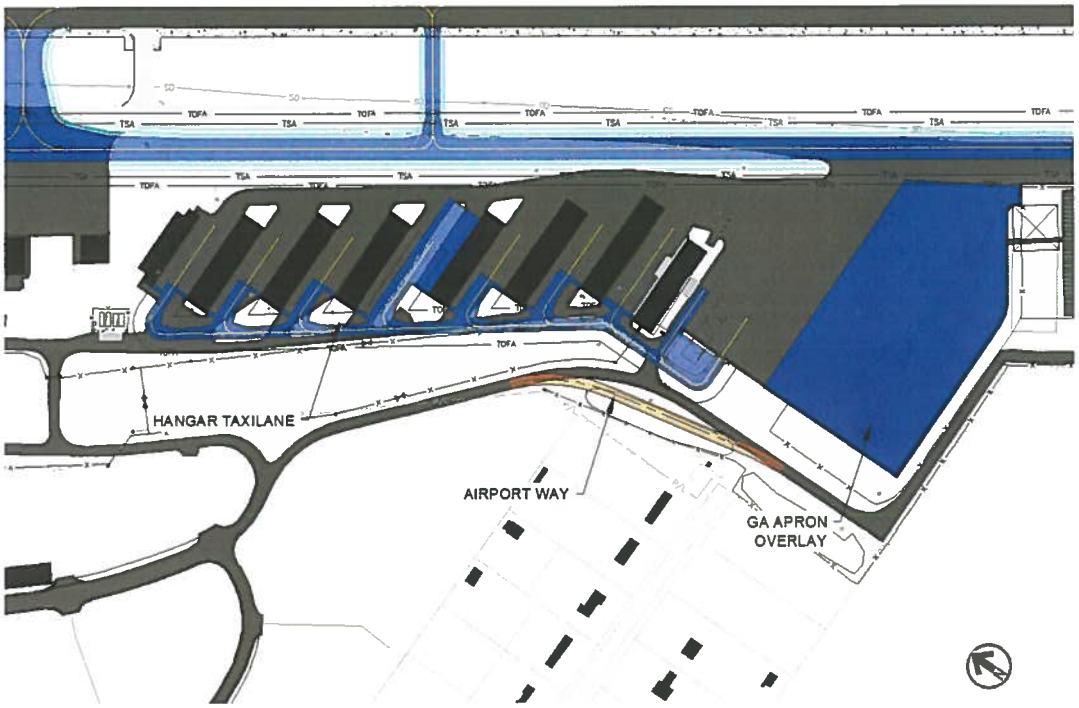


Figure 2.9. *Taxilane Relocation Option 1.*

Option 2

Option 2 (Figure 2.10) was designed to maximize the amount of new tie-downs along the taxilane. This involved moving the taxilane as far west as possible to increase the area between the new taxilane and existing hangars. Also, the apron was expanded and the maintenance hangar was placed in a new location. Airport Way needed a larger section of road to be realigned with this option. The addition of tie-downs was determined not to be an efficient use of airport land. Snow storage and a large increase in paved surface with loss of water retention space was also a concern.

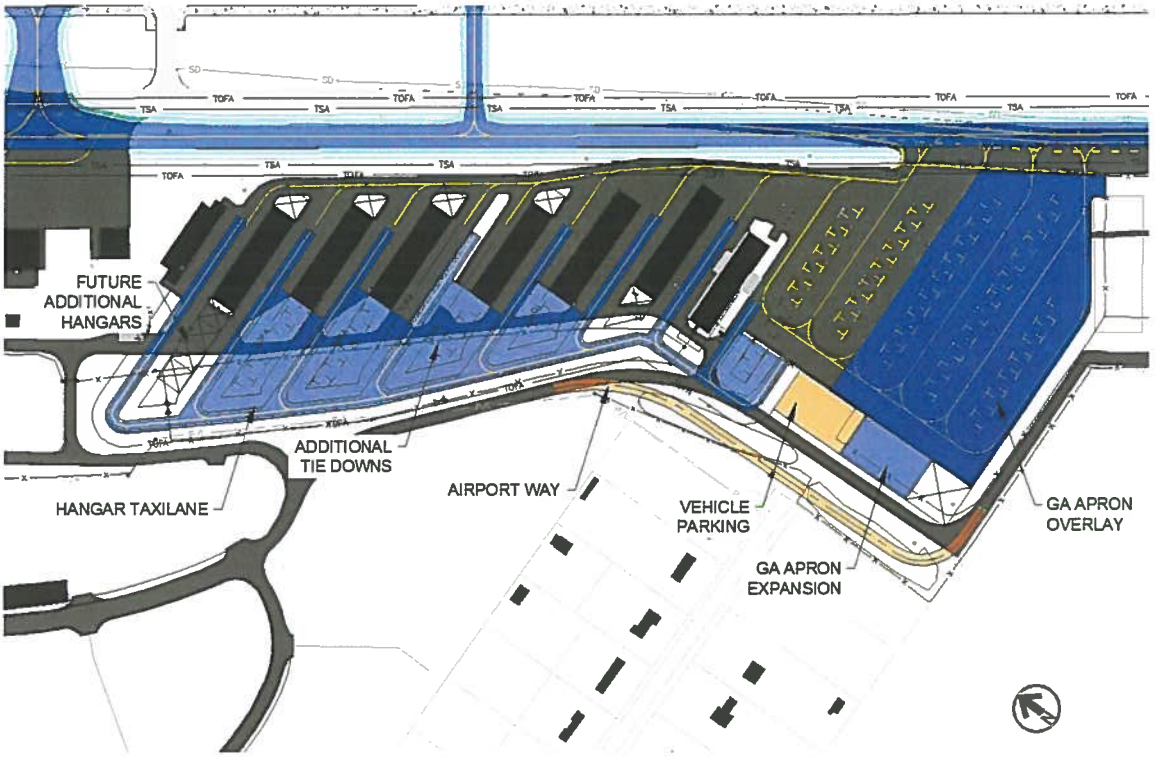


***Figure 2.10**. Taxilane Relocation Option 2.*

Option 3 (Preferred Option)

Option 3 (Figure 2.11) is the preferred option for many reasons. This option includes more aircraft parking and vehicle access than Option 1 but less paved surface and cost than Option 2. Option 3 also has less impact on Airport Way than both Options 1 and 2, while increasing overall vehicle access. The taxilane geometry in Option 3 also softens many of the sharp turns proposed in the previous options.

The loss of parking from the relocation of Taxiway B was mitigated in part by the expansion of apron space in other phases of the overall project. This allowed the scaling back of additional apron in this phase. The GA apron will be expanded, and a row of additional tie downs will parallel the proposed taxilane, leaving islands for snow storage and utility vaults between the hangars and the taxilane.

A more in depth look at vehicle access was taken when formulating Option 3. To access fuel tanks, fuel trucks currently drive and turn around where the proposed taxilane will be. An existing gravel vehicle parking lot is also located at the proposed site for the new taxilane. Rather than relocating the fuel tanks, a new access loop will be added which will also serve the purpose of access for a new paved vehicle parking lot. As a part of Option 3, Airport Way will be shifted and vehicle parking will added off of it, near the expanded GA Apron.

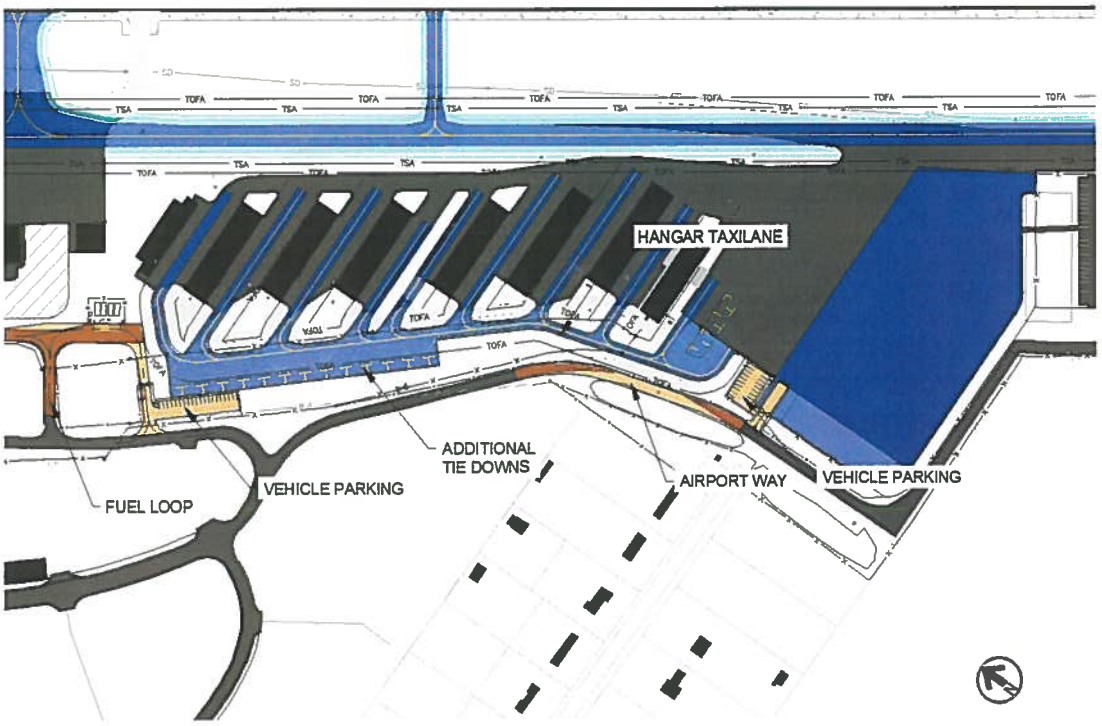


***Figure 2.11**. Taxilane Relocation Preferred Option, and Option 3.*

Summary

Airport geometry reconfiguration is necessary to improve the Runway 13-31 RSA. The reconfiguration starts near the runway and extends outward to the rest of the airport. Taxiway A will be demolished and Taxiway B will be shifted away from the runway. Much of the airport operations and many of the airport's facilities will be affected by the shifting of Taxiway B. This drives the geometric reconfiguration of the project areas discussed in this chapter.

3. Grading and Drainage

The proposed airfield geometry requires significant modification of the grading and drainage of the airfield. FAA requirements dictate the appropriate grades of all areas on airfields, and provide guidance on appropriate treatment and disposal of stormwater.

The majority of the proposed improvements at the airport involve extensive earthwork and grading. This includes filling existing stormwater retention basins, significant RSA grading and construction of several large fill areas for aprons and facilities.

Extending Taxiway B requires significant grade changes. The existing area where the extension will be constructed is currently used for stormwater retention. The existing taxiway also needs to be raised to meet RSA grading requirements. The maximum slope for the RSA is 3%, but the existing RSA slopes exceed 5% at multiple locations. Raising the taxiway will decrease the steep slope and meet standards.

Currently there is a grade difference of approximately 10 feet at the location of the proposed apron at the north bypass. This drop off will require a considerable amount of fill; so much so that a retaining wall will be constructed along the northwest and southwest edges of the apron in order to keep the effects of the project within the airport property limits.

The central bypass apron area will need to be built up to accommodate the new shop and a future apron to the southeast. The existing grade will be brought up approximately 15 feet.

The majority of the fill needed to construct Taxiway B, the north bypass apron, and the relocated shops/manager's office, will be cut from the east RSA (where Taxiway A is currently). Unlike the steep RSA west of the runway, the east RSA is flatter than the minimum. Therefore, after Taxiway A is demolished enough fill can be generated by steepening the RSA grading east of the runway to construct the other phases of the airport improvement project. Additional fill will be generated from the hangar taxilane phase and from the construction of additional storm water retention basins. Finally, some additional fill will need to be imported.

The stormwater system on the airfield will require significant modifications. Currently, all storm drainage on the airfield flows through a storm drain system to the southwest corner of the airfield, where it is disposed of in the location where Taxiway B will be extended. The system will be modified so that drainage on the east side of the airfield will flow over land to a new storm retention and disposal basin at the southeast corner of the airport property. On the west side of the field, most of the existing system will be maintained, with a number of new storm drain inlets installed. A new outlet structure and disposal basins will also be constructed south of the new end of Taxiway B.

Detailed storm drainage analysis was completed as part of this formulation effort, as described in the report included in Appendix 2.

4. Building Relocations

Alternative 6 identified a number of facilities that required removal or relocation, including hangars, the electrical vault, the US Forest Service helitack facility and others. The total number of facilities identified in Alternative 6 for removal or relocation was 15, including 12 hangar units.

During the formulation effort, the projects were modified to try to reduce this number. As recommended in this effort, the total number of facilities to be removed or relocated is nine, with five of those being hangar units. These changes were made for the following reasons:

- Hangar units (3) and electrical vault north of terminal apron will remain, due to tug-in/out operations on that apron. (The original Alternative 6 anticipated taxi-in/out operations.)
- Hangar units (2) on west end of southernmost hangars were preserved by relocating Airport Way.
- Two hangars south of ARFF/SRE building do not require relocation, as the Central Bypass was relocated north to avoid conflicts with Taxiway B4.

The existing hangars were structurally evaluated to determine if the buildings could be relocated. A copy of the evaluation report is included at Appendix 3. It is possible for the facilities to be relocated, but this may not prove to be practical, as it may be more advantageous to simply remove and salvage the facilities.

5. General Aviation Aircraft Access and Parking

GA Aprons and Tie-Downs

As a result of modifications to the elevation of Taxiway B and the extension of Taxiway B to the south, there were considerable impacts to apron space utilized to park both large and small aircraft that currently use the airport. The relocation of Taxiway B impacts aircraft parking in apron areas north and south of the FBO. As a result, the reconfiguration/configuration of the GA large aircraft parking and small aircraft tie-down aprons were evaluated together.

Figure 5.1 below depicts the apron areas north and south of the FBO.

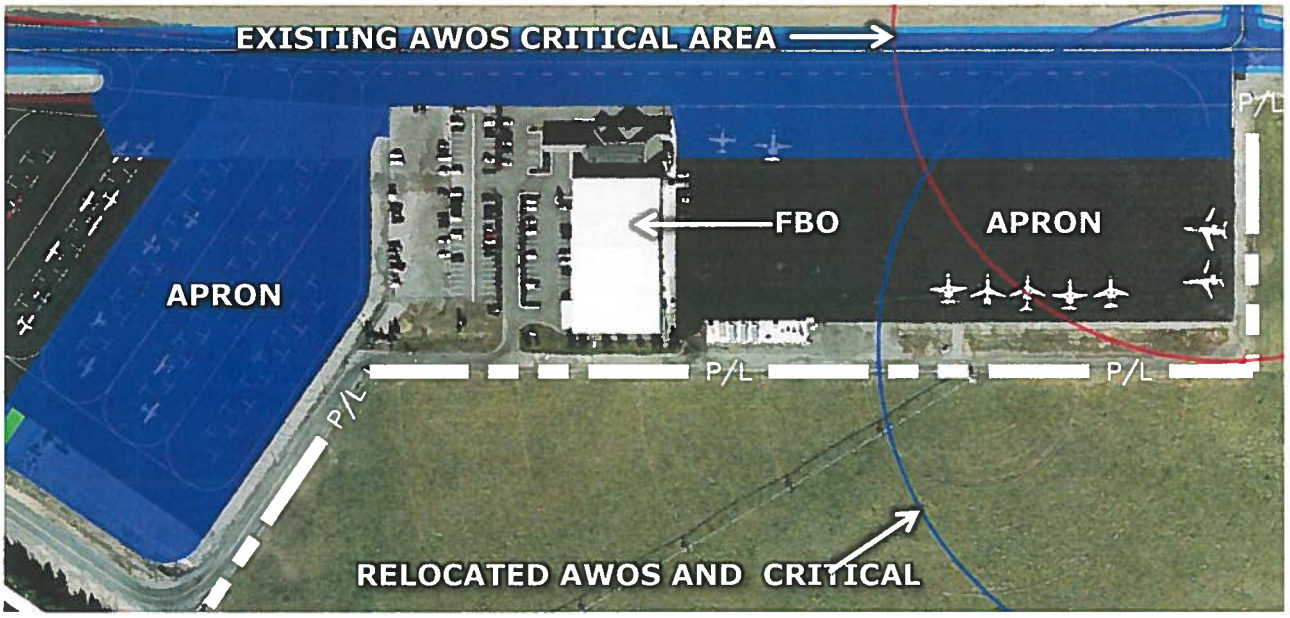


***Figure 5.1** – Apron Areas North and South of FBO*

The impacts of the relocated Taxiway B results the loss of large aircraft parking space on the existing apron south of the FBO apron as well as 32 tie-downs (from 81 down to 49) in the apron area north.

Large GA Aircraft Apron

Large GA aircraft parking is critical to the operation of the airport and FBO. In order to recapture some of the lost functionality and replace some of the lost GA parking space south of the FBO, the apron north of the FBO was strengthened/reconfigured to accommodate the existing large GA aircraft fleet displaced from the FBO apron. Previously, this apron area was used for small GA aircraft tie-downs. An overlay was performed on this portion of apron increasing pavement strength to 60,000 lbs. dual wheel and it is intended to serve large Design Group II aircraft up to this weight. Discussions with airport management revealed that current demand for tie-downs for large twin and turbo-prop aircraft on this apron could be accommodated with two groups of nested tie-downs on the north end of the apron. A small apron extension has also been added along the western edge of the strengthened apron for additional aircraft parking.

Figures 5.11 depicts the reconfigured large GA large aircraft apron.

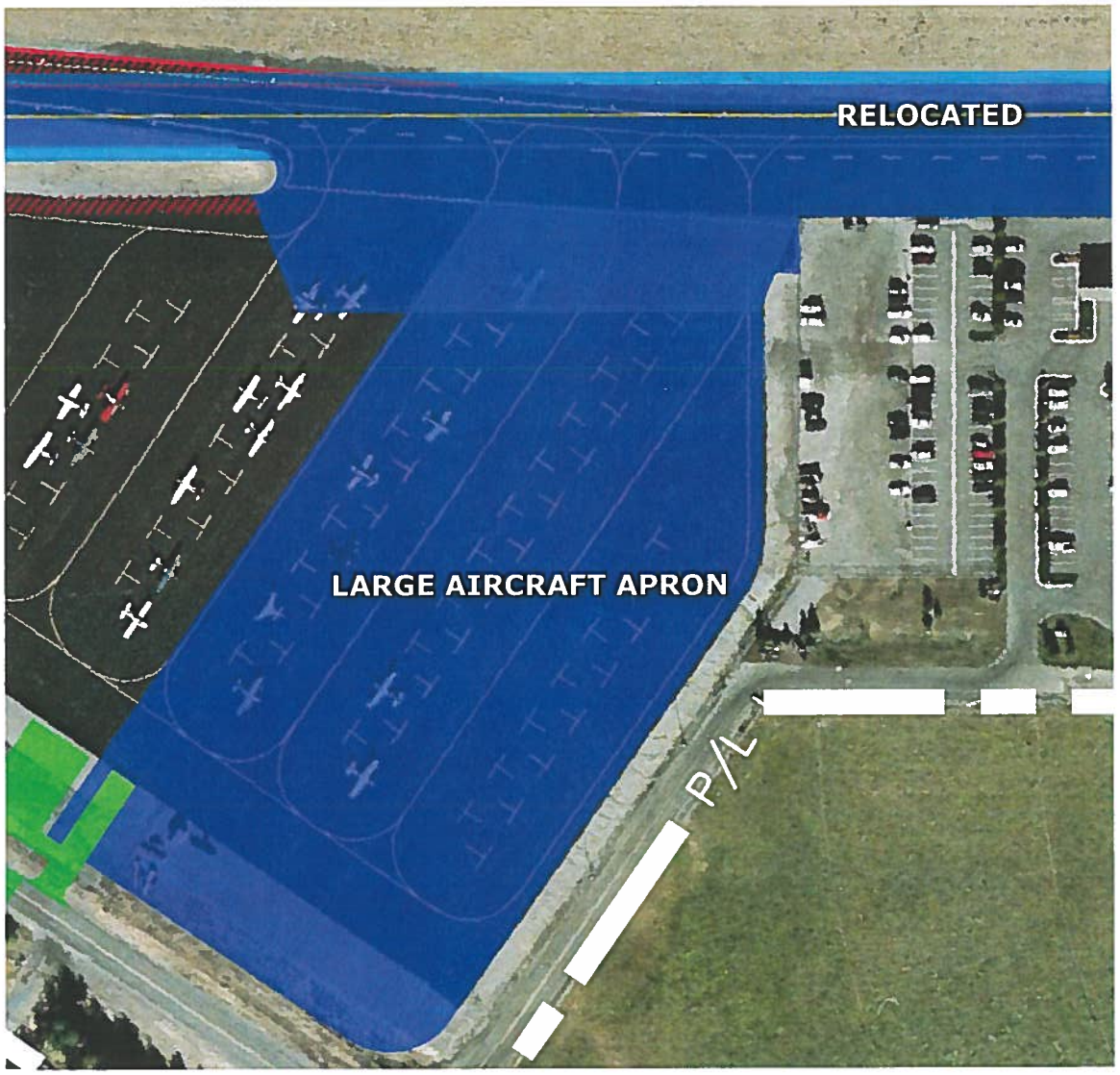


***Figure 5.11** – Reconfigured Large GA Aircraft Apron*

Small Aircraft Tie-down Apron

The need to replace and provide additional small aircraft tie-downs was addressed by adding a new small aircraft parking apron west of the existing GA hangars. This new apron area will provide for approximately 11 new small aircraft tie-downs. As previously discussed, the new apron and access taxilane is designed to accommodate Design Group 1 aircraft with wingspans up to 49 feet and has pavement strength of 12,500 pounds single wheel.

Figure 5.12 below depicts the new small aircraft tie-down apron west of the existing GA hangars.

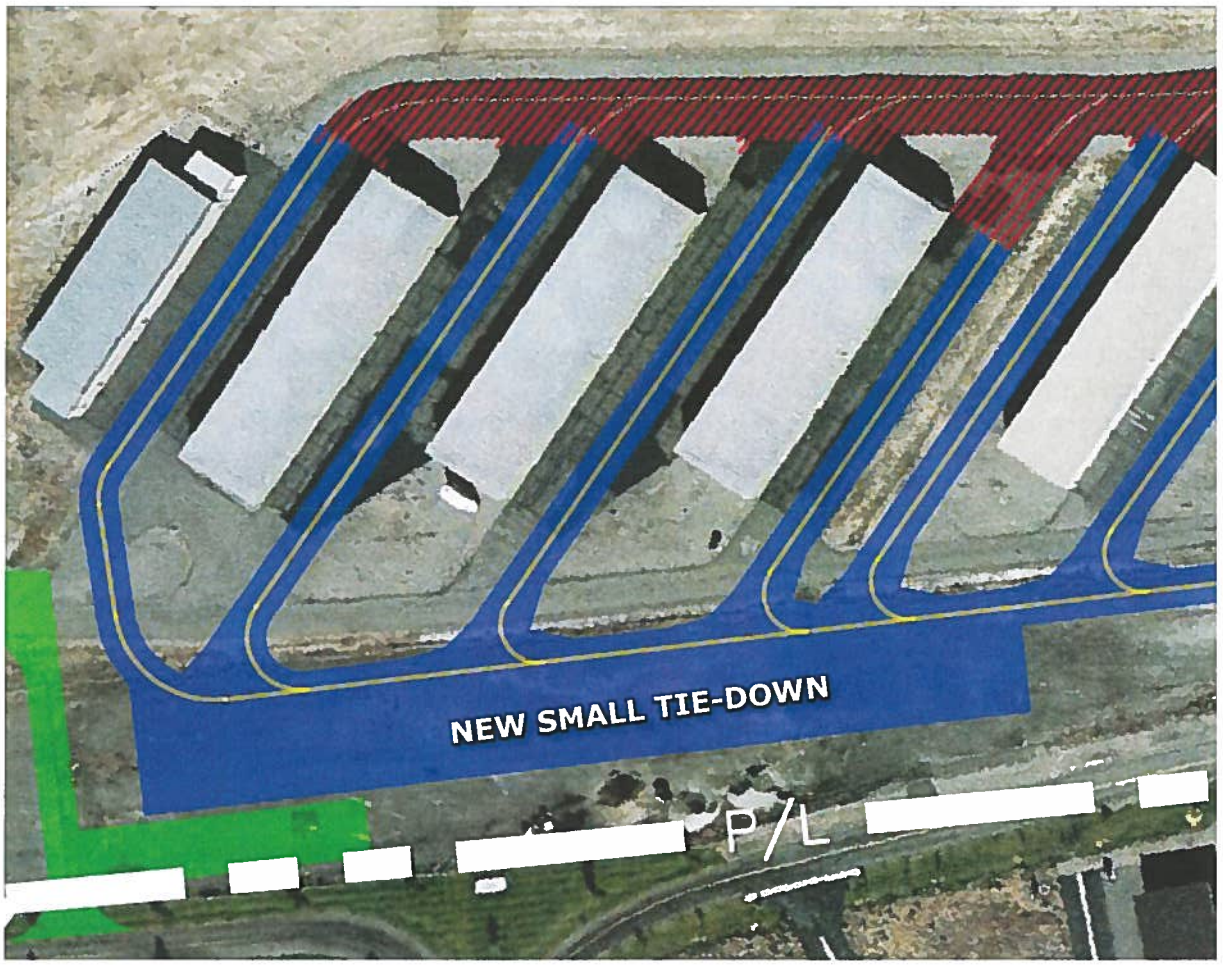


Figure 5.12 *– New Small Aircraft Tie-Down Apron*

6. Terminal Area Planning

Commercial Air Carrier Apron

Existing commercial air carrier aircraft all park on the east side of the terminal inside of the designated Security Identification Display Area (SIDA). When Taxiway B is relocated to the west, this area will no longer provide adequate clearance for taxiway OFA. The preferred alternative moves air carrier aircraft parking to the north side of the terminal. Several different concepts were evaluated to accommodate a fleet mix of Q400s, CRJ700s, and EMB 120 Brasílias. Initial configuration evaluated the option of removing the east/west row of hangar buildings located just north of the terminal building in order to provide more room for taxi in/out operations. This option was discarded and the preferred alternative will require power in/tug out operations for the air carriers. This alternative leaves the hangars in place.

A direct result of moving the air carrier parking to the northern side of the terminal is the displacement of Fed Ex and UPS freight aircraft operations to another area of the airport. These facilities are accommodated on a new apron located east of Taxiway B2, in conjunction with a new north end future hangar/taxilane development area.

Figure 6.1 below depicts the reconfigured commercial apron.

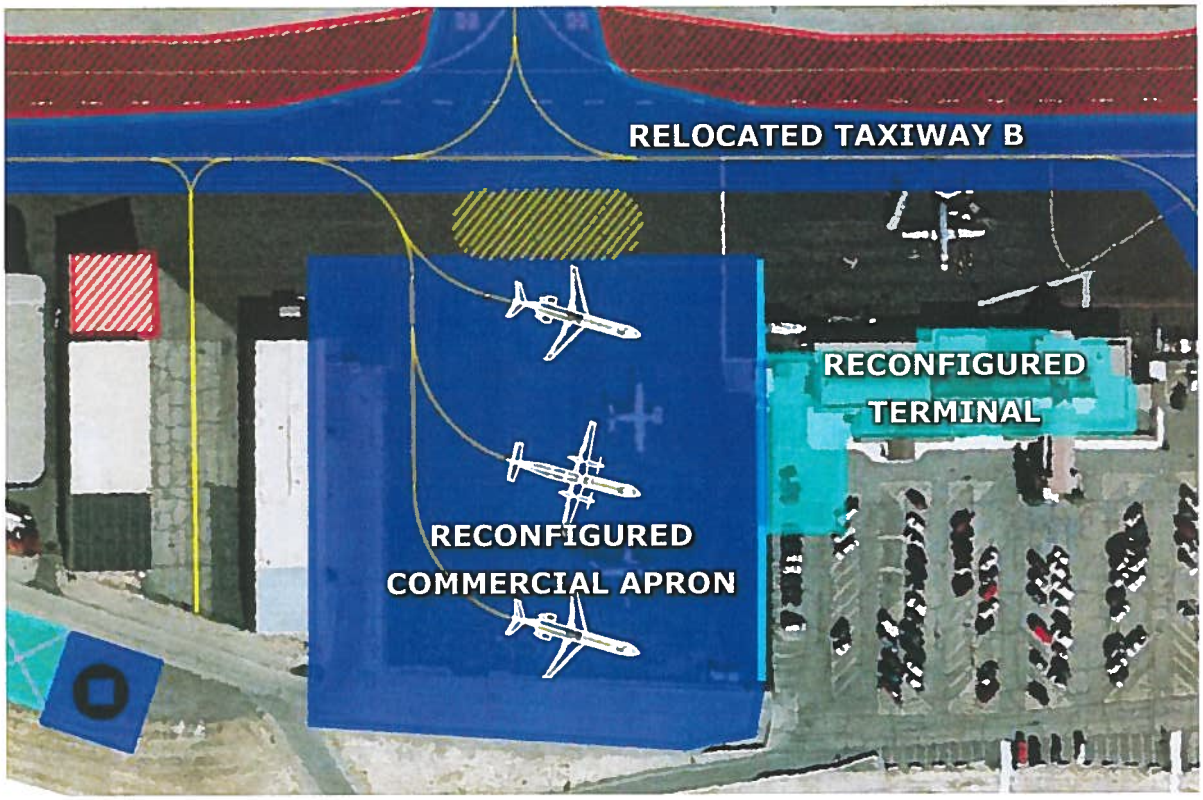


***Figure 6.1** – Reconfigured Commercial Apron*

Terminal Building Modifications

With relocation of commercial air carrier parking to the north side of the building, modifications to the terminal will be necessary in order for passengers to safely move to and from parked aircraft. In the current terminal configuration, passengers are screened and wait at the south end of the building, baggage is moved from ticket counters to aircraft in the center of the building and arrivals and baggage claim are at the north end. If aircraft are parked on the apron north of the building, there is significant potential for conflict between passengers moving to/from aircraft and the flow of baggage.

Alternative 6 included a conceptual plan for a covered walkway to move passengers to and from the new aircraft parking area. During formulation, this was not deemed to be the best solution for this problem, due to conflicts with incoming and outgoing baggage, airline ground equipment and other functions. A detailed analysis of alternatives for the terminal was completed, evaluating several options. This is discussed in detail in the report at Appendix 1. The preferred alternative for the terminal reconfiguration is illustrated in Figure 6.2 below.

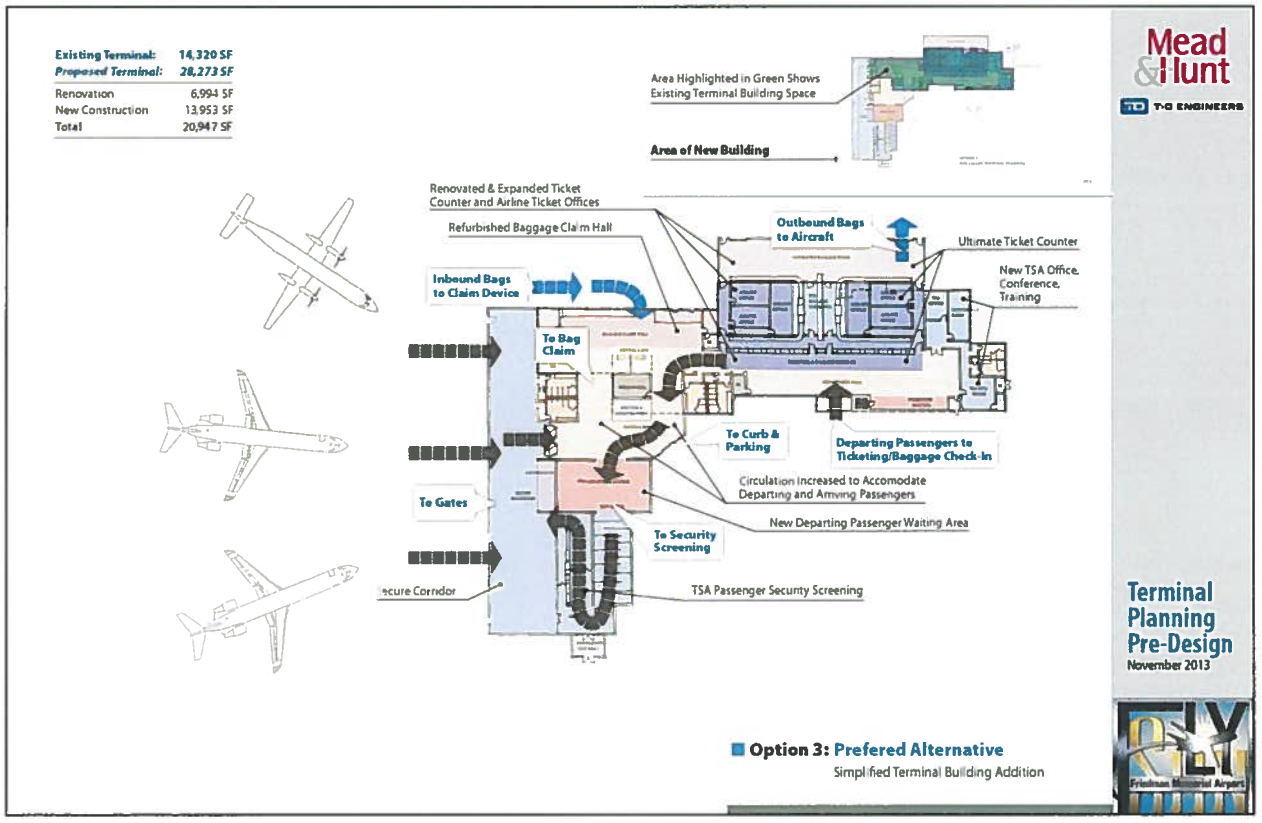


***Figure 6.2** – Preferred Terminal Concept*

7. AWOS Siting

The existing Automated Weather Observation System (AWOS) is located on the west side of the runway just south and east of the FBO apron. The extension of Taxiway B to the Runway 31 end will require the AWOS to be relocated. There are no sites on airport property that meet FAA AWOS siting criteria, as described in FAA Order 6562.20B. A significant amount of coordination with FAA Technical Operations and the ADO was conducted to evaluate multiple locations, including two locations on the east side of the airport, adjacent to Highway 75 and multiple locations on the west side of the airport. The result of this coordination was a site southwest of the FBO apron, as shown in Figure 7.1 below. This site does not meet all of the siting criteria contained in FAA Order 6562.20B, but it was the only site considered that was acceptable to FAA Technical Operations.

Figure 7.1 below depicts the relocated AWOS and critical area.

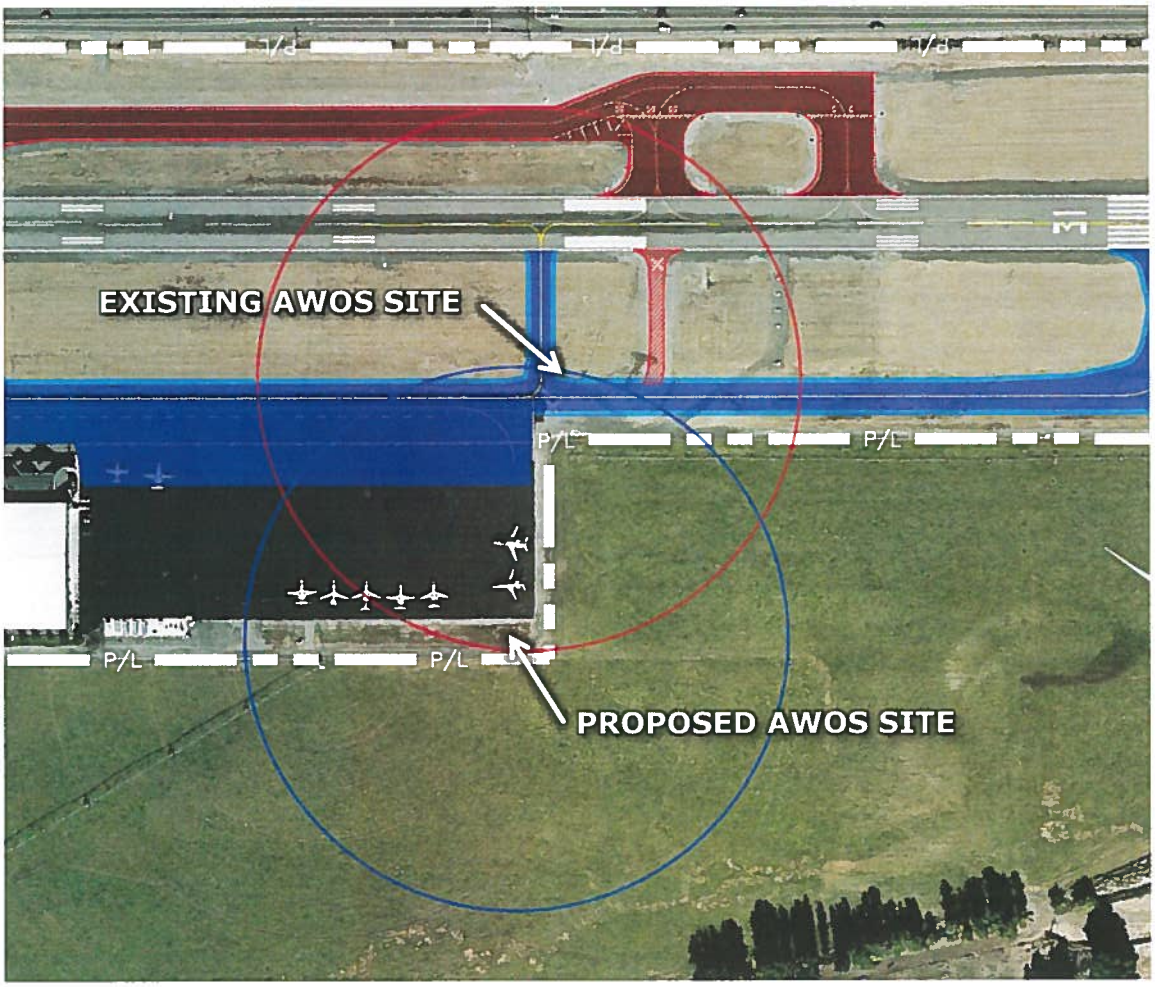


***Figure 7.1** – Proposed AWOS Site*

8. Airport Layout Plan Update

As of the beginning of this formulation effort, the airport's Airport Layout Plan (ALP) did not reflect any of the improvements proposed in Alternative 6. Therefore, the formulation included an update of the ALP drawing set to reflect all of the proposed improvements. This was not a complete planning update, simply an update of the ALP to show the required projects. No traditional planning tasks (forecasts, inventory, etc.) were included. As the proposed improvements were discussed publically at length before Alternative 6 was selected, no additional public involvement was conducted, other than monthly updates to the FMAA Board. A complete set of drawings was prepared, including the addition of an instrument departure sheet, which did not exist previously. A brief narrative was also prepared, describing the process followed to develop the preferred alternative and the justification for the projects. The narrative report and drawings are available as separate documents.

9. Phasing Plan

The effort to improve the airport to meet standards will require significant construction projects on the airfield. Completion of these projects will have a major impact on the operation of the airport. Due to the local climate, civil construction is generally limited to the months of May through September. Summer is also the busiest operational time at the airport, specifically the period from late June through early September. Extended closures of the airfield will have an unacceptable negative impact on the airport, and projects must be planned to limit closures. The purpose of this task will be to develop an overall phasing plan for all of the planned projects that allows construction to take place while minimizing operational impacts.

Multiple phasing approaches were considered, including options with closures of varying lengths. Through this process, it was determined that a phasing plan which included two full airfield closures of approximately 25 days, with various other partial closures, best met the needs of safe, efficient construction with a minimal impact on operations. The overall phasing plan is illustrated in the following Figures, which were taken from a public presentation of the phasing plan.

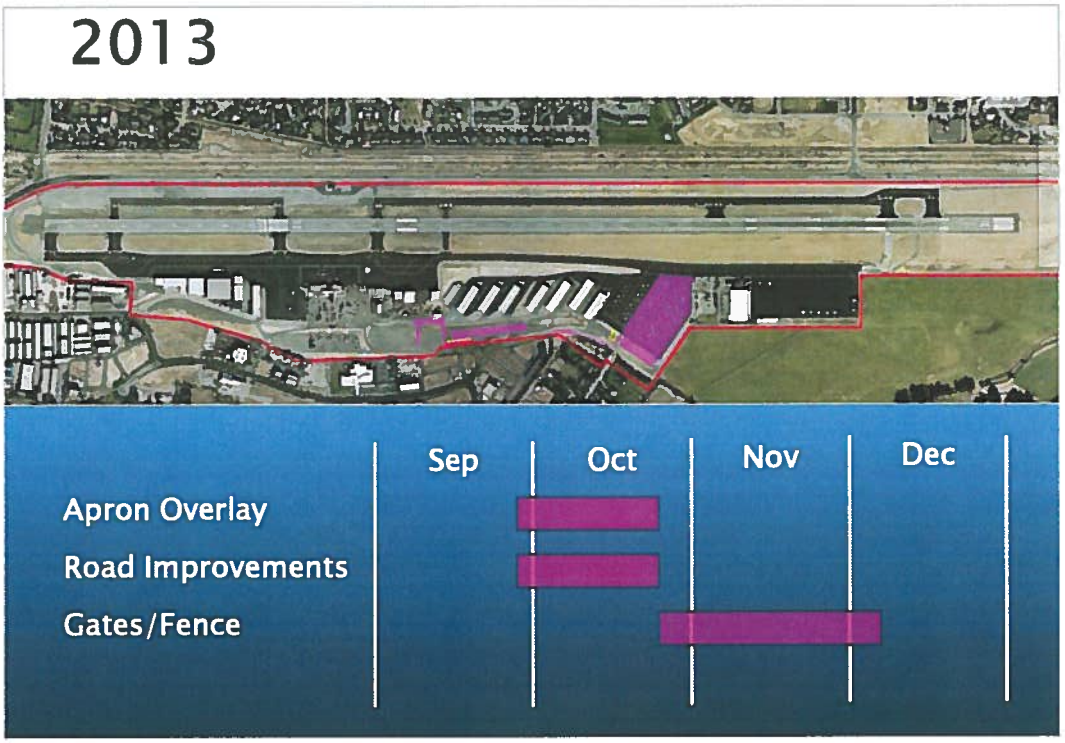


***Figure 9.1** – 2013 Construction*

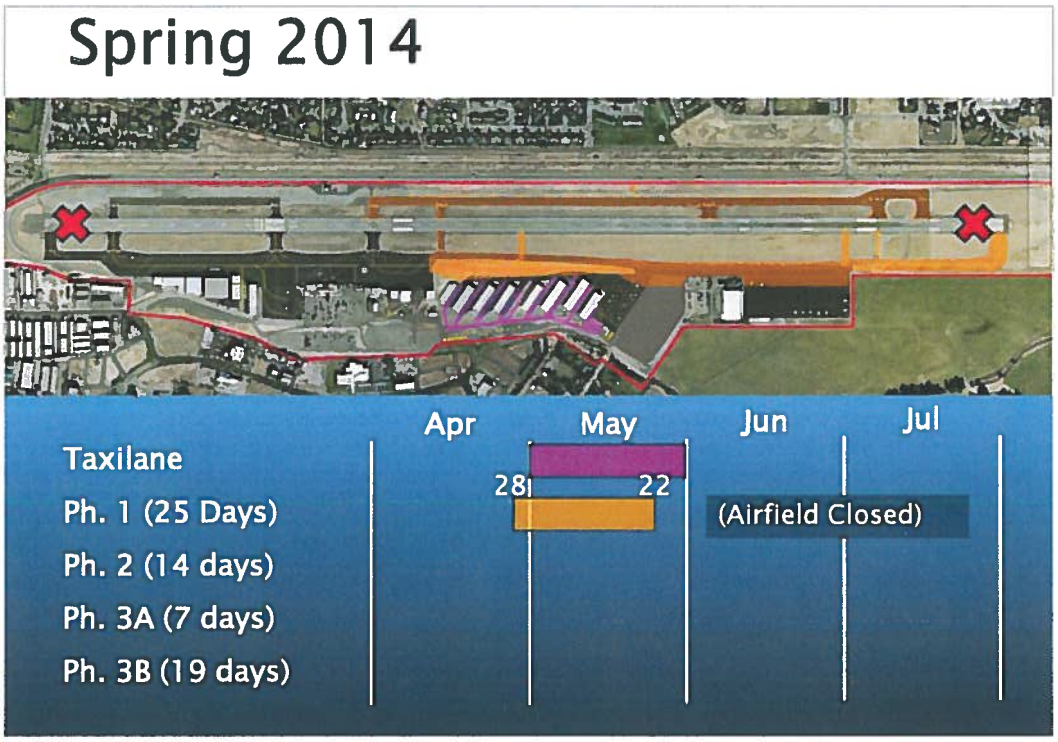


Figure 9.2 *– Spring 2014 Construction – Phase 1*

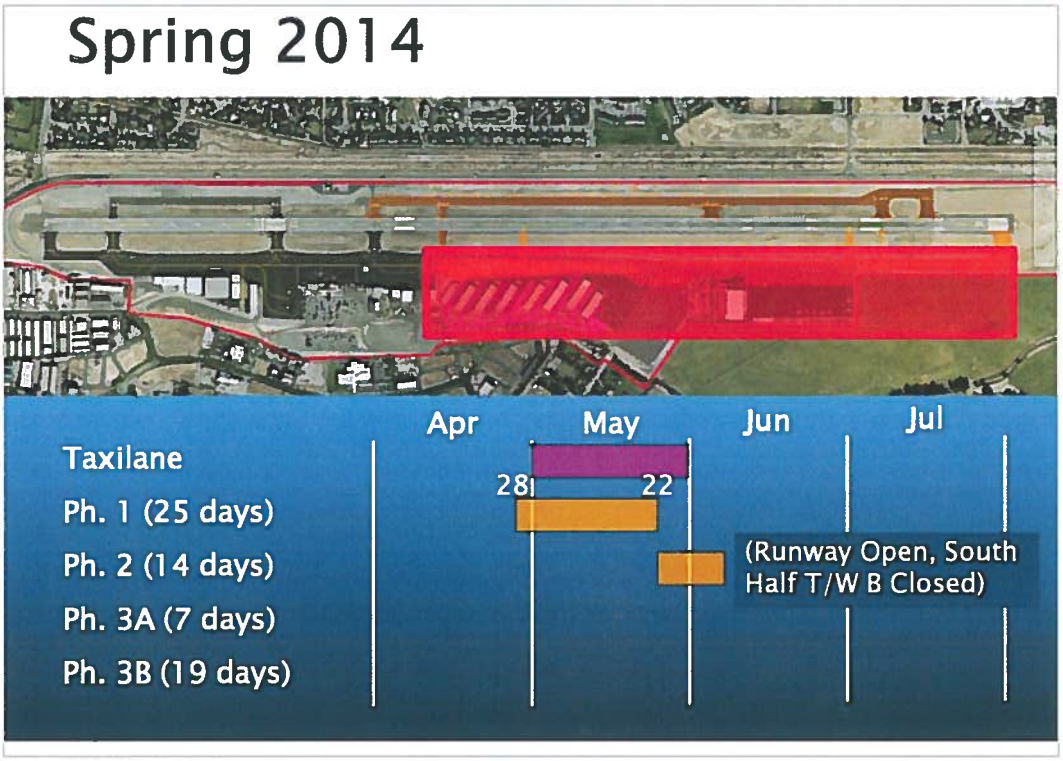


Figure 9.3 *– Spring 2014 Construction – Phase 2*

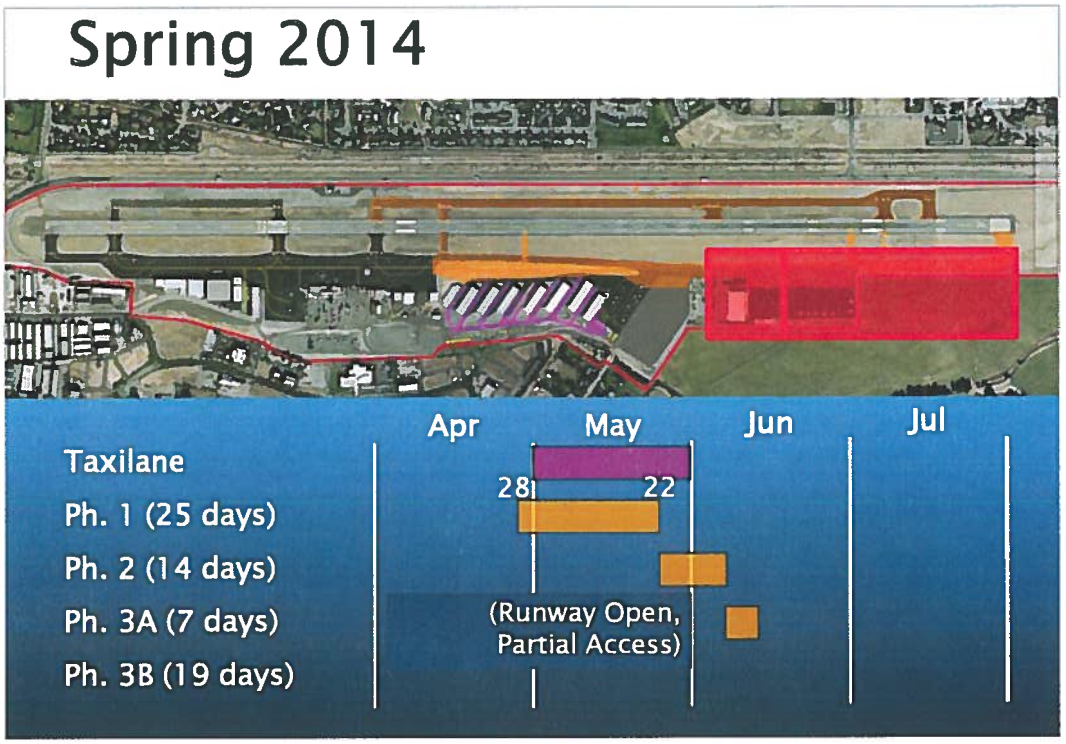


***Figure 9.4** – Spring 2014 Construction – Phase 3A*

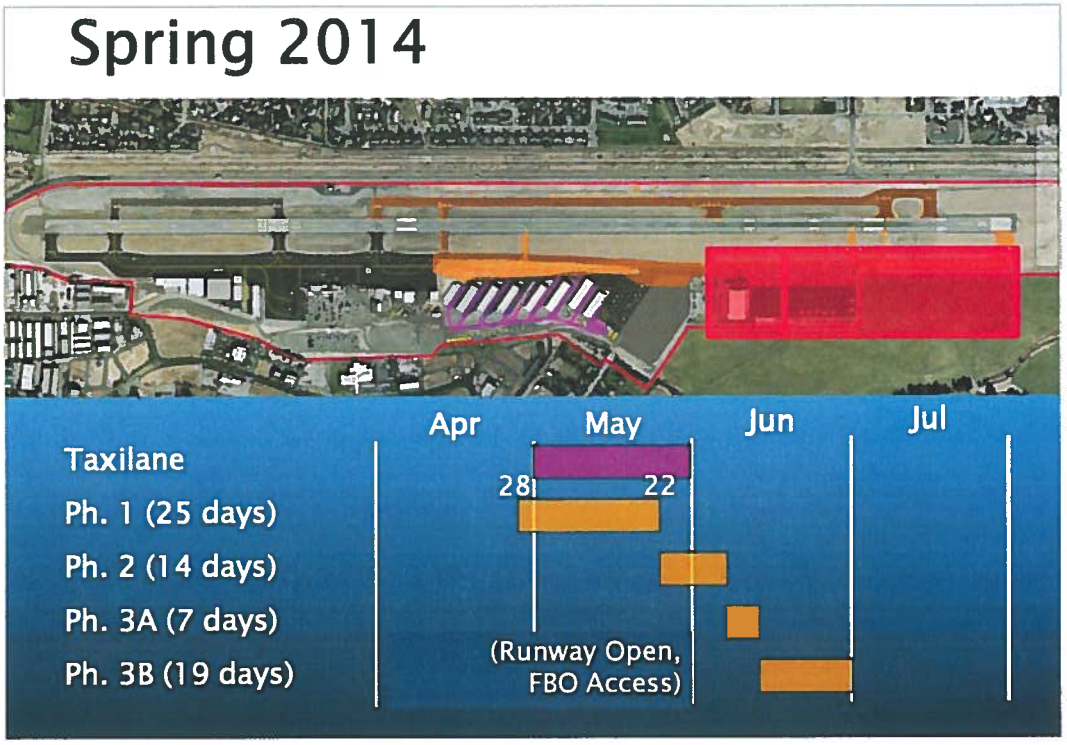


***Figure 9.5** – Spring 2014 Construction – Phase 3B*

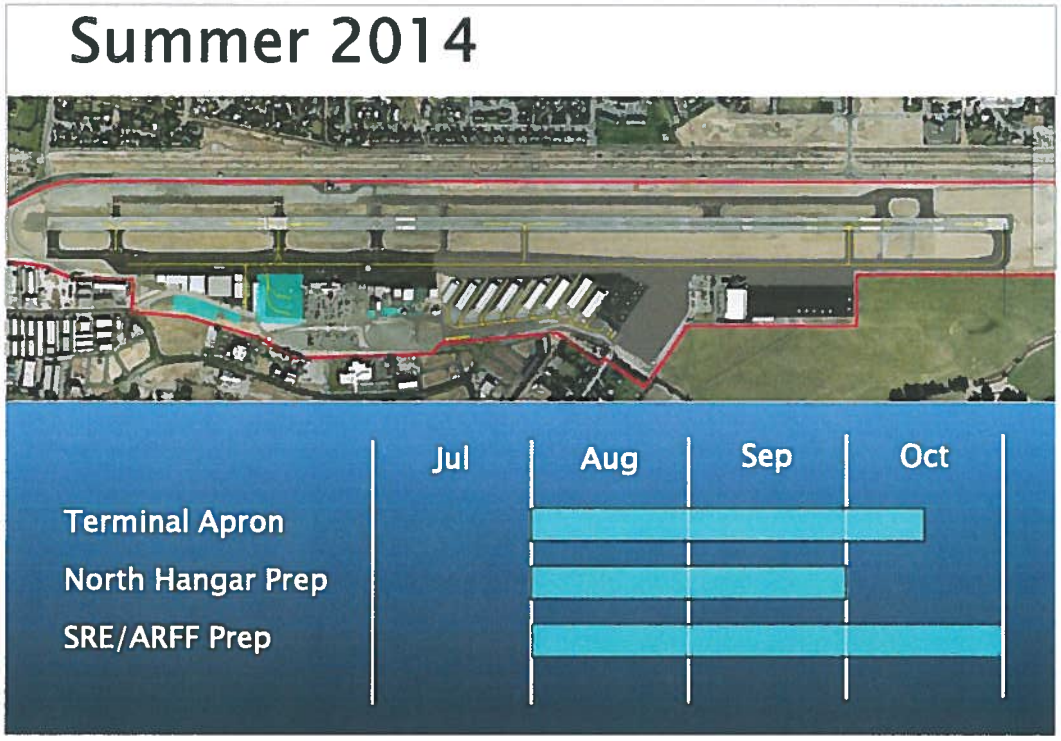


Figure 9.6 *– Summer 2014 Construction*

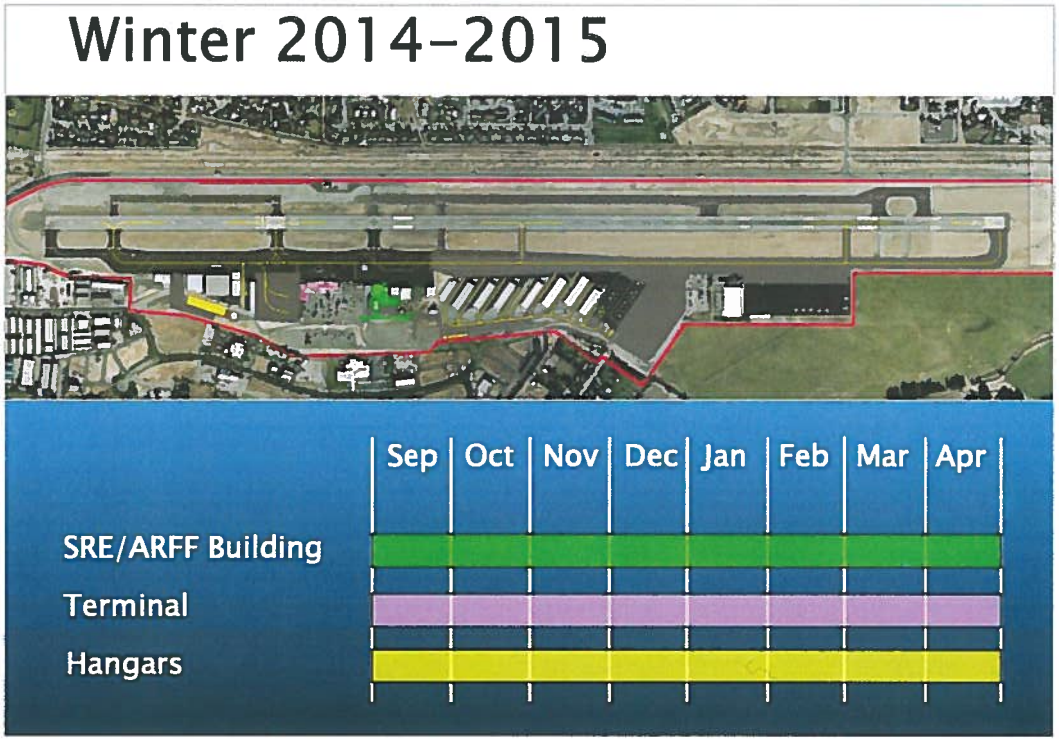


Figure 9.7 *– Winter 2014-2015 Construction*

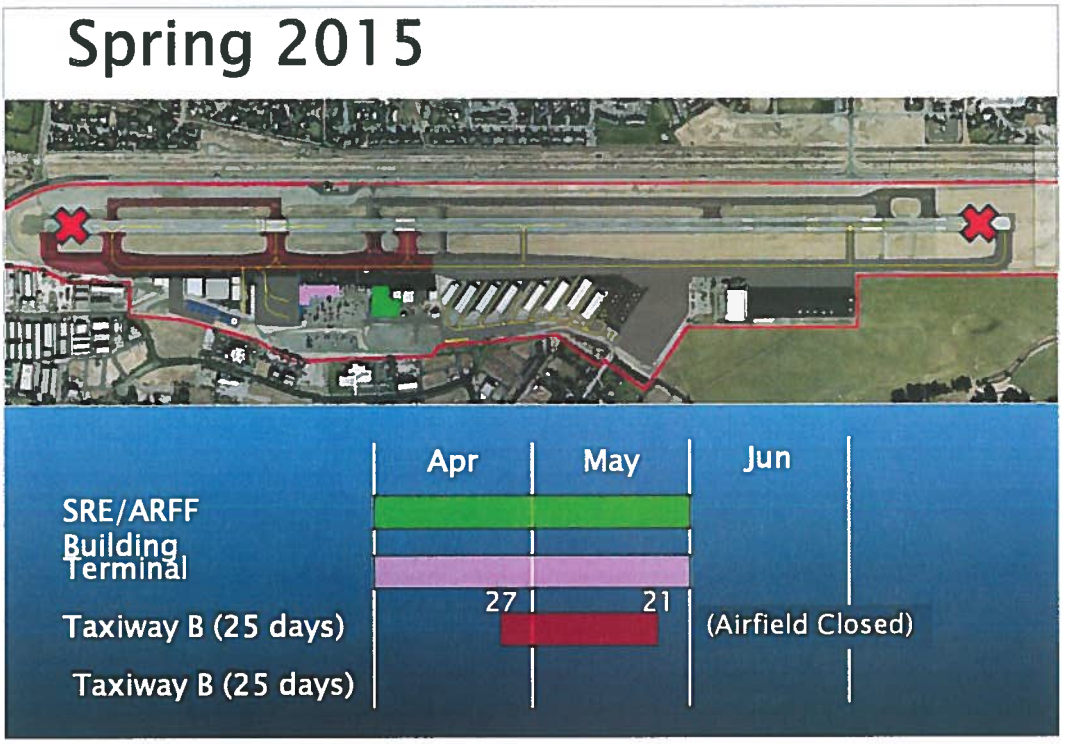


Figure 9.8 *– Spring 2015 Construction – Phase 1*

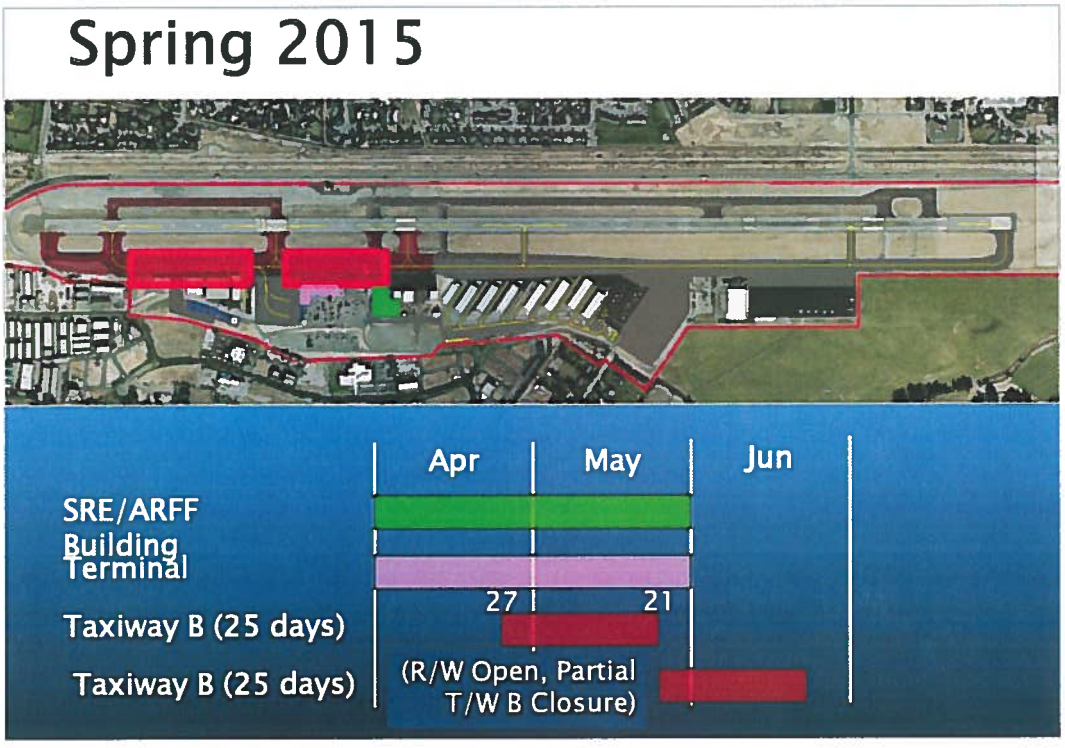


Figure 9.9 *– Spring 2015 Construction – Phase 2*

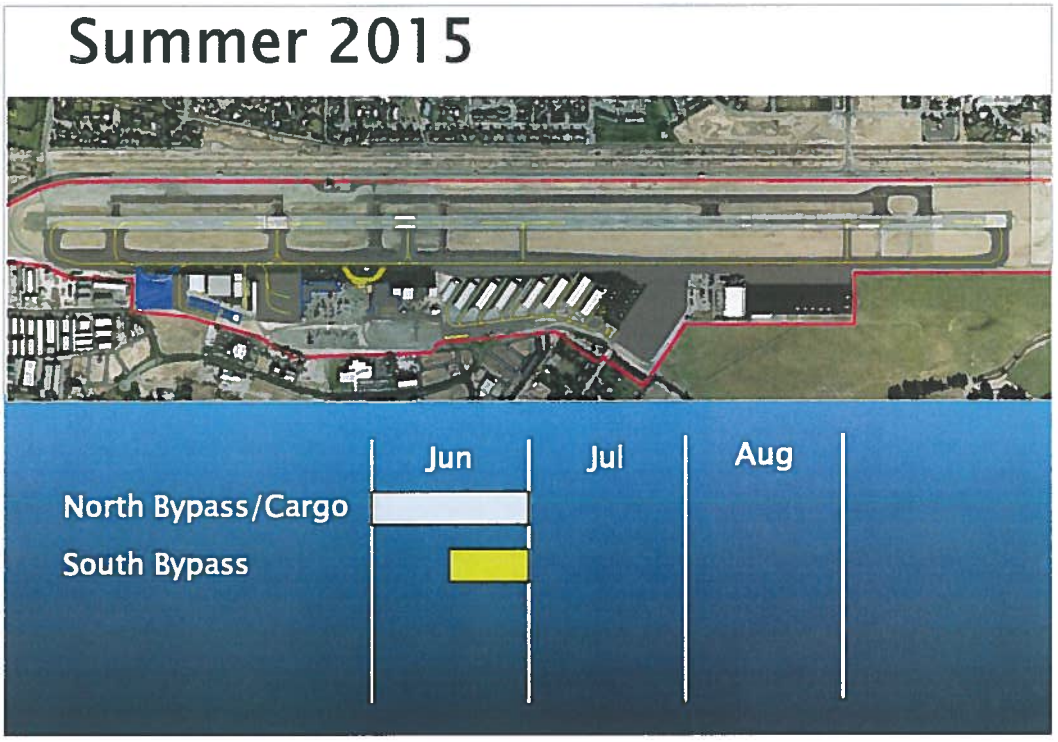


Figure 9.10 *– Summer 2015 Construction*

10. Capital Improvement Program (Funding Plan)

The proposed projects will be completed during a relatively short period of time and the airport's current Capital Improvement Program did not reflect these projects, when this effort began. In order for the FAA and FMAA to budget appropriately for this effort, accurate cost estimates and a funding plan are necessary.

All of the proposed projects were estimated and a funding plan was developed. The total cost of this plan is over $34.5 million, and the funding plan is sown in Figure 10.1 below.

Friedman Memorial Airport Runway Safety Area Improvements
Capital Improvement Program, 2013-2015

Calendar Year	Project	Total Cost	FAA		Match/Local Share		
			Entitlements	Discretionary	PFC	Airport*	Total
2013	Hangar Taxilane Relocation	$2,525,584	$0	$0	$62,500	$0	$62,500
	Subtotal, 2013	$2,525,584	$0	$0	$62,500	$0	$62,500
2014	South RSA Grading/Relocate Taxiway B	$8,650,000	$1,000,000	$7,109,375	$540,625	$0	$540,625
2014	Terminal Apron Reconstruction	$1,523,000	$0	$1,427,813	$95,188	$0	$95,188
2014	North Hangar Taxilane	$890,000	$0	$834,375	$55,625	$0	$55,625
2014	Hangar Acquisitions	$1,775,000	$0	$1,664,063	$110,938	$0	$110,938
2014	SRE/ARFF Shop	$4,206,000	$0	$3,943,125	$262,875	$0	$262,875
2014	Terminal Reconfiguration (AIP Eligible Portion)	$6,960,000	$0	$6,525,000	$435,000	$0	$435,000
2014	Master Plan Update	$275,000	$0	$0	$275,000	$0	$275,000
	Subtotal, 2014	$24,279,000	$1,000,000	$21,503,750	$1,775,250	$0	$1,775,250
2015	Terminal Reconfiguration (Bag Screen and Outbound Bag)	$390,000	$0	$0	$390,000	$0	$390,000
2015	Terminal Reconfiguration (TSA and Airlines)	$419,250	$0	$0	$0	$419,250	$419,250
2015	Terminal Reconfiguration (Ineligible)	$181,500	$0	$0	$0	$181,500	$181,500
2015	Acquire SRE	$500,000	$0	$0	$500,000	$0	$500,000
2015	Master Plan Update	$275,000	$0	$0	$275,000	$0	$275,000
2015	Airport Admin Office	$401,000	$0	$0	$0	$401,000	$401,000
2015	North RSA Grading/Relocate Taxiway B	$2,238,000	$1,000,000	$1,098,125	$139,875	$0	$139,875
2015	Central Bypass Apron	$186,000	$0	$174,375	$11,625	$0	$11,625
2015	Air Cargo Ramp/North Bypass	$2,319,000	$0	$2,174,063	$144,938	$0	$144,938
2015	Demo Hangars	$428,000	$0	$401,250	$26,750	$0	$26,750
2015	Rehabilitate Runway	$200,000	$0	$0	$200,000	$0	$200,000
2015	Rehabilitate Terminal Parking Lot	$200,000	$0	$0	$0	$200,000	$200,000
	Subtotal, 2015	$7,737,750	$1,000,000	$3,847,813	$1,688,188	$1,201,750	$2,889,938
	TOTAL	$34,542,334	$2,000,000	$25,351,563	$3,525,938	$1,201,750	$4,727,688

* Airport costs are costs that can not be reimbursed by PFCs.

March 5, 2014

Figure 10.1 *– Funding Plan*

11. Modifications of Standards

Alternative 6 makes significant improvements in areas where the existing airport does not meet standards. The focus of this Alternative is compliance with FAA Runway Safety Area standards and improvements in other areas. Full compliance with all standards would require significant additional investment and environmental impacts, however, and was not deemed practical. Instead, the Technical Analysis identified a series of Modifications of Standards that would be necessary for areas where standards cannot be practicably met. The Technical Analysis included preliminary Modifications of Standards (MOS) documents, intended to be finalized under this formulation effort. The standards that could not be met included:

- Runway to Parallel Taxiway Separation
- Parallel Taxiway Object Free Area
- Runway Object Free Area
- Runway Safety Area Grading
- Runway Centerline to Aircraft Parking

These MOS were numbered MOS 1-5, respectively. As the coordination effort for these MOS began, two additional MOS were identified to reflect the operational restrictions currently in place at the airport. These MOS, (MOS 6 and 7) were later determined not to be necessary and they were not developed further.

A significant amount of coordination between FAA (including the ADO, Region and Airports Headquarters (ARP HQ)), FMAA and T-O Engineers was part of the MOS development/approval process. The five proposed MOS were developed in support of the preferred alternative and submitted to the FAA for review and approval on February 15, 2013.

On March 18, 2013, FMAA received feedback from FAA HQ regarding the proposed MOS. All MOS were preliminarily approved by ARP HQ; some with various conditions/restrictions. Final approval was contingent on the outcome of a Safety Risk Management (SRM) assessment. On June 4-5, 2013, an SRM assessment to discuss the MOS was held on-site in Hailey, Idaho. After detailed discussion by the panel, FAA requested specific revisions to the MOS.

During this process, AC 150/5300-13A, *Airport Design* was released. This update to the FAA's main airport design document included changes to taxiway width design. Due to traffic at the airport by Q400 aircraft, the AC requires a taxiway width of 75 feet. This created a conflict with the Runway Safety Area as proposed; therefore another MOS was developed, called MOS 8.

On November 6, 2013, all MOS originally submitted to the FAA along with the additional sixth MOS for taxiway width were approved by all FAA Lines of Business. Table 11.1 includes a summary of the approved MOS. A copy of the approved MOS can be found in Appendix 4. The revised ALP reflects the impacts of the MOS on dimensional standards and geometry at SUN.

Table 11.1 – Summary of Approved SUN MOS

	SUN MOS Description	FAA Standard	Approved MOS
MOS 1	Runway to Parallel Taxiway Separation	400 ft.	**320 ft.**
MOS 2	Parallel Taxiway Object Free Area	186 ft.	**160 ft.**
MOS 3	Runway Object Free Area	400 ft. from RWY CL)	**250 ft.-345 ft.**
MOS 4	Runway Safety Area Grading	1.5% - 3% Transverse	**Varies 0%-1%**
MOS 5	Runway Centerline to Aircraft Parking	500 ft.	**400 ft.**
MOS 8	Taxiway Width	75 ft.	**50 ft. + Paved Shoulders**

12. Instrument Approach Feasibility

Current instrument approaches to the airport are extremely limited, due to severe terrain in the vicinity of the airport. During winter months, over 20 percent of commercial flights and an unknown number of GA flights are diverted to other airports because they are unable to land at SUN. FAA Flight Procedures Office has stated that instrument approach minima cannot be improved at the existing site at this time. Previous independent analyses indicated that some improvement to reliability.

The formulation effort included further analysis of the ability to achieve satellite-based and/or ground-based Special or Standard Instrument Approach Procedures with minima notably better than existing procedures at SUN. This included the identification of necessary ground infrastructure, along with rough order-of-magnitude costs for procurement, installation, procedures development, and commissioning flight inspection. This analysis was completed primarily by Spohnheimer Consulting and the findings are summarized in Table 12.1 below. The complete analysis report is included at Appendix 5.

Table 12.1 Potential Instrument Approach Procedures

	Approach	Potential Minima (very approximate)	Climb Gradient Required, ft/NM	Usage
1	Offset ILS/LDA similar to GPS-W	1800-3	200	**Public**
2	Offset ILS/LDA similar to GPS-W	1600-3	≤240	**Public**
3	Offset ILS/LDA similar to GPS-W	1400-3	≤300	**Public**
4	Offset ILS/LDA similar to TLS & RNAV-Y	1000-3	400-450	**Special**
5	RNAV GPS W (modified)	1600-3	>250	**Special**
6	NDB/DME	2700' or 3 NM reduced?	≤240 >250	**Public**
7	WAAS-based LPV	1800-3	200-300	**Public**
8	**Modify RNAV W and (future?) ILS missed approaches with navaid to the west**			

13. Environmental Coordination

According to the Scope of Work, the intent of this task under the Project Formulation effort was to "coordinate with Airport Staff and FAA regarding environmental steps required for the proposed projects". Environmental analysis was not anticipated, only identification of areas where analysis would be necessary during implantation of the projects. Implementation actually began before formulation was complete, however, and completion of the FAA's environmental checklist for all of the planned work was completed in Fall 2013. A copy of this checklist is included at Appendix 6.

14. Work Order Summary

This section provides a summary of the work completed, relative to the original scope of work. With a formulation project like this, it is common for the project to evolve while it is being completed. The purpose of this effort was to validate and refine alternatives developed previously. In this process, refinements of one portion of the project lead to changes in another. The major tasks of the Scope of Work are discussed below, with significant changes from the original scope highlighted.

Task	Description	Changes From Scope
1	Study Design	None
2	Project Management	None
3	Project Development	• No major changes to survey elements. • Geometry refinements had impacts on subsequent tasks (e.g., grading and drainage, building relocations, etc.) • No major changes to other subtasks.
4	ALP Update	None
5	Phasing Plan	None
6	Capital Improvement Program	None
7	Modifications of Standards	A total of seven MOS forms were prepared. Extensive coordination with FAA and multiple revisions of the forms were required. These changes were added to the scope by Amendment 1, dated May 6, 2013.
8	Instrument Approach Feasibility	None
9	Environmental Coordination	None
10	Summary Report	Changes to the format were made. (Instead of 3-ring binders, a simple bound report was prepared.) Other than this, no other changes from the scope.
11	Safety Risk Management	This Task was added by Amendment 1. It anticipated two separate SRM panels, one to address standards implications of the MOS's and one to address operational impacts. The panels were combined into one to increase the efficiency of the process. Unanticipated coordination after the panel was necessary, however, including multiple revisions to the documentation and further unanticipated revisions to the MOS's themselves.

Overall, the completion of the project followed the Scope closely. Some areas required less analysis than the Scope anticipated, but others exceeded the Scope. The finished product matched the intent of the project: to verify previous analyses and develop a detailed implantation strategy for the projects.

Appendix 1

Rationale and Justification

Taxiway Connector/Terminal Reconfiguration and ARFF/SRE Building Relocation as part of RSA Improvements Project

FRIEDMAN MEMORIAL AIRPORT

Rationale and Justification
Taxiway Connector/Terminal Reconfiguration and ARFF/SRE Building Relocation as part of RSA Improvements Project

***Final DRAFT* May 20, 2014**

Friedman Memorial Airport

T-O ENGINEERS

in association with

RUSCITTO/LATHAM/BLANTON ARCHITECTURA P.A.

Mead & Hunt

1.0 Introduction

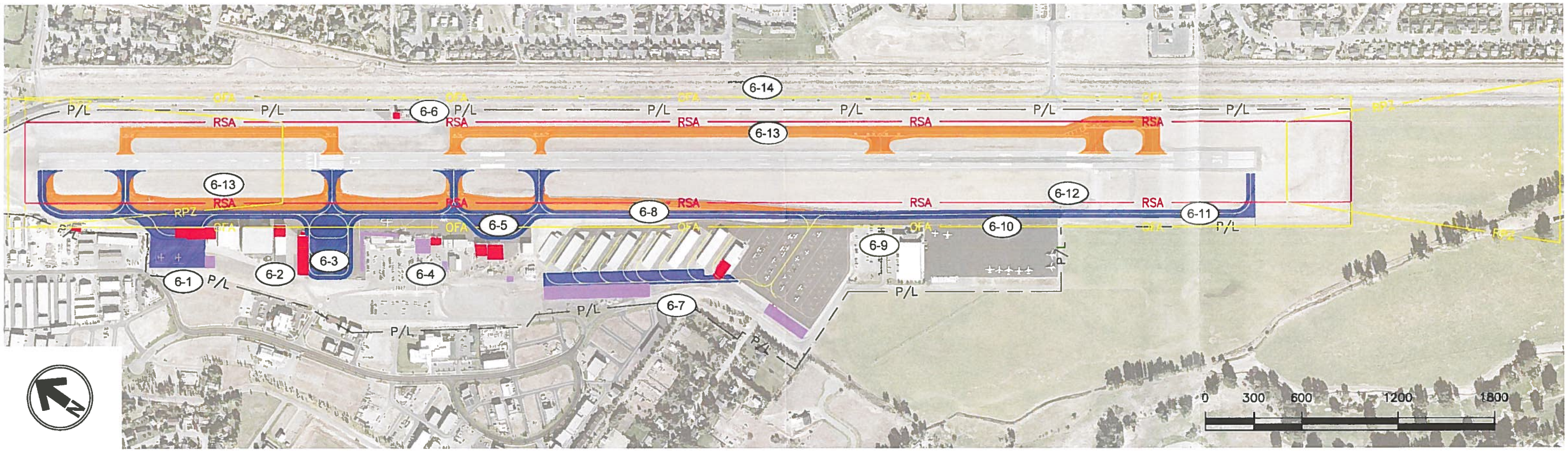
The Friedman Memorial Airport Authority (FMAA) is undertaking a significant effort to improve the airport to meet RSA standards. The necessary improvements were developed in a Technical Analysis prepared in late 2012 and further refined in 2013. The selected alternative from the Technical Analysis was labeled Alternative 6 (see **Exhibit 1**, next page). The main elements of this alternative include removing Taxiway Alpha (A) and relocating and extending Taxiway Bravo (B). The Technical Analysis did not include any analysis of the connecting taxiways at the airport.

After coordination with and approval from the FAA, project formulation followed the Technical Analysis. The formulation process included consideration of the taxiway system since Taxiway A will be removed as part of the project. Analysis performed as part of formulation determined that, without Taxiway A, additional connecting taxiways on the west side of the runway (between Taxiway B and the runway) and reconfiguring the existing connector taxiways are necessary to efficiently move aircraft off the runway.

These improvements in turn require additional improvements/modifications to the airport. These include relocating terminal aircraft parking from the east side of the terminal to the north side to accommodate the Taxiway B Object Free Area (OFA) as well as the relocation of two bypass taxiways to accommodate head-to-head traffic on Taxiway B. The terminal also must be reconfigured to access the proposed terminal aircraft parking apron. In addition, the airport administration office and ARFF/SRE building must be relocated to accommodate the relocated central bypass taxiway.

The purpose of this document is to summarize the rationale and justification used to develop the improvements/modifications as proposed. The following sections are included in this document:

Section 2.0 - Taxiway Connectors and Central Bypass Taxiway
Section 3.0 - Terminal Reconfiguration
Section 4.0 - Summary



ITEM	DESCRIPTION
6-1	RELOCATE AIRCRAFT PARKING/HANGARS, RECONSTRUCT BUS ROUTE ACCESS ROAD, CLOSE WINTER BUS ROUTE
6-2	REMOVE HANGARS, RELOCATE ELECTRICAL VAULT
6-3	TERMINAL AIRCRAFT PARKING
6-4	RELOCATE AIRPORT OFFICES, AND HANGAR
6-5	REMOVE HANGARS, RELOCATE DE-CONFLICTION
6-6	RELOCATE AIR TRAFFIC CONTROL TOWER
6-7	NEW TAXILANE TO ACCESS T-HANGARS
6-8	RELOCATE TAXIWAY B

ITEM	DESCRIPTION
6-9	RELOCATE EXISTING FBO FENCE AND PORTION OF PARKING LOT OUTSIDE OF TAXIWAY OFA
6-10	LOSS OF PARKING DURING HIGH DEMAND: 79,000 SF
6-11	EXTEND TAXIWAY B
6-12	RELOCATE AWOS
6-13	REMOVE PAVEMENT AND GRADE RSA
6-14	HIGHWAY 75 ALIGNMENT REMAINS THE SAME

AIRCRAFT PARKING IMPACTS

FBO:	-39,000 SF
GENERAL AVIATION:	-95,000 SF
TERMINAL APRON:	+41,200 SF
AIR CARGO APRON:	-88,500 SF
NET DIFFERENCE:	-181,300 SF

LEGEND

6-1	KEY NUMBER
	NEW AIRFIELD PAVEMENT
	NEW BUILDING / HANGAR / STRUCTURE AREA
	BUILDING / HANGAR / STRUCTURE REMOVAL
	PAVEMENT REMOVAL

POTENTIAL MODIFICATIONS REQUIRED

AIRPORT DESIGN STANDARD	STANDARD DIMENSIONS	POTENTIAL MODIFICATIONS REQUIRED AS SHOWN
RUNWAY TO PARALLEL TAXIWAY SEPARATION	400'	320'
RUNWAY TO AIRCRAFT PARKING	500'	400'
RUNWAY OFA GRADING	10:1	4:1
RUNWAY OFA CLEARING	NO FIXED OBJECTS	HWY 75/BUILDINGS AT NE CORNER
TAXIWAY OBJECT FREE AREA	186'	160'

NOTES

1. THIS ALTERNATIVE RESULTS IN A NET LOSS OF 2 HANGARS.
2. OPERATIONAL CHALLENGES (SNOW REMOVAL/DISPOSAL, ETC.) WILL BE CREATED BY THIS ALTERNATIVE.
3. EXISTING STORM DRAINAGE DISPOSAL SYSTEM WILL REQUIRE EXTENSIVE MODIFICATION.

Exhibit 1

EXHIBIT 5-6
ALTERNATIVE 6 - NO LAND ACQUISITION

2.0 Taxiway Connectors and Central Bypass Taxiway

A major element of the overall RSA Improvements Project at the airport is the removal of Taxiway A on the east side of Runway 13/31. Taxiway A currently plays an important role in operational safety and efficiency at the airport. A significant amount (approximately 90%) of aircraft operations at SUN take place on a one way in, one way out basis with a majority of aircraft arrivals coming from the south. As currently configured, several connector taxiways associated with Taxiway A provide the Air Traffic Control Tower (ATCT) a "relief valve" during times of high traffic volume or opposite direction arrivals; in particular connectors A-4, A-5, A-6, A-7 and A-8.

During these high traffic periods, ATCT routinely directs aircraft to exit the runway to the east, utilizing the Taxiway A connectors in order to reduce the amount of rollout time of north arriving aircraft on the runway. This reduces opposite direction conflicts as well as the likelihood for opposite direction conflicts on Taxiway B on the west side of the runway.

Exhibit 2 depicts the current configuration of the taxiway and connector system at SUN.

As a system, ATCT commonly uses the A and B taxiway connectors as follows:

Unless required by uncommon wind conditions, arrivals from the north on Runway 13 are predominately performed by smaller single and multiengine reciprocating and turboprop aircraft. Aircraft land at approximately the Runway 13 touchdown zone markings and begin their roll out. Currently there are no B connectors south of B-5. Existing taxiway connector A-6 is strategically located so that, when necessary due to opposite direction traffic, ATCT will direct the arriving aircraft to exit east on A-6 then taxi north on Taxiway A to either connector A-4 or A-5. When traffic allows, ATCT will clear the aircraft to cross the runway to access Taxiway B (via existing connectors B-4 and B-5) providing access to all airport facilities located on the west side of the airport. Without Taxiway A on the east side, north arriving aircraft will need to roll out and back taxi. This creates potential efficiency and safety issues; especially during the times when the ATCT is not active.

After discussing operational needs with ATCT personnel, airport management, airport operators and further analyzing the impacts of removing Taxiway A, several alternatives were considered before settling on the proposed relocation/location of Taxiway B connectors. Our analysis was performed for two areas of the airfield; the central airfield area and the Runway 31 end area. The purpose of the analysis was to identify improvements to the Taxiway B connector system which will result in increased operational efficiency and safety of the airport.

2.1 Central Airfield Area

Taxiway Connector B-4

In the central airfield area, the existing location of connector taxiway B-4 was analyzed first. Connector B-4 is currently used extensively by nearly all aircraft arriving Runway 31, including large business jets up to 95,000 lbs. As previously mentioned, the predominant direction for arriving aircraft at SUN is via Runway 31. The preferred alternative shifts connector B-4 south of its existing location by 265 feet resulting in a new location 4,708 feet from the Runway 31 end.

Based on aircraft landing requirements included in both AC 150/5300-13A and specific aircraft performance manuals, the shift of connector B-4 south results in a more optimal location which will allow the vast majority of the aircraft fleet to exit the runway sooner after arrival on Runway 31. Again, this will increase operational safety and efficiency at the airport. Aircraft landing distance requirements were reviewed to assist in determining the location of connector B-4. Table 4-9 in Advisory Circular (AC)

150/5300-13A, indicates nearly all single and twin engine aircraft will be able to use the relocated connector B-4 in both dry and wet conditions. Table 4-9 in the AC was not used for jet aircraft as the range in the table covers all jet aircraft up to 300,000 lbs and the largest aircraft currently using the airfield are business jets weighing less than 100,000 lbs.

To evaluate business jet landing requirements, specific aircraft performance charts were reviewed. Specifically the performance charts for FAR Part 91, unfactored landing length, were used as this was seen as the most representative data of the length in which an aircraft would decelerate and turn off of the runway. Actual runway lengths required to satisfy Part 135 regulatory requirements were not considered. We evaluated several jet aircraft representative of those using SUN including the Gulfstream III, Gulfstream V, Challenger 300 and Citation X. **Table 2-1** below summarizes landing length requirements for common business jets currently using SUN.

Table 2-1 – Business Jet Landing Length Requirements

Aircraft	Landing Length (ft)[1]	
	Dry[2]	Wet
Gulfstream III[3]	3,600′	4,650′
Gulfstream V[3]	3,200′	4,300′
Citation X[3]	4,530′	-[4]
Challenger 300[3]	3,260′	4,555′

Source: T-O Engineers/FAA AC 150/5300-13A/Aircraft Performance Data

NOTES:

[1] Dry landing length was evaluated using a temperature of 86 degrees while wet landing length was evaluated using a temperature of 30 degrees. For both dry and wet landing lengths, a field elevation of 5,500 feet was used to simply calculations; actual field elevation is 5,320.

[2] Dry landing length includes no correction for runway gradient (Actual dry landing length would be shorter).

[3] The Gulfstream III and V landing lengths include corrections for runway gradient slope of +0.8%. The Citation X and Challenger 300 do not include corrections for runway gradient.

[4] There was no data available for the wet landing length requirements for the Citation X.

T-O ENGINEERS

Exhibit 2 - Existing Taxiway Complex and Connectors

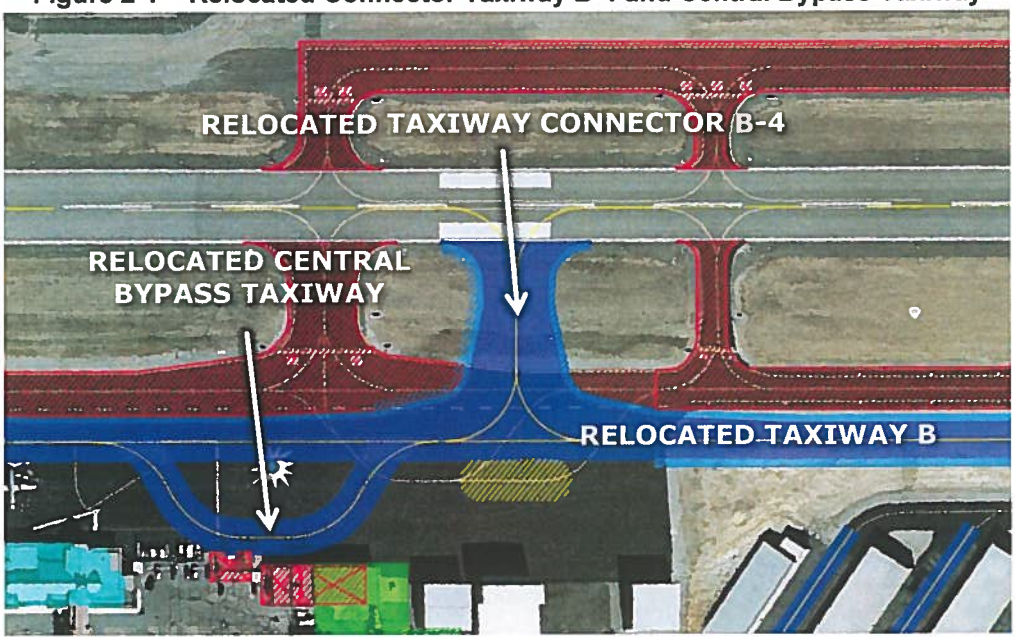
Central Bypass Taxiway

The relocation of connector B-4 to the south will impact the existing central bypass taxiway. The central bypass taxiway is critical to current operations at the airport as it allows simultaneous operations of opposite flow traffic on Taxiway B. To mitigate this conflict, the central bypass taxiway has been moved north of its existing location.

To mitigate direct access to the runway from the apron adjacent to connector B-4, the addition of a surface painted "No Taxi" island is included to address Runway Safety concerns.

Figure 2-1 depicts the relocated B-4 connector and central bypass taxiway.

Figure 2-1 – Relocated Connector Taxiway B-4 and Central Bypass Taxiway



Source: T-O Engineers

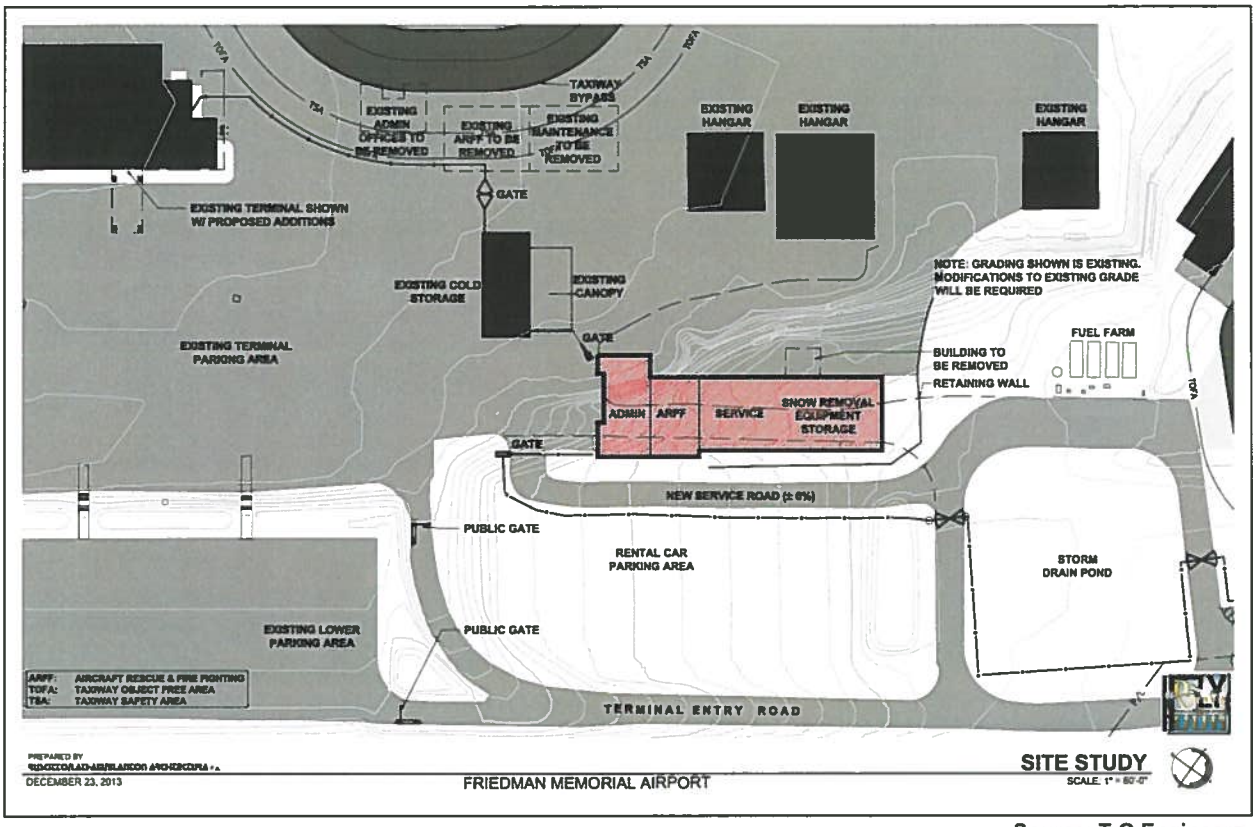
Airport ARFF/SRE Building Relocation

Relocating the central bypass taxiway removes the need to purchase and demolish hangars, but requires the relocation of the airport's existing SRE/ARFF and administration buildings to meet separation standards associated with the central bypass taxiway safety area (see **Figure 2-1** above). The current SRE building is inadequate for the equipment currently in use at the airport and does not meet current FAA standards. The airport currently has over 10 pieces of snow removal equipment, all of which is necessary to meet FAA snow clearance standards. ARFF equipment includes one primary vehicle and one back-up. Current inside storage space is available for only two large pieces of equipment, with additional outside storage. Additional space to better store and maintain this equipment is justified, based on FAA guidance, as well as necessary to store and maintain this equipment so that it is available to remove snow in the airport's environment.

Additionally, the airport administration building is undersized and does not meet the needs of current airport staff. Collocating this facility with the SRE/ARFF building increases efficiency, both in terms of building construction and airport staff operations.

Multiple schemes for a new building suitable to replace the existing facilities were considered, with the preferred alternative shown in **Figure 2-2**.

Figure 2-2 – Airport Administration and SRE/ARFF Building Relocation – Preferred Alternative



Source: T-O Engineers

This configuration meets the operational needs of the facility as described in Advisory Circular (AC) 150/5210-15A, *Aircraft Rescue and Firefighting Station Building Design,* AC 150/5220-18A, *Buildings for Storage and Maintenance of Airport Snow and Ice Control Equipment and Materials* and AC 150/5210-19A, *Aircraft Rescue and Firefighting Station Building Design*, while also maximizing the use of the existing site. The facility will provide space for vehicle service and minimal storage, in addition to the administrative space needed by airport staff.

FAA Project Funding Eligibility of Airport Administration and SRE/ARFF Building

Construction of a new SRE/ARFF facility that better meets the needs of the airport is AIP eligible and appropriate at this time, however the administration portions of the building are not eligible for AIP funding and will be funded by the airport.

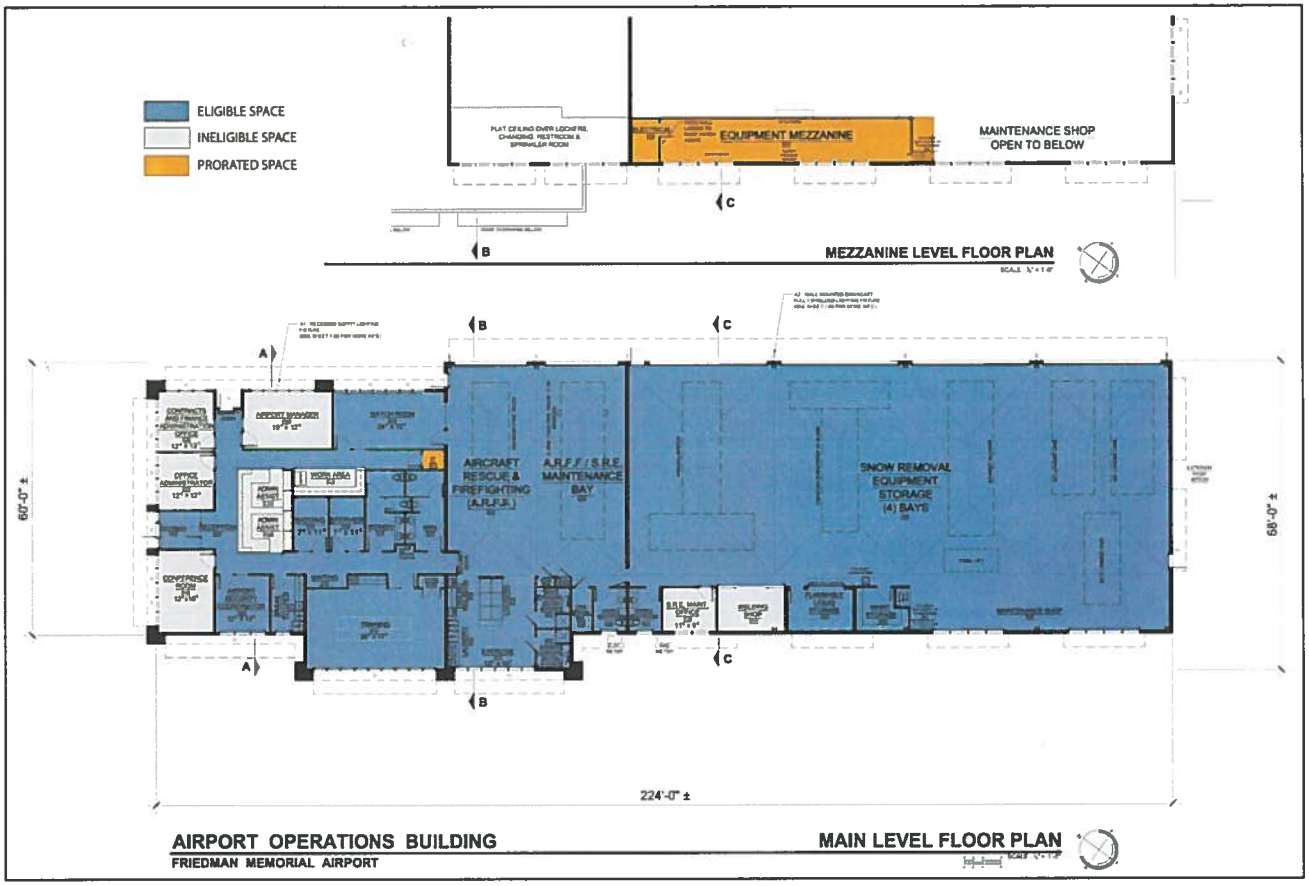
Eligibility for FAA funding participation for this building was determined using the AIP Handbook, Order 5100.38D. A summary of areas in the building and the percentage of the building that is eligible for FAA funding participation are listed in **Table 2-2** on the following page. A floor plan of the proposed building, referenced to **Table 2-2,** is shown on **Figure 2-3**.

Friedman Memorial Airport
ARFF/SRE Facility - Prelim. Eligibility Determination
May 20, 2014

General Information		Area	Eligibility		
Label	Description	Proposed	Proration %	Eligible (SF)	Ineligible (SF)
Interior Space					
1	Vestibule	76		76	
2	Reception/Circulation	642		642	
3	Admin Assistant	218			218
4	Watch Room	309		309	
5	Airport Manager	245			245
6	Contracts/Finance Admin Office	160			160
7	Office Administrator	154			154
8	Conference Room	223			223
9	Airport Security Coordinator	151		151	
10	Waiting	27		27	
11	Break	91		91	
12	Training	563		563	
13	IT	20	88.5%	18	2
14	Work Area	91			91
15	Badging	89		89	
16	Interview	89		89	
17	Women's Restroom	152		152	
18	Men's Restroom	142		142	
19	Laundry	62		62	
20	First Aid/Medical Decon	56		56	
21	Exercise	143		143	
22	Lockers	129			
23	Women's Changing/Shower	62		62	
24	Janitor	8		8	
25	Men's Changing/Shower	65		65	
26	Unisex Restroom	69		69	
27	Unisex Restroom	68		68	
28	Fire Sprinkler Room	43		43	
29	SRE Maintenance Office	113			113
30	Welding Shop	145			145
31	Flammable Liquid Storage	131		131	
32	Maint. Parts Storage/Wash	111		111	
33	Shop/Repair/Maintenance Support	564		564	
34	ARFF Vehicle Bays	899		899	
35	SRE Vehicle Bays	5,824		5,824	
36	Maintenance Bay	942		942	
37	Mechanical Mezzanine	547	88.5%	484	63
38	Electrical Mezzanine	57	88.5%	50	7
Walls and Vertical Chases					
NA	Walls and Vertical Chases	591	88.5%	523	68
	Totals:	**14,071**	**-**	**12,453**	**1,489**
				% of Total Floor SF Eligible: **88.5%**	

Table 2-2- ARFF/SRE Facility – Preliminary Eligibility Determination

Figure 2-3 – Airport Administration and SRE/ARFF Building – Proposed Plan

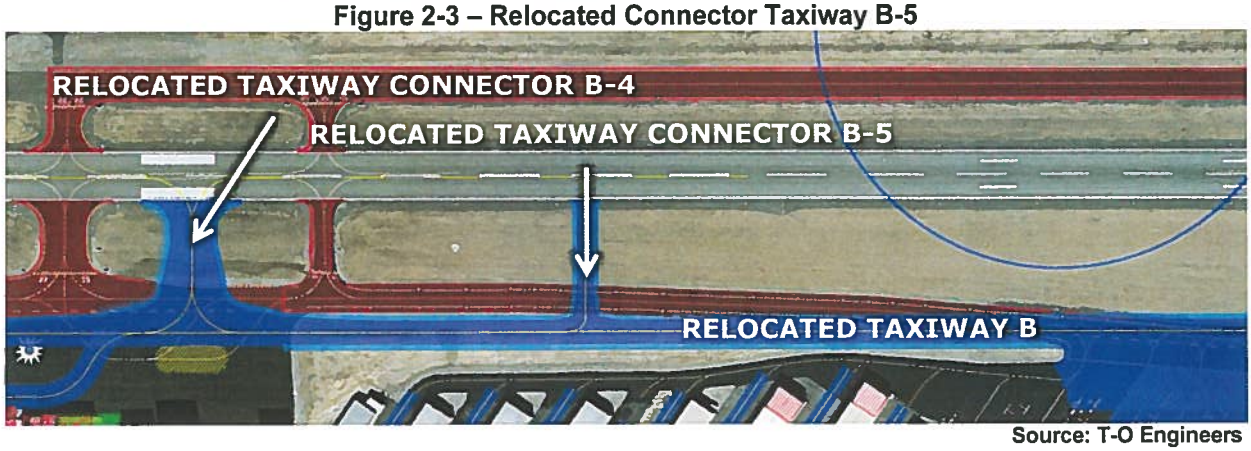


Taxiway Connector B-5

In addition to relocating connector B-4 to a more optimal location, existing connector B-5 will be relocated. While connector B-4 will be primarily used by aircraft arrivals on Runway 31, the purpose of connector B-5 will be to accommodate small aircraft (12,500 lbs or less) arrivals landing from the north on Runway 13. Coordination with ATCT personnel and a review of landing requirements support this location. It should be noted that this connector will be constructed and limited to use ONLY by small aircraft. Operationally, the ideal location for connector B-5 is directly adjacent to the GA tie-down apron further south. However, due to the longitudinal grade difference between the runway and apron, a taxiway connector meeting longitudinal grade requirements cannot be constructed. The location of was selected because it is the farthest south a taxiway connector meeting DG-II longitudinal grade requirements can be placed.

Figure 2-3 depicts the relocated B-5 connector and the relationship to relocated connector B-4.

Figure 2-3 – Relocated Connector Taxiway B-5



Source: T-O Engineers

2.2 Runway 31 End

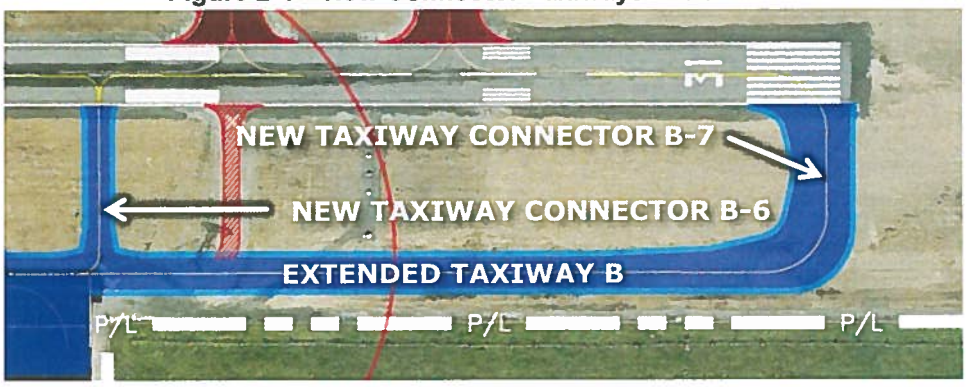
Two new taxiway connectors are being added to the Taxiway B configuration on the south end of the airfield near the Runway 31 end; connectors B-6 and B-7.

Connector B-6 is being added to accommodate both small aircraft arrivals and departures. If an aircraft is unable to use connector B-5 upon arrival on Runway 13, this connector will reduce aircraft rollout requirements allowing the aircraft to exit the runway prior to runway end. Like connector B-5, this connector will be constructed and limited to use ONLY by small aircraft. Lastly, in compliance with Runway Safety protocols, this connector has been located just south of the south FBO apron edge eliminating direct access from the FBO apron to the runway via this connector. Similar to connector B-5, the location of new connector B-6 was selected because DG-II longitudinal grade requirements precluding other locations.

Connector B-7 is a new connector that will serve the Runway 31 end. The connector is a result of the Taxiway B extension resulting in a full parallel taxiway at SUN. This connector will primarily serve all north bound departures on Runway 31, as well as any larger aircraft landing Runway 13.

Figure 2-4 depicts the new Runway 31 end taxiway/taxiway connector configuration.

Figure 2-4 – New Connector Taxiways B-6 and B-7



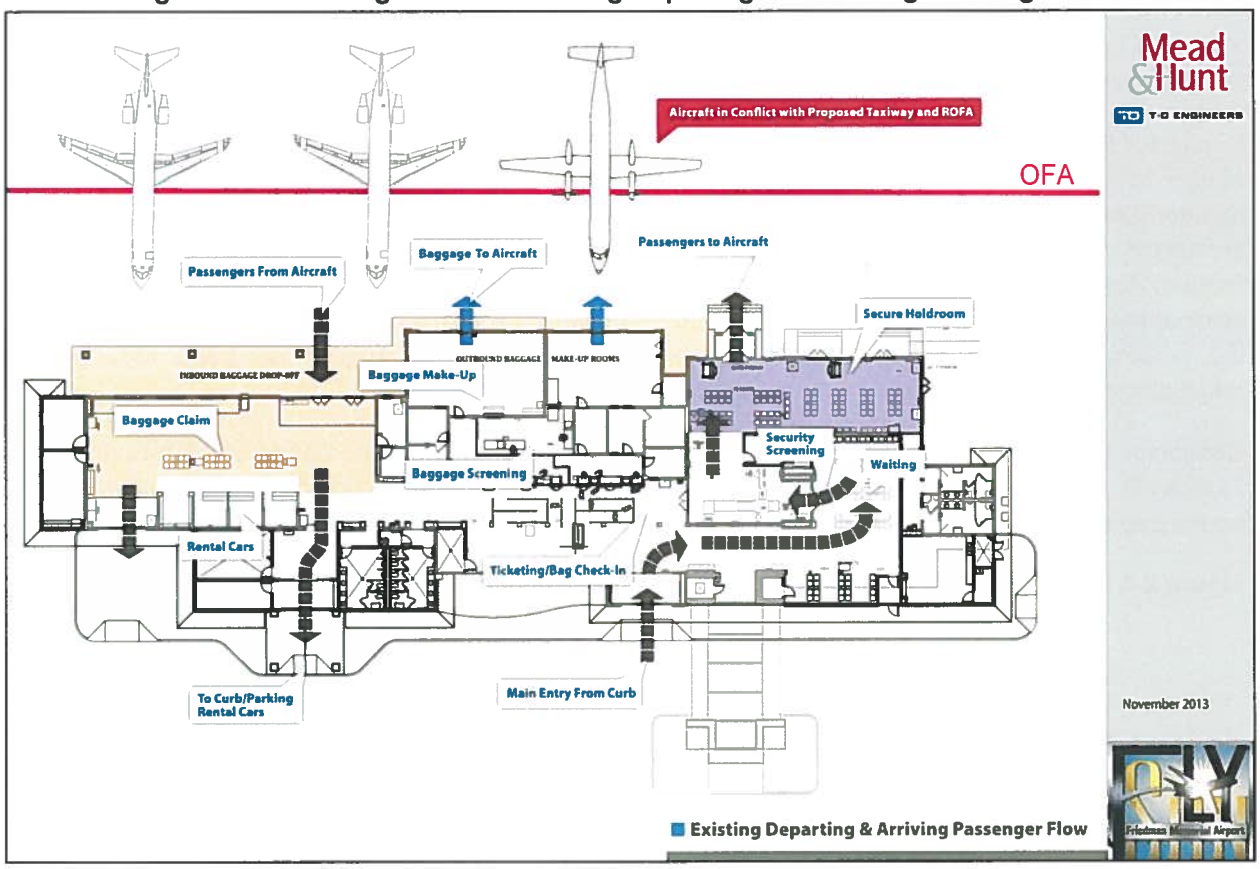
Source: T-O Engineers

3.0 Terminal Reconfiguration

During development of Alternative 6, it was clear that the terminal aircraft parking would need to move to the north side of the existing terminal as existing airline aircraft parking on the east side will result in aircraft being parked within the relocated Taxiway B OFA. Relocating the aircraft parking will require a means for the traveling public to get to and from the aircraft from the existing arrival and departure areas of the terminal. The existing passenger flow in the terminal is shown in **Figure 3-1** below.

As can be seen in **Figure 3-1**, passengers check in in the center of the building and baggage screening and make-up takes place directly behind the check-in counters and moving straight out to the aircraft. Passenger screening and the secure hold area are located at the south end of the building (purple shaded area). Arriving passengers come through doors directly north of the baggage make-up rooms and wait for bags to be delivered via a slide system in the baggage claim area.

Figure 3-1 – Existing Terminal Building Departing and Arriving Passenger Flow



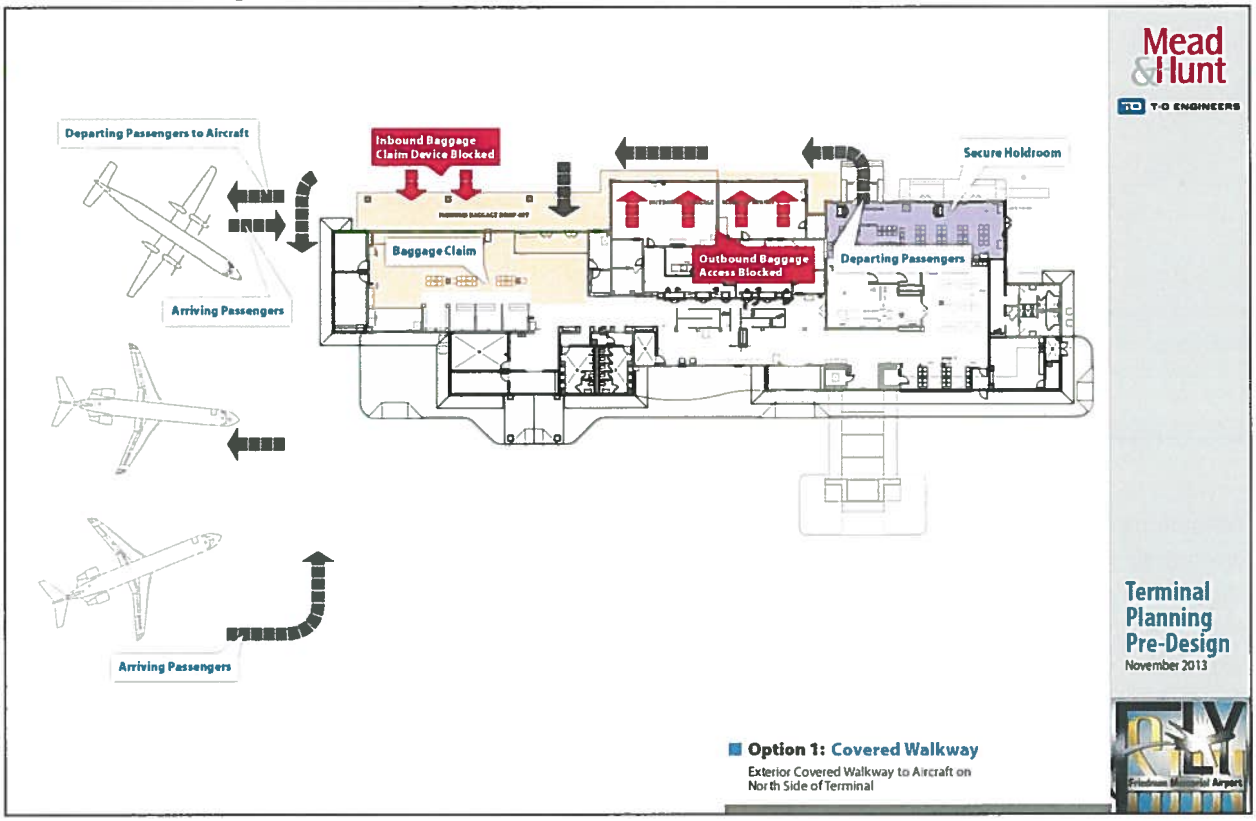
Source: Mead & Hunt and T-O Engineers

3.1 Initial Terminal Layout Options

Initially, changes to the terminal building were evaluated as a part of the airfield work. The terminal was evaluated with respect to passenger flow and the building's proposed relationship with the airfield. The initial analysis completed in the Technical Analysis assumed that passengers could be moved from the existing secure holdroom to the north end of the terminal building via a covered walkway. Similarly, deplaning passengers would travel from the aircraft to the arrival gate via the same covered walkway.

Early in the formulation process, **Option 1: Covered Walkway**, was developed and it became clear that the assumptions regarding the covered walkway were invalid. **Figure 3-2** shows this option. There are multiple conflicts with this configuration, as shown in the figure. These conflicts can be summarized in two categories: safety and security. From a safety standpoint, in order for inbound and outbound baggage to enter and exit the terminal, openings in the proposed walkway would be required to allow baggage handling equipment access to and from the aircraft and terminal. Mixing ground equipment and passengers presents a significant safety concern. Further, passengers could easily access the airfield through the walkway openings allowing them immediate access to or near the airport's movement area; also a significant safety concern. From a security standpoint, passengers leaving the walkway would be in the SIDA resulting in an obvious security concern.

Figure 3-2 – Terminal Reconfiguration Option 1: Covered Walkway

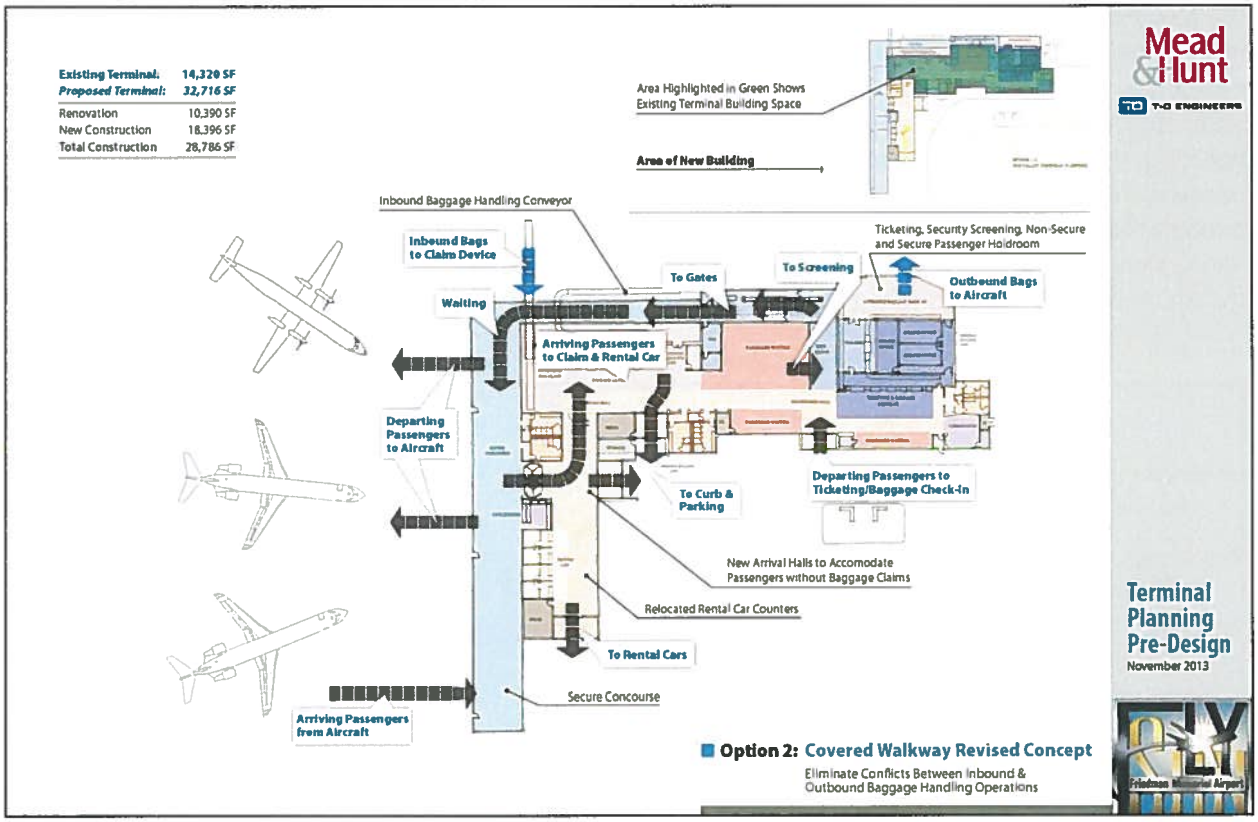


Source: Mead & Hunt and T-O Engineers

In an attempt to resolve the conflicts discovered in Option 1, the covered walkway concept was revised resulting in **Option 2**. Option 2 is shown in **Figure 3-3**. This secure corridor alternative would require relocation of the existing check-in and baggage makeup areas, which would "trade places" with the secure holding area. The walkway would then travel along the side of the building and a below-grade means of moving baggage to the claim area would be necessary, along with a new baggage claim belt mechanism. Currently, bags are delivered via a simple slide system. This alternative was extremely costly and the phasing required to complete it would impact the terminal negatively for a significant period of time.

Another option was considered which included an elevated walkway but, ADA and other code requirements made this option cost prohibitive as well.

Figure 3-3 – Terminal Reconfiguration Option 2: Covered Walkway Revised Concept



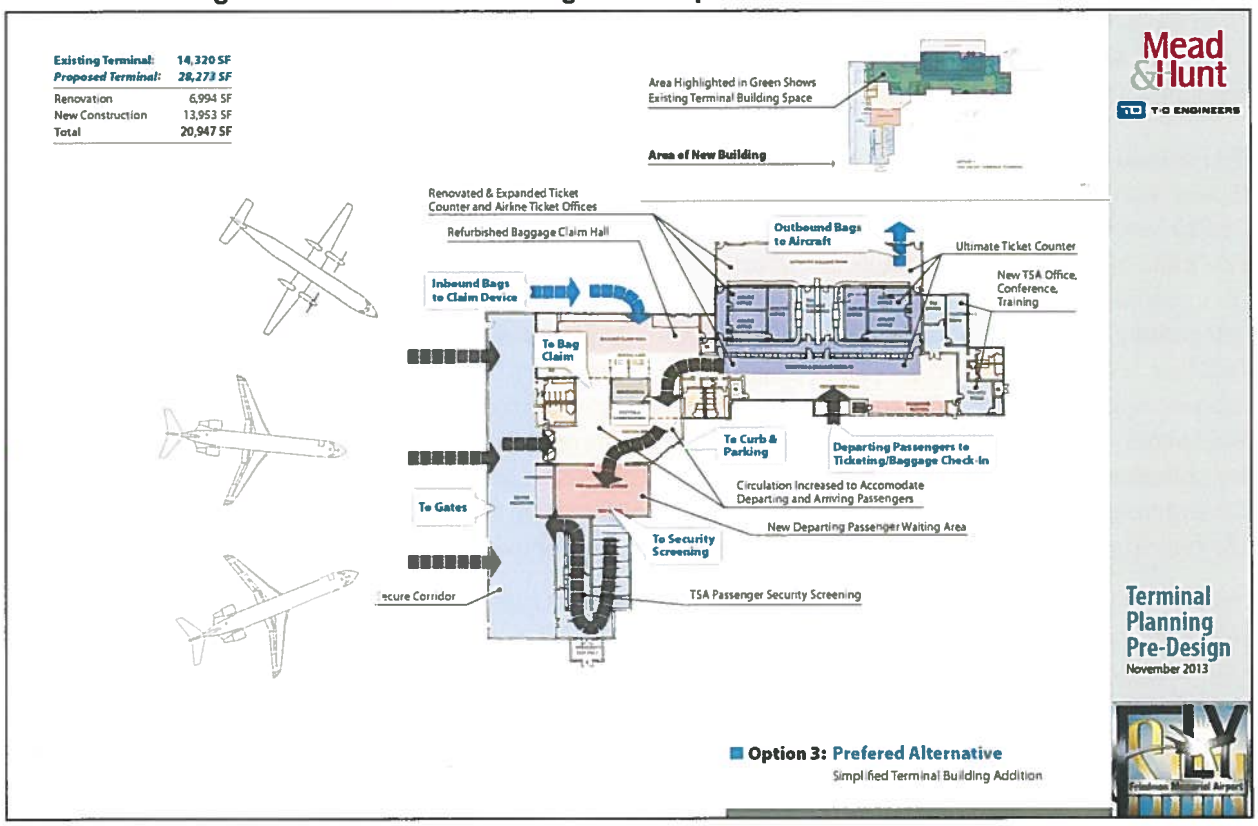
Source: Mead & Hunt and T-O Engineers

As options were evaluated for opportunities to accommodate the proposed change in airfield access, they were also reviewed for passenger flow and spatial requirements in relationship to passenger demand. Significant effort was spent developing a third option, which added a new area onto the terminal on the north end of the existing building. Multiple iterations of this option were considered, with the preferred alternative shown as **Option 3** included as **Figure 3-4**. Estimates of probable costs were developed for the three main options. See **Appendix A** for information regarding the concept plan probable estimates of construction costs for the proposed options.

Option 3 was deemed to be the most cost effective and simple to construct. Under this option, passenger screening, holding and arrival would all take place at the north end of the building. Approximately 17,000 square feet of new space would be necessary for these functions. This option presents the following advantages:

- Efficient, safe and secure movement of passengers to and from aircraft.
- Lower cost than Option 2.
- Separation of new space from existing operational space allows for construction phasing with minimal impact to existing functionality of the building

Figure 3-4 – Terminal Reconfiguration Option 3: Preferred Alternative



Source: Mead & Hunt and T-O Engineers

This preferred alternative provides improvements to several areas in the passenger terminal including the ticketing lobby, the hold room and passenger screening. These improvements will allow the building meet current airline demand and TSA passenger screening requirements. Additional improvements were proposed to the airline offices, baggage screening and TSA offices. However, changes that do not directly impact the public areas are optional in this project.

3.2 Terminal Development

While the general configuration of the building and its relationship with the airfield was largely set, the layout of the spaces within the building and the scope of the terminal project continued to develop. The capacity of the terminal was analyzed based on peak usage, which is determined through evaluating passenger demand.

Terminal Facility Demand

The aircraft mix and passenger demand were evaluated in order to establish sizing for the facilities in the terminal building. For planning purposes, one (1) Dash-8 Q400 and (2) CRJ-700 departures within a peak period served as the basis for demand on the terminal facility. At 74 seats for the Q400 and 66 seats for the CRJ-700 aircraft, there will be 206 departing seats during the peak period. At a 90% load factor during peak travel season, the actual peak period departing passenger demand would be as follows:

206 Departing Seats x 90% Design Load Factor (DLF) equals 185 Departing Passengers

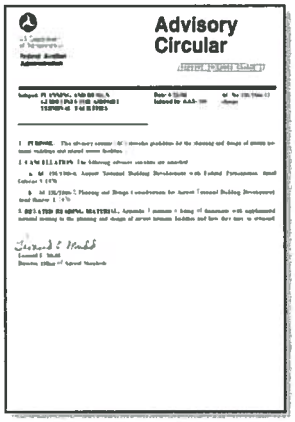
While this figure may seem high for the airport, it is not unreasonable given the design aircraft moving up from EMB-120 to Dash-8 and CRJ-700, and increase of 36 to 44 seats per departure or double previous capacity. See Appendix A for additional information regarding 2013 TAF, and a technical memorandum evaluating aircraft mix and passenger demand.

Terminal Space Justification

Space within the airport terminal building is divided into categories in order to identify and address the facility requirements of each type of space. The facility components in the terminal were evaluated based on "peak period" passenger activity, which is the time that the terminal building experiences the most concentrated public use based on departure flight schedules. All terminal facilities must be capable of adequately meeting the demands of this period. Many of the recommendations for changes to the facilities are the result of shortfalls, such as an area being too small to accommodate the expected amount of use, while other recommendations will improve operational performance. An example of this is passenger security screening. By designing to the TSA guidelines, passenger and carry-on baggage will be screened much more quickly and effectively. This also applies to building mechanical performance; for example, upgrading equipment using advanced technology and designing the entire system to support the building demand will significantly improve building mechanical performance.

The recommendations for changes that are necessary to meet current facility area requirements were developed by the consultant using design standards and guidelines for airport terminal design which are listed below:

- FAA's Advisory Circular (AC) 150/5360-9, *Planning and Design of Airport Terminal Building Facilities at Non-Hub Locations*
- FAA's Advisory Circular (AC) 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities*



The Circulars were developed in the 1980s and, while many of the recommendations they provide are still useful today, some of the guidelines are not as relevant today. Sections of AC 150/5360-13 are in the process of being revised as of this writing. Other recent references have been developed by various entities to address present day airport terminal facility requirements. These include:

- Transportation Security Administration's *Recommended Security Guidelines for Airport Planning, Design and Construction, Revision 4*
- Transportation Security Administration's *Checkpoint Design Guide, Revision 5*
- Airport Cooperative Research Program (ACRP) Report 25, Volumes 1 & 2: *Airport Passenger Terminal Planning and Design*.
- International Air Transportation Association (IATA) publication: *Airport Development Reference Manual, 2014 Edition*

Additional factors affected plan development, including construction phasing for a building that must remain operational and the consultant's prior experience at other airports of similar size, the latter

contributing to planning for potential increases in service, those that have begun to be implemented at the airport and others. The approach of applying terminal planning and design guidelines and similar case studies from the consultant's experience as well as referencing work of other experts is a proven methodology that has been the basis for design on this terminal.

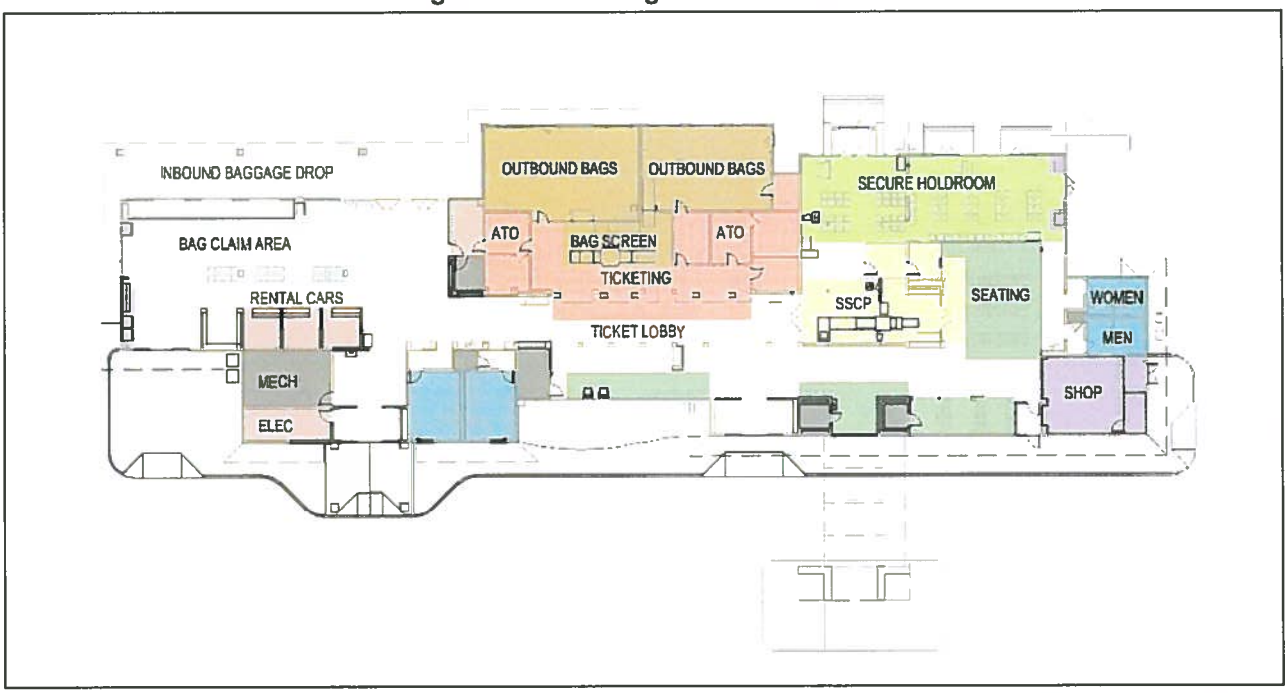
Construction phasing will be a key factor in building the terminal given the existing terminal facilities will remain operational and the construction schedule is short compared to comparable facilities. The contractor will have to make the best use of the window of time when the airport is closed for airfield work in order to meet the RSA deadline.

Existing Terminal Space

The existing building is currently 16,600 square feet in overall area. Measured in component processing capability and area, it is too small to meet current passenger demand. The terminal has been expanded in three separate expansions, the first in 1985, which reflects the majority of the space and layout today. A 1991 expansion added the present secure holdroom and security screening area. The third renovation and expansion was made to the building in 2005 which expanded restrooms at the front of the building along with additional mechanical space. Two planned alternates from the 2005 project, one an expansion of the baggage claim for storage and break room, and the other a TSA breakroom at the southeast corner of the building, were not built. Each of the expansions were made to accommodate current operations in order to make them more efficient. As a result, the building has been capable of supporting a fixed schedule of one successive arrival and departure throughout the day. This may have limited growth over time although this is difficult to quantify with other factors such as airfield capability effect on growth.

The existing terminal building is a one-story structure with a linear layout, shown in **Figure 3-5**.

Figure 3-5: Existing Terminal Plan



Source: Mead & Hunt and T-O Engineers

With carriers replacing their smaller regional jets with larger capacity jets in their fleets, the airlines have begun service into SUN with CRJ-700 aircraft. Horizon serves SUN with Q400 aircraft, which are still in the same capacity range as the regional jets. This increase in aircraft capacity has placed an increased demand on terminal components which are being managed today operationally, such as in the case of TSA's willingness to open passenger security screening in response to departing aircraft passenger loads. Additionally, the secure hold room and baggage claim are currently located along the east side of the terminal in order to have access to the aircraft parking area. Relocation of these functions will affect the efficiency of associated functions, such as airline and car rental tenants.

Proposed Terminal Space

Changes that are made to the terminal in order to accommodate relocation of aircraft parking from the east side of the building to the north will affect the efficiency with which the entire terminal functions. For this reason, all passenger-related facilities within the terminal were evaluated, not just those that will be relocated to support the move.

A comparison of the amounts of existing spaces, the amounts of space required to meet forecasted 2015 and 2020 demand and the amounts of space proposed in the preferred option is provided in **Table 3-1**, Sun Valley Terminal Area Justification. The amounts shown were calculated in accordance with the design standards and guidelines for airport terminal design noted above.

Table 3-1: Sun Valley (FMA) Terminal Building Basis for Justification

Mead & Hunt, Inc.
March 18, 2014

Forecast Summary					
Annual Enplaned Passengers (AEP)			47,734	53,837	
Peak Month – December	11.2%			6,049	
Peak Hour - Enplaned (PHEP)	37.5%			179	
Peak Hour - Terminating (PHTP)	37.5%			179	

Space Description	Factor	Units	Existing (2012)	2015 Basis	Preferred Plan
SSCP					
Security Screening Checkpoint					
Employees + Crews	5.0%			*9*	
total for screening				*188*	
Peak 10 Minute Originating	33.3%			*63*	
Queue	10	SF/Pk 10 min	136	630	1,234
Number of Lanes	150	PAX/hour	*1*	*2*	*1*
Screening Area	1,250	SF/lane	777	2,500	2,194
Composure	125	SF/lane	0	250	
Exit Lane – **estimated**	150	SF/lane	0	300	250
Total: SSCP		***SF***	***913***	***3,680***	***3,678***
AIRSIDE					
Airside: Holdroom Area					
Holdroom Floor Area	18	SF/PHEP	1,478	3,222	3,331
Gate Podium / Storage (wheelchairs, etc.)	150	SF/gate	above	450	above
Gates (Airport goal)			*2*	*3*	*3*
Public Circulation, (30% in Airside)	27.0%	% of total	520	2,900	2,587
Subtotal Holdroom Area		***SF***	***1,998***	***6,572***	***5,918***
Airside: Restrooms					
Restrooms (50% on Airside)	3.5	SF/PHP	***321***	***627***	***708***
Restroom fixtures per M/F	180.0	SF/stall	*2*	*3*	*5*
Airside: Concessions					
Food/Beverage/Retail (85% in Airside)	8	SH/PHEP	0	1,217	334
Vending	0.6	SF/1000 AEP	42	32	0
Subtotal Airside Concessions		***SF***	***42***	***1,250***	***334***
Total: AIRSIDE		***SF***	***2,361***	***8,448***	***6,960***
LANDSIDE					
Landside: Public Waiting Areas					
Public Waiting	7.5	SF/PHTP	1,383	1,343	2,403
Bag Claim Floor Area	16.5	SF/PHTP	1,450	2,954	2,273
Public Circulation & Ancillary Space, (70% Landside)	27.0%	% of total	4,269	6,766	6,089
Subtotal Public Waiting Areas		***SF***	***7,102***	***11,062***	***10,765***

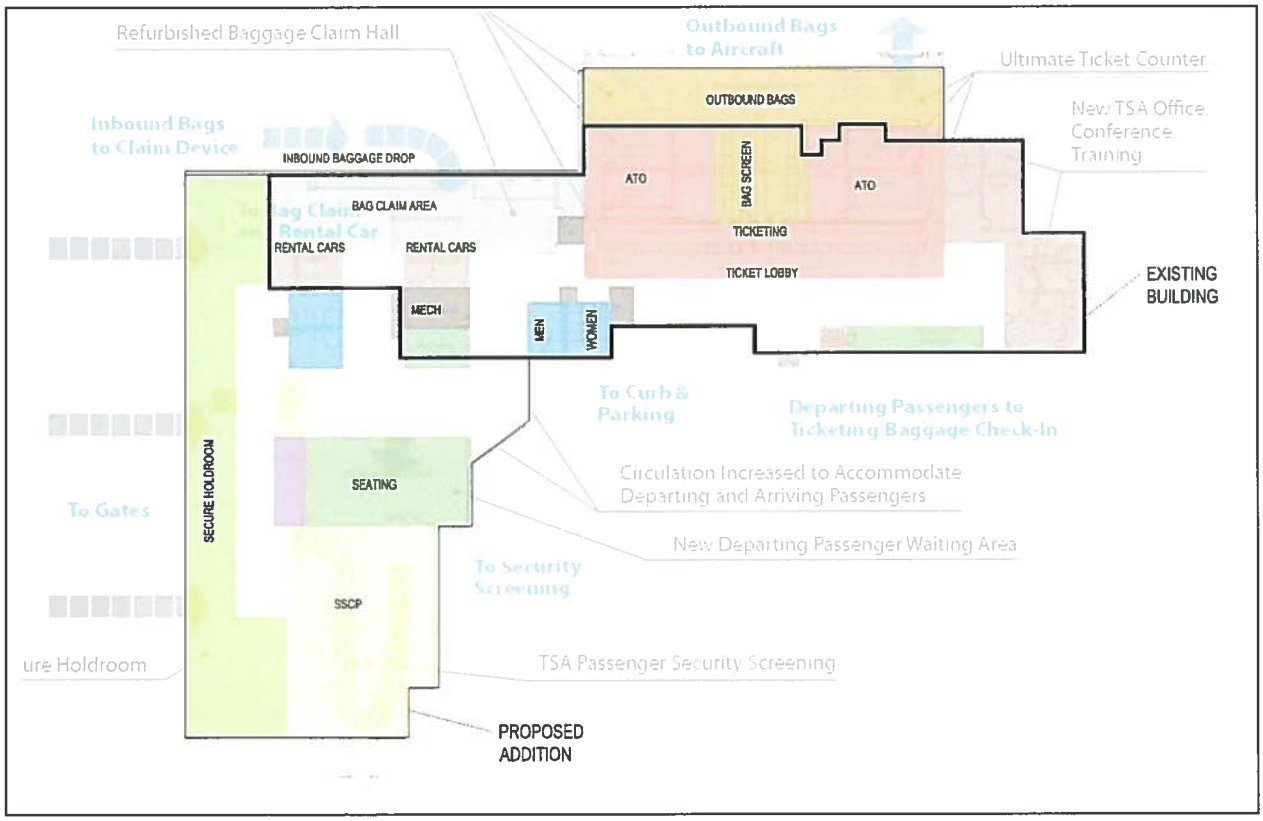
Landside: Restrooms					
Restrooms (50% on Landside)	3.5	SF/PHEP	***520***	***627***	***525***
Restroom fixtures per M/F	180.0	SF/stall	*5*	*3*	*5*
Landside: Baggage Areas					
Pk Hr Terminating Passenger w/ bags				*125*	
Bag Claim Device Length	1.4	LF/PAX w/bag		*211*	
Bag Claim Devices (estimated length for planning)	150	LF/device		*2*	
Screening Devices: Stand-Alone EDS+ETD	200	bags / hr	*1 EDS+2 ETD*	*1*	*2*
TSA Bag Screening Floor Area	5.5	SF/PHOP	332	985	1,016
Outbound Baggage	8.5	SF/PAX w/bag	1,701	1,522	2,738
Inbound Baggage (outdoor covered area)	0.0	SF/PAX w/bag	0	0	0
Subtotal Baggage Areas			***2,033***	***2,506***	***3,754***
Landside: Concessions					
Food/Beverage/Retail (15% in Landside)	8	SH/PHEP	546	215	
Vending (vending seating above)	0.6	SF/1000 AEP	69	32	72
Airport Administration / TSA Tenant	x	x	333	703	2,054
Subtotal Landside Concessions		***SF***	***948***	***950***	***2,126***
Landside: Airline Areas					
Ticket Agent Positions	20	PHEP/20	*8*	*9*	*20*
Ticket Queue	7.0	SF/PHEP	254	1,253	1,327
Kiosk Area/Queue	2.0	SF/PHEP	0	358	0
Ticket Counter Area	72.0	SF/Agent pos.	592	644	969
Airline Ticket Office	22.0	SF/LF counter	839	1,181	2,862
Subtotal Airline Areas		***SF***	***1,685***	***3,437***	***5,158***
Landside: Car Rental Areas					
Number of Car Rental Offices (3 exist, 4 projected)			3	3	3
Car Rental Queue	80	SF/office	0	240	96
Car Rental Counter Area	75	SF/office	140	225	196
Car Rental Offices	100	SF/office	172	300	260
Subtotal Car Rental Areas		***SF***	***312***	***765***	***552***
Total: LANDSIDE		***SF***	***12,600***	***19,347***	***22,880***
Building Systems & Janitor	10.0%	% of total	**726**	3,580	576
Walls, Chases, Structure: for *ref. - included above*	9.0%	% of total	above	*3,222*	above
Total of All Areas (Gross)		***SF***	***16,600***	***35,054***	***34,094***

Internal components of an airport terminal have prescribed functional relationships with other areas and become more efficient in their operation when they are located in close proximity or adjacent to each other. These relationships, or functional adjacencies, become evident in reviewing a passenger's path through the terminal building. For example when arriving passengers exit the sterile area their paths of travel will be more efficient when routes to the baggage claim area, car rental counters and terminal building exits are straightforward and easily discernable.

Several options for arranging internal space within the expansion were generated in order to study opportunities for the FMAA terminal building plan. The layouts work toward meeting the year 2015 facility requirements that were identified earlier in this document. These options considered efficiency of the layout and use of existing facilities and utilities and complexity of construction phasing.

Figure 3-6 shows the layout of spaces within the preferred terminal building plan.

Figure 3-6: Preferred Alternative Plan



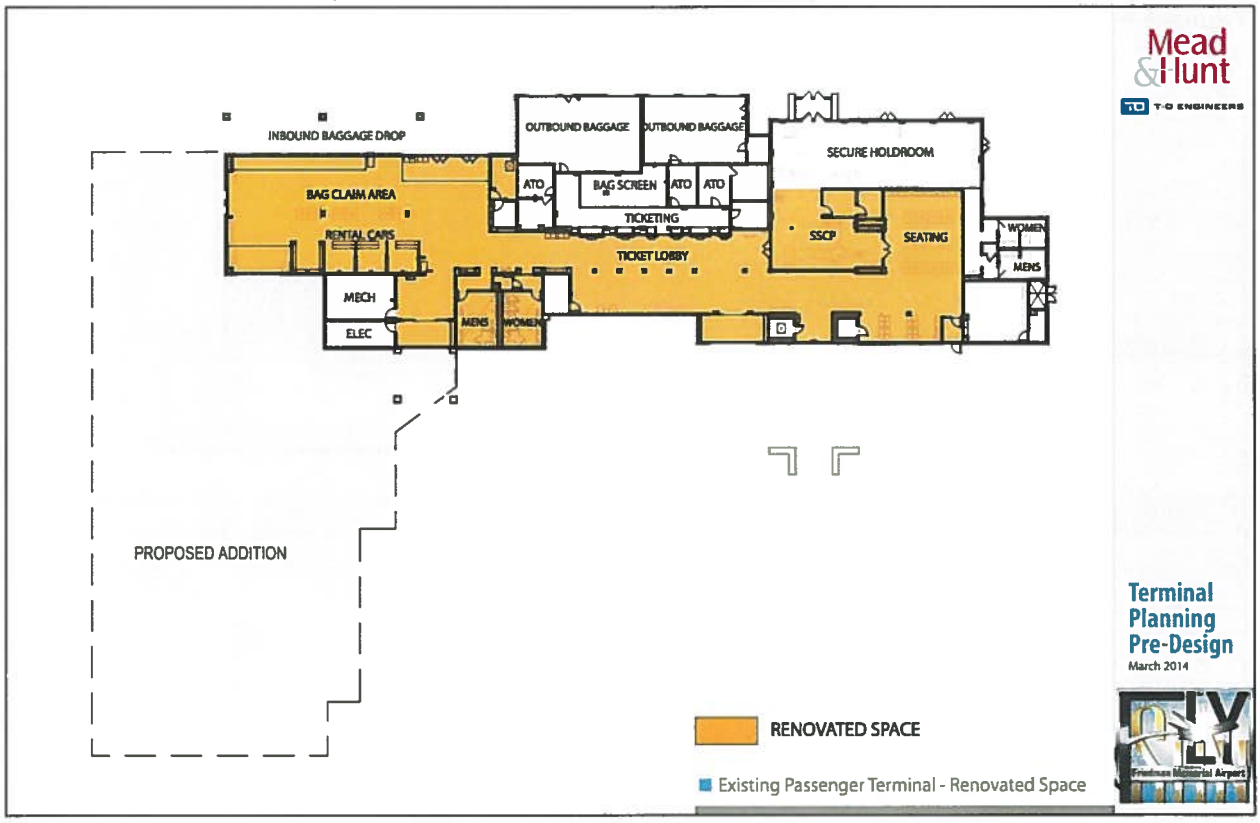
Source: Mead & Hunt and T-O Engineers

3.3 Preferred Option: Partial Buildout

The Preferred Alternative was reviewed by the FAA and the Airport for operations and cost. Based on the discussions that followed, the scope of the project was redefined in order to focus on shortfalls that are related to the public movement of passengers and baggage. For this reason, areas relating to airline offices, baggage screening and outbound baggage were removed from the scope of the project. In addition, several existing portions of the terminal that would no longer have access to aircraft parking were removed from the project since they will not contribute to passenger-related operations.

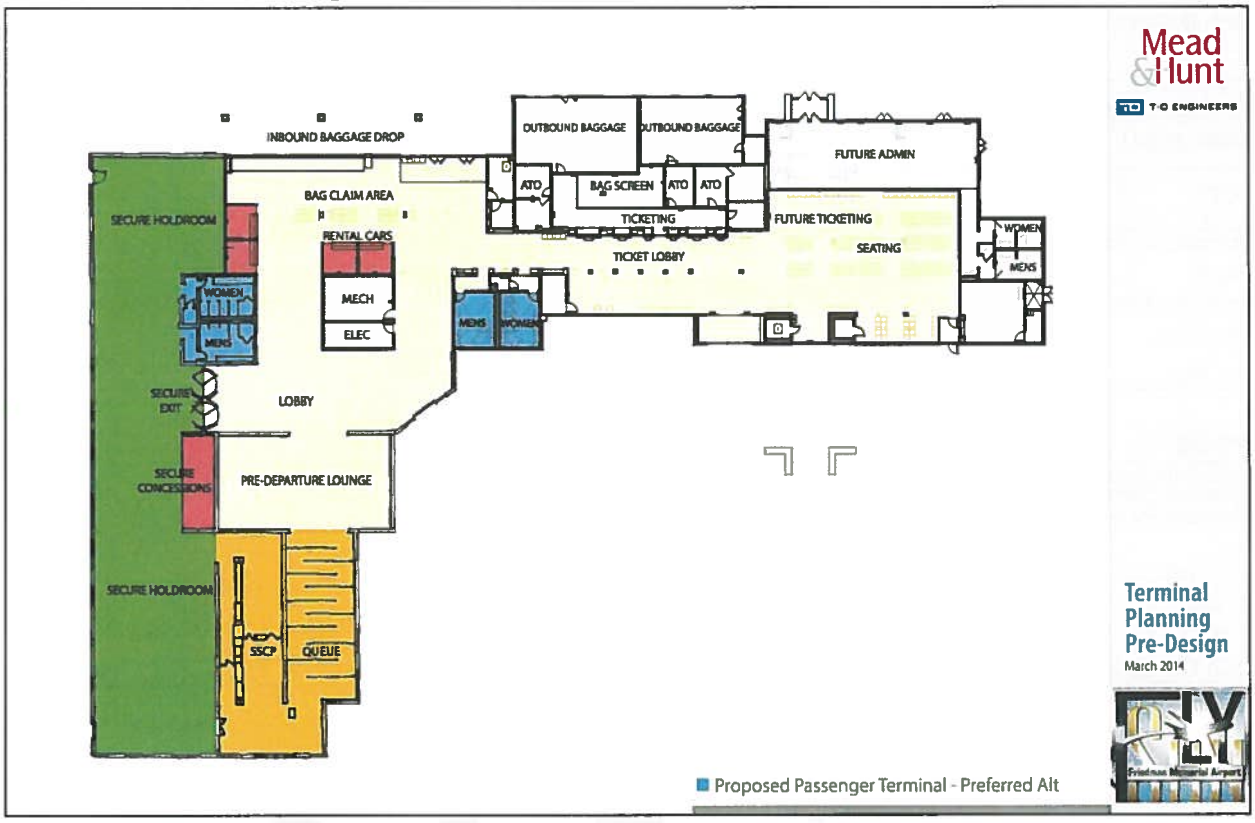
Existing areas that will no longer be included in the project are shown in white in **Figure 3-7**.

Figure 3-7: Preferred Alternative – Renovated Area



Source: Mead & Hunt and T-O Engineers

Figure 3-8: Preferred Alternative – Partial Buildout



Source: Mead & Hunt and T-O Engineers

FAA Project Funding Eligibility

The Federal Aviation Administration (FAA) is the agency within the U.S. Department of Transportation that regulates the non-military aviation system in the United States. The FAA administers the Airport Improvement Program (AIP) through which it provides grants for the planning and development of capital improvement projects at public-use airports. These AIP grants are funded through airport user fees and are used for public-use portions of the terminal that are directly related to the movement of passengers and baggage. Eligibility for FAA funding participation for the SUN terminal building was determined using AIP Handbook, Order 5100.38D, Appendix N for Terminal Building Projects.

Table 3-2: Sun Valley (FMA) Terminal Building Eligibility
Mead & Hunt, Inc.
March 6, 2014

	2015 Building			Preferred Plan: Partial Buildout				
Space Description (Gross Area)	**Justified Area (SF)**	**Eligibility Rate**	**Eligible Area (SF)**	**Exist. to Remain**	**Exist. Remod.**	**New Cnst (SF)**	**Elig-ibility Rate**	**Eligible Area (SF)**
SSCP								
Security Screening Checkpoint								
Queue	630	100.0%	630		136	1,098	100.0%	1,234
Screening Area	2,500	100.0%	2,500		777	1,417	100.0%	2,194
Composure	250	100.0%	250	0		0	100.0%	0
Exit Lane	300	100.0%	300	0		250	100.0%	250
AIRSIDE								
Airside: Holdroom Area								
Holdroom Floor Area	3,222	100.0%	3,222			3,331	100.0%	3,331
Gate Podium / Storage (wheelchairs, etc.)	450	100.0%	450				100.0%	0
Public Circulation	2,900	100.0%	2,900		144	2,443	100.0%	2,587
Airside: Restrooms								
Restrooms	627	100.0%	627			708	100%	708
Airside: Concessions								
Food/Beverage/ Retail	1,217	70.0%	852	0		334	70%	234
Vending	32	100.0%	32		0		100%	0
LANDSIDE								
Landside: Public Waiting Areas								
Public Waiting	1,343	100.0%	1,343	0	1,383	1,020	100.0%	2,403
Bag Claim Floor Area	2,954	100.0%	2,954		1,578	695	100.0%	2,273
Public Circulation & Ancillary Space	6,766	100.0%	6,766		4,269	1,820	100.0%	6,089
Landside: Restrooms								
Restrooms	627	100.0%	627	520		5	100%	5
Landside: Baggage Areas								
TSA Bag Screening Floor Area	985	0.0%	0	332		0	0.0%	0
Outbound Baggage	1,522	0.0%	0	1,701		0	0.0%	0
Inbound Baggage (outdoor space)	0	0.0%	0	0		0	0.0%	0

Landside: Concessions								
Food/Beverage/ Retail	215	100.0%	215				100.0%	0
Vending (vending seating above)	32	100.0%	32		69	3	100.0%	72
Admin area changed to public area				205				
Airport Administration/ TSA Tenant	703	0.0%	0	0		0	0.0%	0
Landside: Airline Areas								
Ticket Queue	1,253	100.0%	1,253		254	1,073	100.0%	1,327
Kiosk Area/Queue	358	100.0%	358	0		0	100.0%	0
Ticket Counter Area	644	75.0%	483	592		377	75.0%	283
Airline Ticket Office	1,181	0.0%	0	839		0	0.0%	0
Landside: Car Rental Areas								
Car Rental Queue	240	100.0%	240	0		96	100.0%	96
Car Rental Counter Area	225	75.0%	169		140	56	75.0%	147
Car Rental Offices	300	0.0%	0	115	57	88	0.0%	0
Building Systems & Janitor	3,580	100.0%	3,580	726		1,499	100.0%	1,499
Undesignated Areas				2,763				
Totals	**35,054**	**83.2%**	29,781	7,793	**8,807**	**16,313**	**98.5%**	**24,732**

4.0 Summary

In summary, the closure of Taxiway A and associated taxiway connectors impacts the overall operation of the airport. The preferred Taxiway B connector configuration as detailed above provides relief from the impact of losing Taxiway A. The relocation of connectors B4 and B5, the central bypass taxiway, and the addition of new connectors B6 and B7 offer substantial, justifiable improvements versus the current configuration and will result in increased efficiency and safety at the airport. The proposed reconfiguration of the terminal building and relocation of the airport administration and SRE/ARFF buildings are clearly justified and necessary based on operational and safety considerations resulting from the RSA Improvements Project. These particular improvements will allow the airport to operate in a safe and efficient manner at the existing site meeting a primary goal of both FMAA and the FAA for overall improvements of the airport for foreseeable future.

For the passenger terminal, the process of developing alternative layouts has led to discussions involving the Airport, airport users and tenants, the public and planning team. These discussions have provided important information that is particular to the operation of FMAA. Layouts of the building were developed and assessed for operational performance and a preferred layout was chosen and developed in greater detail. The preferred alternative for meeting current facility requirements is to provide an addition to the existing building that will improve the efficiency with which passengers are processed through the terminal and allow passengers to move safely and securely between the building and the aircraft. It is a viable, cost-effective option that separates new space from existing operational spaces during construction, allowing construction phasing that will minimally impact a building that must remain operational during construction.

The layouts of the terminal building and airfield will continue to be developed and become more refined, as the planning process ends and the design process begins. Once construction is complete, it is the built condition that must adapt to the changes in facility requirements until additional facility modifications become necessary.

Appendix 2

Storm Drainage

Friedman Memorial Airport (SUN)
Hailey, Idaho
RSA Improvements – Project Formulation
Drainage Design

July 25, 2013

Introduction

This report provides an overview of how storm water is currently handled at Friedman Memorial Airport in Hailey Idaho and details the design methodology of the proposed drainage at the completion of the airport improvement project.

Due to the non-standard Runway Safety Area (RSA) of Runway 13-31, Friedman's sole runway, an improvement project is proposed to reconfigure the airport layout to comply with RSA standards. This reconfiguration has significant effects on stormwater drainage. Several basins and drywells will be relocated to create room for airport geometry changes and grading associated with this project will redirect the water flow. New pavement will create additional impervious surfaces and additional edge drains will be installed to draw water out of the pavement sections.

When analyzing the stormwater drainage, three areas of concern were the Heavy Apron, South Parking Apron, and Runway Safety Area. These areas will be the focus of this report.

Design Methodology

The existing drainage in three basins were analyzed to determine if any changes would be required to provide adequate storage post-construction. The three areas in question are:

- Heavy Apron
- South Parking Apron
- Runway Safety Area storm drain system

These three areas were analyzed with the proposed changes. The results and recommendations are summarized below.

Design Elements and Procedures

Runoff Coefficients: The following runoff coefficients were used (AC 150/5320-5C, Table 2-1):

Asphaltic 0.90 (Runway, Taxiway, Apron, Roads and Paved Shoulders)

Gravel Pavements 0.60 (Gravel Runway and Taxiway Shoulders, Gravel roads)

Unimproved Areas 0.20 (Grassy Areas)

Time of Concentration: Time of Concentration was calculated according to AC 150/5320-5C, section 2-3.2.4.

Rainfall Intensity: The storm event used in design was the 25-year event. An intensity-duration-frequency curve was synthesized using the procedure outlined in NOAA Atlas 2.

Analysis: To determine storage requirements, the following procedure was used for each catchment basin (all equations and procedures reference AC 150/5320-5C:

1. Determine size of areas within basin for each value of C and calculate weighted C value using equation 2-2.
2. Determine Time of Concentration using procedures in Section 2-3.2.4.
3. Use IDF curve to interpolate storm intensity *i*.
4. Calculate Peak Flow Q using the Rational Method (2-3.2.1). Determine total volume required for 1-hr, 25-year storm.
5. Use the Bowstring Method to calculate maximum storage requirements.

Runway Infield Storm Drain System (Figures 1-3)

Existing Conditions: A storm drain system currently drains the Runway 13-31 infield to a grassed infiltration area (GIA) and drywell complex south of the runway. The existing Taxiway B, all connecting taxiways, and portions of the apron are also drained by this system. The area northeast of the runway and north of Taxiway A is not connected to the storm drain system and is drained by drywells.

Project Changes: Significant improvements will be made to the area served by the existing storm drain system. Taxiway A will be removed entirely and will be regraded to meet RSA grading standards. Taxiway B will be relocated and regraded. The infield area between Runway 13-31 and Taxiway B will be regraded to meet RSA grading standards. Taxiway B will be extended to the end of Runway 13, eliminating two of the three GIA-drywell storage complexes. This significantly decreases the available storage for the storm drain system.

Analysis and Recommendations: The remaining GIA-drywell basin was analyzed and it was determined that it does not provide adequate storage for the storm drain system. Several scenarios were analyzed. The following design provides the necessary storage for the proposed changes:

- **East Side (Figure 1)** – The storm drain on the east side of the runway will be removed and replaced with a drainage swale containing 5 drywells. The existing drywell at the end of Runway 13-31 will remain in place. These drywells, in concert with increased surface infiltration due to the removal of Taxiway A, provide necessary storage for the east side of Runway 13-31. They also reduce the demand on the existing GIA-drywell complex.
- **West Side Cutoff (Figure 2)** – Drainage Basins W.1 through W.8 will be redirected through a new storm drain that will drain into two storage basins (one new, one existing) west of the aprons and outside of the aircraft operations area. A drop manhole will be installed to control water velocity in new pipe. Removing these basins from the existing system will further reduce the

demand on the existing GIA-drywell complex. See Figure 2 for possible locations of proposed storm drain.

- **Remaining West Side Storm Drain (Figure 3)** – With the proposed changes above, total storage required in the GIA-drywell complex is reduced from 240,957 CF to 54,053 CF. The remaining storm drain system will require the following improvements to meet this demand:
    - 4 existing inlets will be covered by relocated Taxiway B. New inlets will be installed in each basin and connected to existing storm system
    - Drain downstream from inlet W.17 will be abandoned. New storm drain will be installed east of and parallel to new Taxiway B extension. New inlets attached to this storm drain will connect basins W.18 and W.19 to the system (they previously drained directly to the drywell complex, now blocked by Taxiway B extension).
    - Drywell complex will be expanded to include four 100' x 110' x 1.5' basins connected in series. A new drywell will be located in each basin (4 total plus 1 existing). This new drywell complex will increase storage capacity from 26,301 CF to 42,183 CF. Outflow from the new drywells also reduces storage demand to 35,858 CF

South Parking Area (Figure 4)

Existing Conditions: Storm water currently drains to two locations. The west end of the apron (called Basin 1) drains to two drywells, each located in a swale on either side of the perimeter access road. The remainder of the apron (Basin 2) drains to a swale on the south end of the apron. Water travels from the swale through two 12" pipes under the access road and then to a drywell west of the FBO parking area.

Project Changes:

- Basin 1 – No grading will be done in the catchment area for Basin 1. However, the extension of the parking apron and addition of the vehicle parking significantly increases the runoff coefficient of the basin. Extension of the parking area will also require regarding of the adjacent swale and relocation of the existing drywell.
- Basin 2 – Taxiway B will be relocated east and regarded to drain across the apron, adding 1.2 paved acres to Basin 2.

Analysis and Recommendations:

- Basin 1 – The existing swale and drywell in Basin 1 provide adequate storage for a 25-yr storm event. However, with the extension of the parking apron, the drywell will need to be relocated and the swale regraded to continue functioning. Additional volume could be added to accommodate a larger storm even but is not necessary.
- Basin 2 – The existing swale complex provides the necessary storage and will require no improvements.

Heavy Apron (Figure 5)

Existing Conditions: Storm water currently drains to two swales located between the southwest edge of the apron and the perimeter road. Outflow is provided by a drywell in each swale.

Project Changes: Regrading of Taxiway B will add 2.7 acres of pavement to the catchment area.

Analysis and Recommendations: Basin 1 does not provide adequate storage for the added area. An additional 1,608 CF of storage is required. Basin 2 provides 13,613 CF of storage and only requires 8,335 CF.

Basin 1 and 2 can be connected by installing a pipe underneath the gravel access road that separates the two basins. This will allow overflow from Basin 1 to be stored in Basin 2.

Appendix 3

Hangar Structural Analysis

Appendix 4

Modifications of Standards

Federal Aviation Administration

Memorandum

Date: October 7, 2013

To: The File

From: Steve Engebrecht, P.E., HLN-620, Helena ADO

Subject: Modification of Standards 1 – Runway Centerline to Parallel Taxiway Centerline: Friedman Memorial Airport (SUN), Hailey, Idaho
Airspace Case 2013-ANM-1175-NRA

Design Standards Affected: Federal Aviation Administration Advisory Circular 150/5300-13A, *Airport Design*, Chapter 3, Paragraph 321.a.(2), and Table A7-8, Runway Centerline to Parallel Taxiway Centerline.

Extent of Modification:

For Airport Reference Code (ARC) C-III aircraft (Aircraft Approach Category C per 14 CFR Part 97 and a grouping of aircraft with wingspans up to 118') with visibility minimums not lower than 1 mile, Table A7-8 shows the required Runway Centerline to Parallel Taxiway Centerline separation as 400'.

This proposed Modification of Standards (MOS) is to allow a Runway Centerline to Parallel Taxiway Centerline separation of 320', for a proposed full length parallel taxiway.

Due to operational constraints related to terrain and development around the airport, a site selection study for a replacement airport commenced in 2006. Ultimately seventeen (17) potential sites for a replacement airport were identified. An Environmental Impact Statement (EIS) commenced in September 2007 and a short list of three sites was identified. In August 2011 the EIS was suspended due to potential wildlife impacts and the estimated high cost of constructing a replacement airport. Selection of a suitable site and construction of a replacement airport is still considered the long term solution for Hailey and the surrounding area.

In the meantime, the existing Airport is required to meet a Congressional mandate that all airports certificated under 49 U.S.C. 44706 comply with FAA design standards for Runway Safety Areas (RSA) as required by 14 CFR Part 139 no later than December 31, 2015. Currently, the airport does not meet RSA design standards for the ARC C-III aircraft that regularly operate at SUN. RSA width of 500' (250' each side of runway centerline) is required. There are existing partial parallel taxiways on each side of Runway 13/31 that lie within the RSA. The runway centerline to parallel taxiway centerline separation for the taxiway to the east of the runway (Taxiway A) is 185'. The runway centerline to parallel taxiway centerline separation for the taxiway to the west of the runway (Taxiway B) is 250'. It is proposed to remove both of these taxiways, and to construct a new full length parallel taxiway at 320' runway centerline to taxiway centerline separation, to allow for construction of the standard RSA.

Several Modifications of Standards are necessary to allow the airport to continue to operate and meet ARC C-III RSA standards, as follows.

- MOS 1 - Runway Centerline to Parallel Taxiway Centerline (this MOS)
- MOS 2 – Parallel Taxiway Object Free Area Width
- MOS 3 – Runway Object Free Area Width
- MOS 4 – Runway Safety Area Grading

- MOS 5 – Runway Centerline to Aircraft Parking Area
- MOS 8 – Taxiway Width

Note: Two additional MOS were prepared to address existing runway/taxiway separation. MOS 6 was for existing separation with the ATCT in operation. MOS 7 was for existing separation without the ATCT in operation. MOS 6 and 7 are not related to the MOS required to construct a standard RSA (MOS 1-5, and 8).

Existing constraints hinder the airport's ability to meet the required Runway Centerline to Parallel Taxiway Centerline separation of 400'. Man-made constraints include State Highway 75, which runs along the eastern and northern airport boundaries, and high density residential development beyond State Highway 75. To the west of the runway there are numerous hangars, the Terminal Building, and airplane parking. The current airport property has insufficient space for relocating most of these facilities. Commercial, industrial, and lower density residential developments abut most of the airport's western property boundary. Due to cost, environmental, and community concerns, the airport's ability to acquire enough property to provide additional lateral separation not is likely.

The published pavement strength at SUN is 95,000 pounds. For the current fleet of all available aircraft, no aircraft with a maximum takeoff weight of 95,000 pounds or less has a wingspan greater than 100 feet. Therefore, at 320 feet runway to taxiway centerline separation, the wingtip of taxiing aircraft in the current fleet will not penetrate the runway safety area.

A Safety Risk Assessment was conducted at SUN on June 4-5, 2013. This MOS was considered by that panel, and given the existing controls of the published pavement strength limiting aircraft wingspan, the ATCT, overall low activity, and a proposed MOS to reduce parallel taxiway width to keep taxiing aircraft wingtips out of the RSA, the panel determined that the safety risk was acceptable. Additional benefits of the proposed improvements include: a full length parallel taxiway (eliminates back taxi on runway); removal of four (4) runway crossings; elimination of the existing LOA for Approach Category C commercial aircraft; a compliant RSA and Runway Obstacle Free Zone; and a clear Part 77 primary surface.

Effect and Duration of Modification of Standards:

This Modification to Standards will be re-evaluated a minimum of every five (5) years. Additional operational conditions may be necessary based on the Runway to Taxiway distance for larger aircraft based on a FAA national safety audit. Once completed, a national implementation plan will be developed to include SUN and may result in future changes to this MOS. We have determined that the modification will provide an acceptable level of safety, economy, durability, and workmanship.

Attachments: Modification of Standards 1 - Runway to Parallel Taxiway Separation
Existing Condition Drawing
Proposed Condition Drawing

Concur: _____ Date: 10/16/13
Manager, Seattle Flight Standards Division (ANM-200)

Concur: _____ Date: 10/24/13
Manager, Seattle Flight Procedures Office (AJV-W24)

Concur: _____ Date: 11/1/13
Director, Terminal Operations, Western Service Area (AJT-W)

Concur: _____ Date: 11-05-2013
Director, Technical Services, Western Service Area (AJW-W)

Approved: _____ Date: 10/7/2013
Manager, Helena Airports District Office

(Coordinate modification as follows: ANM-200, Rick Domingo, coordinate thru David Menzimer, AJV-W24 Jason Pitts, send directly to Jason, AJT-W Ron Fincher, send directly to Ron, AJW-W David Spencer, coordinate by sending to Kevin Zirger, Calvin Ngo, and Gloria Coleman)

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NORTHWEST MOUNTAIN REGION
AIRPORT IMPROVEMENT PROGRAM

MODIFICATION OF AIRPORT DESIGN STANDARDS

BACKGROUND

1. AIRPORT: **Friedman Memorial Airport**	2. LOCATION(CITY,STATE): **Hailey, ID**	3. LOC ID: **SUN**
4. EFFECTED RUNWAY/TAXIWAY: **RUNWAY 13-31** **TAXIWAY B**	5. APPROACH (EACH RUNWAY): **RW 13 VISUAL** **RW 31 NPI**	6. AIRPORT REF. CODE (ARC): **C-III**

7. DESIGN AIRCRAFT (EACH RUNWAY/TAXIWAY): **Bombardier Q-400 and Gulfstream G-V**

MODIFICATION OF STANDARDS

8. TITLE OF STANDARD BEING MODIFIED (CITE REFERENCE DOCUMENT):

Runway to Parallel Taxiway Separation, Advisory Circular 150/5300-13A, *Airport Design* (AC 150/5300-13A)

9. STANDARD/REQUIREMENT:

400 feet, per Table 3-8 on page 94 of AC 5300-13A.

10. PROPOSED:

320 feet.

11. EXPLAIN WHY STANDARD CANNOT BE MET (FAA ORDER 5300.1F):

In the airport's current configuration, relocation of Parallel Taxiway B to a separation of 400 feet would either require relocating the runway, adjacent Highway 75 and other facilities to the east or relocating all existing airport facilities to the west. Neither of these options are seen as practicable and providing a less than standard Runway to Parallel Taxiway Separation will provide an acceptable level of safety, based on the aircraft traffic at the airport.

12. DISCUSS VIABLE ALTERNATIVES (FAA ORDER 5300.1F):

The airport sponsor has considered three alternatives to improve Runway To Parallel Taxiway Separation at the airport. The first two alternatives, though viable, are not practicable, due to cost and environmental impact.

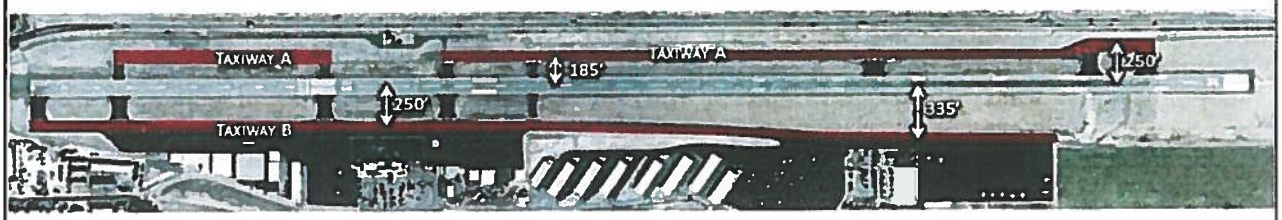
1. Relocate Runway And All Airport Facilities To The West – Not Practicable
   - Essentially reconstructs the entire airport west of existing facilities, including the terminal, FBO facilities, all hangars and maintenance/ARFF facilities.
   - Total estimated cost exceeds $144 million.
2. Relocate Runway and Highway to the East – Not Practicable
   - Requires relocation of approximately 2 miles of State Highway 75 to the east.
   - Requires acquisition of over 100 homes to accommodate relocated highway.
   - Idaho Transportation Department has completed an Environmental Impact Statement study for a proposed project on this highway, which identifies the following environmental impacts of the highway in this location, all of which would be exacerbated significantly by relocating the highway as described. Note that an environmental analysis for the proposed action relative to the airport has not been completed – these impacts are identified based on previous studies and would require further evaluation.
     - Historical Resources: Relocation of the highway would require removal of a railroad berm that has been identified as a potential historic structure.
     - Noise: The noise levels of a relocated highway may exceed those permitted by Federal Highway Administration guidelines and require mitigation. Mitigation is difficult at this location, due to local ordinances prohibiting construction of noise walls.
     - Environmental Justice: The adjacent neighborhood is high density, with relatively low incomes and a high minority population. Based on these factors, relocating the highway could induce environmental justice impacts.
   - Costs for this alternative are estimated to exceed $115 million.
3. Relocate Taxiway B to 320-feet Separation From Runway 13-31 and extend to Runway 31 end
   - A separation of 320' from Runway 13-31 to Taxiway B is the maximum distance the taxiway can be relocated without the need to remove numerous existing hangars/facilities (including the passenger terminal) and acquire land.
   - Requires reconstruction of Taxiway B.
   - Requires relocation of several hangars and terminal parking apron to accommodate aircraft parking and maneuvering.
   - Based on existing traffic at the airport, this will provide an acceptable level of safety. (See explanation below.)
   - Total estimated cost of approximately $9 million

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NORTHWEST MOUNTAIN REGION
AIRPORT IMPROVEMENT PROGRAM

MODIFICATION OF AIRPORT DESIGN STANDARDS

13. STATE WHY MODIFICATION WOULD PROVIDE ACCEPTABLE LEVEL OF SAFETY, ECONOMY, DURABILITY, AND WORKMANSHIP (FAA ORDER 5300.1F):

Currently the airport is served by partial parallel taxiways on each side of Runway 13-31. Taxiway A runs along the east side of the Runway at a separation of 185' to 250' from runway centerline. Taxiway B runs along the west side of the runway at a separation of 250' to 335'. There are also four (4) connecting taxiways crossing the runway from Taxiway A to Taxiway B. The current taxiway configuration is shown in the figure below:



As both Taxiway A and portions of Taxiway B are in the Runway Safety Area (RSA), a Letter of Agreement (LOA) between the ATCT, FAA and the airport is currently in place allowing Category C commercial aircraft to operate at the airfield. This LOA requires all taxiways to be sterilized during the operation of Category C commercial aircraft to provide a compliant RSA. This LOA does not include any provisions for the operation of general aviation Category C or D aircraft currently using the airfield.

In order to meet RSA standards, Taxiway A must be removed and Taxiway B relocated.

The published pavement strength at SUN is 95,000 pounds. For the current fleet of all available aircraft, no aircraft with a maximum takeoff weight of 95,000 pounds or less has a wingspan greater than 100 feet. Therefore, at 320 feet runway to taxiway centerline separation, the wingtip of aircraft in the current fleet will not penetrate the runway safety area.

A Safety Risk Assessment was conducted at the airport on June 4-5, 2013. This MOS was considered by that panel, and given the existing controls of the published pavement strength limiting aircraft wingspan, the ATCT, and overall low activity, the panel determined that the safety risk was acceptable.

The following additional measures will be taken to provide an acceptable level of safety.

- This MOS will be re-evaluated a minimum of every five (5) years starting with the MOS approval date.
- The following note will be added to the Airport/Facility Directory: *"PPR for aircraft with wingspan greater than 100 feet"*.
- Additional operational conditions may be necessary based on the Runway to Taxiway distance for larger aircraft based on a FAA national safety audit. Once completed, a national implementation plan will be developed to include SUN and may result in future changes to this MOS.

With these measures, not only does the relocation of Taxiway B to 320' provide an acceptable level of safety, the proposed improvements will also provide additional safety improvements including:

- Full Length Parallel Taxiway (Eliminate the need for back taxing)
- Removal of four (4) Runway crossings
- Compliant RSA, OFZ and Part 77 Primary Surface

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NORTHWEST MOUNTAIN REGION
AIRPORT IMPROVEMENT PROGRAM

MODIFICATION OF AIRPORT DESIGN STANDARDS

MODIFICATION: Runway to Parallel Taxiway Separation	LOCATION: Friedman Memorial Airport, Hailey, Idaho	PAGE 2 OF 2
14. SIGNATURE OF ORIGINATOR: Richard G. Baird	15. ORIGINATOR'S ORGANIZATION: Friedman Memorial Airport	16. TELEPHONE: (208) 788-9003
17. DATE OF LATEST FAA SIGNED ALP: March 31, 2010		
18. ADO RECOMMENDATION: Approve	19. SIGNATURE: Steve Engebrecht, Acting Manager	20. DATE: 8/27/2013

21. FAA DIVISIONAL REVIEW (AT, AF, FS):

ROUTING SYMBOL	SIGNATURE	DATE	CONCUR	NON-CONCUR
ANM-102		9/16/13	✓	
AJT2A3		9/17/13	✓	
AFS-408		9/17/13	✓	

COMMENTS:

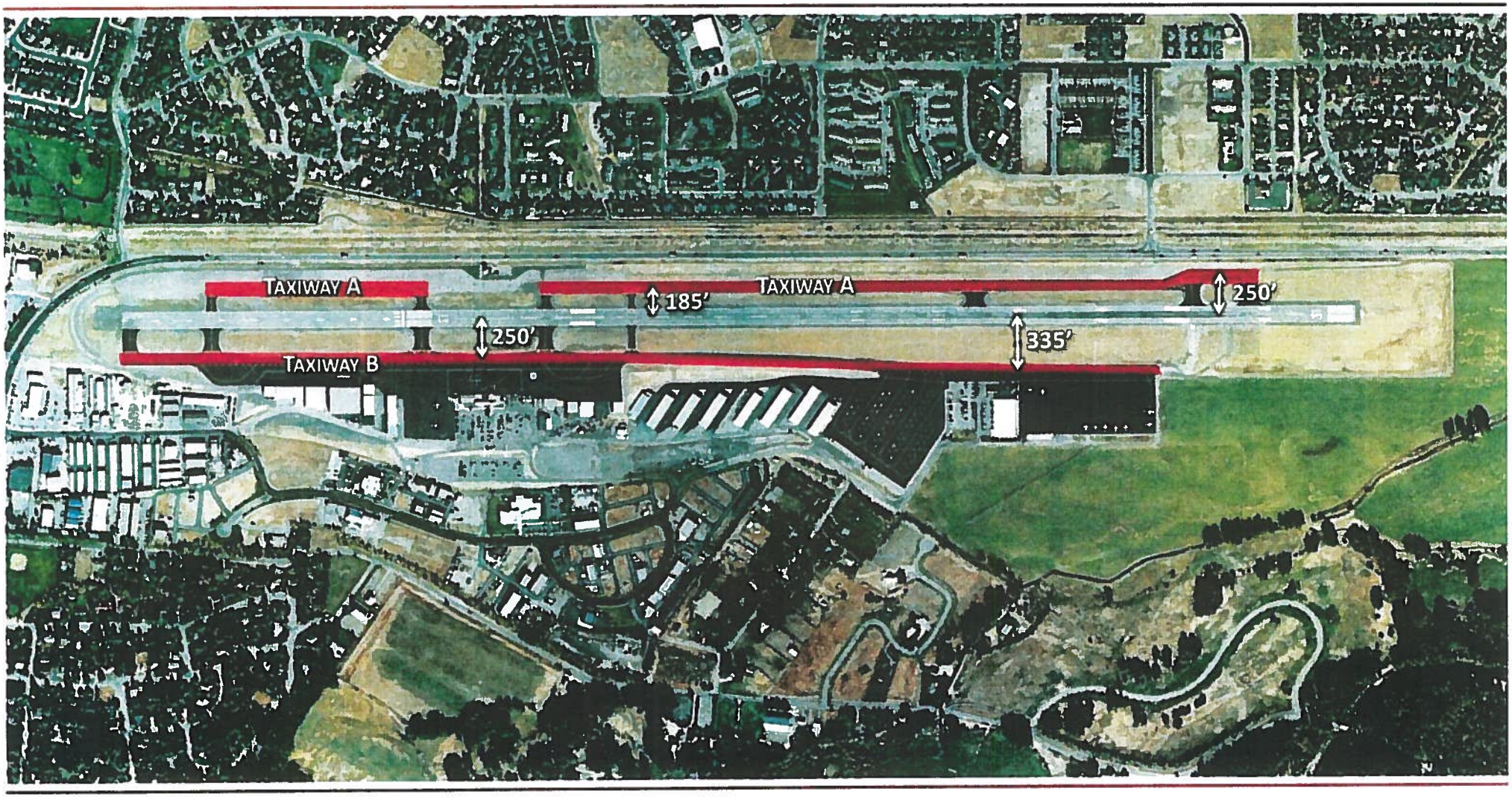
22. AIRPORTS' DIVISION FINAL ACTION:

☐ UNCONDITIONAL APPROVAL	☒ CONDITIONAL APPROVAL	☐ DISAPPROVAL

DATE: 9/17/13	SIGNATURE:	TITLE: MANAGER, AAS-100

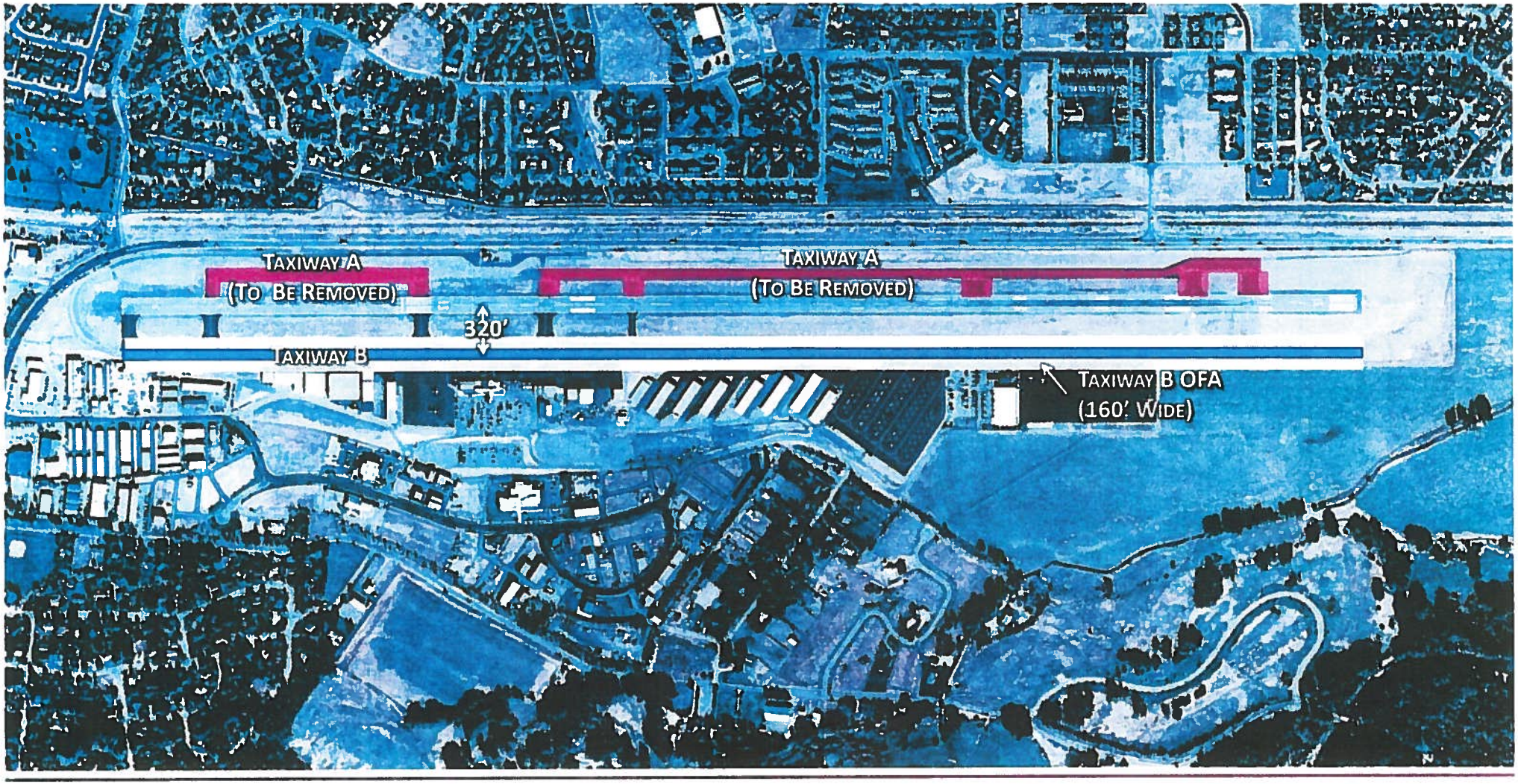
CONDITIONS OF APPROVAL:

CONDITIONS LISTED IN BOXES #10 & #13 ABOVE.



T-O ENGINEERS

MOS 1 – Runway to Parallel Taxiway Separation
Existing Condition



T-O ENGINEERS

MOS 1 – Runway to Parallel Taxiway Separation
Proposed Condition

Federal Aviation Administration

Memorandum

Date: October 7, 2013

To: The File

From: Steve Engebrecht, P.E., HLN-620, Helena ADO

Subject: Modification to Standards 2 – Parallel Taxiway Object Free Area Width:
Friedman Memorial Airport (SUN), Hailey, Idaho
Airspace Case 2013-ANM-1176-NRA

Design Standards Affected: Federal Aviation Administration Advisory Circular 150/5300-13A, *Airport Design*, Chapter 4, Table 4-1, Design standards based on Airplane Design Group (ADG), Taxiway Object Free Area Width.

Extent of Modification:

For Airplane Design Group III (a grouping of aircraft with wingspans up to 118'), Table 4-1 shows the required Taxiway Object Free Area width as 186'.

This proposed Modification of Standards (MOS) is to allow a Taxiway Object Free Area (TOFA) width of 160', for a proposed full length parallel taxiway constructed at 320' runway centerline to taxiway centerline separation (see MOS 1 - Runway Centerline to Parallel Taxiway Centerline).

Due to operational constraints related to terrain and development around the airport, a site selection study for a replacement airport commenced in 2006. Ultimately seventeen (17) potential sites for a replacement airport were identified. An Environmental Impact Statement (EIS) commenced in September 2007 and a short list of three sites was identified. In August 2011 the EIS was suspended due to potential wildlife impacts and the estimated high cost of constructing a replacement airport. Selection of a suitable site and construction of a replacement airport is still considered the long term solution for Hailey and the surrounding area.

In the meantime, the existing Airport is required to meet a Congressional mandate that all airports certificated under 49 U.S.C. 44706 comply with FAA design standards for Runway Safety Areas (RSA) as required by 14 CFR Part 139 no later than December 31, 2015. Currently, the airport does not meet RSA design standards for the ARC C-III aircraft that regularly operate at SUN. RSA width of 500' (250' each side of runway centerline) is required. There are existing partial parallel taxiways on each side of Runway 13/31 that lie within the RSA. The runway centerline to parallel taxiway centerline separation for the taxiway to the east of the runway (Taxiway A) is 185'. The runway centerline to parallel taxiway centerline separation for the taxiway to the west of the runway (Taxiway B) is 250'. It is proposed to remove both of these taxiways, and to construct a new full length parallel taxiway at 320' runway centerline to taxiway centerline separation, to allow for construction of the standard RSA.

Several Modifications of Standards are necessary to allow the airport to continue to operate and meet ARC C-III RSA standards, as follows.

- MOS 1 - Runway Centerline to Parallel Taxiway Centerline
- MOS 2 – Parallel Taxiway Object Free Area Width (this MOS)
- MOS 3 – Runway Object Free Area Width
- MOS 4 – Runway Safety Area Grading
- MOS 5 – Runway Centerline to Aircraft Parking Area
- MOS 8 – Taxiway Width

Note: Two additional MOS were prepared to address existing runway/taxiway separation. MOS 6 was for existing separation with the ATCT in operation. MOS 7 was for existing separation without the ATCT in operation. MOS 6 and 7 are not related to the MOS required to construct a standard RSA (MOS 1-5, and 8).

Existing constraints hinder the airport's ability to meet the required TOFA width of 186'. Man-made constraints include State Highway 75, which runs along the eastern and northern airport boundaries, and high density residential development beyond State Highway 75. To the west of the runway there are numerous hangars, the Terminal Building, and airplane parking. The current airport property has insufficient space for relocating most of these facilities. Commercial, industrial, and lower density residential developments abut most of the airport's western property boundary. Due to cost, environmental, and community concerns, the airport's ability to acquire enough property to provide additional lateral separation is not likely.

Per paragraph 404.(2). of AC 150/5300-13A, the TOFA was computed using Engineering Brief 78, *Linear Equations for Evaluating the Separation of Airplane Design Groups on Parallel Taxiways and Taxiways to Fixed/Movable Objects*, using a 100' wingspan. Based on the current fleet, no aircraft with a maximum takeoff weight less than the airport's published pavement strength has a wingspan greater than 100 feet. Therefore, the existing and anticipated aircraft traffic will include only aircraft with wingspans less than 100 feet. Should an aircraft with wingspan greater than 100' and with maximum takeoff weight less than the airport's published pavement strength enter the fleet, an operational procedure will be put in place.

By using the 100' wingspan with equation number 2 in Engineering Brief 78, the TOFA is calculated as follows: $S_2 = ((0.7 \times 100') + 10') \times 2 = 160'$.

Using the building line of the 6 private hangars on the north end of the airport, which are located 400' from the runway centerline, the taxiway centerline is required to be 400' – 80' = 320' from the runway centerline (see MOS 1 – Runway Centerline to Parallel Taxiway Centerline).

A Safety Risk Assessment was conducted at SUN on June 4-5, 2013. This MOS was considered by that panel, and as the proposed Taxiway OFA was calculated under the procedure outlined in EB 78, the panel determined that there was no risk associated with this proposed MOS.

Effect and Duration of Modification of Standards:

The duration of this Modification to Standards will be for the useful life of the project and the modification will be reevaluated prior to the next taxiway pavement rehabilitation project. We have determined that the modification will provide an acceptable level of safety, economy, durability, and workmanship.

Attachment: Modification of Standards 2 - Taxiway Object Free Area Width
Proposed Condition Drawing

Concur: _____ Date: 10/16/13
Manager, Seattle Flight Standards Division (ANM-200)
NORTHWEST MOUNTAIN REGION,

Concur: _____ Date: 10/30/13
Manager, Seattle Flight Procedures Office (AJV-W24)

Concur: For _____ Date: 11/1/13
Director, Terminal Operations, Western Service Area (AJT-W)

Concur: _____ Date: 11-6-13
for Director, Technical Services, Western Service Area (AJW-W)

Approved: _____ Date: 10/7/2013
Manager, Helena Airports District Office

(Coordinate modification as follows: ANM-200, Rick Domingo, coordinate thru David Menzimer, AJV-W24 Jason Pitts, send directly to Jason, AJT-W Ron Fincher, send directly to Ron, AJW-W David Spencer, coordinate by sending to Kevin Zirger, Calvin Ngo, and Gloria Coleman)

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NORTHWEST MOUNTAIN REGION
AIRPORT IMPROVEMENT PROGRAM

MODIFICATION OF AIRPORT DESIGN STANDARDS

BACKGROUND

1. AIRPORT: Friedman Memorial Airport	2. LOCATION(CITY,STATE): Hailey, ID	3. LOC ID: SUN
4. EFFECTED RUNWAY/TAXIWAY: TAXIWAY B	5. APPROACH (EACH RUNWAY): RW 13 VISUAL RW 31 NPI	6. AIRPORT REF. CODE (ARC): C-III

7. DESIGN AIRCRAFT (EACH RUNWAY/TAXIWAY): Bombardier Q-400 and Gulfstream G-V

MODIFICATION OF STANDARDS

8. TITLE OF STANDARD BEING MODIFIED (CITE REFERENCE DOCUMENT):

Parallel Taxiway Object Free Area (OFA), Advisory Circular 150/5300-13A, *Airport Design* (Advisory Circular 150/5300-13A)

9. STANDARD/REQUIREMENT:

186 feet per Table 4-1 on page 124 of AC 150/5300-13A.

10. PROPOSED:

160 feet.

11. EXPLAIN WHY STANDARD CANNOT BE MET (FAA ORDER 5300.1F):

In a separate modification request, the airport proposes relocating Taxiway B to 320 feet separation from Runway 13-31. In the airport's current configuration, relocation of Parallel Taxiway B to a separation of 320 feet with a full C-III Taxiway OFA of 186 feet would require significant modification to existing airport facilities, along with property acquisition and removal of adjacent buildings. This significant effort is not necessary, due to current and anticipated aircraft traffic at the airport.

12. DISCUSS VIABLE ALTERNATIVES (FAA ORDER 5300.1F):

The airport sponsors have considered two alternatives for Taxiway OFA on Taxiway B. Though both are viable, the first is not seen as practicable, due to the high costs and impacts, nor is it seen as necessary, due to the existing traffic at the airport.

1. Provide full C-III Taxiway OFA
   - Requires removal/relocation of 6 private hangars (1 of which is multi-unit condo hangars) on the north end of the airfield along with relocation of the FBO access at the south end of the airfield.
   - Several businesses northwest of the airport outside of the existing property boundary would need to be acquired and removed.
   - The estimated cost of removing the hangars and reconfiguring the FBO is at least $8.5 million. The estimated cost of acquiring the land northwest of the airport is $2.5 million, for a total cost in excess of $11 million.
2. Reduce Taxiway OFA to 160 feet.
   - Provides acceptable level of safety for aircraft that currently use the airport.
   - There is no cost associated with this alternative.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NORTHWEST MOUNTAIN REGION
AIRPORT IMPROVEMENT PROGRAM

MODIFICATION OF AIRPORT DESIGN STANDARDS

13. STATE WHY MODIFICATION WOULD PROVIDE ACCEPTABLE LEVEL OF SAFETY, ECONOMY, DURABILITY, AND WORKMANSHIP (FAA ORDER 5300.1F):

In the airport's current configuration, relocation of Parallel Taxiway B to a separation of 320 feet with a full C-III Taxiway OFA of 186 feet would require significant modification to existing airport facilities, along with property acquisition and removal of adjacent buildings. When considering the current and anticipated traffic at the airport, these improvements are not necessary. The published pavement strength for Runway 13-31 at SUN is 95,000 pounds. For the current fleet of all available aircraft, no aircraft with a maximum takeoff weight of 95,000 pounds or less has a wingspan of greater than 100 feet. Therefore, existing and anticipated aircraft traffic will include only aircraft with wingspans less than 100 feet. The relocation of Taxiway B to 320' with a Taxiway OFA of 160' is shown in the figure below.

Using equation #2 from Table 1 in Engineering Brief (EB) 78 and this maximum wingspan, an aircraft specific Taxiway OFA was calculated. Equation #2 from EB 78 gives the separation from centerline to an object as 0.7 x Wingspan + 10 feet. Using the 100' wingspan described above, this calculation results in a Taxiway OFA of 160 feet. For the aircraft that use the airport, this Taxiway OFA meets standards and therefore will provide an acceptable level of safety.

This MOS is based on the current fleet of all available aircraft and the airports published pavement strength. Should an aircraft with wingspan greater than 100' but takeoff weight less than the airport's published pavement strength enter the fleet an operational procedure will be put in place.

A Safety Risk Assessment was conducted at the airport on June 4-5, 2013. This MOS was considered by that panel and, as the proposed Taxiway OFA was calculated under the procedure outlined in EB 78, the panel determined that there was no risk associated with this proposed MOS.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NORTHWEST MOUNTAIN REGION
AIRPORT IMPROVEMENT PROGRAM

MODIFICATION OF AIRPORT DESIGN STANDARDS

MODIFICATION: Taxiway Object Free Area	LOCATION: Friedman Memorial Airport, Hailey, Idaho	PAGE 2 OF 2
14. SIGNATURE OF ORIGINATOR: Richard G Baird	15. ORIGINATOR'S ORGANIZATION: Friedman Memorial Airport	16. TELEPHONE: (208) 788-9003
17. DATE OF LATEST FAA SIGNED ALP: March 31, 2010		
18. ADO RECOMMENDATION: Approve	19. SIGNATURE: Steve Engebrecht, Acting Manager	20. DATE: 8/27/2013

21. FAA DIVISIONAL REVIEW (AT, AF, FS):

ROUTING SYMBOL	SIGNATURE	DATE	CONCUR	NON-CONCUR
AAS-100		9/12/2013	With Box 10 9/13	
ANM-220		10/13/2013	✓	

COMMENTS:

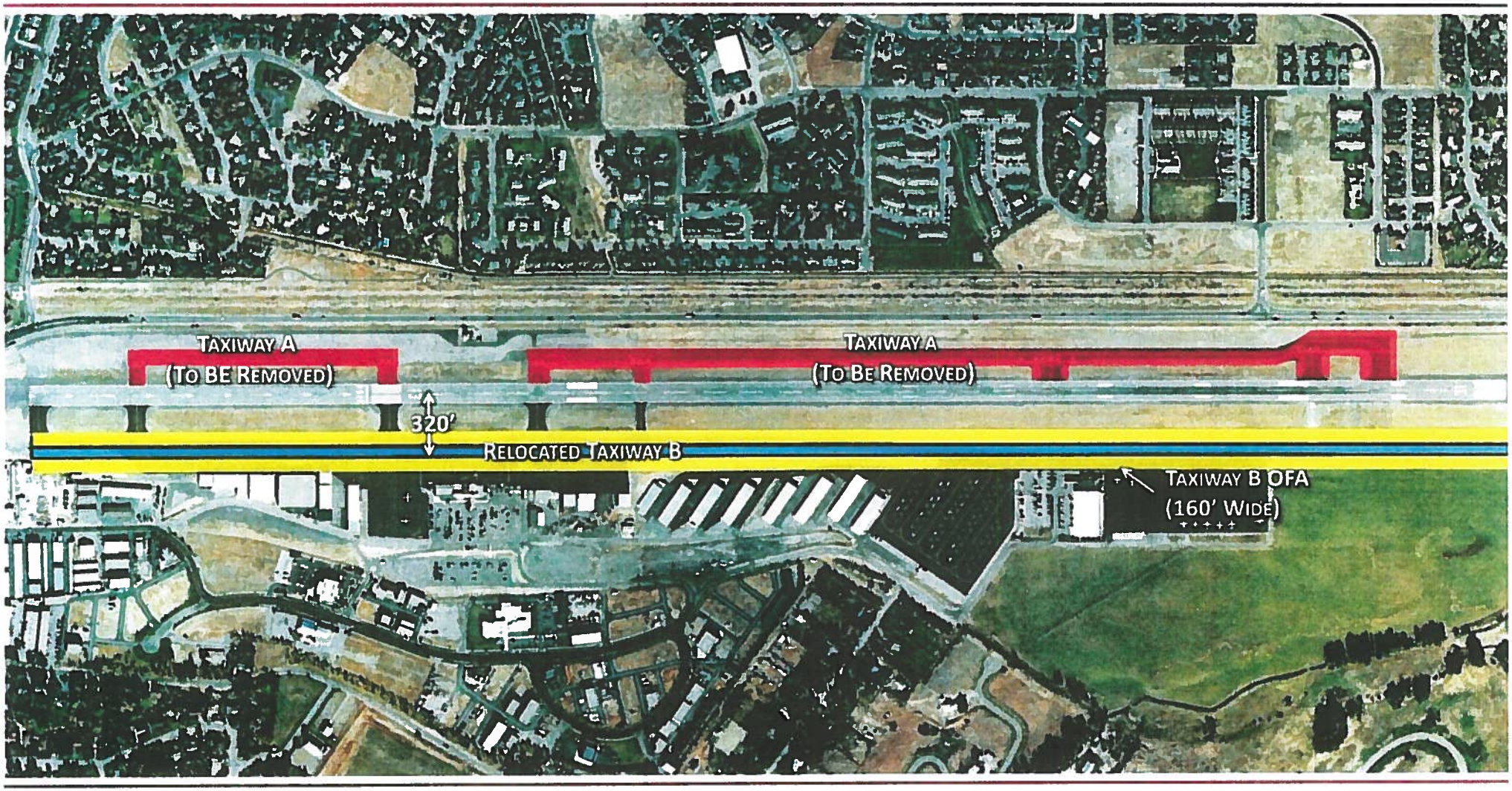
22. AIRPORTS' DIVISION FINAL ACTION:

☐ UNCONDITIONAL APPROVAL	☒ CONDITIONAL APPROVAL	☐ DISAPPROVAL

DATE: 9/13/13	SIGNATURE:	TITLE: MANAGER, AAS-100

CONDITIONS OF APPROVAL:

Boxes #10 and #13 CONTAINS THE CONDITIONS OF APPROVAL.



T-O ENGINEERS

MOS 2 – Parallel Taxiway Object Free Area

Federal Aviation Administration

Memorandum

Date: October 7, 2013

To: The File

From: Steve Engebrecht, P.E., HLN-620, Helena ADO

Subject: Modification to Standards 3 – Runway Object Free Area Width: Friedman Memorial Airport (SUN), Hailey, Idaho
Airspace Case 2013-ANM-1177-NRA

Design Standards Affected: Federal Aviation Administration Advisory Circular 150/5300-13A, *Airport Design*, Chapter 3, Paragraph 309 and Table A7-8, Runway Object Free Area Width.

Extent of Modification:

For Airport Reference Code (ARC) C-III aircraft (Aircraft Approach Category C per 14 CFR Part 97 and a grouping of aircraft with wingspans up to 118') with visibility minimums not lower than 1 mile, Table A7-8 shows the required Runway Object Free Area (ROFA) width as 800' (400' each side of runway centerline).

This proposed Modification of Standards (MOS) is to allow the following structures to remain in the Runway Object Free Area (ROFA):

- State Highway 75 – 275' to 345' from runway centerline
- Perimeter Fence – 320' from runway centerline
- Off airport buildings – 335' from runway centerline

Existing objects in the ROFA are planned for removal as follows:

- Aircraft parking in the ROFA will be removed no later than December 31, 2015.
- Hangar located in the ROFA will be removed no later than December 31, 2015.
- Propane tank at the base of the ATCT will be removed by December 31, 2013.
- Portion of airport perimeter fence less than 320' from runway centerline will be replaced with frangible fence no later than June 1, 2014.
- ATCT will be moved as soon as possible (within 10 years of approval of the MOS). A tower siting study is required prior to relocating the tower. In the meantime, the Airport Diagram and information in the Airport/Facility Directory and 5010 form will be updated to note the close proximity of the ATCT to the runway, and local outreach will be made to notify pilots of the close proximity of the ATCT to the runway.

Due to operational constraints related to terrain and development around the airport, a site selection study for a replacement airport commenced in 2006. Ultimately seventeen (17) potential sites for a replacement airport were identified. An Environmental Impact Statement (EIS) commenced in September 2007 and a short list of three sites was identified. In August 2011 the EIS was suspended due to potential wildlife impacts and the estimated high cost of constructing a replacement airport.

Selection of a suitable site and construction of a replacement airport is still considered the long term solution for Hailey and the surrounding area.

In the meantime, the existing Airport is required to meet a Congressional mandate that all airports certificated under 49 U.S.C. 44706 comply with FAA design standards for Runway Safety Areas (RSA) as required by 14 CFR Part 139 no later than December 31, 2015. Currently, the airport does not meet RSA design standards for the ARC C-III aircraft that regularly operate at SUN. RSA width of 500' (250' each side of runway centerline) is required.

Several Modifications of Standards are necessary to allow the airport to continue to operate and meet ARC C-III RSA standards, as follows.

- MOS 1 - Runway Centerline to Parallel Taxiway Centerline
- MOS 2 – Parallel Taxiway Object Free Area Width
- MOS 3 – Runway Object Free Area Width (this MOS)
- MOS 4 – Runway Safety Area Grading
- MOS 5 – Runway Centerline to Aircraft Parking Area
- MOS 8 – Taxiway Width

Note: Two additional MOS were prepared to address existing runway/taxiway separation. MOS 6 was for existing separation with the ATCT in operation. MOS 7 was for existing separation without the ATCT in operation. MOS 6 and 7 are not related to the MOS required to construct a standard RSA (MOS 1-5, and 8).

This MOS addresses an existing condition. The improvements required to meet the RSA standard will not change the existing ROFA width.

Existing constraints hinder the airport's ability to meet the required ROFA width of 800'. Man-made constraints include State Highway 75 and associated property boundary fence, which runs along the eastern and northern airport boundaries, and lie within the required ROFA. High density residential developments adjacent to State Highway 75 make significant relocation of the highway to the east unlikely.

To the west of the runway there are numerous hangars, the Terminal Building, FBO facilities, and airplane parking. The current airport property has insufficient space for relocating most of these facilities. Commercial, industrial, and lower density residential developments abut much of the airport's western property boundary. Removing the highway from the ROFA by shifting the runway to the west would require significant relocation of these existing airport facilities, as well as off-airport facilities.

Due to cost, environmental, and community concerns, the airport's ability to acquire enough property to provide additional lateral separation is not likely.

A Safety Risk Assessment was conducted at the airport on June 4-5, 2013. This MOS was considered by that panel. The panel determined that the safety risk was acceptable for:

- State Highway 75 at 275' to 345' from runway centerline. Due to the separation to this object and the low number of operations at SUN, the highway in this location was determined to be an acceptable risk. Continued efforts will be made to move the highway as far as possible from the runway during future project(s). The Airport Diagram and information in the Airport/Facilties Directory and 5010 form will be updated to show the location of the highway.
- Perimeter fence at 320' from runway centerline. Due to separation to this object and the low number of operations at SUN, this fence location is not deemed to be a significant safety risk.
- Off airport buildings at 335' from runway centerline. These buildings are outside the control of the airport, but most landings are from the south (opposite runway end from

buildings), most takeoffs are to the north (away from the buildings), the buildings are beyond the Runway 13 threshold, and the ground elevation of the buildings is significantly lower than the Runway 13 end elevation. Based on operations, building location, and the difference in elevation, these buildings were not deemed to be a credible hazard.

Effect and Duration of Modification of Standards:

The duration of this Modification to Standards will be for the useful life of the project and the modification will be reevaluated prior to the next runway pavement rehabilitation project. We have determined that the modification will provide an acceptable level of safety, economy, durability, and workmanship.

Attachment: Modification of Standard 3 – Runway Object Free Area Width
Existing Objects within ROFA Drawing
Proposed Condition Drawing

Concur: _____ Date: 10/16/13
Manager, ~~Seattle~~ NORTHWEST MOUNTAIN REGION, Flight Standards Division (ANM-200)

Concur: _____ Date: 10/24/13
Manager, Seattle Flight Procedures Office (AJV-W24)

Concur: For _____ Date: 11/1/13
Director, Terminal Operations, Western Service Area (AJT-W)

Concur: _____ Date: 11-6-13
Director, Technical Services, ~~Western~~ Service Area (AJW-W)

Approved: _____ Date: 10/7/2013
Manager, Helena Airports District Office

(Coordinate modification as follows: ANM-200, Rick Domingo, coordinate thru David Menzimer, AJV-W24 Jason Pitts, send directly to Jason, AJT-W Ron Fincher, send directly to Ron, AJW-W David Spencer, coordinate by sending to Kevin Zirger, Calvin Ngo, and Gloria Coleman)

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NORTHWEST MOUNTAIN REGION
AIRPORT IMPROVEMENT PROGRAM

MODIFICATION OF AIRPORT DESIGN STANDARDS

BACKGROUND

1. AIRPORT: **Friedman Memorial Airport**	2. LOCATION(CITY,STATE): **Hailey, ID**	3. LOC ID: **SUN**
4. EFFECTED RUNWAY/TAXIWAY: **RUNWAY 13-31**	5. APPROACH (EACH RUNWAY): **RW 13 VISUAL** **RW 31 NPI**	6. AIRPORT REF. CODE (ARC): **C-III**

7. DESIGN AIRCRAFT (EACH RUNWAY/TAXIWAY): **Bombardier Q-400 and Gulfstream G-V**

MODIFICATION OF STANDARDS

8. TITLE OF STANDARD BEING MODIFIED (CITE REFERENCE DOCUMENT):

Runway Object Free Area (OFA), Advisory Circular 150/5300-13A, *Airport Design* (AC 150/5300-13A)

9. STANDARD/REQUIREMENT:

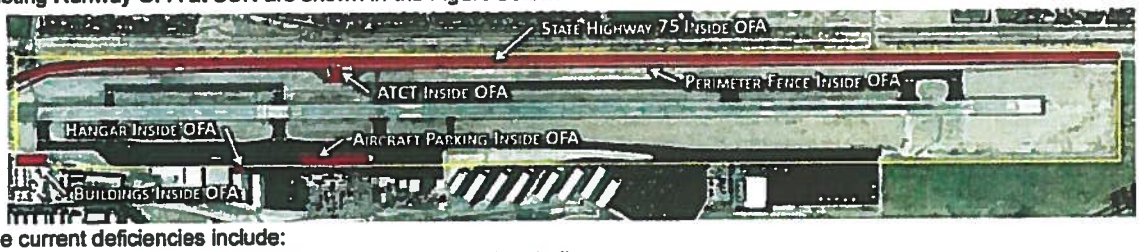
800 feet (400 foot either side of centerline) per Table 3-8 on page 94 of AC 150/5300-13A.

10. PROPOSED:

Varies see below.

11. EXPLAIN WHY STANDARD CANNOT BE MET (FAA ORDER 5300.1F):

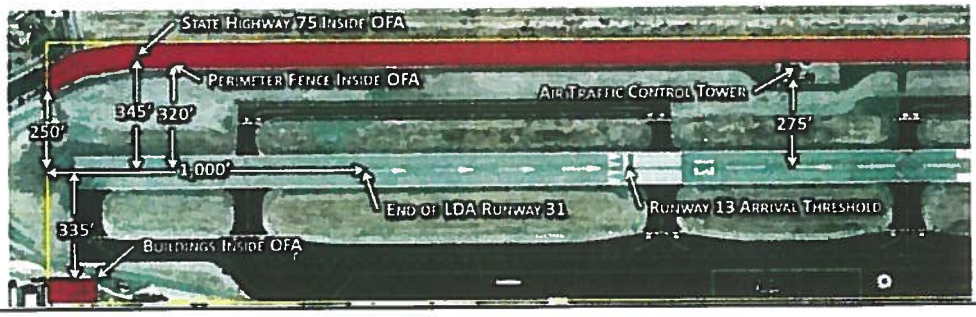
The FAA design standard for Runway OFA Width for ARC C-III is 800', centered on the runway. The deficiencies in the existing Runway OFA at SUN are shown in the Figure below:



The current deficiencies include:

- Aircraft Parking Inside OFA (To be relocated)
- Hangar Inside OFA (To be relocated)
- Air Traffic Control Tower (ATCT) Inside OFA (To be relocated)
- Propane Tank at Base of ATCT (To be relocated)
- Perimeter Fence Inside OFA (250'-320' from Runway CL)
- State Highway 75 Inside OFA (275'-345' from Runway CL)
- Off Airport Buildings Inside OFA (335' from Runway CL)

This MOS includes the Perimeter Fence, State Highway 75 and the Off Airport Buildings inside the OFA; all of which are located off or at the edge of airport property. The remainder of the OFA deficiencies are located on airport property and could be relocated. The ATCT will be relocated outside of the OFA once a feasible site for the tower is found through a tower siting study. State Highway 75 and the Perimeter Fence run parallel to Runway 13-31 from south to north until approximately 210' from the Runway 13 pavement end at which point they curve toward the runway until they are a minimum distance of 250' for the Perimeter Fence and 275' for State Highway 75 from the extended runway centerline. The following figure shows the deficiencies on the north end of the airfield in more detail:



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NORTHWEST MOUNTAIN REGION
AIRPORT IMPROVEMENT PROGRAM

MODIFICATION OF AIRPORT DESIGN STANDARDS

As SUN is currently configured using declared distances, the OFA for arrivals and departures in each direction have different deficiencies with the exception of the ATCT which penetrates both. The OFA to the east of Runway 13-31 for both arrivals and departures is penetrated by both State Highway 75 and the Perimeter Fence at 345' and 320' respectively. The OFA for Runway 13 departures and Runway 31 arrivals are penetrated to a greater degree at the north end of the airfield by the Perimeter Fence and State Highway 75 along with two buildings located off airport property. The deficiencies are summarized in the following table:

Runway OFA	State Highway 75	Perimeter Fence	Off Airport Buildings	ATCT
13 Arrivals	345'	320'	None	275'
13 Departures	275' to 345'	250' to 320'	335'	275'
31 Arrivals	275' to 345'	250' to 320'	335'	275'
31 Departures	345'	320'	None	275'

In order to meet OFA requirements either the runway and all airport facilities would have to be shifted to the West or State Highway 75 would have to be shifted to the East.

Neither of these options are seen as practicable and providing a less than standard OFA will provide an acceptable level of safety, based on the aircraft traffic at the airport.

12. DISCUSS VIABLE ALTERNATIVES (FAA ORDER 5300.1F):

The airport sponsor has considered three alternatives to provide a Runway OFA at the airport that complies with standards. The first two alternatives, though viable, are not practicable, due to cost and environmental impact.

1. Relocate Runway And All Airport Facilities To The West – Not Practicable
    - Essentially reconstructs the entire airport west of existing facilities, including the terminal, FBO facilities, all hangars and maintenance/ARFF facilities.
    - Total estimated cost exceeds $144 million.
2. Relocate Highway to the East – Not Practicable
    - Requires relocation of approximately 2 miles of State Highway 75 approximately 75 feet to the east.
    - A large neighborhood exists east of the airport in this location and relocating the highway will greatly increase the environmental impact of the highway on that neighborhood. Idaho Transportation Department has completed an Environmental Impact Statement study for a proposed project on this highway, which identifies the following environmental impacts of the highway in this location, all of which would be exacerbated significantly by relocating the highway as described. Note that an environmental analysis for the proposed action relative to the airport has not been completed – these impacts are identified based on previous studies and would require further evaluation.
        - Historical Resources: Relocation of the highway would require removal of a railroad berm that has been identified as a potential historic structure.
        - Noise: The noise levels of a relocated highway may exceed those permitted by Federal Highway Administration guidelines and require mitigation. Mitigation is difficult at this location, due to local ordinances prohibiting construction of noise walls.
        - Environmental Justice: The adjacent neighborhood is high density, with relatively low incomes and a high minority population. Based on these factors, relocating the highway could induce environmental justice impacts.
    - Costs for relocating the highway are estimated to exceed $17 million.
3. Allow Highway, Fence, and Off-Airport Buildings To Remain
    - Do not relocate State Highway 75.
    - Coordination will continue with the Idaho Transportation Department to determine the feasibility of shifting State Highway 75 away from the runway without causing significant environmental impacts.
    - Based on existing traffic at the airport, this will provide an acceptable level of safety. (See explanation below.)
    - Costs for this alternative is estimated to be $0

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NORTHWEST MOUNTAIN REGION
AIRPORT IMPROVEMENT PROGRAM

MODIFICATION OF AIRPORT DESIGN STANDARDS

13. STATE WHY MODIFICATION WOULD PROVIDE ACCEPTABLE LEVEL OF SAFETY, ECONOMY, DURABILITY, AND WORKMANSHIP (FAA ORDER 5300.1F):

Current aircraft traffic at SUN averages approximately 30,400 operations per year. Of those operations, less than 15% are C-I or larger, which require an 800' OFA. This low number of operations reduces the risk of an accident related to the sub-standard OFA. With the proposed improvements described below, this configuration will provide an acceptable level of safety for the traffic at the airport.

With the exception of the ATCT, the objects with the closest separations are all located on the north end of the airfield. At SUN, over 90% of operations arrive from and depart to the south, due to terrain in the vicinity of the airport. Though each of these objects penetrates the departure OFA for Runway 13, the risk of an incident is actually much lower as an aircraft would be taking off in the opposite direction of the objects. For arrivals on Runway 31, due to the use of declared distances, the objects are located a minimum of 1,000' from the end of the runway declared suitable for landing operations. Therefore, the risk of striking these objects is low. The individual objects are addressed below:

- Perimeter fence at 250', extreme northeast corner of the OFA. The fence in this area, located less than 320' from the Runway 13/31 centerline, will be replaced with frangible fence to reduce the severity of impact, should an aircraft depart from the runway and end up at this extreme edge of the OFA.
- Perimeter fence at 320' from runway centerline (along east edge of airport property). Due to the separation to this object and the low number of operations at SUN, this fence location is not deemed to be a significant safety risk.
- State Highway 75 at 275', extreme northeast corner of the OFA. Based on the location at the extreme of the OFA, this location is not deemed to be a high safety risk. Moving the Highway would require approval and participation from the Idaho Transportation Department. The airport has discussed moving the highway during a planned future project, and this may be possible. Continued efforts will be made to move the highway as far as possible from the runway. Additionally, the airport will work with the Idaho Transportation Department to add "Low Flying Aircraft" signs along the highway near the north end of the airport. The Airport Diagram and information in the Airport/Facilities Directory and 5010 form will be updated to show the location of the highway.
- State Highway 75 at 345, along east boundary of airport. Due to the separation to this object and the low number of operations at SUN, the highway in this location is not deemed to be a high safety risk. As discussed above, continued efforts will be made to move the highway as far as possible from the runway during future project(s).
- Off airport buildings at 335', northwest corner of the OFA. These buildings are outside the control of the airport, but 90% of landings are from the south (opposite runway end from buildings) and 90% of takeoffs are to the north (away from the buildings), the buildings are beyond the Runway 13 threshold, and the ground elevation at the location of the buildings is significantly lower than the Runway 13 end elevation. Based on operations, building location and this difference in elevation, these buildings are not deemed to be a credible hazard.
- Air Traffic Control Tower, 275'. The tower is seen as a safety risk and will be relocated as soon as possible (not ~~less~~ more than 10 years from the date of approval of this MOS.)

JA

Objects in the ROFA are planned for removal as follows:

- Aircraft parking in the ROFA will be removed no later than December 31, 2015.
- Hangar located in the ROFA will be removed no later than December 31, 2015.
- Propane tank at the base of the ATCT will be removed by December 31, 2013.
- ATCT will be moved as soon as possible. A tower siting study is required prior to relocating the tower. In the meantime, the Airport Diagram and information in the Airport/Facility Directory and 5010 form will be updated to note the close proximity of the ATCT to the runway, and local outreach will be made to notify pilots of the close proximity of the ATCT to the runway.

A Safety Risk Assessment was conducted at the airport on June 4-5, 2013. This MOS was considered by that panel and, with the proposed changes noted above, the panel determined that the safety risk was acceptable for all of the objects within the OFA, with the exception of the Air Traffic Control Tower. The panel recommended that the tower be relocated as soon as possible, for this reason.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NORTHWEST MOUNTAIN REGION
AIRPORT IMPROVEMENT PROGRAM

MODIFICATION OF AIRPORT DESIGN STANDARDS

MODIFICATION: Runway Object Free Area	LOCATION: Friedman Memorial Airport, Hailey, Idaho	PAGE 2 OF 2
14. SIGNATURE OF ORIGINATOR: Richard G Baird	15. ORIGINATOR'S ORGANIZATION: Friedman Memorial Airport	16. TELEPHONE: (208) 788-9003
17. DATE OF LATEST FAA SIGNED ALP: March 31, 2010		
18. ADO RECOMMENDATION: Approve	19. SIGNATURE: Steve Engebrecht, Acting Manager	20. DATE: 8/27/2013

21. FAA DIVISIONAL REVIEW (AT, AF, FS):

ROUTING SYMBOL	SIGNATURE	DATE	CONCUR	NON-CONCUR
AAS-100		9/12/2013	✓ with Comment Box #13	
ANM-220		10/5/2013	✓	

COMMENTS:

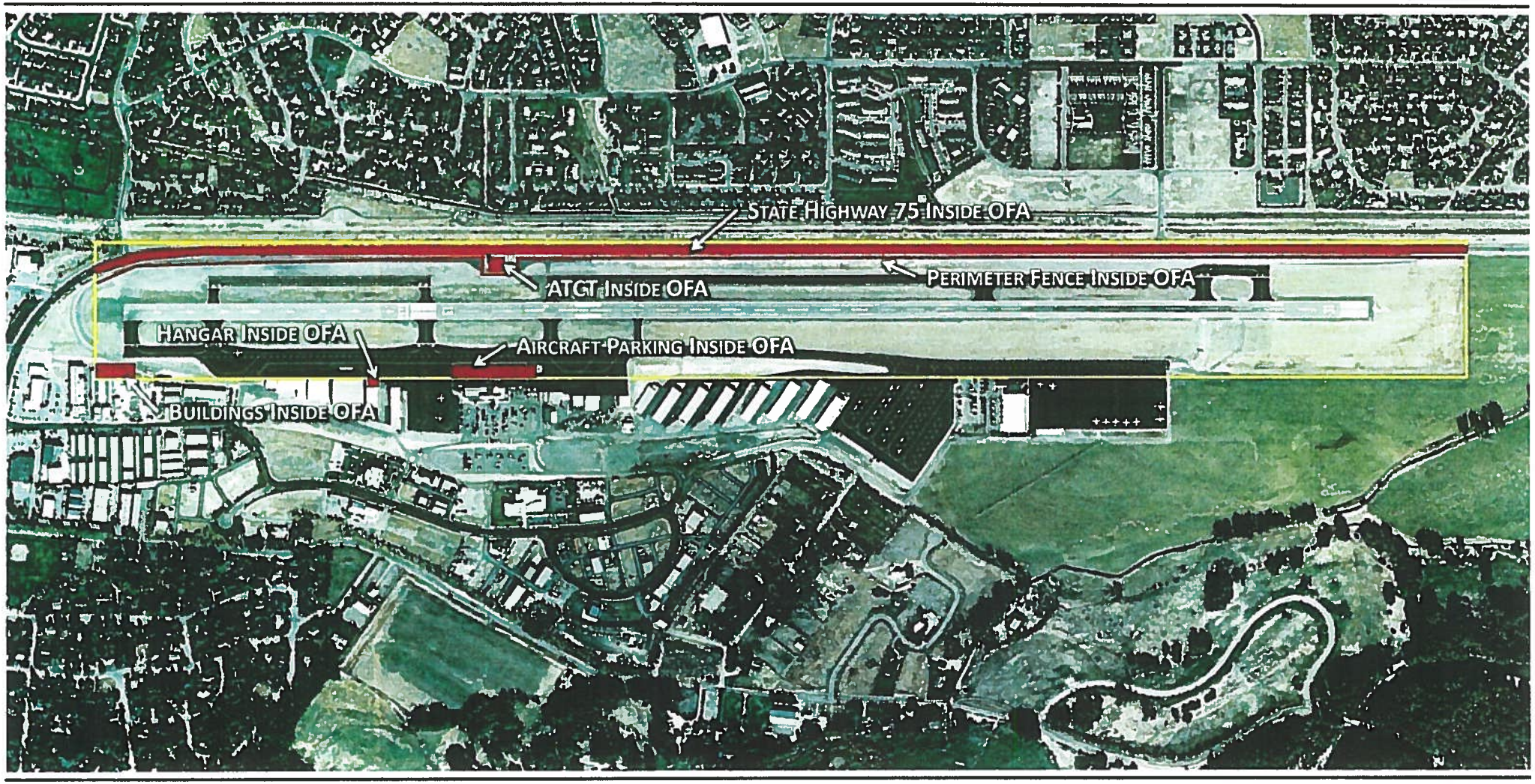
22. AIRPORTS' DIVISION FINAL ACTION:

☐ UNCONDITIONAL APPROVAL	☒ CONDITIONAL APPROVAL	☐ DISAPPROVAL

DATE: 9/16/13	SIGNATURE:	TITLE: MANAGER, AAS-100

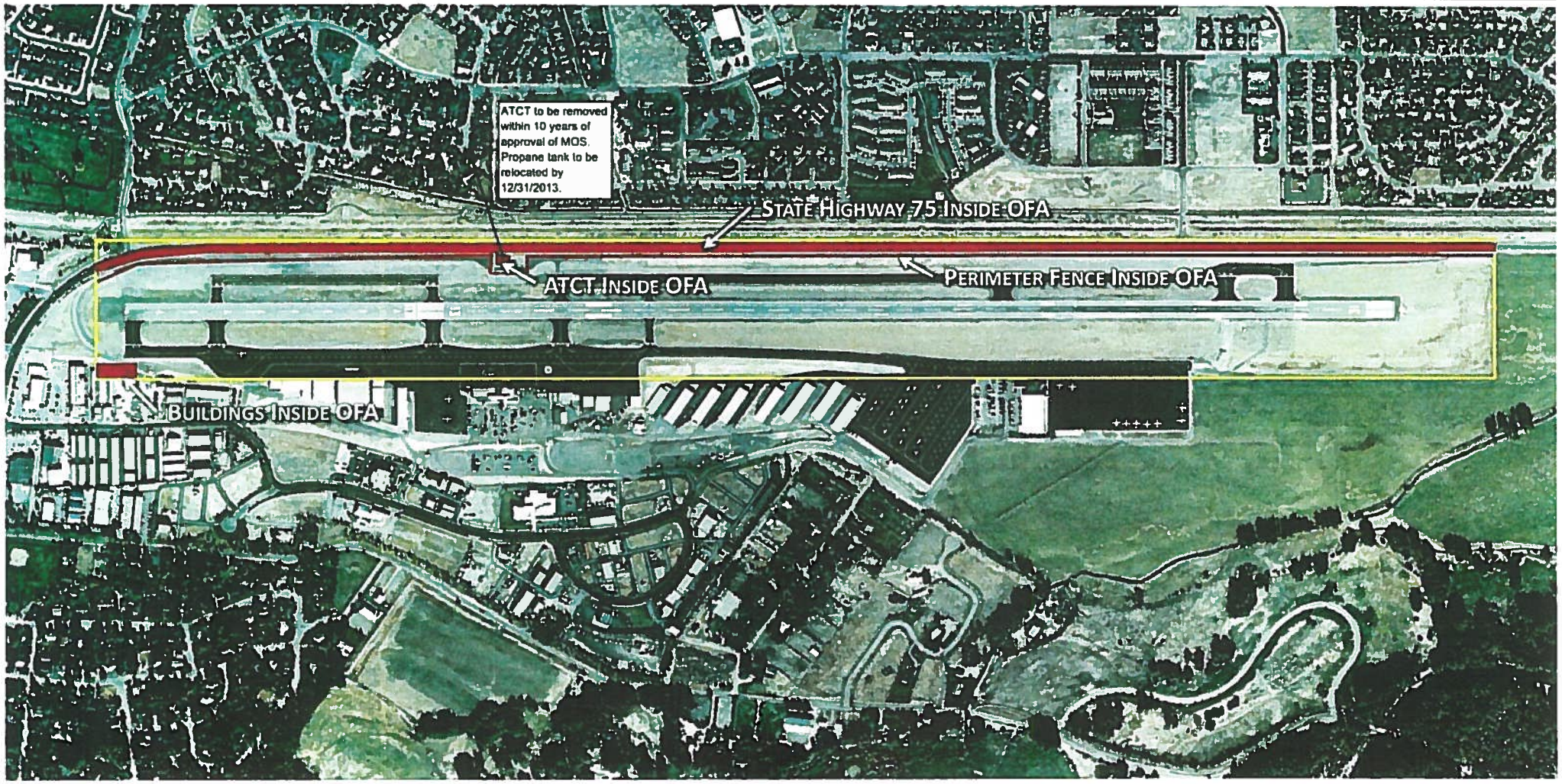
CONDITIONS OF APPROVAL:

APPROVAL CONDITIONS PER BOXES #10 & #13 ABOVE. ONLY CORRECTION IS THAT THE ATCT SHALL BE REMOVED AS SOON AS POSSIBLE, NO LATER ~~THAN~~ 10 YEARS' FROM THE DATE OF THIS MOS APPROVAL.



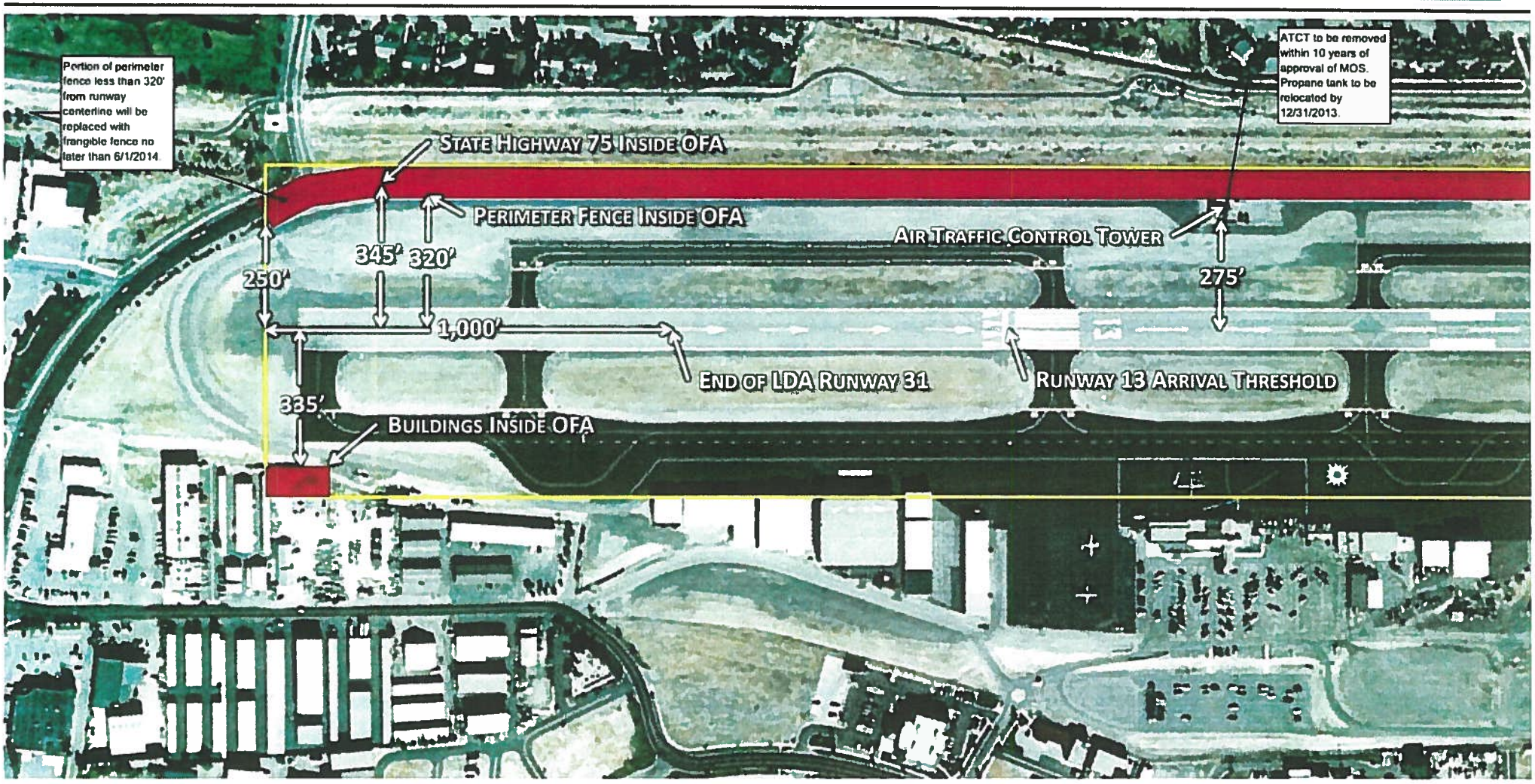
T-O ENGINEERS

MOS 3 – Runway Object Free Area Width
Existing Condition



T-O ENGINEERS

MOS 3 – Runway Object Free Area Width
Proposed Condition



T-O ENGINEERS

MOS 3 – Runway Object Free Area Width
Proposed Condition North End

Federal Aviation Administration

Memorandum

Date: October 7, 2013

To: The File

From: Steve Engebrecht, P.E., HLN-620, Helena ADO

Subject: Modification to Standards 4 – Runway Safety Area Grading: Friedman Memorial Airport (SUN), Hailey, Idaho
Airspace Case 2013-ANM-1178-NRA

Design Standards Affected: Federal Aviation Administration Advisory Circular 150/5300-13A, *Airport Design*, Chapter 3, Paragraph 313.d.(2), Table 3-3, Figure 3-23, Runway Safety Area Transverse Grades.

Extent of Modification:

For Aircraft Approach Category C aircraft (per 14 CFR Part 97), Table 3-3 and Figure 3-23 show required Runway Safety Area (RSA) transverse grades of 1.5% to 5.0% for the runway shoulder and 1.5% to 3.0% from the shoulder to the edge of the RSA. At SUN, the required shoulder width is 20' and the RSA width is 500'.

This proposed Modification of Standards (MOS) is to allow the existing RSA transverse grades of 0% to 1% to remain.

Due to operational constraints related to terrain and development around the airport, a site selection study for a replacement airport commenced in 2006. Ultimately seventeen (17) potential sites for a replacement airport were identified. An Environmental Impact Statement (EIS) commenced in September 2007 and a short list of three sites was identified. In August 2011 the EIS was suspended due to potential wildlife impacts and the estimated high cost of construction of a replacement airport. Selection of a suitable site and construction of a replacement airport is still considered the long term solution for Hailey and the surrounding area.

In the meantime, the existing Airport is required to meet a Congressional mandate that all airports certificated under 49 U.S.C. 44706 comply with FAA design standards for Runway Safety Areas (RSA) as required by 14 CFR Part 139 no later than December 31, 2015. Currently, the airport does not meet RSA design standards for the ARC C-III aircraft that regularly operate at SUN. RSA width of 500' (250' each side of runway centerline) is required. There are existing partial parallel taxiways on each side of Runway 13/31 that lie within the RSA. The runway centerline to parallel taxiway centerline separation for the taxiway to the east of the runway is 185'. The runway centerline to parallel taxiway centerline separation for the taxiway to the west of the runway is 250'. It is proposed to remove both of these taxiways, and to construct a new full length parallel taxiway at 320' runway centerline to taxiway centerline separation, to allow for construction of the standard RSA.

Several Modifications of Standards are necessary to allow the airport to continue to operate and meet ARC C-III RSA standards, as follows.

- MOS 1 - Runway Centerline to Parallel Taxiway Centerline
- MOS 2 – Parallel Taxiway Object Free Area Width
- MOS 3 – Runway Object Free Area Width
- MOS 4 – Runway Safety Area Grading (this MOS)

- MOS 5 – Runway Centerline to Aircraft Parking Area
- MOS 8 – Taxiway Width

Note: Two additional MOS were prepared to address existing runway/taxiway separation. MOS 6 was for existing separation with the ATCT in operation. MOS 7 was for existing separation without the ATCT in operation. MOS 6 and 7 are not related to the MOS required to construct a standard RSA (MOS 1-5, and 8).

This MOS addresses an existing condition. Existing soils at the airport drain very well and support aircraft wheel loading and airport support vehicles. The local climate is dry, with only 16 inches average annual precipitation. There is a storm drainage system on the airport that collects and removes surface runoff efficiently. The existing RSA drains extremely well, with no accumulation of surface water.

The RSA can be constructed to meet the transverse grade requirements. Meeting the RSA transverse grade requirement is estimated to cost $5,000,000, will require the airport's only runway to be closed for a lengthy period, and will make the task of meeting the RSA dimensional standards by December 31, 2015 more difficult. Furthermore, with the proposed full length parallel taxiway at 320' separation from the runway centerline (see MOS 1A – Runway Centerline to Parallel Taxiway Centerline), the Runway Object Free Area (ROFA) transverse grade requirement shown in Table 3-3 and Figure 3-23 of AC 150/5300-13A cannot be met. An additional Modification of Standards would be required for ROFA transverse grade.

Existing slopes steeper than the allowable transverse grade will be re-graded to comply with the standard. Other than the flatter transverse grades, the finished RSA will meet all requirements.

A Safety Risk Assessment was conducted at SUN on June 4-5, 2013. This MOS was considered by that panel, and determined that there was no risk associated with this proposed MOS.

Effect and Duration of Modification of Standards:

The duration of this Modification to Standards will be for the useful life of the project and the modification will be reevaluated prior to the next runway pavement rehabilitation project. The airport operator will monitor the RSA and inform ANM-600 to determine remedial action(s) when: actual ponding or water stains appear on or along Runway 13/31 four or more times per year; and when repeated ponding events of considerable size occur yearly in the RSA. We have determined that the modification will provide an acceptable level of safety, economy, durability, and workmanship.

Attachment: Modification of Standards 4 – Runway Safety Area Grading
Existing and Proposed Condition Drawing

Concur: _____ Date: 10/16/13
Manager, Seattle Flight Standards Division (ANM-200)

Concur: _____ Date: 10/24/13
NORTHWEST MOUNTAIN REGION
Manager, Seattle Flight Procedures Office (AJV-W24)

Concur: For _____ Date: 11/1/13
Director, Terminal Operations, Western Service Area (AJT-W)

Concur: _____ Date: 11-6-13
Director, Technical Services, Western Service Area (AJW-W)

Approved: _____ Date: 10/7/2013
Manager, Helena Airports District Office

(Coordinate modification as follows: ANM-200, Rick Domingo, coordinate thru David Menzimer, AJV-W24 Jason Pitts, send directly to Jason, AJT-W Ron Fincher, send directly to Ron, AJW-W David Spencer, coordinate by sending to Kevin Zirger, Calvin Ngo, and Gloria Coleman)

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NORTHWEST MOUNTAIN REGION
AIRPORT IMPROVEMENT PROGRAM

MODIFICATION OF AIRPORT DESIGN STANDARDS

BACKGROUND

1. AIRPORT: **Friedman Memorial Airport**	2. LOCATION(CITY,STATE): **Hailey, ID**	3. LOC ID: **SUN**
4. EFFECTED RUNWAY/TAXIWAY: **RUNWAY 13-31**	5. APPROACH (EACH RUNWAY): **RW 13 VISUAL RW 31 NPI**	6. AIRPORT REF. CODE (ARC): **C-III**

7. DESIGN AIRCRAFT (EACH RUNWAY/TAXIWAY): **Bombardier Q-400 and Gulfstream G-V**

MODIFICATION OF STANDARDS

8. TITLE OF STANDARD BEING MODIFIED (CITE REFERENCE DOCUMENT):

Runway Safety Area (RSA) Grading, Advisory Circular 150/5300-13A, *Airport Design* (AC 150/5300-13A)

9. STANDARD/REQUIREMENT:

Per Figure 3-23 on page 82 of AC 5300-13, the RSA transverse grades vary from 1.5% to 3% from the edge of runway shoulder down to the edge of the runway safety area.

10. PROPOSED:

Existing transverse grades in the north half of the airport vary from 0% to 1% to remain.

11. EXPLAIN WHY STANDARD CANNOT BE MET (FAA ORDER 5300.1F):

In order to meet the RSA grading standards, approximately 250,000 cubic yards of excavation would be disposed of offsite in addition to approximately 50,000 yards of onsite embankment. The estimated cost of disposing of the material offsite alone is over $3.7 million dollars. In the mountain environment of Hailey, the project would need to occur in the summer during peak travel times and the airport's single runway would need to be shut down for approximately 90 days to complete the work. The closure of the airport for an extended period of time would have significant negative economic impacts on the community.

12. DISCUSS VIABLE ALTERNATIVES (FAA ORDER 5300.1F):

The airport sponsor has considered two alternatives to meet this standard. Though viable, the first alternative is not seen as practicable due to cost and operational impacts relative to the improvement in safety.

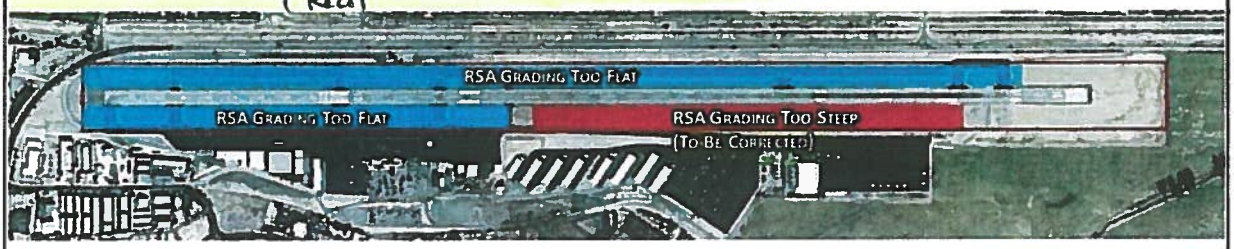
1. Grade the RSA so transverse grades are -1.5% to -3%.
    - Requires excavation of over 300,000 cubic yards of material, over 250,000 of which would need to be disposed of off-site.
    - Additional cost of over $3.7 million to dispose of material off site.
    - Additional cost of $1.5 million to relocate storm drainage system.
    - Would require runway shut down of up to 90 days during summer months, with a huge negative impact to the airport and local economy.
2. Allow existing grades of 0% to +1% to remain.
    - Provides acceptable level of safety, as described below.
    - No operational or cost impacts.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NORTHWEST MOUNTAIN REGION
AIRPORT IMPROVEMENT PROGRAM

MODIFICATION OF AIRPORT DESIGN STANDARDS

13. STATE WHY MODIFICATION WOULD PROVIDE ACCEPTABLE LEVEL OF SAFETY, ECONOMY, DURABILITY, AND WORKMANSHIP (FAA ORDER 5300.1F):

The following figure shows the areas on the airfield that do not currently meet RSA transverse grading standards. Note that areas where the existing grade is steeper than standard will be filled to provide grades that meet standards.



From AC 150/5300-13A, the purpose of the RSA is to *"enhance the safety of aircraft which undershoot, overrun or veer off the runway, and it provides greater accessibility for fire fighting and rescue equipment during such incidents."* The distance an aircraft departs from the runway is affected by three (3) major elements: weight of the aircraft, speed of the aircraft and RSA gradient. The third variable and the subject of this modification, the RSA gradient, affects the rate at which an aircraft slows after departing the runway. The steeper the gradient the longer it will take for an aircraft to stop. The existing transverse RSA gradients at SUN are flatter than standard; meaning an aircraft would actually come to a stop sooner if all other variables were equal. Paragraph 307 f in AC 5300-13 describes this condition: *"Keeping negative grades to the minimum practicable contributes to the effectiveness of the RSA."* Though flatter than standard, the RSA at SUN is graded smoothly and is capable of safely accommodating an aircraft without damage, in the case of a veer off.

The negative aspect of gradients flatter than standard are the inability to adequately drain the RSA during rainfall events. The existing RSA at SUN drains extremely well, with no accumulation of water. Existing soils are typically poorly-graded gravels (USCS classification GP or GP-GM) that drain very well. The local climate is dry, with an average annual rainfall of only 16 inches. In addition, the runway is equipped with a storm drainage system that collects and removes drainage efficiently. The following table summarizes the design requirements that would be met at SUN:

RSA Requirement	Standard Met
Cleared and Graded	Yes
Drained by grading or storm sewers	Yes
Capable of supporting SRE, ARFF and aircraft	Yes
Free of objects	Yes

As the proposed RSA at SUN will meet the RSA requirements as shown above, the grades flatter than standard will provide an acceptable level of safety and result in significant cost and operational savings.

A Safety Risk Assessment was conducted at the airport on June 4-5, 2013. This MOS was considered by that panel and, due to the dry environment and free-draining soils noted above, the panel determined that there was no risk associated with this proposed MOS.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NORTHWEST MOUNTAIN REGION
AIRPORT IMPROVEMENT PROGRAM

MODIFICATION OF AIRPORT DESIGN STANDARDS

MODIFICATION: Runway Safety Area Transverse Gradient	LOCATION: Friedman Memorial Airport, Hailey, Idaho	PAGE 2 OF 2
14. SIGNATURE OF ORIGINATOR: Richard G. Baird	15. ORIGINATOR'S ORGANIZATION: Friedman Memorial Airport	16. TELEPHONE: (208) 788-9003
17. DATE OF LATEST FAA SIGNED ALP: March 31, 2010		
18. ADO RECOMMENDATION: Approve	19. SIGNATURE: Steve Engebrecht, Acting Manager	20. DATE: 8/27/2013

21. FAA DIVISIONAL REVIEW (AT, AF, FS):

ROUTING SYMBOL	SIGNATURE	DATE	CONCUR	NON-CONCUR
AAS-100	Jason Lyon	9/12/2013	With comments See Box #22	
AAS-300		9/13/13	✓	
ANM-220		10/13/2013	✓	

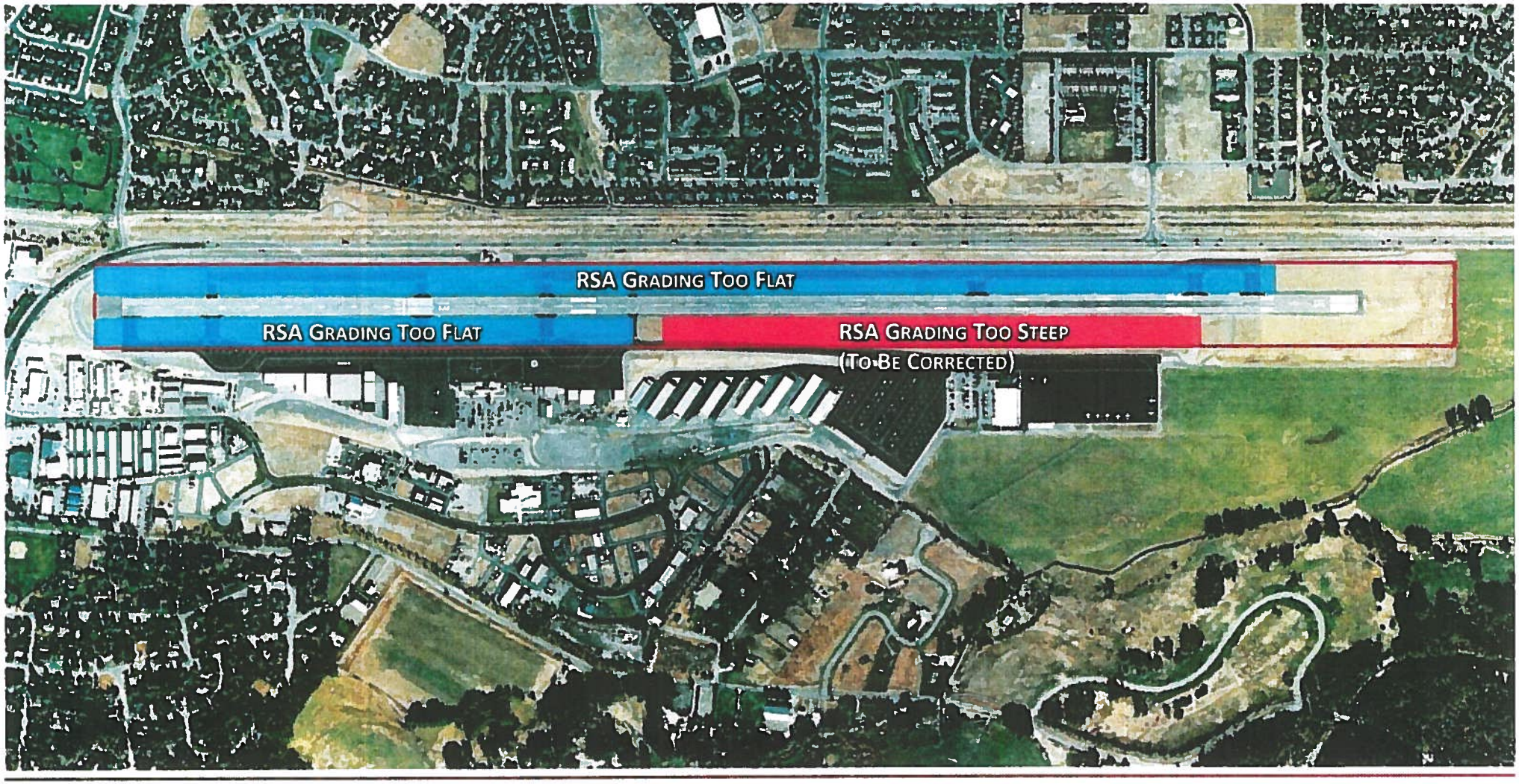
COMMENTS:

22. AIRPORTS' DIVISION FINAL ACTION:

☐ UNCONDITIONAL APPROVAL	☒ CONDITIONAL APPROVAL	☐ DISAPPROVAL
DATE: 9/13/13	SIGNATURE:	TITLE: AAS-100 MANAGER

CONDITIONS OF APPROVAL:

1. Red-colored sections of the runway safety area identified by MOS Box #13 are corrected (regraded) to the runway safety area surface grading standards.
2. The airport operator will inform ANM-600 to determine remedial action(s) when:
   (a) Actual ponding or water stains appear on or along Rwy 13/31 four or more times a year.
   (b) Repeated ponding events of considerable size occur yearly in the runway safety area.



MOS 4 – Runway Safety Area Grading

Federal Aviation Administration

Memorandum

Date: October 7, 2013

To: The File

From: Steve Engebrecht, P.E., HLN-620, Helena ADO

Subject: Modification to Standards 5 – Runway Centerline to Aircraft Parking Area:
Friedman Memorial Airport (SUN), Hailey, Idaho
Airspace Case 2013-ANM-1179-NRA

Design Standards Affected: Federal Aviation Administration Advisory Circular 150/5300-13A, *Airport Design*, Chapter 3, Paragraph 321.a.(3), and Table A7-8, Runway Centerline to Aircraft Parking Area.

Extent of Modification:

For Airport Reference Code (ARC) C-III aircraft (Aircraft Approach Category C per 14 CFR Part 97 and a grouping of aircraft with wingspans up to 118') with visibility minimums not lower than 1 mile, Table A7-8 shows the required Runway Centerline to Aircraft parking Area separation as 500'.

This proposed Modification of Standards (MOS) is to allow a Runway Centerline to Aircraft Parking Area separation of 400'.

Due to operational constraints related to terrain and development around the airport, a site selection study for a replacement airport commenced in 2006. Ultimately seventeen (17) potential sites for a replacement airport were identified. An Environmental Impact Statement (EIS) commenced in September 2007 and a short list of three sites was identified. In August 2011 the EIS was suspended due to potential wildlife impacts and the estimated high cost of constructing a replacement airport. Selection of a suitable site and construction of a replacement airport is still considered the long term solution for Hailey and the surrounding area.

In the meantime, the existing Airport is required to meet a Congressional mandate that all airports certificated under 49 U.S.C. 44706 comply with FAA design standards for Runway Safety Areas (RSA) as required by 14 CFR Part 139 no later than December 31, 2015. Currently, the airport does not meet RSA design standards for the ARC C-III aircraft that regularly operate at SUN. RSA width of 500' (250' each side of runway centerline) is required.

Several Modifications of Standards are necessary to allow the airport to continue to operate and meet ARC C-III RSA standards, as follows.

- MOS 1 - Runway Centerline to Parallel Taxiway Centerline
- MOS 2 – Parallel Taxiway Object Free Area Width
- MOS 3 – Runway Object Free Area Width
- MOS 4 – Runway Safety Area Grading
- MOS 5 – Runway Centerline to Aircraft Parking Area (this MOS)
- MOS 8 – Taxiway Width

Note: Two additional MOS were prepared to address existing runway/taxiway separation. MOS 6 was for existing separation with the ATCT in operation. MOS 7 was for existing separation without the ATCT in operation. MOS 6 and 7 are not related to the MOS required to construct a standard RSA (MOS 1-5, and 8).

This MOS addresses an existing condition. Currently, aircraft park within 400' of the runway centerline. The proposed full length parallel taxiway at 320' separation from the runway centerline (MOS 1 – Runway Centerline to Parallel Taxiway Centerline), and its proposed Object Free Area width of 160' (MOS 2 – Parallel Taxiway Object Free Area Width) eliminate the ability of any portion of a parked aircraft to be closer than 400' to the runway centerline. The non-movement area boundary markings will be relocated to 400' from the runway centerline under this proposed MOS.

Existing constraints hinder the airport's ability to meet the required Runway Centerline to Aircraft Parking Area separation of 500'. Man-made constraints include State Highway 75, which runs along the eastern and northern airport boundaries, and high density residential development beyond State Highway 75. To the west of the runway there are numerous hangars, the Terminal Building, and airplane parking. The current airport property has insufficient space for relocating most of these facilities. Commercial, industrial, and lower density residential developments abut most of the airport's western property boundary. Due to cost, environmental, and community concerns, the airport's ability to acquire enough property to provide additional lateral separation is not likely.

This proposed MOS eliminates existing aircraft parking within 400' of the runway centerline, prevents parked aircraft from penetrating the Part 77 primary and transitional surfaces, and prevents aircraft parking within the Runway and Taxiway Object Free Areas and Runway Obstacle Free Zone.

A Safety Risk Assessment was conducted at the airport on June 4-5, 2013. This MOS was considered by that panel and, as the proposed aircraft parking configuration met the intent of the standard (no part of a parked aircraft within the ROFA or penetrating the Runway Obstacle Free Zone), the panel determined that the risk associated with this proposed MOS was acceptable.

Effect and Duration of Modification of Standards:

The duration of this Modification to Standards will be for the useful life of the project and the modification will be reevaluated prior to the next taxiway pavement rehabilitation project. We have determined that the modification will provide an acceptable level of safety, economy, durability, and workmanship.

Attachment: Modification of Standards 5 – Runway Centerline to Aircraft Parking Area
Existing Condition Drawing
Proposed Condition Drawing

Concur: _____ Date: 10/16/13
Manager, Seattle Flight Standards Division (ANM-200)
NORTHWEST MOUNTAIN REGION

Concur: _____ Date: 10/24/13
Manager, Seattle Flight Procedures Office (AJV-W24)

Concur: For Mark Berry _____ Date: 11/1/13
Director, Terminal Operations, Western Service Area (AJT-W)

Concur: _____ Date: 11-6-13
Director, Technical Services, Western Service Area (AJW-W)

Approved: _____ Date: 10/7/2013
Manager, Helena Airports District Office

(Coordinate modification as follows: ANM-200, Rick Domingo, coordinate thru David Menzimer, AJV-W24 Jason Pitts, send directly to Jason, AJT-W Ron Fincher, send directly to Ron, AJW-W David Spencer, coordinate by sending to Kevin Zirger, Calvin Ngo, and Gloria Coleman)

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NORTHWEST MOUNTAIN REGION
AIRPORT IMPROVEMENT PROGRAM

MODIFICATION OF AIRPORT DESIGN STANDARDS

BACKGROUND

1. AIRPORT: **Friedman Memorial Airport**	2. LOCATION(CITY,STATE): **Hailey, ID**	3. LOC ID: **SUN**
4. EFFECTED RUNWAY/TAXIWAY: **RUNWAY 13-31**	5. APPROACH (EACH RUNWAY): **RW 13 VISUAL** **RW 31 NPI**	6. AIRPORT REF. CODE (ARC): **C-III**

7. DESIGN AIRCRAFT (EACH RUNWAY/TAXIWAY): **Bombardier Q-400 and Gulfstream G-V**

MODIFICATION OF STANDARDS

8. TITLE OF STANDARD BEING MODIFIED (CITE REFERENCE DOCUMENT):

Runway to Aircraft Parking Area, Advisory Circular 150/5300-13A, *Airport Design* (Advisory Circular 150/5300-13A)

9. STANDARD/REQUIREMENT:

500 feet per Table 3-8 on page 94 of AC 150/5300-13A.

10. PROPOSED:

400 feet

11. EXPLAIN WHY STANDARD CANNOT BE MET (FAA ORDER 5300.1F):

In the airport's current configuration, relocation of aircraft parking area to a separation of 500 feet would either require the reconfiguration of all airfield facilities on the west side of the airport or relocating the runway and Highway 75 to the east to provide the required separation. Neither of these options are seen as practicable and providing a separation of 400 feet between Runway 13-31 and Aircraft Parking will provide an acceptable level of safety, based on the aircraft traffic at the airport.

12. DISCUSS VIABLE ALTERNATIVES (FAA ORDER 5300.1F):

The airport sponsor has considered three alternatives to provide meet or improve compliance with standards at the airport, including Runway to Aircraft Parking Separation. The first two alternatives, though viable, are not practicable, due to cost and environmental impact.

1. Relocate Terminal and Aircraft Parking To The Southwest – Not Necessary
    - Acquire 30 Acres of land, relocate terminal building and access road, extend utilities and construct 50,000 SY of aircraft parking
    - Total estimated cost exceeds $30 million.
2. Relocate Runway and Highway to the East – Not Practicable
    - Requires relocation of approximately 2 miles of State Highway 75 approximately 75 feet to the east.
    - A large neighborhood exists east of the airport in this location and relocating the highway will greatly increase the environmental impact of the highway on that neighborhood. Idaho Transportation Department has completed an Environmental Impact Statement study for a proposed project on this highway, which identifies the following environmental impacts of the highway in this location, all of which would be exacerbated significantly by relocating the highway as described. Note that an environmental analysis for the proposed action relative to the airport has not been completed – these impacts are identified based on previous studies and would require further evaluation.
        - Historical Resources: Relocation of the highway would require removal of a railroad berm that has been identified as a potential historic structure.
        - Noise: The noise levels of a relocated highway may exceed those permitted by Federal Highway Administration guidelines and require mitigation. Mitigation is difficult at this location, due to local ordinances prohibiting construction of noise walls.
        - Environmental Justice: The adjacent neighborhood is high density, with relatively low incomes and a high minority population. Based on these factors, relocating the highway could induce environmental justice impacts.
    - Costs for relocating the Runway and Highway are estimated to exceed $119 million.
3. Reconfigure Aircraft Parking to Provide 400 Feet Separation
    - Can be accomplished along with other proposed standards improvements, without additional cost or environmental impact.
    - Provides acceptable level of safety.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NORTHWEST MOUNTAIN REGION
AIRPORT IMPROVEMENT PROGRAM

MODIFICATION OF AIRPORT DESIGN STANDARDS

13. STATE WHY MODIFICATION WOULD PROVIDE ACCEPTABLE LEVEL OF SAFETY, ECONOMY, DURABILITY, AND WORKMANSHIP (FAA ORDER 5300.1F):

Currently at SUN, multiple aircraft parking areas are located within 500' of the runway centerline including the terminal area parking, located as close as 320' from the runway centerline. The commercial aircraft currently using the terminal area include the Bombardier Q400, the Embraer EMB120 (Brasilia) and the Canadair Regional Jet 700. Various general aviation aircraft including the Gulfstream V and Global Express currently park within 500' of the runway centerline as well. The majority of general aviation aircraft currently park at 400' or greater from runway centerline. The current aircraft parking is shown in the figure below:

According to AC 150/5300-13A Paragraph 321 a (3), "Runway to aircraft parking area separation is determined by the landing and takeoff flight path profiles and physical characteristics of the aircraft. The runway to parking area separation standard precludes any part of a parked aircraft (tail, wingtip, nose, etc.) from being within the ROFA or penetrating the OFZ."

A runway to aircraft parking area separation of 400 feet would preclude any part of a parked aircraft from penetrating the Runway OFA or the Runway OFZ. In addition, a separation of 400 feet would also provide the following benefits:

1. Prevent parked aircraft from penetrating the Runway Primary Surface
2. Prevent parked aircraft from penetrating the Runway Transitional Surface
3. Prevent parked aircraft from penetrating the Taxiway OFA

As the proposed aircraft parking configuration would meet the Intent of the standard as stated in AC 150/5300-13A, the level of safety is deemed to be acceptable.

A Safety Risk Assessment was conducted at the airport on June 4-5, 2013. This MOS was considered by that panel and, as the proposed aircraft parking configuration met the intent of the standard, the panel determined that the risk associated with this proposed MOS was acceptable.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NORTHWEST MOUNTAIN REGION
AIRPORT IMPROVEMENT PROGRAM

MODIFICATION OF AIRPORT DESIGN STANDARDS

MODIFICATION: Runway to Aircraft Parking Separation	LOCATION: Friedman Memorial Airport, Hailey, Idaho	PAGE 2 OF 2
14. SIGNATURE OF ORIGINATOR: Richard G Baird	15. ORIGINATOR'S ORGANIZATION: Friedman Memorial Airport	16. TELEPHONE: (208) 788-9003
17. DATE OF LATEST FAA SIGNED ALP: March 31, 2010		
18. ADO RECOMMENDATION: Approve	19. SIGNATURE: Steve Engebrecht, Acting Manager	20. DATE: 8/27/2013

21. FAA DIVISIONAL REVIEW (AT, AF, FS):

ROUTING SYMBOL	SIGNATURE	DATE	CONCUR	NON-CONCUR
ANM-102		9/16/13	✓	
AJT ZA3		9/17/13	✓	
AFS-408		9/17/13	✓	

COMMENTS:

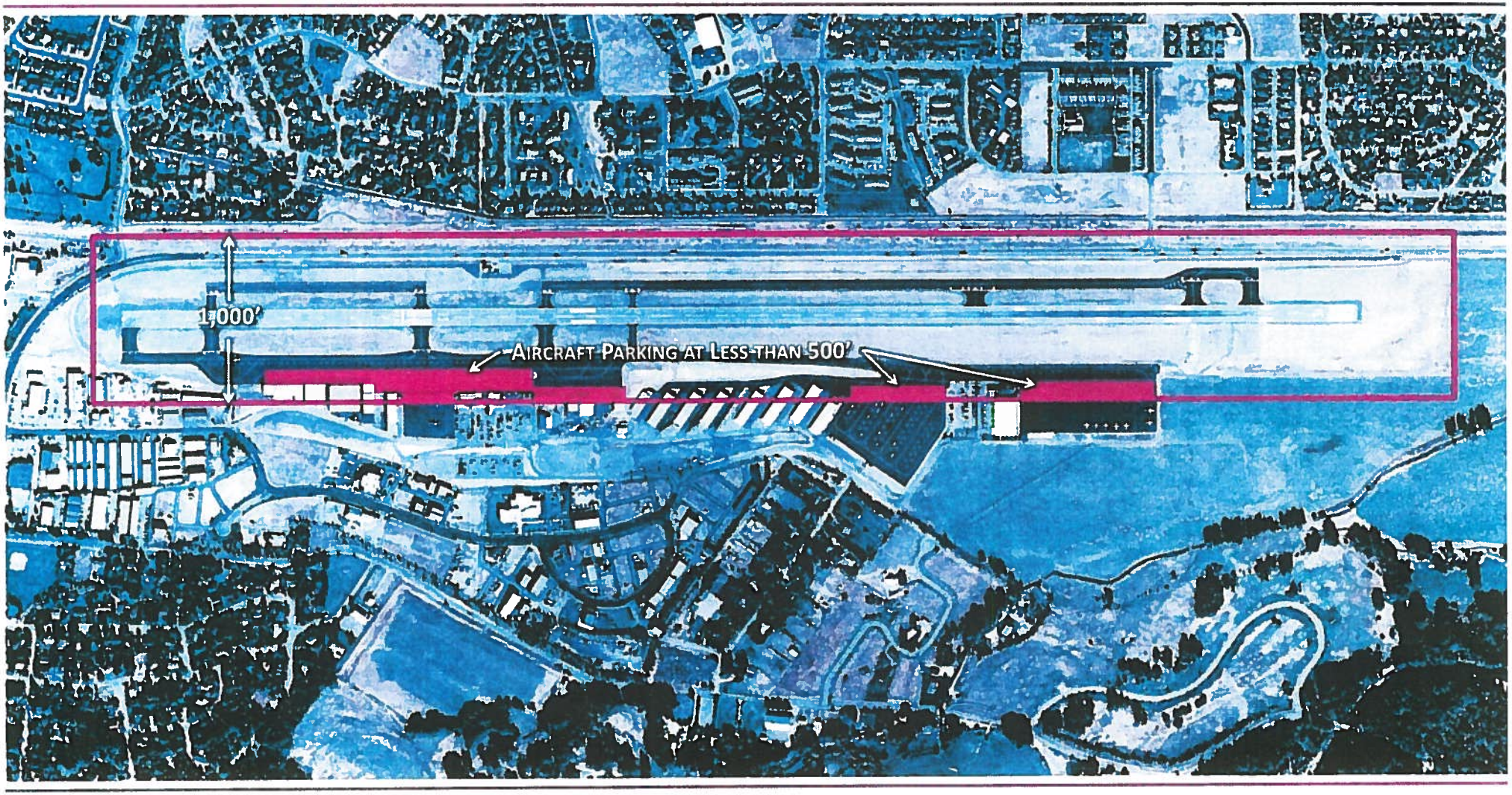
22. AIRPORTS' DIVISION FINAL ACTION:

☐ UNCONDITIONAL APPROVAL	☒ CONDITIONAL APPROVAL	☐ DISAPPROVAL

DATE: 9/17/13	SIGNATURE:	TITLE: MANAGER, AAS-100

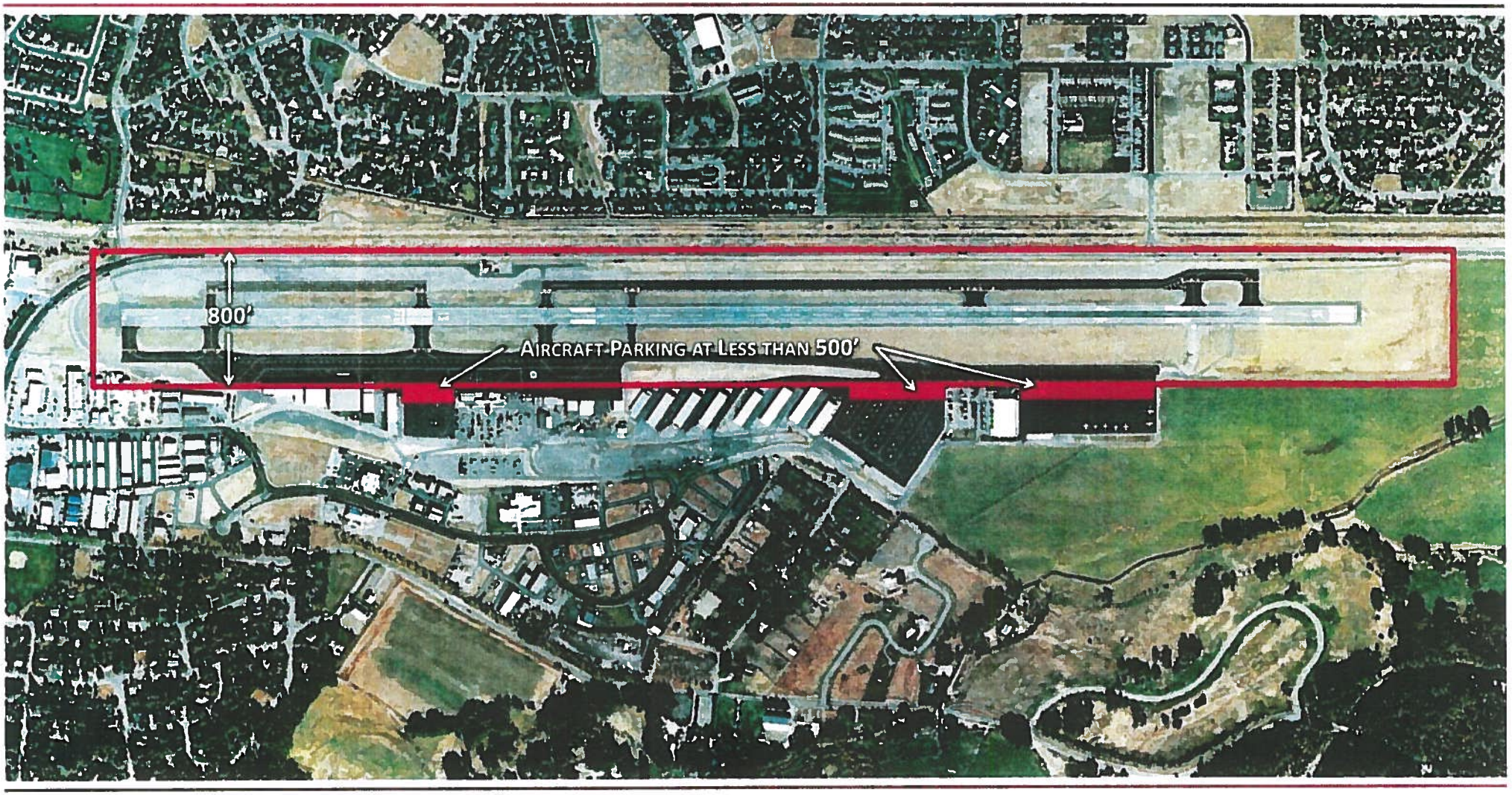
CONDITIONS OF APPROVAL:

CONDITIONS LISTED IN BOXES #10 & #13 ABOVE.



T-O ENGINEERS

MOS 5 – Runway to Aircraft Parking
Existing Condition



T-O ENGINEERS

MOS 5 – Runway to Aircraft Parking
Proposed Condition

Federal Aviation Administration

Memorandum

Date: October 7, 2013

To: The File

From: Steve Engebrecht, P.E., HLN-620, Helena ADO

Subject: Modification of Standards 8 – Parallel Taxiway Width: Friedman Memorial Airport (SUN), Hailey, Idaho
Airspace Case 2013-ANM-1181-NRA

Design Standards Affected: Federal Aviation Administration Advisory Circular 150/5300-13A, *Airport Design*, Chapter 4, Paragraph 403, and Table 4-2, Design standards based on Taxiway Design Group (TDG).

Extent of Modification:

Based on current airline schedules, the airport has approximately 824 annual operations (approximately 2.6% of total annual operations) of a Bombardier Q-400 aircraft. This aircraft falls into Taxiway Design Group (TDG) 5. The Q-400 is the only TDG 5 aircraft currently operating at SUN.

For Taxiway Design Group (TDG) 5 aircraft, Table 4-2 shows the required taxiway width as 75 feet, and a taxiway edge safety margin of 15 feet. All remaining operations require a taxiway width of 50' or less, and a taxiway edge safety margin of 10' or less.

This proposed Modification of Standards (MOS) is to allow a parallel taxiway width of 50' plus 10' paved shoulders. Intersections and fillets will be designed to accommodate TDG 5 aircraft so that the required taxiway edge safety margin is provided for all aircraft operating at SUN.

Due to operational constraints related to terrain and development around the airport, a site selection study for a replacement airport commenced in 2006. Ultimately seventeen (17) potential sites for a replacement airport were identified. An Environmental Impact Statement (EIS) commenced in September 2007 and a short list of three sites was identified. In August 2011 the EIS was suspended due to potential wildlife impacts and the estimated high cost of constructing a replacement airport. Selection of a suitable site and construction of a replacement airport is still considered the long term solution for Hailey and the surrounding area.

In the meantime, the existing Airport is required to meet a Congressional mandate that all airports certificated under 49 U.S.C. 44706 comply with FAA design standards for Runway Safety Areas (RSA) as required by 14 CFR Part 139 no later than December 31, 2015. Currently, the airport does not meet RSA design standards for the ARC C-III aircraft that regularly operate at SUN. RSA width of 500' (250' each side of runway centerline) is required. There are existing partial parallel taxiways on each side of Runway 13/31 that lie within the RSA. The runway centerline to parallel taxiway centerline separation for the taxiway to the east of the runway (Taxiway A) is 185'. The runway centerline to parallel taxiway centerline separation for the taxiway to the west of the runway (Taxiway B) is 250'. It is proposed to remove both of these taxiways, and to construct a new full length parallel taxiway at 320' runway centerline to taxiway centerline separation, to allow for construction of the standard RSA.

Several Modifications of Standards are necessary to allow the airport to continue to operate and meet ARC C-III RSA standards, as follows.

- MOS 1 - Runway Centerline to Parallel Taxiway Centerline (this MOS)
- MOS 2 – Parallel Taxiway Object Free Area Width
- MOS 3 – Runway Object Free Area Width
- MOS 4 – Runway Safety Area Grading
- MOS 5 – Runway Centerline to Aircraft Parking Area
- MOS 8 – Taxiway Width

Note: Two additional MOS were prepared to address existing runway/taxiway separation. MOS 6 was for existing separation with the ATCT in operation. MOS 7 was for existing separation without the ATCT in operation. MOS 6 and 7 are not related to the MOS required to construct a standard RSA (MOS 1-5, and 8).

The published pavement strength at SUN is 95,000 pounds. The aircraft with the largest wingspan that currently operates at SUN is the Gulfstream G650, with a wingspan of 99.6'. Based on the current fleet of all available aircraft, there are no aircraft with a greater wingspan that weight less than 95,000 pounds. At the proposed Runway to Parallel Taxiway Separation of 320' (see MOS 1 – Runway Centerline to Parallel Taxiway Centerline), and with a taxiway width of 75', the tip of the G650 wing would penetrate the RSA, assuming the main gear is at the edge of the useable taxiway pavement.

The proposed taxiway width of 50' will prevent any part of any aircraft that currently uses the airport from penetrating the RSA. Providing 10' shoulders, constructed to accommodate limited passes of the Q400 aircraft, will provide a taxiway edge safety margin greater than the required 15'.

A Safety Risk Assessment was conducted at SUN on June 4-5, 2013. This MOS is a mitigation for MOS 1 – Runway Centerline to Parallel Taxiway Centerline, so was not evaluated by the panel. Because the proposed modification will provide the required taxiway edge safety margin, it will provide an acceptable level of safety, economy, durability, and workmanship.

Effect and Duration of Modification of Standards:

The duration of this Modification to Standards will be for the useful life of the project and the modification will be reevaluated prior to the next taxiway pavement rehabilitation project. However, should an aircraft with wingspan greater than 100' but takeoff weight less than the airport's published pavement strength enter the fleet, this MOS will be reconsidered to ensure that the RSA is protected at all times. We have determined that the modification will provide an acceptable level of safety, economy, durability, and workmanship.

Attachments: Modification of Standards 8 - Parallel Taxiway Width

Concur: _____ Date: 10/16/13
Manager, Seattle Flight Standards Division (ANM-200)

Concur: _____ Date: 10/24/13
Manager, Seattle Flight Procedures Office (AJV-W24)

Concur: _____ Date: 11/1/13
Director, Terminal Operations, Western Service Area (AJT-W)

Concur: _____ Date: 11-6-13
Director, Technical Services, Western Service Area (AJW-W)

Approved: _____ Date: 10/7/2013
Manager, Helena Airports District Office

(Coordinate modification as follows: ANM-200, Rick Domingo, coordinate thru David Menzimer, AJV-W24 Jason Pitts, send directly to Jason, AJT-W Ron Fincher, send directly to Ron, AJW-W David Spencer, coordinate by sending to Kevin Zirger, Calvin Ngo, and Gloria Coleman)

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NORTHWEST MOUNTAIN REGION
AIRPORT IMPROVEMENT PROGRAM

MODIFICATION OF AIRPORT DESIGN STANDARDS

BACKGROUND

1. AIRPORT: **Friedman Memorial Airport**	2. LOCATION(CITY,STATE): **Hailey, ID**	3. LOC ID: **SUN**
4. EFFECTED RUNWAY/TAXIWAY: **TAXIWAY B**	5. APPROACH (EACH RUNWAY): **RW 13 VISUAL** **RW 31 NPI**	6. AIRPORT REF. CODE (ARC): **C-III**

7. DESIGN AIRCRAFT (EACH RUNWAY/TAXIWAY): **Bombardier Q-400 and Gulfstream G-V**

MODIFICATION OF STANDARDS

8. TITLE OF STANDARD BEING MODIFIED (CITE REFERENCE DOCUMENT):

Parallel Taxiway Width, Advisory Circular 150/5300-13A, *Airport Design*

9. STANDARD/REQUIREMENT:

75 feet width for Q400 aircraft (Taxiway Design Group 5).

10. PROPOSED:

50 feet, plus 10 feet paved shoulders.

11. EXPLAIN WHY STANDARD CANNOT BE MET (FAA ORDER 5300.1F):

In a separate modification request, the airport proposes relocating Taxiway B to 320 feet separation from Runway 13-31. This is the maximum separation that can be attained at the existing airport, based on current aircraft traffic and the location of existing facilities. At this separation, with a 75-feet taxiway width, it is possible for the wingtip of an aircraft at the edge of the taxiway to penetrate the Runway Safety Area.

12. DISCUSS VIABLE ALTERNATIVES (FAA ORDER 5300.1F):

The airport sponsors have considered two alternatives for Taxiway Width on Taxiway B. Though both are viable, the first is not seen as practicable, due to the high costs and impacts. The second alternative is much more cost effective and still provides appropriate safety margins for the limited number of Taxiway Design Group 5 (TDG 5) aircraft that use the airport.

1. Provide full 75' taxiway width.
    - In order to ensure that no part of any aircraft on the parallel taxiway would penetrate the RSA, a minimum Runway to Parallel Taxiway separation of 329' would be required. This in turn would require removal/relocation of 6 private hangars (1 of which is multi-unit condo hangars) on the north end of the airfield along with relocation of the FBO access at the south end of the airfield.
    - Several businesses northwest of the airport outside of the existing property boundary would need to be acquired and removed.
    - The estimated cost of removing the hangars and reconfiguring the FBO is at least $8.5 million. The estimated cost of acquiring the land northwest of the airport is $2.5 million, for a total cost in excess of $11 million.
2. Provide 50' taxiway width, with 10' paved shoulders.
    - Prevents any penetration of RSA by any part of aircraft taxiing on the parallel taxiway.
    - Provides adequate Taxiway Edge Safety margin for Q400 aircraft, the only TDG 5 aircraft that currently use the airfield.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NORTHWEST MOUNTAIN REGION
AIRPORT IMPROVEMENT PROGRAM

MODIFICATION OF AIRPORT DESIGN STANDARDS

13. STATE WHY MODIFICATION WOULD PROVIDE ACCEPTABLE LEVEL OF SAFETY, ECONOMY, DURABILITY, AND WORKMANSHIP (FAA ORDER 5300.1F):

The Bombardier Q400 measures 45.7' from cockpit to main gear and has a main gear width of 31.4'. Entering Figure 4-1 in AC 150/5300-13A, the Taxiway Design Group (TDG) for this aircraft is in the lower limits of TDG 5. All other aircraft traffic at the airport falls in TDG 3 or lower. The Q400 is operated at SUN by Horizon Air with a current maximum of 4 operations per day. The required taxiway width for TDG 5 is 75' (AC 150/5300-13A, Table 4-2).

The aircraft with the largest wingspan that currently operates at the airport is the Gulfstream G650, with a wingspan of 99.6' and main gear width of 16.9'. At the proposed Runway-Parallel Taxiway Separation of 320' and with a taxiway width of 75', the tip of the G650 wing would penetrate the RSA by over nearly nine feet, assuming the main gear are at the edge of the taxiway. Protection of the RSA is a higher priority than taxiway width.

According to Table 4-2 in AC 150/5300-13A, the required Taxiway Edge Safety Margin for TDG 5 is 15'. In order to provide this Taxiway Edge Safety Margin for the Q400, the required taxiway width would be 31.4'+2(15')=61.4'. At this taxiway width, the tip of a G650 wing would still penetrate the RSA.

The proposed taxiway width of 50' will prevent any part of any aircraft that currently uses the airport from penetrating the RSA, as shown in Figure 1. Providing 10' paved shoulders, constructed to accommodate limited passes of the Q400 will provide a Taxiway Edge Safety Margin of at least 19.3' in all straight portions of the parallel taxiway. Intersections and fillets will be designed for TDG 5, which will provide a minimum Taxiway Edge Safety Margin of approximately 22.2'. With these Taxiway Edge Safety Margins, this taxiway width will provide a safe taxiing environment for the Q400, while providing a compliant RSA for all aircraft at the airport.

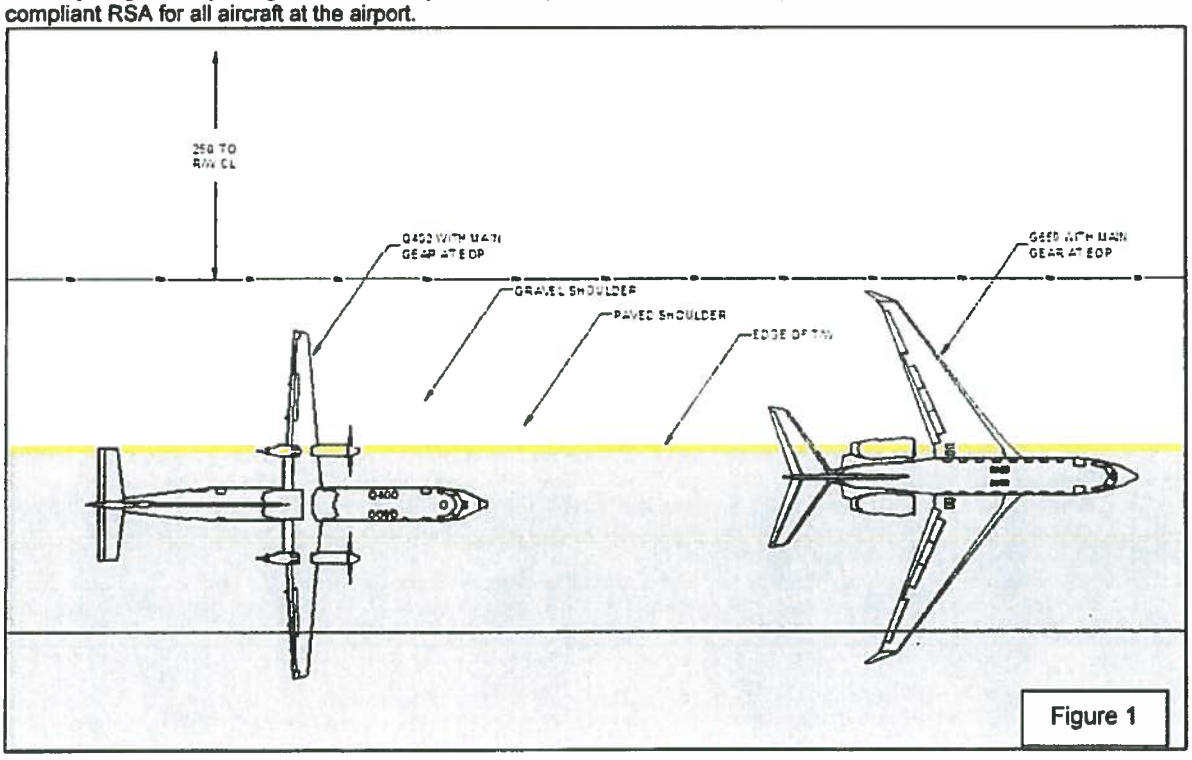


Figure 1

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NORTHWEST MOUNTAIN REGION
AIRPORT IMPROVEMENT PROGRAM

MODIFICATION OF AIRPORT DESIGN STANDARDS

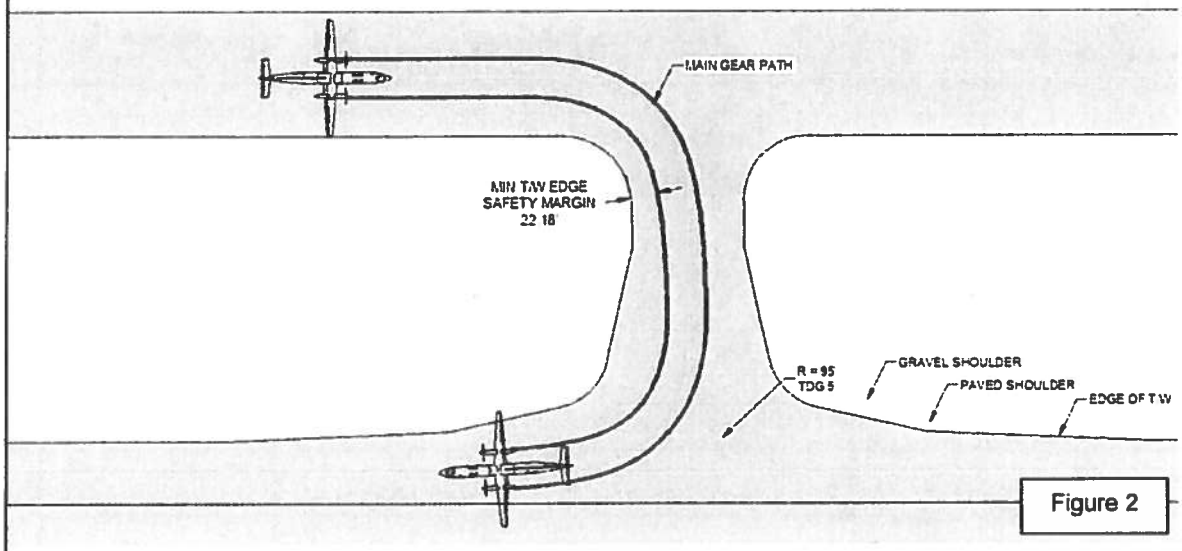


Figure 2

This MOS is based on the current fleet of all available aircraft and the airport's published pavement strength. The current published pavement strength for the airport is 95,000 lbs. Based on the current fleet of all available aircraft, there are no aircraft with wingspans greater than 100' that weigh less than 95,000 lbs. Should an aircraft with wingspan greater than 100' but takeoff weight less than the airport's published pavement strength enter the fleet, this MOS will be reconsidered to ensure that the RSA is protected at all times.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NORTHWEST MOUNTAIN REGION
AIRPORT IMPROVEMENT PROGRAM

MODIFICATION OF AIRPORT DESIGN STANDARDS

MODIFICATION: Taxiway Object Free Area	LOCATION: Friedman Memorial Airport, Hailey, Idaho	PAGE 2 OF 2
14. SIGNATURE OF ORIGINATOR: Richard R Baird	15. ORIGINATOR'S ORGANIZATION: Friedman Memorial Airport	16. TELEPHONE: (208) 788-9003
17. DATE OF LATEST FAA SIGNED ALP: March 31, 2010		
18. ADO RECOMMENDATION: Approve	19. SIGNATURE: Steve Engebrecht, Acting Manager	20. DATE: 8/27/2013

21. FAA DIVISIONAL REVIEW (AT, AF, FS):

ROUTING SYMBOL	SIGNATURE	DATE	CONCUR	NON-CONCUR
AAS-100		9/12/2013	✓	
AEM-220		10/15/2013	✓	

COMMENTS:

22. AIRPORTS' DIVISION FINAL ACTION:

☐ UNCONDITIONAL APPROVAL	☒ CONDITIONAL APPROVAL	☐ DISAPPROVAL

DATE: 9/13/13	SIGNATURE:	TITLE: MANAGER, AAS-100

CONDITIONS OF APPROVAL:

CONDITIONS OF APPROVAL CONTAINED IN BOXES #10 AND #13 ABOVE.

Appendix 5

Instrument Approach Analysis

IMPROVEMENT OF INSTRUMENT APPROACH PROCEDURES

Friedman Memorial Airport
Hailey, Idaho

April 2013

Spohnheimer Consulting

IMPROVEMENT OF INSTRUMENT APPROACH PROCEDURES

Friedman Memorial Airport (Sun Valley), Idaho

April 2013

Issue

How can instrument approach procedures to Friedman Memorial Airport (identifier SUN, for Sun Valley) be improved for better arrival reliability?

Background

The SUN airport is located in a deep valley with numerous close-in mountains. As a result, instrument flight procedures used by pilots to transition from enroute altitudes to a point near the runway typically have high weather ceiling and large visibility requirements (known as minima), resulting in a high percentage of flight cancellations or diversions during inclement weather.

Until recently, it was thought the airport might be relocated into a more flat area to the south with better instrument procedures, but the Federal Aviation Administration (FAA) suspended its work on an Environmental Impact Statement. It is now known that the airport must remain in its present location for the short- to mid-term.

This brief feasibility study was chartered to examine the existing procedures and consider others that might improve airport arrival reliability. It implements the next step following the *SUN Reliability Analysis Summary* by T-O Engineers and Mead & Hunt in early 2012. The study considers modifications to existing procedures, creative application of ground facilities, and the use of navigational aids which the FAA may have deemed inappropriate for federal investment. The study is neither a Terminal Instrument Procedures design study nor a ground facility siting study, but recommends those activities be pursued where appropriate.

Facts Bearing on the Issue

Airport Location. The SUN airport is located in the Wood River Valley approximately one mile southeast of Hailey, ID. Its elevation is 5320' above mean sea level (MSL), and it is surrounded by mountain peaks on three sides with terrain elevations immediately adjacent the airport in the 6000-7000' range. Terrain at intermediate distances reaches 8000-9000'. Figure 1 shows Runway 13/31, which is 7550' long and 100' wide, and its immediately surrounding terrain.

Figure 1. SUN Runway 13/31 and Immediately Surrounding Terrain

Typical Operators. The SUN airport has several commercial scheduled air carriers (Horizon and Sky West), operating Bombardier Q400 and Embraer EMB120 aircraft, with the addition of CRJ-700 aircraft expected soon. Numerous high-end business jets and other private aircraft are based or operate at this airport.

Existing Intrument Procedures. The SUN airport is presently supported by five Instrument Approach Procedures (IAPs), all providing landing guidance from the south. Two are public procedures and can be flown by aircraft with standard climb capabilities; three are special procedures that require authorization and higher climb capabilities. One is also "private" in the sense that it was developed for specific aircraft or airlines. The procedures are included in Attachment 1 and summarized in Table 1. (For simplification, circling minima, if listed separately from other minima in the procedure, are not shown in the table.) Aircraft are categorized by weight and speed, with Category A typically being light, general aviation propeller-driven types, while Category C aircraft are typically used by air carriers at SUN, and by operators of business jets. For many years, public IAPs required no unique authorization, and assumed a standard climb rate (one-engine out for multi-engine commercial aircraft) for missed approaches of 200 feet per nautical mile (ft/NM). Special IAPs required authorization and crew training, and usually required aircraft with substantially better climb rates. In recent years, however, the FAA has allowed procedures requiring higher climb rates (e.g., up to 350 ft/NM) to be considered standard procedures.

The decision height/altitude and Visibility columns in Table 1 comprise the "minima", and are typically spoken (e.g., for the NDB IAP) as "2700 and five," where 2700 is a rounded value for the actual value of 2687'. This phrasing means that the base of the clouds must be at least 2700' above the field elevation (i.e., 8000' MSL) and the forward visibility must be at least 5 statute miles. Simply stated, if a pilot upon reaching this altitude while descending cannot see the airfield, a missed approach or "go-around" must be executed. (An exception to this general statement is the NDB/DME or GPS-A approach, which has a fly-visual segment.) A missed approach usually results in a diversion to another airport, unless the pilot elects to try again.

Table 1. Existing IAPs

IAP Name	Decision Altitude/Height (DA/H) feet	Visibility, NM	Type	Climb Gradient Required, ft/NM
RNAV (RNP) Y RWY 31 RNP 0.3	974 (1000) (Straight-in 31)	Cat A-C: 3	Special	330 to 14,000' MSL
RNAV (GPS) W RWY 31 LNAV MDA	1790 (1800) (Straight-in 31)	Cat A: 1 ¼ Cat B: 1 ½ Cat C: 3	Public	200
RNAV (GPS) X RWY 31	1610 (1700) (Straight-in 31)	Cat A: 1 ¼ Cat B: 1 ½ Cat C: 3	Special	414 to 7500' MSL
RNAV Z RWY 31 (GPS) (G4 and G5 only)	910 (1000) (Straight-in 31)	Cat C: 2	Special	385 to 10,000' MSL
NDB/DME OR GPS-A	2687 (2700) (Circling only)	Cat A-C: 5	Public	200

Previous Instrument Procedures. Since the 1980s, several technologies to provide landing guidance, in addition to the standard Instrument Landing System (ILS), have been tried by the US and international aviation communities. The general motivations have been increased flexibility from curved approaches, variable descent angles, and smaller protective areas required around the ground-based antenna systems.

One technology was the Microwave Landing System (MLS), which was installed for a few years at SUN to support landings from the north. This was a non-federal installation for Horizon, and its descent angle was very high at 6.00 degrees, but could be flown by aircraft types in use at the time. Its use was discontinued, and it will not be discussed further here.

A second newer technology is the Transponder Landing System (TLS), also a non-federal installation with Horizon as the intended operator. It existed for a few years at SUN to support landings from the south. Two special IAPs were developed for it, one by the FAA and the other by a private third party, and these are included in Attachment 2. The TLS was discontinued before it could be commissioned.

Procedure Design. Instrument flight procedures are designed using detailed criteria found in FAA Order 8260.3B, *United States Standard for Terminal Instrument Procedures (TERPS)*, and related smaller orders. Embedded in all procedures is the concept of Required Obstacle Clearance, which is established by defining various shaped and sized imaginary surfaces which cannot be penetrated by terrain or objects. The size and nature of the surfaces vary according to the accuracy of the underlying navigation method, as well as other parameters. An example of such a surface in both top and "end-on" views is shown in Figure 2.

For mountainous terrain airports, the general challenge is to locate approach and missed-approach paths to the airport for which a given surface (e.g., for an ILS Localizer or a GPS approach) is not penetrated by terrain or other objects, and can take the aircraft to the lowest

descent point from which a missed approach climbout can be conducted with a specified climb capability. For procedures based on traditional ground-based navigational aids, the (usually) straight paths for approach and missed approach must be supported by the radiated signals. This in turn requires that a navaid must be capable of being installed to support the desired ground track(s). For satellite-based procedures, there is more flexibility in that essentially all 360 straight ground tracks can be supported, as well as some segmented tracks that approach curves.

Detailed efforts to locate best minima are beyond the scope of this report, but a feasibility approach has been taken to assess potential options as well as possible locations for any required ground-based navaids.

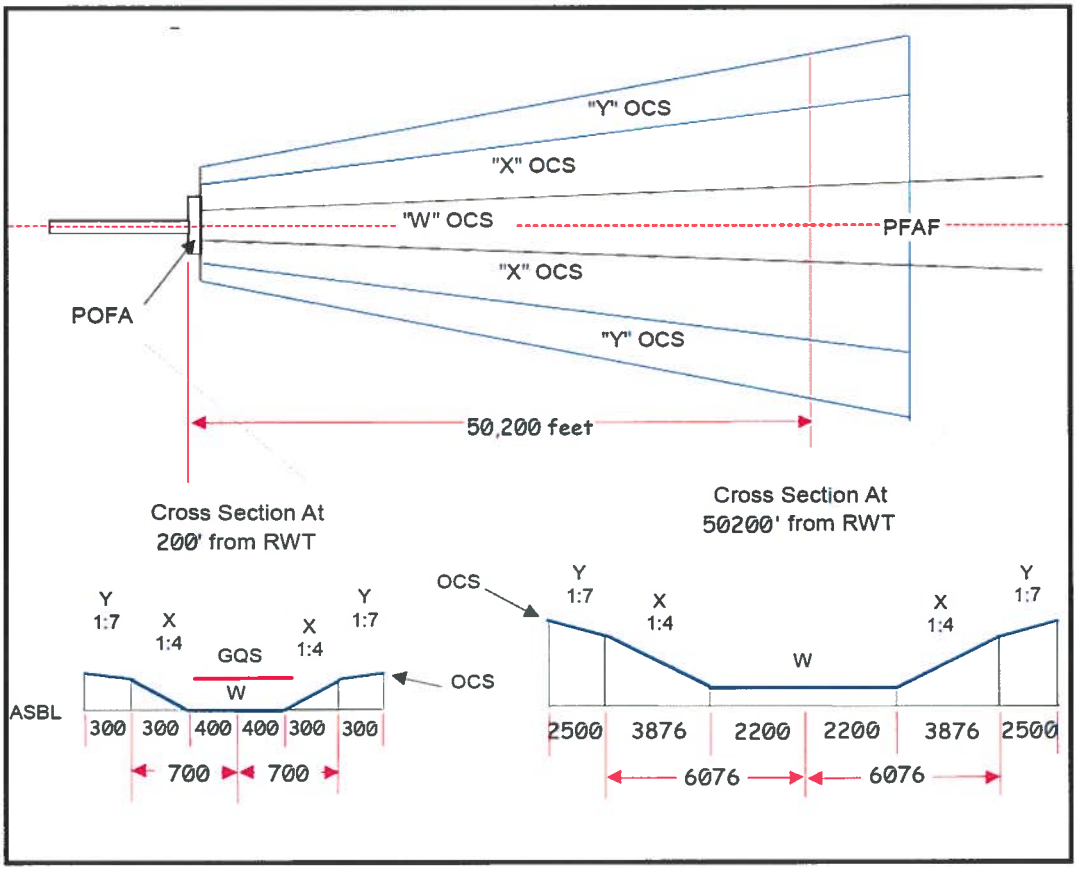


Figure 2. Example of a TERPS Obstacle Clearance Surface (ILS)

Analysis

Approaches from the North. None of the existing approach procedures provides an approach from the north, although the now-discontinued MLS approach did with a steep descent angle of 6.00 degrees. Given today's mix of scheduled carriers and other aircraft and current approvals for advanced navigation methods, a maximum descent angle of approximately 3.60 degrees, especially for public approaches, is appropriate. To begin such an approach, an aircraft must navigate to the starting point from the en route environment. For SUN, the high terrain north of the airport combined with the intervening topography and airport elevation result in a descent angle well above the desired maximum 3.60 degree value. Further advances in technology will

be required to make less steep approaches from the north more viable. Until that time, they can be dismissed here without further analysis. (At least one of the SUN scheduled carriers may obtain approval for advanced navigation methods, which in turn may enable a more shallow descent angle (i.e., below 3.6 degrees) using navigation guidance through valleys.)

Approaches from the South. The remainder of this analysis will deal with approaches from the south. Figure 3 shows the mountainous terrain east, west, and south of the SUN airport (which is highlighted at the extreme upper part of the Figure). The lower terrain of the open valley well south of the airport is seen with irrigation circles. The relevant obstacle clearance surface for any proposed instrument procedure and its missed approach, whether relying on ground-based signals or satellite signals, must be overlaid on this terrain to determine if a fight path is feasible to reasonable minima (i.e., substantially better minima than the existing public NDB procedure's 2700 - 5).

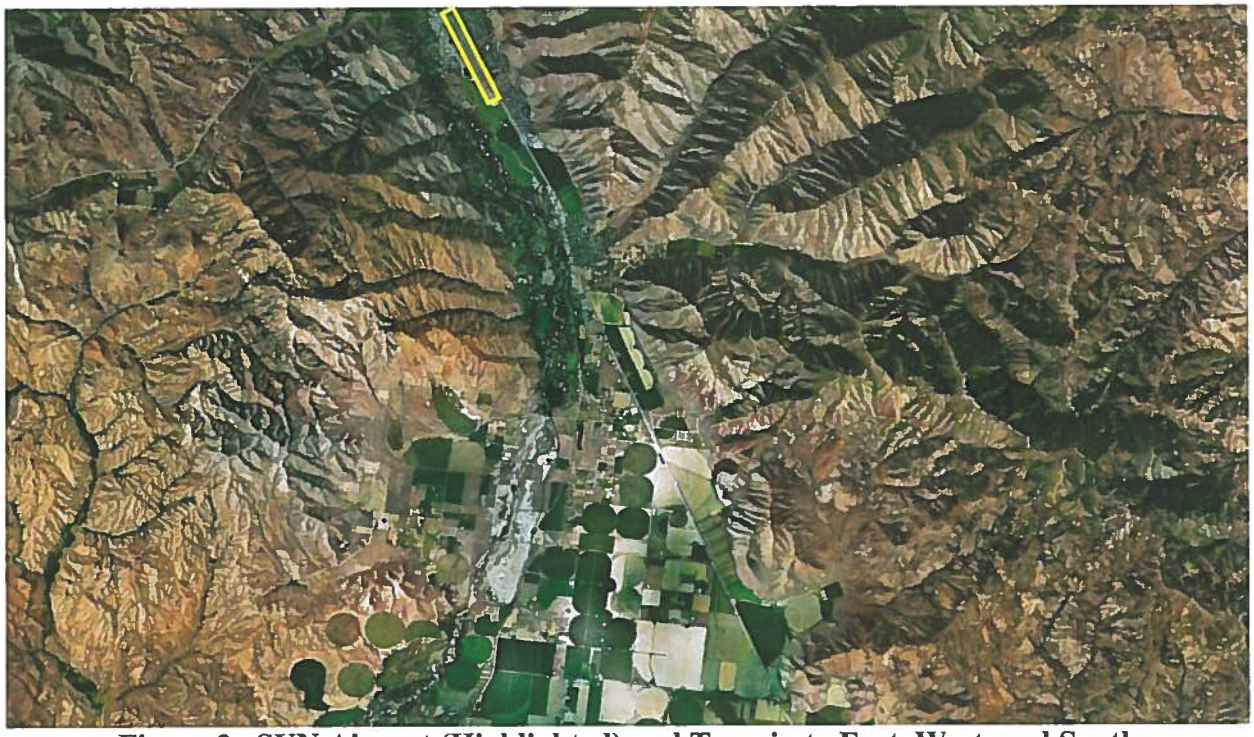


Figure 3. SUN Airport (Highlighted) and Terrain to East, West, and South

Recalling that terrain north of the airport is generally higher than that shown in Figure 3, instrument approach procedure minima for approaches from the south at this airport are primarily controlled by the missed approach segment, rather than terrain underlying the approach segment. This in turn means that the climb gradient (or, simply, steepness) and flight path of the missed approach are critical components of obtaining the resulting minima. The standard climb gradient for missed approaches is between 200 and 350 feet per nautical mile (ft/NM). This standard climb rate is achievable by common light aircraft and determines the minima for a public approach suitable for a wide variety of aircraft. For operators with aircraft capable of substantially higher climb rates, lower minima can be authorized via a "special" instrument approach procedure, also known as an "AR" (for Authorization Required) procedure.

The best general solution for this issue is to define a public approach procedure meeting obstacle clearance criteria with better-than-NDB minima, and for which most operators are already equipped.

The existing (Attachment 1) and developmental TLS (Attachment 2, never commissioned) procedures are again tabulated in Table 2, characterized by some of their technical details, such as the Final Approach Course (FAC) descent angle, climb gradient, and missed approach point location. It is immediately evident that the better minima are achieved for climb gradients required in the missed approach segment which are substantially higher than the long-standard 200 ft/NM (now 200-350) – i.e., only for special approaches. Special approaches, however, are generally not practical or desirable for private owners or itinerant/occasional use aircraft, due to the costs which must be borne for procedures design and maintenance and recurring flight inspections.

Table 2. Approaches from the South, Existing and Previously Proposed

IAP Name	Cat C Aircraft Minima	FAC Descent Angle	FAC Offset Angle	Climb Gradient Required, ft/NM	MAP
RNAV (RNP) Y RWY 31 RNP 0.3 (AR)	1000-3	3.50	5	330 to 14,000 MSL	THR (OLUYA waypoint)
RNAV (GPS) W RWY 31 LNAV MDA (Public)	1800-3	3.11	14	200	THR
RNAV (GPS) X RWY 31	1700-3	3.11	14	414 to 7500' MSL	THR
RNAV Z RWY 31 (GPS) (G4 and G5 only)	1000-2	3.60 to TADOE (1) 3.09 to THR	11	385 to 10,000' MSL	~2.5 prior THR
NDB/DME OR GPS-A (Public)	2700-5	N/A	21	200	5 DME (~5 prior THR)
TLS RWY 31 (Developmental) (AR) (Previous, never used)	1100-3	3.43	9.21	430 to 7,800 MSL	7.4 DME (2.9 prior THR)
TLS RWY 31 (Developmental) (AR) (Previous, never used)	900-2 ½	3.00	9.22	300	2.5 prior THR

The RNP Y procedure, with minima of 1000-3 and a climb-gradient of 330 ft/NM, requires advanced avionics capable of Required Navigation Performance, assuring containment of the aircraft within specified airspace volumes. At least one Sun Valley air carrier (Horizon) has this capability. However, the missed approach path to the north and west is 81 miles long, and as a result, this procedure is rarely used.

The public GPS W procedure, with minima of 1800-3 and a standard climb gradient of 200 ft/NM, requires dual, fully independent avionics for air carriers. This procedure is used by Horizon and possibly Sky West.

The GPS X procedure, with minima of 1610-3 and an aggressive climb gradient of 414 ft/NM, also requires dual, fully independent avionics for air carriers. This procedure is in use by at least one carrier, and provides the best current mimina (given that the RNP Y procedure is not used and the GPS Z approach is for only two aircraft types).

The GPS Z procedure, with minima of 910-2, very aggressive climb gradients of 385 ft/NM to 10,000', and a somewhat steep descent angle of 3.6 degrees, is approved for only G4 and G5 aircraft, and requires dual, fully independent avionics. It is currently used by NetJets.

The public NDB/DME procedure, with minima of 2700-5 and a standard climb gradient of 200 ft/NM, requires only common avionics carried by nearly all aircraft rated for instrument flight. However, the high ceiling and visibility requirements prevent the use of this procedure much of the time during inclement weather, and it is not authorized at night. A conservative estimate, based on data in the T-O Engineers and Mead & Hunt Analysis, is that landings would not be possible with this procedure at least 20% of the time annually, and a substantially higher percentage of the time during the December-February months. The NDB/DME facilities are installed on the side of a hill, with the DME signals shadowed such that they are generally receivable only after overflying the DME inbound.

The two TLS approaches, with nominal minima of approximately 1000-3, would have required moderate and high climb gradients, and roughly match the minima of the unused RNP Y and the GPS Z procedures, but with lower descent angles. TLS procedures were developed using ILS TERPS criteria, suggesting that an ILS installation supporting an approach from the south may be feasible. (The TLS procedures in Attachment 2 may not meet current procedures development criteria, which include adjustments in Required Obstacle Clearance for precipitous terrain.)

Imminent New Approach Procedure. Horizon will likely receive FAA approval for RNP .1 approaches during the summer of 2013. They have evaluated an RNAV RNP .1 approach from the north and believe they can obtain minimums as low as 300 DA/H and 1 mile visibility with an approach angle as low as 3.2 degrees. This could allow landings in all but the most severe weather. (RNP approaches require avionics capable of assuring aircraft containment within, in this case, 0.1 or 0.3 miles either side of the desired ground track.)

Options

Given basic limitations for approaches from the south such as a descent angle maximum of 3.60 degrees and a climb gradient maximum of 350 ft/NM for most operators, several potential new instrument approaches appear feasible, and some existing approaches might be modified for generally minor improvements. At present, these options have received only an elementary TERPS analysis. They are tabulated in Table 3 and discussed briefly below.

Table 3. Potential new IAPs or Modification of Existing IAPs

	Approach	Potential Minima (very approximate)	Climb Gradient Required, ft/NM	Usage
1	Offset ILS/LDA similar to GPS-W	1800-3	200	Public
2	Offset ILS/LDA similar to GPS-W	1600-3	≤240	Public
3	Offset ILS/LDA similar to GPS-W	1400-3	≤300	Public
4	Offset ILS/LDA similar to TLS & RNAV-Y	1000-3	400-450	Special
5	RNAV GPS W (modified)	1600-3	>250	Special
6	NDB/DME	2700' or 3 NM reduced?	≤240 >250	Public
7	WAAS-based LPV	1800-3	200-300	Public
8	Modify RNAV W and (future?) ILS missed approaches with navaid to the west			

Background for ILS-based Options. Four of the options involve a full or partial ILS installation, and vary in detail based on characteristics such as climb gradient or FAC. They are based in part on the observation that if a GPS approach (RNAV GPS W) can provide 1800-3 with a standard climb gradient, and its missed approach is controlled by terrain, then an ILS approach along the same ground track may be able to provide similar minima. (Both the ILS and the larger Localizer Directional Aid (LDA) final approach obstacle clearance trapezoids are narrower than an RNP .3 Containment Area., and might eliminate some obstacles in the final approach area. A narrower final approach surface would result in a narrower missed approach trapezoid, which in turn could eliminate some obstacles in the missed approach segment as well.)

It is very likely that a federal ILS installation was not seriously considered by the FAA for several reasons. One is that many in the FAA would consider installing an ILS (which normally supports minima of 200-1/2 or better) a waste of an ILS system, if it provided public minima of only 1800-3. Another is the onset of promising new technologies and expectations for their implementation. For example, the late 1980s and early 1990s were considered the "MLS decade", with that new technology expected to displace ILS nationwide Indeed, as previously mentioned, an early non-fed MLS installation supported SUN for several years. But as the MLS decade neared its end, FAA's initial MLS large-volume procurement contract faltered, and newer technologies such as satellite navigation were increasingly expected to replace ILS. It required another decade (to approximately 2005) before GPS-based satellite approaches appeared in significant volume with similar-to-ILS minimums. Together with the plans to relocate the airport, these considerations may have suppressed the consideration of an ILS at SUN for several decades.

An ILS approach may be based on a variety of ground equipment configurations, each with its own siting and TERPS criteria. These include a Localizer for azimuth guidance and a Glide Slope (GS) for descent guidance, a Localizer (only), a Localizer Directional Aid with Glide Slope (LDA/GS), or an LDA without a GS. A straight-in ILS has its electronic course aligned

within three degrees of the runway heading. An LDA is a localizer with its course aligned more than three degrees from the runway heading.

Siting an ILS azimuth (Localizer or LDA) facility at SUN is challenging. Terrain south of the airport requires a clockwise-offset course for reasonable minima, as corroborated by the various FAC values in Table 2, each with at least five degrees of offset. LDA siting criteria generally require that the electronic course line cross the extended runway centerline up to approximately 5000' prior to the threshold, with some minima penalty for other configurations. At SUN, there is insufficient room between the runway safety area boundary east of the runway and the airport perimeter fence to comfortably locate an LDA antenna system complying with all siting criteria. Placing the antenna system south of the threshold causes the antenna system critical area (an area protected from transient conditions that cannot be flight inspected, such as moving or parked aircraft or vehicles) to extend off airport property, where it cannot be controlled. However, given that any ILS or localizer/LDA-based approach at SUN will have minima well above the usual Category I ILS minima of 200-1/2, it may be feasible to obtain waivers to some of these constraints.

Discussion of Options.

1. Install an offset ILS, LDA/GS, or LDA without a GS, with a standard climb gradient in the missed approach procedure. This procedure would be similar to the existing RNAV (GPS) W approach, with similar minima (i.e., 1800-3), and would benefit any operator not flying the existing GPS-W approach, since essentially any instrument-equipped aircraft has ILS capability. It would be a substantial improvement for those operators currently using the NDB, since they are unlikely to have GPS capability. With a standard climb gradient, it would be a public approach.

2. Same as option 1, but require a mild climb gradient (e.g., 240 ft/NM). This might result in minima of perhaps 1600-3, and would benefit any operator not flying the existing GPS-W approach.

3. Same as option 1, but require a more aggressive climb gradient. This would result in a special procedure with a potentially significant improvement (e.g., from 1800 to perhaps 1400'). This would benefit any operator not flying the existing GPS-W approach but with aircraft capable of the increased climb rate. It would also benefit any operator currently using the NDB approach with an aircraft capable of the increased climb rate.

4. Same as option 1, but design the procedure to mimic the previous proposed and designed TLS procedures. (TLS approach procedures were developed approximately 10-15 years ago using TERPS ILS criteria, and this effort may have been the first serious look at low minima from the south at SUN.) This option would require an approach angle around 3.50 degrees, but would be followed by a substantial climb gradient between 400 and 450 ft/NM, and therefore would be a special, but with minima in the vicinity of 1000-3. (Since the TLS approaches were not placed into service before the TLS was removed, it is possible they are not viable using today's criteria, though two independent sources designed the two IAPS with similar results.) The TLS front approach courses (9.2 degrees offset from runway centerline) appear to have been

carefully selected to optimize the minima, and are notably different from those for the RNP Y and GPS W approaches. This may explain the difference in minima between the RNP/GPS approaches and the TLS approaches. (A detailed TERPS study will be required to confirm this.) Such an approach would benefit air carriers and corporate operators with aircraft capable of the substantial climb gradient, and who are willing to qualify for the special procedure.

5. Modify the existing RNAV GPS-W procedure, which is a public approach using a 200 ft/NM climb gradient, to require a more aggressive climb gradient. This should allow descending to slightly better minima, perhaps 1600' rather than 1800. This incremental improvement would benefit those operators already flying the existing GPS-W approach. (This method was likely used to create the RNAV (GPS) X RWY 31 procedure (i.e, a 414 ft/NM climb gradient). Variations on this option include petitioning the FAA to designate the RNAV (GPS) X RWY 31 procedure a standard procedure with the 414 ft/NM gradient, and modifying the missed approach (e.g., turn point and heading).

6. Modify the existing 2700-5 NDB/DME procedure to require an increased climb gradient. Presently, the 2700-5 minima are for public use with a standard 200 ft/NM gradient. If that were increased, an improvement to either the 2700' or the 5 NM figure might be feasible at the expense of requiring a climb gradient exceeding 240 ft/NM. This would benefit those operators already using the NDB/DME approach who are capable of the climb gradient – e.g., any air carriers flying the NDB. Further, the night restriction could be investigated for potential mitigations

7. Design a Localizer with Precision Vertical (LPV) satellite-based approach. Such approaches rely on the Wide Area Augmentation System (WAAS), and are an initiative of the FAA. The procedures development criteria for LPV are similar to those for ILS. The minima are likely to be controlled by the missed approach, similar to the GPS-W option, and a detailed study will be necessary to determine if better minima might be achievable. Such an approach requires appropriate avionics equipage; however, at least one SUN carrier has several aircraft with this capability. A request to develop an LPV procedure should indicate that an approach angle up to 3.60 degrees would be acceptable.

8. Modify the existing RNAV RNP procedure's missed approach to reduce its 81 NM long miss ground track. This could also be applied to any of the other options above (e.g., ILS) if the resulting missed approach is better than existing missed approach designs. One method would increase the climb gradient above the existing 330 ft/NM and turn the missed approach (left or right) around the NUCIV waypoint (Attachment 1). This option might also be accomplished by placing a ground-based navaid to the east or west of the airport aligned to provide a miss ground track through one of the several east-west valleys. Siting such a facility requires an aggressive solution in this terrain, and meeting flight inspection requirements for the quality of the signals will be a challenge requiring a good antenna system. Adding a ground-based missed approach to the RNAV RNP procedure results in a "blended" procedure – this is uncommon but has been done on previous occasions. Such a procedure would be a special and require a procedures waiver.

Conclusions

1. The RNAV RNP Y procedure is rarely if ever used because of its 81 NM missed approach. Reducing the length of the missed approach even at the expense of raising the minimums would make the procedure more viable and might attract more operators.

2. Raising the climb gradient on the RNAV GPS W procedure to 240 ft/NM or even 300 ft/NM would not result in a significant reduction in minimums. (Note the RNAV GPS X has a 1610 DA/H but requires a climb gradient of 414'/NM.)

3. The RNAV GPS X procedure requires a 414 ft/NM climb gradient to 7500 feet. Changing the missed approach turn point and heading might result in a lower climb gradient, possibly below 400 ft/NM. Since most aircraft are not capable of a 414'/NM climb gradient, even for a short distance, reducing the gradient would make the procedure available to more aircraft.

4. The RNAV Z procedure is a special procedure designed for Gulfstream 4s and 5s and limited to use by NetJets. Any changes to this procedure would be solely at the discretion of NetJets, and would be unlikely to benefit other operators.

5. The NDB/GPS-A procedure has a 2682 DA/H and a standard missed approach climb gradient. Raising the climb gradient might not result in a significant reduction of minimums because of the large obstacle clearance trapezoid associated with NDB procedures. (The effectiveness of a greater than standard climb gradient would be related to how close the controlling obstructions are to the missed approach point - the farther away, the better for improvement by excessive gradient.)

6. An offset ILS or LDA-based approach could provide public minimums as low as 1790 DA/H and 3 miles visibility. Lower minimums could be achievable with a higher climb gradient in the missed approach.

7. A glide slope would not substantially reduce the minimums on an offset ILS or LDA approach. However it would benefit the pilot by allowing the glide slope to be monitored continuously throughout the visual segment of the approach. This would be particularly beneficial at night.

8. Installing an NDB or other navaid east or west of Hailey to support misses to the west could improve some missed approaches by allowing secondary obstacle clearance reduction earlier on the flight path, or possibly throughout the missed approach. This could eliminate some of the missed approach obstacles and result in lower minimums, lower climb gradient, or both.

9. An RNP .1 approach from the north, if confirmed feasible, could allow landings in all but the most severe weather for suitably equipped aircraft.

10. An LPV approach from the south likely would achieve minima similar to an ILS approach, but would require aircraft with suitable avionics.

11. The seven approaches developed for SUN over the past two decades use five different Final Approach Course offset angles. Five of these of these approaches are still active. Discounting the NDB procedure, four have offset angles between 5 and 14 degrees. Some of the differences may be attributed to the different types of approaches, or they may vary at the discretion of the installers and/or developers. However, a more in-depth review might define an optimum offset angle that would be suitable for all the approaches.

Recommendations

1. Amend the RNAV RNP Y procedure to reduce the 81 NM missed approach.

2. Study modifying the RNAV GPS X procedure's turn point and heading to reduce the required climb gradient.

3. Develop an offset ILS or LDA/GS approach from the south (with an approach angle up to 3.60 degrees), possibly with a strategically located navaid east or west of Hailey to provide a miss to the west.

4. Consider a strategically located navaid east or west of Hailey to support misses to the west, for approaches other than the proposed ILS or LDA/GS. (This would result in blended approaches in some cases.)

5. Work with Horizon to develop a RNAV RNP RWY 13 approach from the north.

6. Develop an LPV approach (with an approach angle up to 3.60 degrees). (For the short- or mid-term time frame, this would be attractive only if Recommendation 3 is infeasible. For the longer term, as more aircraft equip for advanced satellite-based procedures, the benefits of this option will increase.)

7. Study existing procedures (except the NDB approach) to determine if a different FAC offset angle would improve minima, and potentially be more usable for all the approaches.

Next Steps

All seven Recommendations require a detailed TERPS study effort as the basis for any additional work. While such a study might require several weeks for each recommendation, actual design and implementation by the FAA of new procedures requires up to 18 months Early and close coordination with the FAA's Regional Approach Procedures Team (RAPT) is necessary.

Each Recommendation provides a different benefit affecting different subsets of the operators. Clearly, Recommendation 3 (implement some form of ILS) has the largest general benefit, because it could support public and special approaches for all operators and provide a substantial improvement over the existing NDB minima. Recommendations 3 and 4 involve ground-based facilities. Assuming either of these is adopted, the high-level activities involved and their individual time requirements are listed below, excluding related processes such as enrivonmental

impact studies. (Some of the activities may run concurrently; some require good weather conditions.)

1. Joint TERPS and feasibility siting work to determine search areas for the facilities (1-2 months)
2. Completion of a detailed siting study (2-3 months)
3. Site test (if needed or recommended by the siting study) of any proposed missed approach facility (1-2 months)
4. Procurement and delivery of equipment (6-12 months including bid package preparation, advertising and bidding time, and award)
5. Design of the installations (1 month)
6. Contracting time for civil and electrical installation work (3 months)
7. Electronic Installation, Tune-up, Commissioning Flight Inspection, and Procedure Publication (2-4 months)

A rough order-of-magnitude cost estimate for Recommendation 3 (some form of ILS) is $1-$2M, with equipment costs being up to about $500k of that amount.. Installation of localizer and glide slope facilities at Hailey is not overly demanding from a construction point of view - power is available nearby, and physical access and security are straightforward. A rough cost estimate for Recommendation 4 (missed approach facility if beneficial) is more difficult at this concept stage, because the locations may need to be in mountainous terrain, where power and physical access, and potentially land acquisition costs, can be surprisingly high.

Attachments

1 Existing Standard Instrument Approach Procedures
2 Previous TLS Approach Procedures (never commissioned)

References

1. FAA Order 8260.3B, *United States Standard for Terminal Instrument Procedures (TERPS)*
2. FAA Order 6750.16B, *Siting Criteria for Instrument Landing Systems*
3. *SUN Reliability Analysis Summary*, February, 2012, by T-O Engineers and Mead & Hunt

Report Prepared by:

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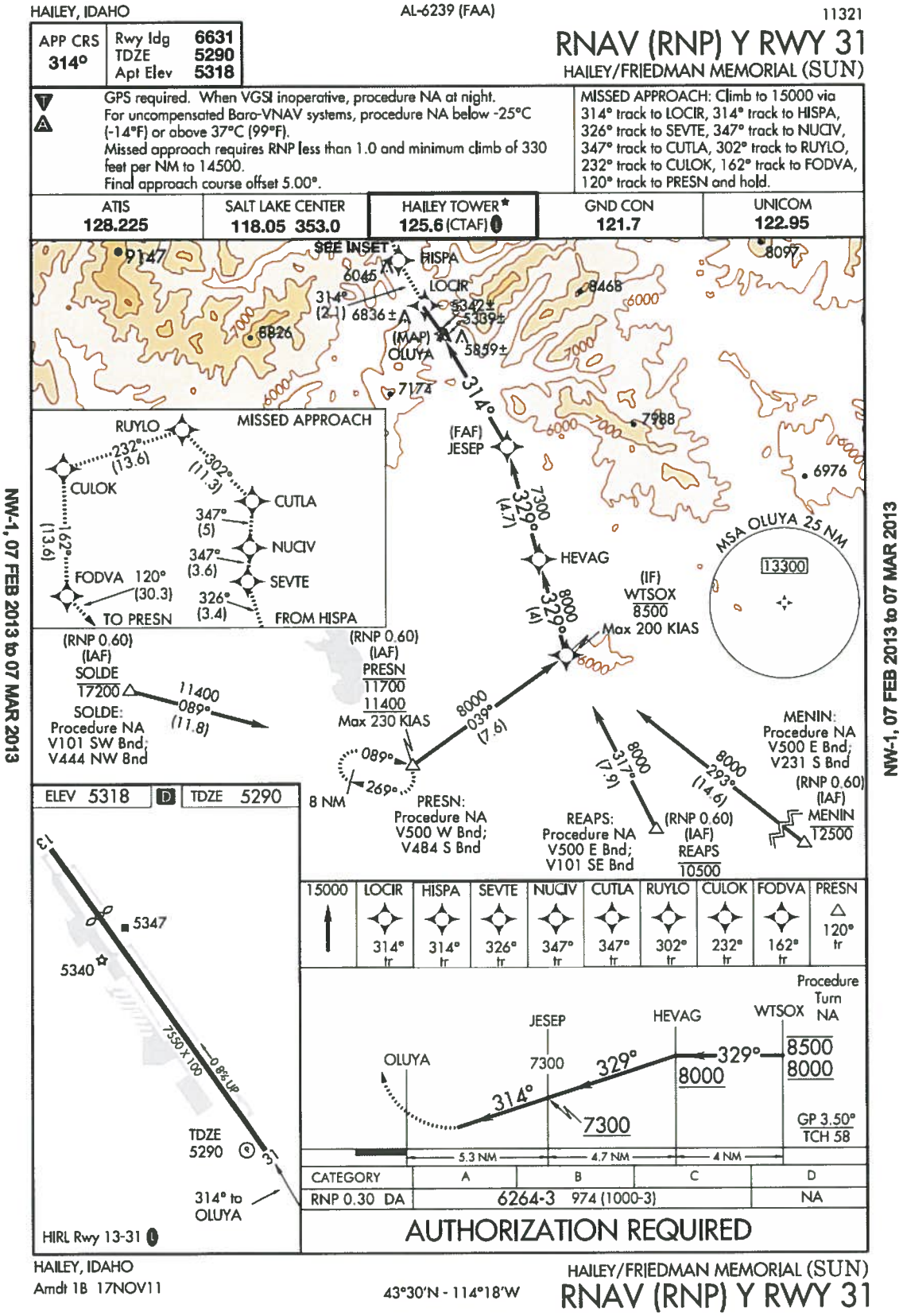
L. Nelson Spohnheimer

ATTACHMENT 1 – Existing Instrument Approach Procedures



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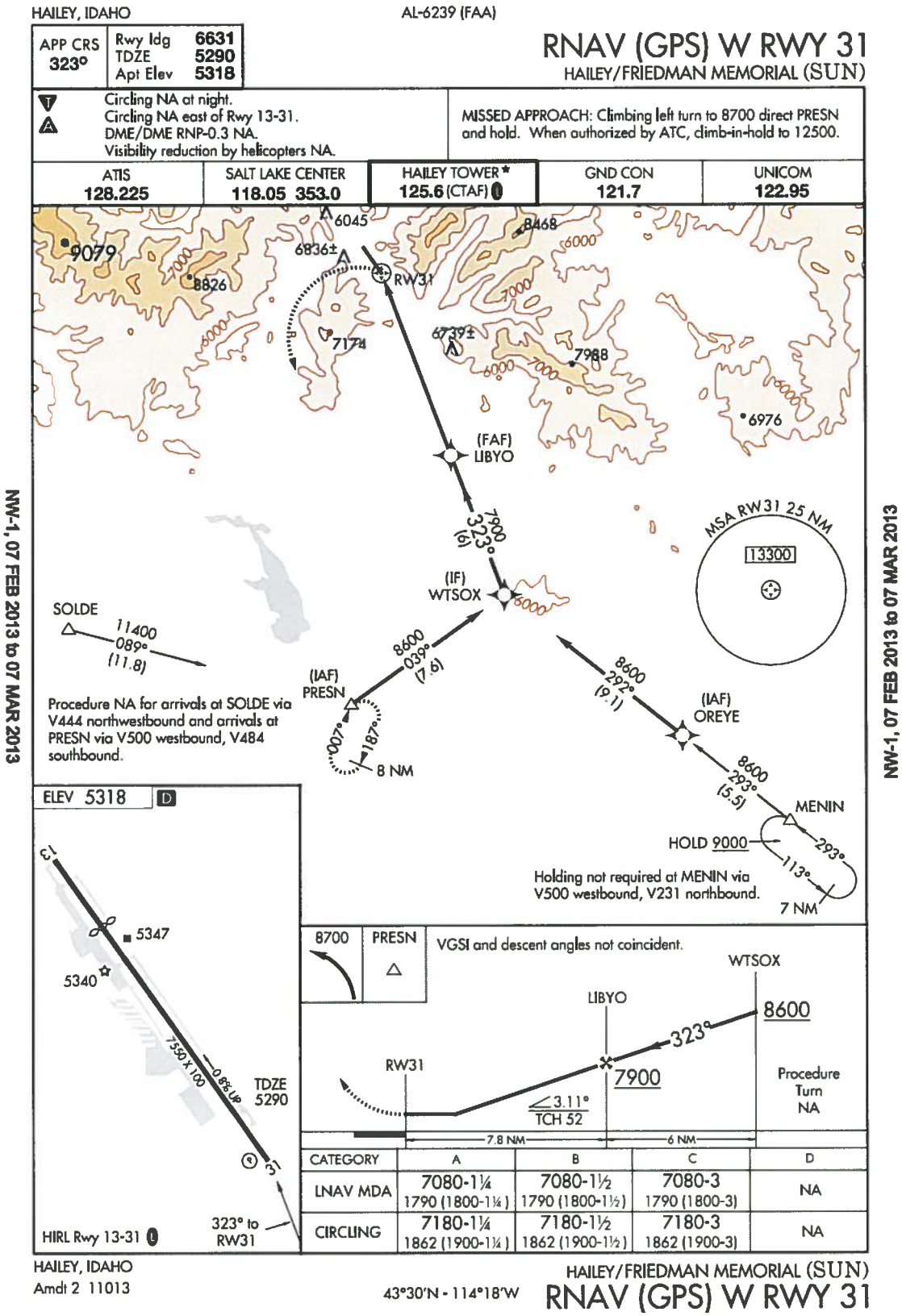

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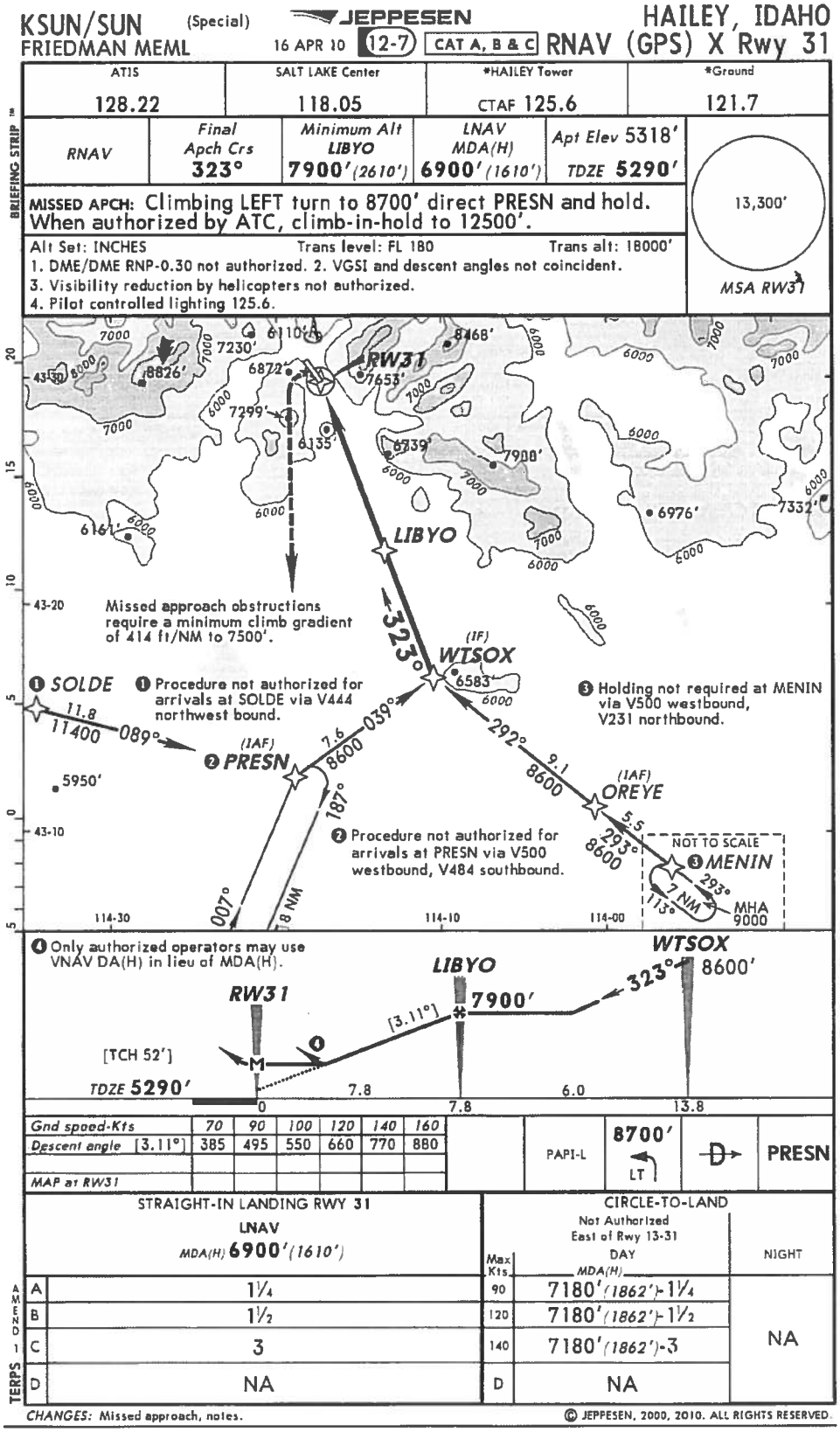

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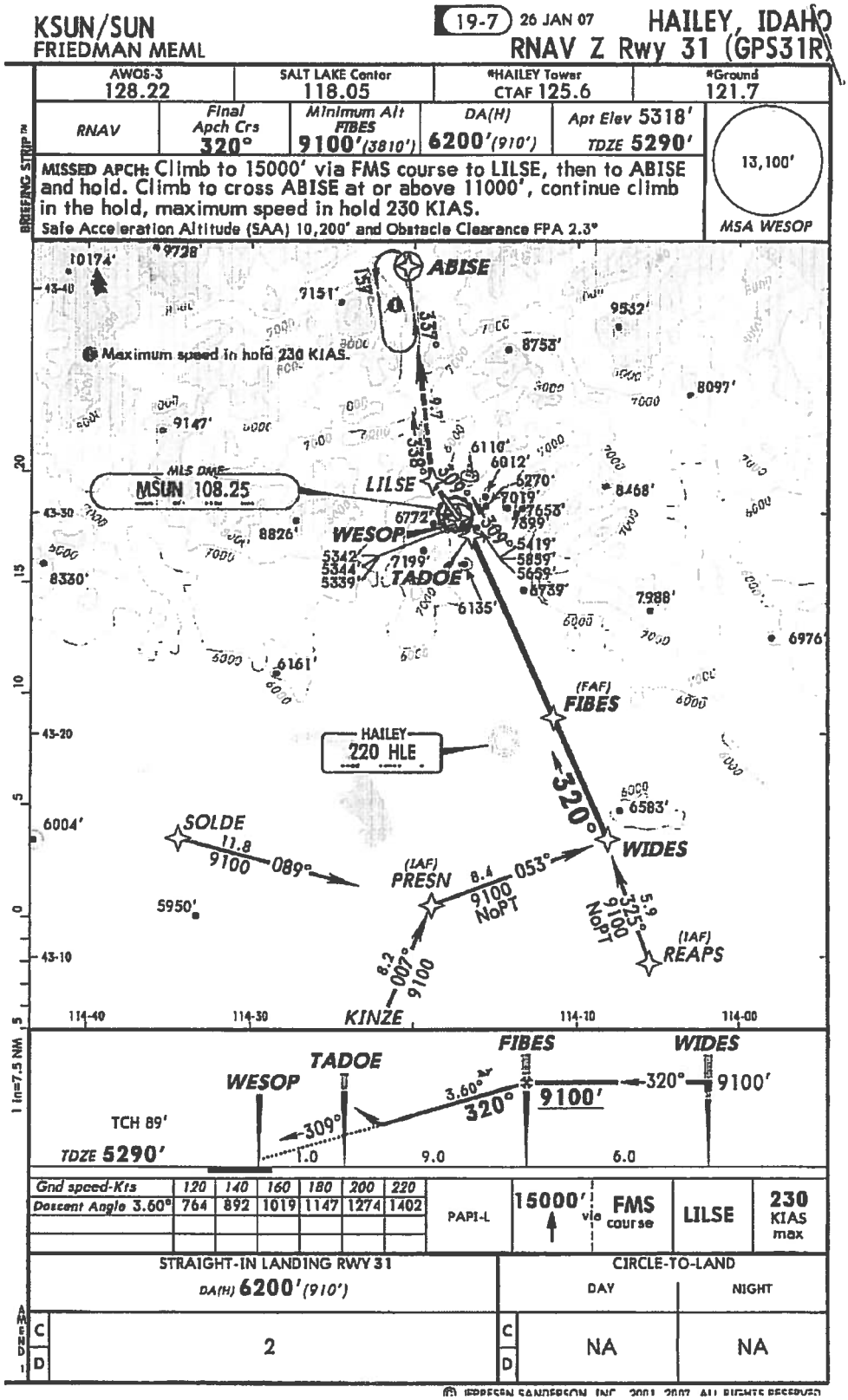

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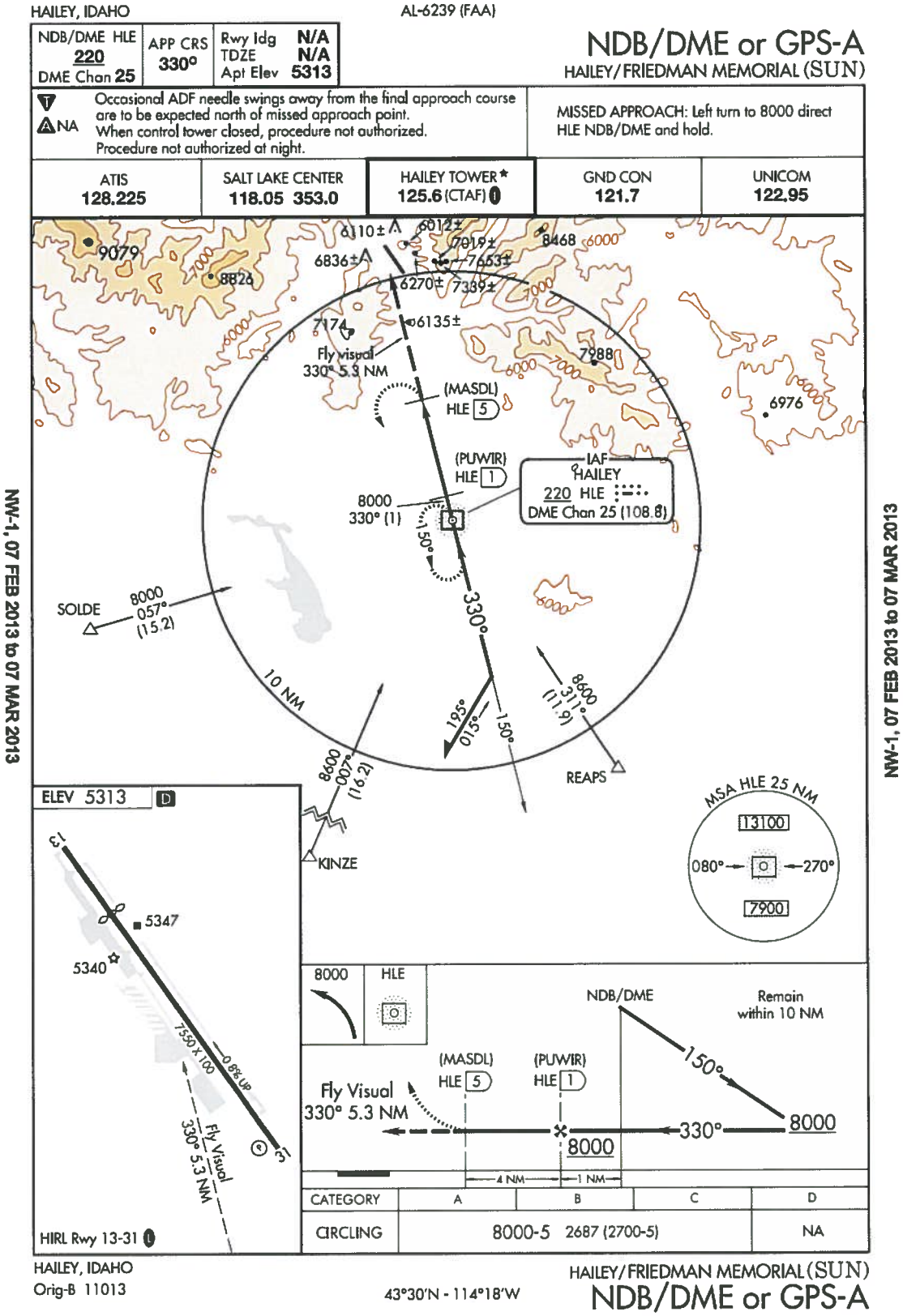
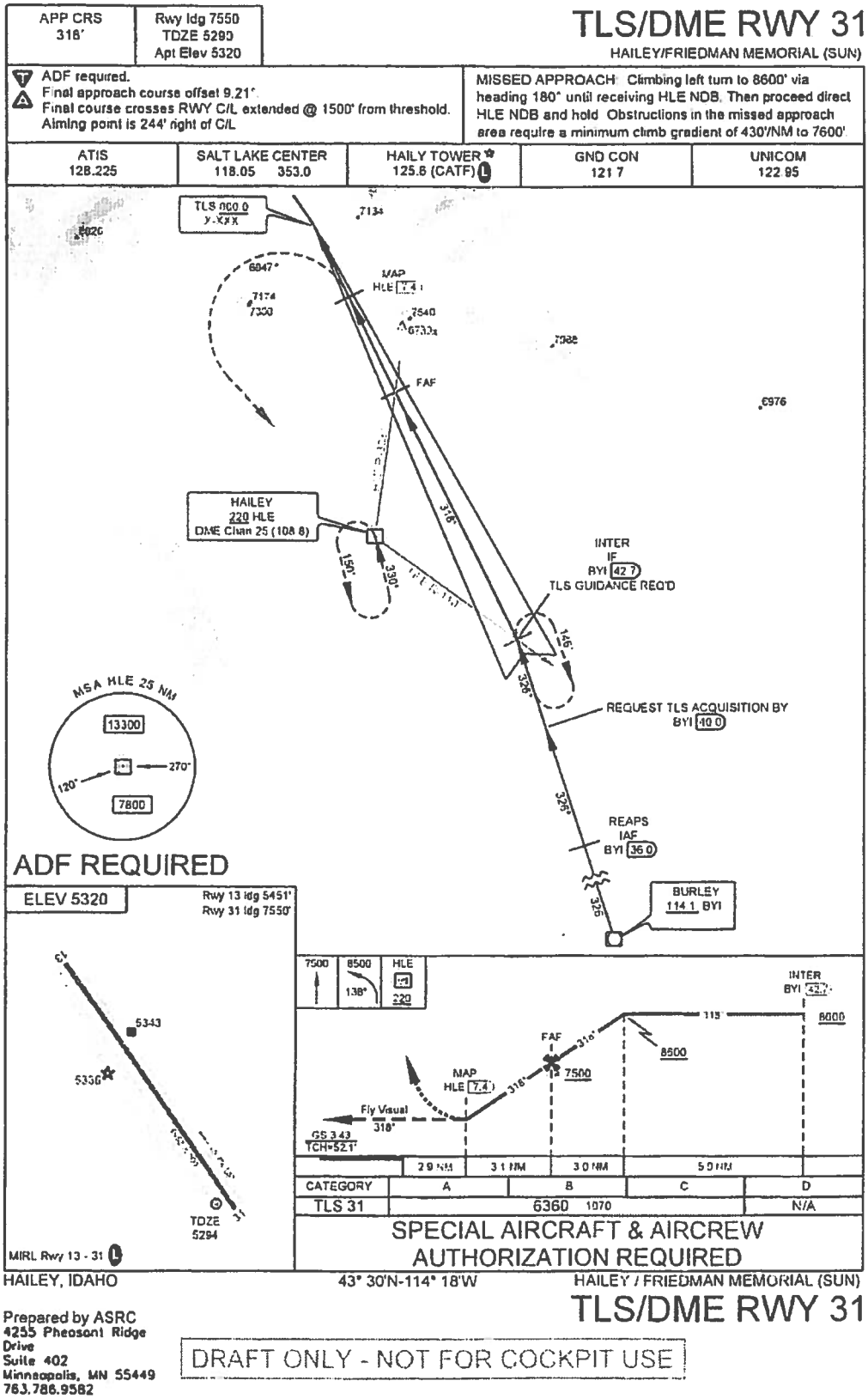
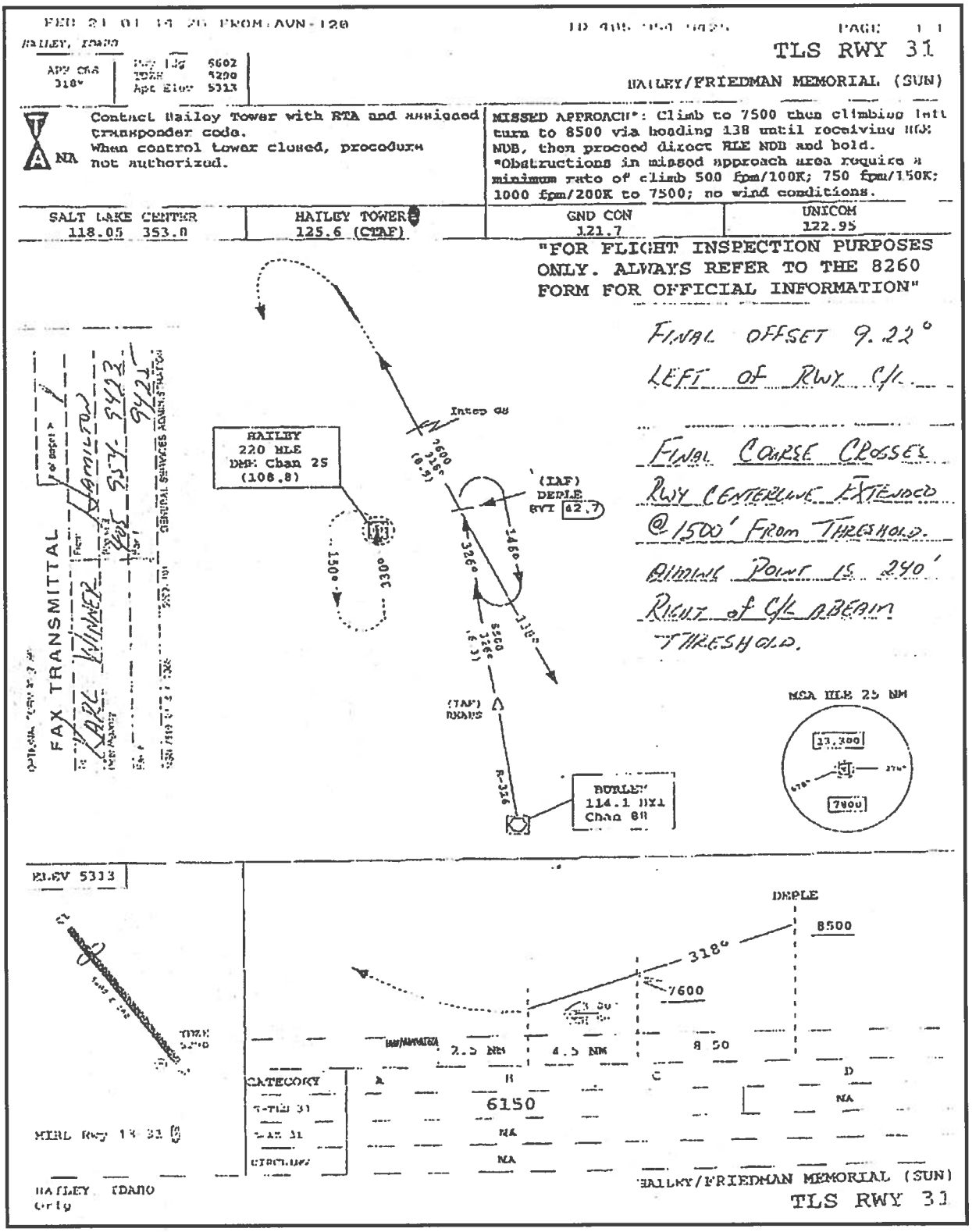


ATTACHMENT 2 – Previous TLS Approach Procedures (never commissioned)



ATTACHMENT 2 – Previous TLS Approach Procedures (never commissioned)



Appendix 6

Environmental Checklist

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

NORTHWEST MOUNTAIN REGION - AIRPORTS DIVISION

Categorical Exclusion Form

Version 08/08/07a

CONTACT THE ADO ENVIRONMENTAL SPECIALIST BEFORE USING THIS FORM

Directions: The person (analyst) preparing this form should have knowledge of the environmental features of the airport and general impacts of the project. Although some responses may be obtained from the preparer's own observations, previous environmental documents or research should be cited. Some of the best sources for information are the jurisdictional federal, state and local resource agencies responsible for the impact categories. This form is to be used with the current versions of FAA guidance, specifically FAA Orders 1050.1E, and 5050.4B.

FAA urges the analyst to contact the ADO as quickly as possible for any extraordinary circumstance that requires FAA to complete the process any applicable special purpose laws require. For example, FAA is solely responsible for completing the Section 106 process. Other special purpose laws may require FAA to complete certain procedures. Early coordination with FAA will do much to reduce delays that would have occurred if it did not begin compliance procedures with the applicable special purpose law early in the project review cycle.

Some of the categories below require a reference or information to support a finding. Attach that information to the form or scan it as an attachment if you are filing this form on the web site noted below.

An electronic version of this form is available at:
http://www.faa.gov/airports_airtraffic/airports/regional_guidance/northwest_mountain/airports_resources/forms/media/environmental/environmental_checklist.doc.

APPLICABILITY:

This Environmental Evaluation Form may be used only if the sponsor's proposed project meets the following two (2) criteria:

1. The proposed project is a federal action subject to NEPA. List applicable paragraph number from FAA Order 5050.4B, Chapter 1 para. 9g (1) Conditional, unconditional, or mixed approval of Federal funding for airport planning and development projects, including separate funding of plans and specifications for those projects.

And

2. The proposed project is identified as one that can be categorically excluded. List applicable category from FAA Order 1050.1E paragraphs 307 through 312. The following paragraphs are applicable: 310a, 310e, 310f, 310h, 310j, 310l, 310o, 310u, 310y, and 310w.

Airport:	**Friedman Memorial Airport**	**Airport Identifier:**	**KSUN (SUN)**
Project Title:	**Runway Safety Area (RSA) Improvements Project (project)**		

Project Description: *List and clearly describe **ALL** components of project proposal including all connected actions. (Attach site map identifying project area).*

SUN does not meet current FAA design standards in several critical areas. Traffic by aircraft such as the Bombardier Q400, operated by Horizon Air, and several models of large GA aircraft (e.g., Gulfstream G-V and Bombardier Global Express) dictates that the Runway Design Code for the airport is C-III. Due to the geometry and spatial limitations of the existing site, the airport does not meet standards for many criteria, most critically the Runway Safety Area (RSA). By Congressional mandate, all commercial service airports, including SUN, must have a compliant RSA by December 31, 2015.

In early 2013, Friedman Memorial Airport Authority (FMAA), sponsor of the airport, submitted to the FAA a Technical Analysis of available alternatives for improving the airport to meet standards where practical and to identify required Modifications of Standards, where standards cannot be met. This Analysis identified seven alternative airport configurations and the costs and possible large scale environmental impacts associated with each. Upon review of the Analysis, the conclusion of the community and the FAA was that Alternative 6 would be pursued. The initial construction priority will be only the elements of Alternative 6 related to the RSA and associated impacts to facilities that are necessary in order to achieve a standard RSA.

Alternative 6 identifies projects within the existing property boundary for SUN that will accomplish the following:

1. Full compliance with C-III RSA dimensions.
2. Maximum runway to parallel taxiway separation of 320'.
3. All aircraft parking outside of the Runway Object Free Area (OFA).

In order to accomplish this, reconfiguration/construction must be completed, including relocation and extension of the primary parallel taxiway on the west side of Runway 13/31 (Taxiway B), removal of a secondary parallel taxiway on the east side of the runway (Taxiway A), relocation of multiple hangars and various other improvements. All of these improvements must be completed prior to December 31, 2015 to meet the aforementioned Congressional mandate.

In order to facilitate the reconfiguration/construction that will be completed as part of the overall RSA Improvements plan, several project phases will be necessary. The overall success of the project is dependent upon all phases being completed. Further, it is important to point out that some level of environmental analysis has been previously completed as part of several unrelated construction projects on the airport in the past with no environmental issues identified.

Exhibit 1 is attached to show a general preliminary project phasing plan resulting in a compliant RSA. Following is a list of project elements covered under this Categorical Exclusion Form. Phase One (1) includes preliminary engineering and also includes the acquisition of approximately .42 acres of land on the north end to facilitate the proper alignment of Taxiway B resulting from its relocation to the west.

Taxiway Bravo (B)
1. Extend Taxiway B (Ph. 2)
2. Relocate Taxiway Connector B-5 (Ph. 2)
3. Relocate South Portion Taxiway B (Ph. 2)
4. Relocate Taxiway Connector B-4 (Ph. 6)
5. Relocate North Portion Taxiway B (Ph. 6)
6. Relocate Runway 31 PAPI Power Control Unit (Ph. 2)

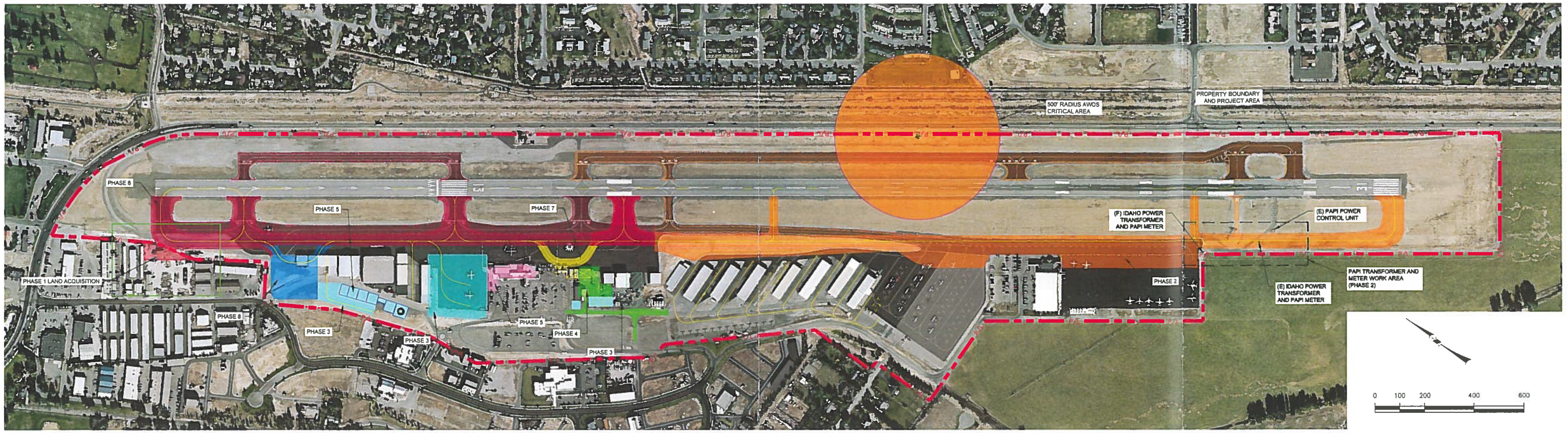
Taxiway Alpha (A)
1. Demo Taxiway A Pavement – South (Ph. 2)
2. Demo Taxiway A Pavement – North (Ph. 6)

Structures
1. Construct SRE/ARFF/Maintenance Facility Pads (Ph. 3)
2. Construct New Hangar Pads (Ph. 3)
3. Relocate SRE/ARFF/Maintenance Facility/Airport Office Facilities (Ph. 4)
4. Reconfigure Terminal (Ph. 5)
5. Relocate Hangars (Ph. 5)

Other
1. Land Acquisition - .42 acres (Ph. 1)
2. Construct North Taxilanes (Ph. 3)
3. Reconstruct Terminal Apron (Ph. 3)
4. Construct Helipad Pad (Ph. 3)
5. Construct Helipad (Ph. 5)
6. Construct Central Bypass Apron (Ph. 7)
7. Construct Air Cargo Ramp (Ph. 8)
8. Relocate AWOS (Ph. 2)
9. Grade RSA (Ph. 2 and 6)

Proposed Start Date of Project: April 1, 2014

Purpose & Need: Upgrade current non-standard RSA to meet C-III Standards. In November of 2005, the U.S. Congress passed a law mandating all airports certificated under 49 U.S.C 44706 comply with FAA design standards for RSA as required by 14 CFR 139. SUN is certificated under 49 U.S.C 44706 and complies with 14 CFR Part 139 and must therefore

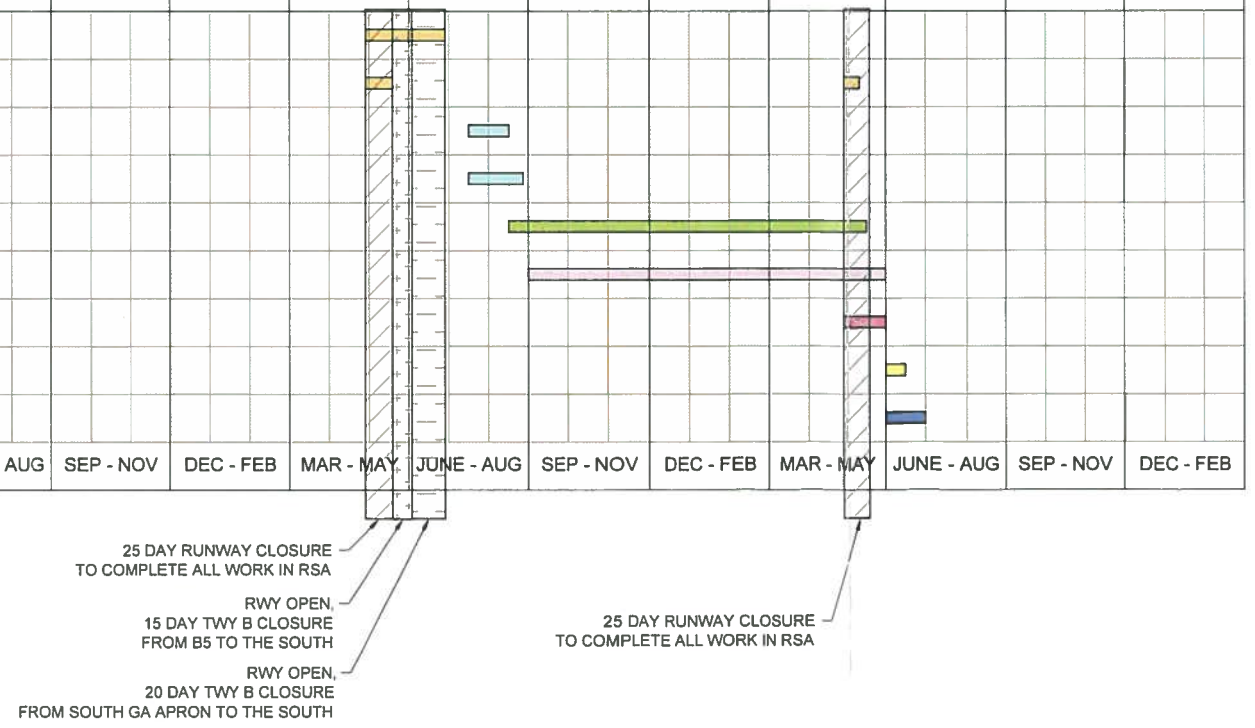


PROJECT SCHEDULE DIAGRAM

PHASE*	PHASE DESCRIPTION	DURATION (CLNDR DAYS)	START	R/W CLOSURE
PHASE 2	TWY B EXTENSION / RELOCATE B5 / RELOCATE SOUTH TAXIWAY B / RELOCATE PAPI TRANSFORMER/METER	60	04-28-13	25
PHASE 2	GRADE RSA / DEMO TWY A PAVEMENT / RELOCATE AWOS	60	05-01-14	25
PHASE 3	SRE / ARFF / SHOP PAD / NORTH TAXILANES / HANGAR PADS / HELIPAD	30	07-15-14	N/A
PHASE 3	TERMINAL APRON RECONSTRUCTION	45	07-15-14	N/A
PHASE 4	RELOCATE SRE / ARFF / SHOP / OFFICE	270	08-15-14	N/A
PHASE 5	TERMINAL RECONFIG / RELOCATE HANGARS / CONSTRUCT HELIPAD	270	09-01-14	N/A
PHASE 6	RELOCATE TWY B4 / NORTH TWY B / DEMO TWY A NORTH / GRADE RSA	35	05-01-15	25
PHASE 7	CENTRAL BYPASS APRON	15	06-01-15	N/A
PHASE 8	AIR CARGO RAMP	30	06-01-15	N/A

*PHASE 1 INCLUDES PRELIMINARY ENGINEERING AND LAND ACQUISITION

NOTE: ACTUAL DATES ARE SUBJECT TO CHANGE, BASED ON FUNDING, WEATHER, ETC



PHASE 1 LAND ACQUISITION AREA

EXHIBIT 1

SUN CATEX FORM
RSA IMPROVEMENTS PROJECT
PRELIMINARY PHASING PLAN
(1-21-2014 SUBJECT TO CHANGE)

T-O ENGINEERS
9777 CHINDEN BOULEVARD
BOISE, IDAHO 83714-2008
PHONE: (208) 323-2288 FAX: (208) 323-2399
E-FILE: I:\130005\PDF Files\Phasing DATE: NOV 2013 JOB: 130005

meet the RSA mandate by the end of calendar year 2015. In order to meet this mandate, the airport will need to be reconfigured via a series of phased construction projects.

Per FAA Order 1050.1E, paragraph 304 and 5050.4B paragraph 606, before a categorical exclusion may be utilized, a review of extraordinary circumstances must be conducted to ensure the categorical exclusion is valid. Extraordinary circumstances exist when the proposed action (1) involves any of the following circumstances and (2) may have an adverse effect requiring further analysis to determine the intensity of that effect. Please complete this form so that the FAA can make a determination.

FOR EACH YES OR NO ANSWER: PROVIDE DOCUMENTATION USED AS THE BASIS FOR THE DETERMINATION

CONTROVERSY

Is the proposed project likely to be highly controversial on environmental grounds? ☐ Yes ☒ No

A proposed Federal action is considered highly controversial when the action is opposed on environmental grounds by a Federal, state, or local government agency, or by a substantial number of the persons affected by such action. For more info see Order 5050.4B, paragraph 9.i. If the action proponent has any doubt whether a given number of opposing persons is "substantial", or there is a probable risk of litigation, that doubt shall be resolved by discussion with ADO Environmental Specialist to determine if the action should be processed as a highly controversial one.
On what basis was the determination made? Reference available documentation to support analysis.

FMAA has discussed this project and the reasons behind it at numerous Board meetings. The Board meetings are all public meetings. Futhermore, FMAA Board members and other representatives of the airport have attended multiple public meetings in Hailey, Idaho, and each of the communities surrounding the airport to provide information and answer questions about this project and other airport matters. No known opposition exists for this project at the time this Categorical Exclusion Form was completed. FMAA Board Meeting minutes are available from airport management as a source of official record.

AIR QUALITY

1. Will the proposed project have the potential to increase landside or airside capacity, including the capacity to handle additional surface vehicles? If no, provide basis and proceed to next section. If yes, proceed to question 2 in this topic. ☐ Yes ☒ No

2. General Conformity requirements. Is the proposed project within or adjacent to a U.S. Environmental Protection Agency, defined NON-ATTAINMENT (or maintenance) AREA? ☐ Yes ☐ No

   a. If yes to 2 above, is the project exempt from the General Conformity regulations published in the Federal Register of November 30, 1993? ☐ Yes ☐ No

   b. If no to 2a, is the project accounted for in the State Implementation Plan? If yes, no further study is necessary. If no, go to 2c below. ☐ Yes ☐ No

   c. Would the proposed project allow the airport to serve 180,000 GA ops and/or 1.3 million enplanements. ☐ Yes ☐ No

If yes, an air pollutant emission inventory must be prepared to determine if the project will produce, on an annual basis, criteria pollutants exceeding applicable de minimis levels. This inventory analysis should include project revisions, intended to reduce the emission inventory to below de minimis levels. If project emissions cannot be kept below de minimis levels an environmental assessment must be prepared.

On what basis was the determination made? Reference available documentation to support analysis.
No increases in capacity, landside or airside, will result from this project. Project construction activities will consist of dirt work, removal of existing pavements, construction of new pavements (to replace displaced facilities), rehabilitation of existing pavements, and demolition and replacement of a small number of structures. The project will include the acquisition of a small area of land on the north end to to facilitate the proper alignment of Taxiway B. All projects are necessary to provide a standard RSA. Use of construction equipment may result in increased vehicle emissions however such emissions will not be significant and will be temporary. Additional discussion on mitigation of construction vehicle emissions is included in the Construction Activity category below. Overall, the project will not result in changes to air quality different than existing conditions. Lastly, the EPA's Counties Designated "Nonattainment" or "Maintenance" Map was reviewed to verify the airport is NOT located in a designated Nonattainment or Maintenance area for National Ambient Air Quality Standards (NAAQS).

COASTAL RESOURCES

Will the project occur in, or affect a coastal zone as defined by the State's Coastal Zone Management Plan? (CZMP)? If no, provide basis and proceed to next section. ☐ Yes ☒ No

Is the proposed project consistent with the approved state CZMP? ☐ Yes ☐ No

If no, then the project sponsor and FAA will need to consult with the state and Federal CZM offices and document the outcome in an environmental assessment.

On what basis was the determination made? Reference available documentation to support analysis (e.g. state CZM plan).
Idaho is located approximately 500 miles inland from the nearest point on the west coast.

COMPATIBLE LAND USE

Is the proposed project reasonably consistent with plans, goals, policies, or controls that have been adopted for the area in which the airport is located? ☒ Yes ☐ No

On what basis was the determination made? Reference available documentation to support analysis (e.g. Master Plan, zoning ordinance, letters from local jurisdictions).
The project is consistent with local plans, goals, policies, and controls. Reference documents include: recently completed Airport Alternatives Technical Analysis, current Airport Master Plan, City of Hailey zoning ordinance, FMAA Board Meetings and meeting minutes.

All project construction activities will take place on airport property, including property acquired as part of the project. The airport is located within the City of Hailey and zoned under the jurisdiction of the City. The current City of Hailey Zoning Ordinance and associated land use map includes an Airport District (Article 4.11) which includes airport property. The Airport District is intended to provide an area that would allow regularly scheduled commercial passenger aircraft services to be used by the general public. The Airport District is also intended to allow other general aviation services for private aircraft and private aircraft charter in conjunction with regularly scheduled commercial passenger aircraft services. The RSA improvements resulting from this project are consistent with the purpose of the Airport District. Land acquisition necessary for the project includes land that is compatible with airport operations and adjacent land uses. The project is also consistent with all other local plans, goals, and policies related to airport development at SUN.

CONSTRUCTION IMPACTS

Will the proposed project produce construction impacts, such as increases in localized noise levels, reduce localized air quality, produce erosion or pollutant runoff, or disrupt local traffic patterns? Include impacts to haul routes, staging areas, disposal sites, stockpiling, etc. Explain. If YES, describe impacts and note project-specific best management practices. ☒ Yes ☐ No

Following is a summary of construction impacts expected from the project. Project work schedule is expected to begin in late spring calendar year 2014 and continue through midsummer 2015. Throughout the project schedule, varying degrees of construction activity will take place based on work elements associated with the various project phases. See Exhibit 1 for reference.

Construction activities will be varied and include existing pavement removal, grading, new paving operations, some building construction, and the relocation of a power transformer for the Runway 31 PAPI. Localized increases in noise levels from construction equipment and activities may be realized in the project area. Further, construction activities will produce some air emissions related to land disturbance and construction vehicles. A majority of daily construction activities are expected to take place between 7 am and 9 pm Monday through Friday. Two 25 day runway closures will be necessary during the project. In order to meet the tight construction schedule of the closures, it will be necessary for crews to work Saturday and Sunday from 9 am to 9 pm. The City is sensitive to impacts to surrounding residents and weekend activity. Special approval from the City will be requested to perform construction activities on Saturday and Sunday. Construction impacts resulting from the project will be minimized by following Best Management Practices (BMP) required under Idaho state law and will include construction during daylight hours, dust control, and operating vehicles only when necessary.

Haul routes will include public roadways, on and in the immediate vicinity of the airport, primarily Airport Way. Some minor delays and disruptions to local traffic may be encountered but access will remain available to the general public and airport tenants throughout the project.

Construction staging and stockpiling will take place on the airport with little to no impact on airport tenants or the general public. Disposal of some construction materials will take place onsite through recycling methods. Some offsite disposal may be necessary via use of the local landfill or through arrangements with a local sand and gravel pit operator. Further discussion of solid waste disposal is included in the Solid Waste Impact category.

The project will not result in any erosion. All runoff will be contained onsite via the system of swales and drywells located on airport.

Lastly, it is important to point out that the airport has undergone significant construction projects in the past; the most recent being a major runway construction project in 2007. All past construction activities share many common elements with this project. Due to the phased nature of this project, construction intensity will not exceed that of past projects. Further, airport staff and the airport's engineer are sensitive to all potential impacts of construction on the community and have developed a significant amount of experience in understanding and minimizing such impacts on airport tenants and the community based on this experience.
On what basis was the determination made? Reference available documentation to support analysis.
Previous construction experience at the airport as well as familiarity with local, state, and federal requirements and BMP related to the mitigation of impacts associated with construction activities.

SECTION 4 (f) [49 U.S.C. 303 (c)] IMPACTS	Will the proposed project impact 49 U.S.C. Section 303 (c) [formerly designated DOT Section 4 (f)] resources (publicly owned land from a public park, recreation area, or wildlife or waterfowl refuge of national, state or local significance, or land of an historic site of national, state or local significance)? If yes, contact ADO specialist for further guidance. **Not applicable.**	☐ Yes	☒ No

On what basis was the determination made? Reference available documentation to support analysis.
All project construction activities will take place on airport property. There are no Section 4(f) resources including parks, wildlife, or recreational areas located within the project area. Approximately five municipal parks are located within one mile north of the airport within the City of Hailey. This project will not result in changes to the current types of aircarft that use the airport, runway utilization, or flight tracks. As a result, these facilities will not be impacted by the project.

FARMLANDS

Will the proposed project impact prime or unique farmlands? Has the Natural Resources Conservation Service (NRCS) or state, if applicable, been contacted to determine if the proposed project will impact prime or unique farmlands? ☐ Yes ☒ No

If there are prime or unique farmlands impacted, has the NCRS Farmland Protection Policy Act form AD-1006 process been completed and project adjustments made to the preferred alternative, if necessary? Provide the total score on that form. Review FAA Order 5050.4B, Table 7-1, Farmlands to determine the intensity of impact. Contact ADO if score is between 200 and 260 for more information. ☐ Yes ☒ No
Not Applicable

On what basis was the determination made? Reference available documentation to support analysis (e.g. Farmland Impact Rating Form).
As a matter of due diligence for this analysis, NRCS was contacted regarding prime or unique farmland in the project area. Per NRCS, under certain conditions, prime farmland exists in the vicinity of the airport. However, all project construction activities will take place on airport property. Land uses on airport property are associated with airport/aeronautical activites per the City's Airport District zoning district as previously discussed. Airport property is not used nor will it be use for farming. As such, this project will not impact prime or unique farmlands. For reference, see Appendix A for existing prime farmlands in the vicinity of the airport per NRCS.

FISH, WILDLIFE AND PLANTS

ENDANGERED AND THREATENED SPECIES

1. Does the proposed project have the potential to impact federal or state listed endangered or threatened species or their habitat? ☐ Yes ☒ No

2. Has the United States Fish and Wildlife Service (USFWS) or National Marine Fishery Service (NMFS, aka NOAA Fisheries Service) been contacted to acquire lists of endangered or threatened species that may be impacted by the project? If, no, then contact the services to get the lists, if any. ☐ Yes ☒ No
The USFWS Species by County Report for Blaine County was reviewed for for this project. A list of list species is included as Appendix B.
If yes to either 1 or 2, contact the ADO Environmental Specialist for further guidance.

On what basis was the determination made? Reference available documentation to support analysis. Note outcome of discussions with ADO. **All project construction activities will take place on airport property. There are currently no endangered or threatened species known to exist in Blaine County that reside on or in the proximity of the airport.**

ESSENTIAL FISH HABITAT (EFH)

Does the proposed project have the potential to impact fish habitat protected under the Magnuson-Stevens Act (ID, OR, WA)? ☐ Yes ☒ No

If yes, has an Essential Fish Habitat assessment been prepared and consulted upon with the National Marine Fisheries Service? ☐ Yes ☐ No

Are the habitats of listed species adversely impacted? ☐ Yes ☐ No

If yes, what conservation measures must be incorporated into the project design?
Not applicable.

On what basis was the determination made? Reference available documentation to support analysis.
All project construction activities will take place on airport property. Based on a review of the NOAA EFH Mapper system, the airport is not within EFH nor is it within HAPC. Chinook Salmon EFH is located several miles to the north of the airport however the Big Wood River flows north to south near the airport. Further, all potential drainage from the project will be retained on-site. Based on the research conducted for this Categorical Exclusion Form, this project will not impact any EFH. See Appendix C.

MIGRATORY BIRD ACT

Does the proposed project have the potential to adversely impact birds protected by the Migratory Bird Treaty Act? ☐ Yes ☒ No

If yes, are the habitats of listed species adversely impacted? ☐ Yes ☐ No

If yes to either, discuss what conservation measures have been incorporated into the project design?
Not applicable.
On what basis was the determination made? Reference available documentation to support analysis.
All project construction activities will take place on airport property. Airport management utilizes maintenance practices within the fence such as routine mowing and weed control that eliminates suitable habitat and food sources that may attract migratory birds and/or other small animals that may serve as prey for migratory birds. As previously mentioned, aircraft flight tracks and runway utilization will not change as a result of this project; therefore no impacts to migratory bird patterns in the area will occur. Further, soil types in the project area are alluvial gravel with high infiltration rates. Such soils are not conducive to standing water and are, therefore, also not an attractant to waterfowl or other migratory bird species. Lastly and practically speaking, the airport has historically never encountered a migratory bird problem anywhere on or near the airport. Based on the analysis completed for this form and historical bird activity at the airport, the project will not adversely impact birds protected by the Migratory Bird Treaty Act.

FLOODPLAINS

Will the proposed project be located in, encroach upon, or otherwise impact a floodplain? ☐ Yes ☒ No

If yes, attach FEMA Flood Map.

On what basis was the determination made? Reference available documentation to support analysis (e.g. 404 permit, consultation with the Corps, floodplain delineation report).
All project construction activities will take place on airport property. FEMA Flood Insurance Rate Maps 16013C0668E and 16013C0856E11 indicate that no parts of the airport lie within a 100 year floodplain. Appendix D includes the referenced FEMA Flood Insurance Rate Maps.

SOLID WASTE IMPACT

Will the proposed project produce solid waste impacts? ☒ Yes ☐ No
If yes, are local solid waste facilities able to accommodate that waste?
If no, how will project-related excess waste be addressed or mitigated?
Yes, local solid waste facilities will be able to accommodate solid waste generated by the project.
On what basis was the determination made? Reference available documentation to support analysis.
Project construction activities will include removal of some existing pavement in particular Taxiway A, on the the east side of the airport. A large portion of the millings produced from the removal of existing pavements will be recyclyed/utilized for other purposes onsite. A minimal amount of offsite disposal in expected. Solid wastes that cannot not be recycled will be disposed of at the local land fill. For those solid wastes that can be recycled but not needed onsite, arrangements will be made with a local sand and gravel pit operator for disposal. Similar arrangements have been made in the past. Based on the anticipated amount of solid waste to be generated by the project, sufficient existing and future capacity exists at local municipal landfills and other facilities capable of accommodating solid wastes.

HAZARDOUS MATERIALS

Is there reason to believe or does evidence exist that the proposed project will be constructed in an area that contains hazardous materials? ☐ Yes ☒ No

If yes, explain how such impacts will be mitigated.
Not applicable
On what basis was the determination made? Reference available documentation to support analysis.
A review of the airport's existing Storm Water Pollution Prevention Plan (SWPPP) was conducted as part of this analysis. The SWPPP indicates no previous leaks or spills of hazardous materials have occurred in the project area or anywhere on airport. Past construction activities and materials derived from construction also have confirmed no hazardous materials contamination. There is no reason to believe nor is there any evidence to suggest the proposed project will be constructed in an area(s) that contains hazardous materials. Should unexpected encounters occur during project construction, all applicable local, state and federal regulations and standards for the handling and disposal of hazardous materials will be followed.

HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL AND CULTURAL RESOURCES

Pursuant to Section 800.3 of 36 CFR Part 800, does the project involve an activity that has the potential to affect historic properties (note: includes any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register). ☐ Yes ☒ No

If no, provide rationale and move to next section.

If yes, work with the ADO environmental specialist to complete the 106 process. It is the ADO environmental specialist's responsibility to coordinate with the Tribes and the SHPO. It is critical that you contact the ADO as soon as possible to avoid project delays.
On what basis was the determination made? Reference available documentation to support analysis. (e.g. survey results, letters from SHPO and Tribes).

For the project, the Area of Potential Effect (APE) is the same as the project boundaries and can be viewed in detail in Exhibit 1. A review of the National Register of Historic Places was conducted, revealing no listed facilities at the Airport or in the immediate vicinity of the project. The Airport does not contain and is not within any historic districts or landmarks.

The project does include the demolition of up to ten (10) structures; eight (8) on existing airport property and two (2) on land to be acquired as part of the project. A records review was conducted for each of the structures proposed for demolition. For structures on existing airport property, each was found to be of recent construction (1969 or newer) with most being constructed in the early 1980's. The two structures located on land to be acquired were constructed in 1978. It was determined that none of the structures meet the qualifications for eligibility for listing on the National Register of Historic Places.

There are no known historical or archaeological sites within the construction areas of the Preferred Alternative. A records review was conducted regarding the possible impacts to historic, architectural, archaeological, and cultural resources. The coordination letter from the Idaho State Historical Society (ISHS) is included as Appendix E.

Should construction activity expose buried archaeological material, work would stop in that area and both the FAA and the ISHS will be contacted.

LIGHT EMISSIONS AND VISUAL IMPACTS

Will the proposed project produce light emission impacts? ☐ Yes ☒ No

Will there be visual or aesthetic impacts from the project, and/or have there been concerns expressed on this? ☐ Yes ☒ No

If yes, how will such impacts be mitigated?
Not applicable.

On what basis was the determination made? Reference available documentation to support analysis.
Project construction activities will consist of dirt work, removal of existing pavements, construction of new pavements (to replace displaced facilities), rehabilitation of existing pavements, a small amount of land acquisition, and demolition and replacement of small number of structure – all to accommodate a standard RSA. These projects will not include elements that produce significant light emissions or visual or aesthetic impacts.

The local community places a significant emphasis on protecting and maintaining the outdoor nature of the area. It should be noted that the City of Hailey, Idaho, Zoning Ordinance, is one of the strictest in the state when it comes to outdoor lighting. Article 8B – Outdoor Lighting, of the Ordinance states the purpose of the Article is, "to protect and promote the public health, safety and welfare, the quality of life, and the ability to view the night sky, by establishing regulations and a process for review of exterior lighting."

No visual or aesthetic impacts will result from the project compared to existing conditions. Still, all construction activities (including construction equipment activities) and new project related development and land acquisition will be subject to and adhere to all local zoning requirements as they pertain to visual or aesthetic impacts.

NATURAL RESOURCES, ENERGY SUPPLY AND SUSTAINABLE DESIGN	Will the proposed project impact energy supply or natural resources in a detrimental manner?	☐ Yes	☒ No
	If yes, please explain. **Not applicable.**		
	On what basis was the determination made? Reference available documentation to support analysis. **The project will not result in a significant use of natural resources or energy. Construction project elements that include new pavement will result in the use of mineral resources. Project design and construction has considered options that result in efficient use of all natural resources (including mineral resources), energy and sustainability.**		
NOISE	1. Do project forecasted operational levels for the period the analysis covers exceed 90,000 annual adjusted propeller operations or 700 annual adjusted jet operations? (Cite data reference).	☒ Yes	☐ No
	If yes, have noise contours been prepared?	☒ Yes	☒ No
	2. Does the project increase noise exposure levels 1.5 DNL or more over noise sensitive areas (residential homes, schools, health facilities, churches, cultural or historic sites) within the 65 DNL contour?	☐ Yes	☒ No
	If yes, can mitigation be committed to reduce the increase to below the 1.5 DNL threshold of significance?	☐ Yes	☐ No
	If no, and mitigation cannot be developed to reduce the impact below the 1.5 DNL threshold, an Environmental Assessment (EA) or an Environmental Impact Statement (EIS) will need to be prepared.		
	3. Identify the nearest 4(f) properties to your project (parks, wildlife and recreational areas, historic properties). Contact the ADO for further directions. **No parks, wildlife, or recreational areas exist in the project area. Approximately five local municipal parks are located within one mile north of the airport. These facilities will not be impacted by the project.**		

On what basis was the determination made? Reference available documentation to support analysis. (e.g. ALP, Master Plan, noise contours).
Operations counts for the airport based on Air Traffic Control Tower, airport, FAA, and FBO records compiled as part of the planning efforts associated with Alternative 6 (justification of Modifications to Standards in particular) indicate over 700 annual operations are conducted by jet aircraft at SUN.

In 2012, an Environmental Assessment (EA) was completed for the initiation of air carrier turbojet service at SUN. As part of this EA, noise contours were produced using the FAA's Integrated Noise Model (Version 7.0c). Baseline fleet mix data for reciprocating, turboprop and jet aircraft was based on the FAA's 2012 SUN Terminal Area Forecast (TAF) and coordination with airport staff. The difference in the number of annual operations modeled compared to the TAF was very small. The noise contours produced as part of the 2012 EA indicate no residential or other sensitive land uses lie within the 65 DNL contour based on current (2012) or forecasted operations (2017). 2012 and 2017 noise contours developed as part of the turbojet service EA are included as Appendix F. (Note: "Project" versus "No Project" designations associated with the contours refers to the initiation of jet service versus no jet service at the airport).

Project activities analyzed as part of this document will consist of dirt work, removal of existing pavements, construction of new pavements (to replace displaced facilities), rehabilitation of existing pavements, a small amount of land acquisition, and demolition and replacement of small number of structure – all to accommodate a standard RSA. No increases in airport capacity, landside or airside, will result from the project. Further, aircraft flight tracks and runway utilization will not change as a result of the project and no aircraft noise will be generated at the airport during two 25 day runway closures. General analysis completed for this project for the purpose of determining noise effects indicates no changes in noise impacts will result from this project.

SECONDARY (INDUCED) IMPACTS

Will the project cause shifts in patterns of population movement and growth; public service demand; or changes in business and economic activity? ☒ Yes ☐ No

Will the project result in disruption of community? ☐ Yes ☒ No

If yes to either, what mitigation is planned?
No shifts in patterns of population movement and growth will result from the project. From a public service demand perspective, SUN is a critical component of the local, state, and national transportation systems. As such, a standard RSA is critical to ensure the airport can meet current aviation demand in a safe manner. There will be *temporary* unvoidable impacts to some local businesses as well as the local economy. The greatest impacts will be felt by certain airport dependent businesses (i.e. the FBO, concessionaires, airlines) as a result of two 25 day runway closures that will be necessary for construction activities. During these closures no aviation traffic will be able to use the airport resulting in less aviation dependent business activity on the airport. At no point however, will the project result in the closure of any businesses. The land to be acquired is commercial property adjacent to the airport. The land previously supported a local masonry business which is no longer in business. The land is currently unoccupied and owned by the bank.

To reduce any impacts as much as possible, significant coordination between the design engineer, airport staff, and airport tenants has been conducted. Based on input from all involved, airport closures are planned during the "off seasons" of this resort community and the length of closures are such that on-airport businesses can continue to employ staff without the need for temporary layoffs. Airlines can continue to serve SUN via bus service from Boise or Twin Falls if they so choose.

Airport staff and the design engineer have been, and will continue to be, sensitive to closure impacts on airport and local businesses and the economy. Proactive efforts to minimize impacts and maintain communication with all impacted parties is one of the highest priority throughout the duration of the project.

On what basis was the determination made? Reference available documentation to support analysis.
Significant coordination between the design engineer, airport staff, and airport tenants. Past experience with major construction and closures of the airport.

SOCIO-ECONOMIC IMPACTS, ENVIRONMENTAL JUSTICE, AND CHILDREN'S ENVIRONMENTAL, HEALTH AND SAFETY RISKS

Does the action require the relocation of residents or businesses? ☒ Yes ☐ No

If yes, how will those being relocated be accommodated?

The project will result in the need to demolish up to ten (10) structures. These structures will need to be removed because they will be located in the relocated taxiway Object Free Areas of parallel Taxiway B. Eight (8) of the ten (10) structures are located on current airport property and include five (5) hangars, one (1) building belonging to the United States Forest Service, and the remaining two (2) the Airport Manager's office and ARFF/Maintenance Facility. Space to relocate and reconstruct replacement existing on-airport buildings is part of the project. Two additional hangars located in the general aviation T Hangar area located on south end of the field may need be reconfigured. These hangars currently have east facing access which may be hampered by new grades resulting from the relocated Taxiway B. Reconfiguration of the hangars wil consist of reorienting the hangar doors to the south side of the hangars. The need to relocate these hangars does not appear necesssary at this time. As previously discussed, the land to be acquired is commercial property adjacent to the airport. The land previously supported a local masonry business which is no longer in business. The land is currently unoccupied and owned by the bank. Two (2) out buildings (a shop and shed) exist on the land to be acquired. Upon acquisition of the land by the airport, these unoccupied structures will be demolished with no need for replacement.

Airport staff is currently working with the impacted hangar tenants regarding new lease terms and relocation plans. Refer to Exhibit 1 and Appendix G for the proposed building demolition/relocation plans.

Does the project alter surface transportation patterns or cause a degradation of level of service? ☒ Yes ☐ No

If yes, what mitigation is planned?
Airport businesses and tenants may experience minor interruptions/delays in airport access due to construction activities in the project area however access will remain available throughout the project. Overall impacts to surface transportation patterns will be minimal on airport businesses and tenants and nearly non-existent to the general public.

Will the project cause disproportionately high adverse impacts on minority or low-income populations within the DNL 65 contour? ☐ Yes ☒ No

If yes, what mitigation is planned?
Not applicable.

Will the project cause disproportionately high adverse impacts in any impact category to minority or low income populations? ☐ Yes ☒ No

If yes, what mitigation is planned?
Not applicable.

On what basis was the determination made? Reference available documentation to support analysis (e.g. census data, local statistics).
For structure demolition and relocation and acquisition of land, the basis of this determination was made based on project design and the requirements to meet RSA standards. While certain airport tenants will be impacted by the project, relocation plans have been made and coordination and negotiation by airport staff with these tenants is being conducted to ensure fair and equitable relocation options and terms. Transportation impacts will be temporary only. Noise impacts are not an issue as no residential or other sensitive land uses lie within the 65 DNL contour (see Appendix F). Lastly, no increases in capacity, landside or airside, will result from this project and all project activities will take place on airport property and land acquired as part of this project. In summary, no adverse impacts to minority or low income populations will result.

WATER QUALITY

Will the proposed project produce water quality impacts to ground water, surface water bodies, public water supply systems, or violate Federal, state or tribal water quality standards? ☐ Yes ☒ No

If yes, what mitigation is planned?
Not applicable.
On what basis was the determination made? Reference available documentation to support analysis (e.g. National Pollutant Discharge Elimination System (NPDES) permit, water quality certification or other consultation with involved water quality agencies).
As with existing conditions, no surface water bodies or public water supply systems will be impacted by the project. The project will not result in significantly altered stormwater runoff as a result of removed or new pavements. All stormwater runoff will remain on the airport for treatment and disposal through drywells located in swales. Collection and treatment of stormwater runoff via swales and drywells is consistent with the airport's current SWPPP as well as Idaho state environmental requirements. While stormwater runoff will be modifed by the net loss in pavement, the fundamental system will not change and water quality on and around the airport will not be negatively impacted by the project.

WETLANDS

1. Will the proposed project impact wetlands? ☐ Yes ☒ No

2. If yes, has the proposed project area been surveyed for wetlands, and/or has a wetland delineation been done? ☐ Yes ☐ No

   a. If not, a wetland delineation may need to be done in consultation with the ADO and the U.S. Army Corps of Engineers (Corps).

   b. If yes to 2, has the Corps concurred on the wetland delineation? ☐ Yes ☐ No

   c. Is a Corps permit required for the project? If so, explain what type (nationwide, general or individual permit).

3. If yes to question 1, have all practical measures been taken to avoid impacting the wetlands? Discuss the measures to avoid, minimize and compensate for wetland impacts.

Note: If an individual permit is required from the Corps, an environmental assessment must be prepared.

On what basis was the determination made? Reference Available documentation to support analysis (e.g. 404 permit, consultation with the Corps, wetland delineation report and Corps verification report).
All project construction activities will take place on airport property. A review of the United States Fish and Wildlife Service (USFWS) National Wetland Inventory for the area indicates there are currenly no wetlands contained within the project area. Further, recent soil samples collected for the project area indicate the soils consist of alluvial gravel with high infiltration rates which drain quickly. Such soils are not conducive to wetlands thus significanly reducing the risk of any wetlands forming on the airport in the future. See Appendix H for a USFWS map of the project area.

WILD AND SCENIC RIVERS

Would the proposed project affect any portion of the free-flowing characteristics of a Wild and Scenic River or a Study River, or any adjacent areas that are part of such rivers, listed on the Wild and Scenic Rivers Inventory? ☐ Yes ☒ No

If yes, explain how such impacts will be mitigated.
Not applicable
On what basis was the determination made? Reference available documentation to support analysis.
All project construction activities will take place on airport property. No Wild and Scenic Rivers are located within the perimeter fence nor are any Wild and Scenic Rivers located in Blaine County based on a review of the National Wild and Scenic River System. See Appendix I for a map of National Wild and Scenic Rivers and their proximity to Hailey, Idaho.

CUMULATIVE IMPACTS	When considered together with other past, present, and reasonably foreseeable future development projects on or off the airport, federal or non-federal, would the proposed project produce a significant cumulative effect on any of the environmental impact categories above? Where the project does have an impact in a resource category, although not significant, a cumulative impact analysis for that category is required. Consider projects that are connected, cumulative, or similar from a timing or geographical perspective. Provide a list of projects considered. Refer to 5050.4B, paragraph 9.q for a definition of reasonably foreseeable. **Included in the narrative below:**	☐ Yes ☒ No

As previously discussed, the airport does not meet current FAA design standards based on the current critical aircraft that utilize the airport. Current aircraft traffic dictates that the Runway Design Code (RDC) for the airport is C-III. The existing site is constrained and does not meet object clearance and separation standards for many C-III standards, most critically the RSA. Operational restrictions currently allow operations by Category C air carrier aircraft at the airport by sterilizing the parallel taxiways during such operations. These operational restrictions were instituted when operations by the Q400 began at the airport in the early 2000s. At that time, the Airport began a series of planning efforts to find a permanent solution to meet C-III standards.

These efforts began with a Master Plan Update, which was completed in 2004. This Master Plan determined that the ultimate solution was the construction of a new airport, due to the constrained environment at the existing site. A Site Selection Feasibility Study was immediately initiated, which identified a preferred site. In 2007, FAA began an Environmental Impact Statement (EIS) for a new airport. This process continued until August of 2011, when the FAA Northwest Mountain Region Airports Division (ANM) indefinitely suspended the EIS due to concerns associated with wildlife and initial cost estimates of the primary sites under consideration. The FAA and FMAA have since concurred that this particular EIS process is permanently cancelled.

After suspension of the EIS, ANM requested that FMAA work with the community to determine what viable options are available and what the path forward for the airport should be. Through a series of extensive public meetings and close coordination with ANM, the community determined that a new airport is still the ultimate solution. Due to the environmental and financial challenges, however, it was recognized that planning, constructing, and opening a new airport will take years to complete, and improvements to the existing airport are necessary in order to improve the safety and viability of the airport.

During the fall of 2012, FMAA, in cooperation with ANM, undertook a Technical Analysis which was submitted to FAA in January 2013. The purpose of the Analysis was to investigate alternatives and provide technical information to the FAA in order to assist the agency in making a decision as to the best alternative(s) that will achieve compliance with RSA standards and result in an increased level of safety at the airport for the type and size of aircraft that use the facility today and before the aforementioned congressionally mandated 2015 RSA deadline.

As a result of the Technical Analysis, ANM concurred with the preferred alternative (referred to as 'Alternative 6' in the Technical Analysis) to improve the existing site. Further, and of utmost importance to FMAA and the community, FMAA and ANM have concurred that the "dual path forward" is the best ultimate solution. FMAA and ANM will continue with coordinated efforts to improve the existing site while continuing the planning process to find a new site to move the airport in the future. At this point, ANM and FMAA began work to implement a plan consisting of projects to construct the elements of the preferred alternative. The development of the Technical Analysis was a very public process and no environment objections were raised.

As a matter of perspective for this cumulative impacts analysis and considering the discussion above, below is a brief summary of more recent past projects and anticpated future projects.

Recent Past Projects

On Airport

As explained above, the past several years have been focused on planning for a new airport. Non-planning project completed at the airport in the past five years include:

- **A pavement maintenance project consisting of crack seal, seal coat and new airport markings (2009)**
- **GA Apron and Hangar Area Reconfiguration and Improvements (2013)**

Adjacent to the Airport

A majority of the area immediately surrounding the airport is within the jurisdiction of the City of Hailey. Due to the constrained environment within the valley and limited space available, much of the area around the airport is already developed and zoned. No recent, major projects have been completed adjacent to the airport that have impacted the airport or vice versa.

Future Projects

On Airport

FMAA intends to initiate a Master Plan Update in 2014 with the intent to study future development needs/options at the existing site as well as revisit a potential new site(s) to meet the goal and ultimate solution of relocating the airport. Until the new master plan is complete, future projects are uncertain but may include additional land acquisition, hangar development, new aircraft parking aprons, new access roads, etc.

Adjacent to the Airport

Based on a review of information available on the City of Hailey and Blaine County websites and/or conversations with local Planning and Zoning officials, no major projects adjacent to the airport are expected in the near future. The City advised the area west of the airport represents an important area for future economic development consistent with the current comprehensive plan as well as current and future planned zoning. With the exception of a few lots, the area west of the airport is mostly built out.

The Idaho Transportation Department (ITD) was contacted during the Technical Analysis regarding State Highway 75 (SH75). Currently SH75 is within the Runway OFA. According to ITD, there are longer range plans to improve SH75 through Hailey, including the stretch adjacent to the airport. As this highway improvement project nears, coordination between ITD and the airport will take place to consider options to that may include relocation of the highway outside the OFA.

Summary

From a cumulative impacts standpoint, the project will have very little cumulative effect on the cateogories. As indicated in this analysis, the following categories were identified for impacts:

- **Construction Impacts**
- **Solid Waste Impacts**
- **Socio-Economic Impacts**

Overall impacts of these categories are insignificant. Construction and socio-economic impacts will be temporary in nature; solid waste impacts will be relatively minor and mitigated with little impact to local facilities. Acquisition of a small amount of land on the north end will be necessary to facilitate the proper alignment of Taxiway B resulting from

its relocation to the west. The land is currently unoccupied and is compatible with the airport and adjacent zoning.

To reiterate, the purpose of this overall RSA improvements project and associated phases is to remove and/or replace existing facilities in order to provide for a standard RSA at the airport. As such, no increases in airport capacity, landside or airside, or activity will result from the project; no changes to the current types of aircraft that use the airport, runway utilization, or flight tracks will be realized as a result of the project. In other words, upon completion of the project, activity at the airport is anticipated to return to pre-project operational status.

Preparer Certification

I certify that the information I have provided above is, to the best of my knowledge, correct.

Signature — 1-21-2014 Date

Chris Pomeroy, Planning Service Leader — Name, Title

208-323-2288 — Phone

T-O Engineers — Affiliation

cpomeroy@to-engineers.com — e-mail address

Airport Sponsor Certification

I certify that the information I have provided above is, to the best of my knowledge, correct. I also recognize and agree that no construction activity, including but not limited to site preparation, demolition, or land disturbance, shall proceed for the above proposed project(s) until FAA issues a final environmental decision for the proposed project (s) and until compliance with all other applicable FAA approval actions (e.g., ALP approval, airspace approval, grant approval) has occurred.

Signature — Rick@FLYFMH.COM e-mail address — 1-21-2014 Date

FAA Decision:

Having reviewed the above information, certified by the responsible airport official, it is the FAA's decision that the proposed project (s) or development warrants environmental processing as indicated below.

- [x] The proposed project has been found to qualify for a Categorical Exclusion as provided by FAA Order 1050.1E, Chapter 3. 310e, 309e, 310i, 310h, 310b, 310t, 309c, 310R
- [ ] The proposed project exhibits conditions that require the preparation of an Environmental Assessment (EA) (List subject areas e.g. noise, water quality, threatened and endangered species etc.)
- [ ] The following additional documentation is necessary for FAA to perform a complete environmental evaluation of the proposed project

Project Reviewed and Recommended by:

FAA Environmental Specialist — 1/28/2014 Date

Approved:

FAA Approving Official — 1/28/2014 Date

Form Date: July 13, 2007

APPENDIX A

Farmlands

Source: Natural Resources Conservation Service

SUN Categorical Exclusion Form
RSA Improvements

Report—Prime and other Important Farmlands (Friedman Memorial Airport)

Prime and other Important Farmlands--Blaine County Area, Idaho		
Map Symbol	**Map Unit Name**	**Farmland Classification**
4	Balaam gravelly sandy loam, 0 to 2 percent slopes	Prime farmland if irrigated
7	Balaam-Adamson complex, cool, 0 to 2 percent slopes	Prime farmland if irrigated
8	Balaam-Adamson-Riverwash complex, 0 to 2 percent slopes	Not prime farmland
20	Bruneel loam, 0 to 2 percent slopes	Prime farmland if irrigated and drained
30	Drage gravelly loam, cool, 2 to 15 percent slopes	Prime farmland if irrigated
42	Gimlett very gravelly sandy loam, 0 to 2 percent slopes	Prime farmland if irrigated
50	Hutton variant clay loam, 0 to 2 percent slopes	Farmland of statewide importance, if irrigated
51	Isknat gravelly clay loam, 0 to 2 percent slopes	Farmland of statewide importance, if irrigated
66	Little Wood very gravelly loam, 0 to 2 percent slopes	Prime farmland if irrigated

Custom Soil Resource Report
Soil Map

Map Scale: 1:17,300 if printed on B landscape (17" x 11") sheet.

N

Meters: 0 250 500 1000 1500

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

APPENDIX B

Endangered and Threatened Species Report
Blaine County, Idaho

Source: USFWS

SUN Categorical Exclusion Form
RSA Improvements

USFWS - Species by County Report - Blaine County, Idaho

Group	Name	Population	Status	Lead Office
Conifers and Cycads	Whitebark pine (Pinus albicaulis)		Candidate	Wyoming Ecological Services Field Office
Fishes	Bull Trout (Salvelinus confluentus)	U.S.A., conterminous, lower 48 states	Threatened	Idaho Fish And Wildlife Office
Fishes	Bull Trout (Salvelinus confluentus)	U.S.A., conterminous, lower 48 states	Threatened	Idaho Fish And Wildlife Office
Fishes	Bull Trout (Salvelinus confluentus)	U.S.A., conterminous, lower 48 states	Threatened	Idaho Fish And Wildlife Office
Mammals	Gray wolf (Canis lupus)	Northern Rocky Mountain DPS (delisted, except WY)	Recovery	Office Of The Regional Director
Mammals	Canada Lynx (Lynx canadensis)	(Contiguous U.S. DPS)	Threatened	Montana Ecological Services Field Office
Mammals	North American wolverine (Gulo gulo luscus)		Proposed Threatened	Montana Ecological Services Field Office

APPENDIX C

Essential Fish Habitat

Source: NOAA

SUN Categorical Exclusion Form
RSA Improvements

NOAA HABITAT CONSERVATION | HABITAT PROTECTION

Essential Fish Habitat Mapper

EFH View Tool | Data Query Tool

Region
Pacific

Essential Fish Habitat
All Fresh-water Salmon EFH

Habitat Areas of Particular Concern

EFH Areas Protected from Fishing

All Fresh-water Salmon EFH

Text Description

Salmon

0% Layer Transparency 100%

Legend

Click to switch between lifestages

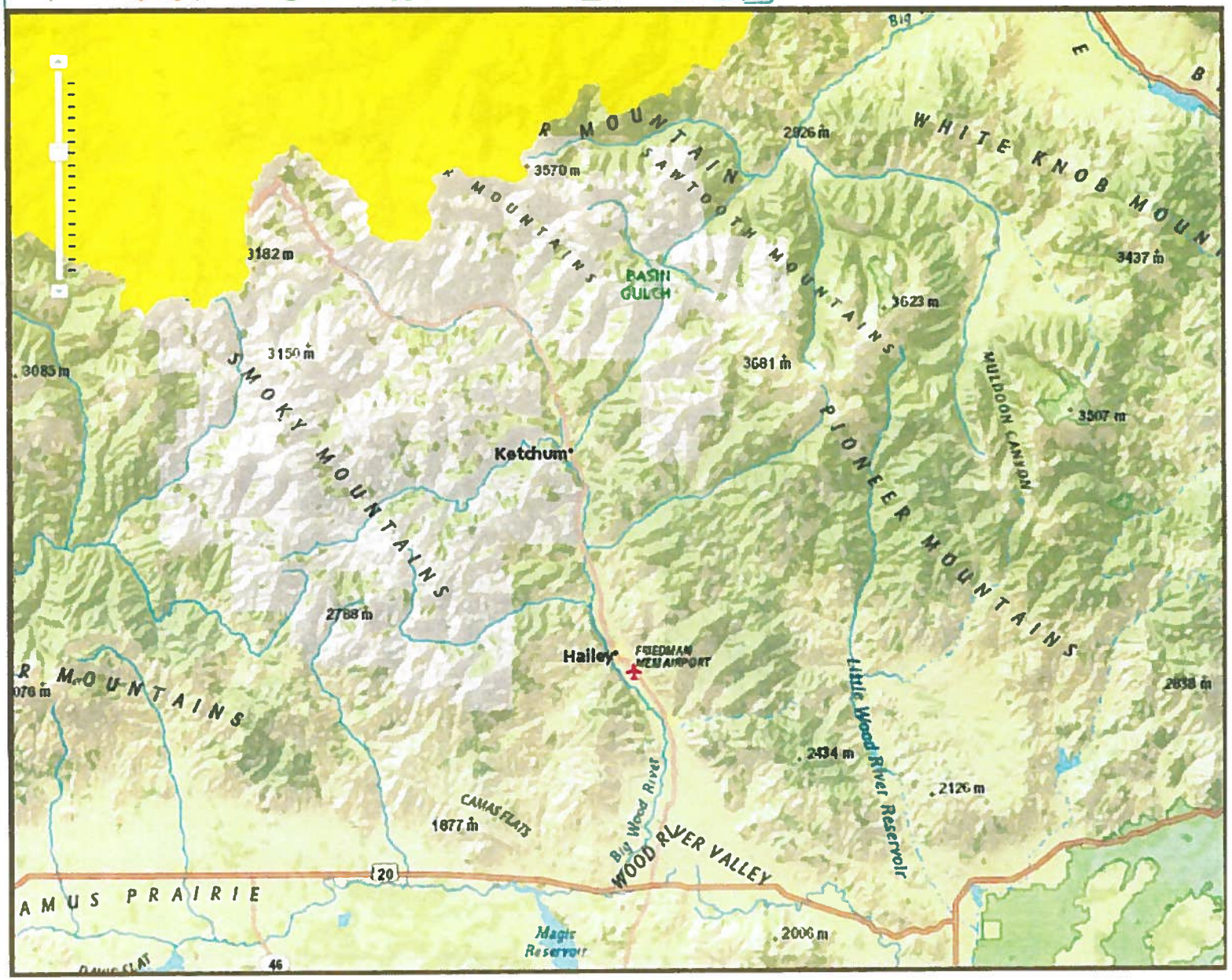
All Salmon

NOAA Nautical Charts

Availability based on zoom level and location

Visible Charts Transparency Not Visible

Zoom: | Extent: | Location Query: | Help:



MAP SCALE 1" = 500'

250 0 500 1000 FEET

METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0668E

FIRM

FLOOD INSURANCE RATE MAP

BLAINE COUNTY, IDAHO AND INCORPORATED AREAS

PANEL 668 OF 2000

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BLAINE COUNTY	165167	0668	E
HAILEY CITY OF	160022	0668	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
16013C0668E

EFFECTIVE DATE
NOVEMBER 26, 2010

Federal Emergency Management Agency

EFH Data Notice: Essential Fish Habitat (EFH) is defined by textual descriptions contained in the fishery management plans developed by the regional Fishery Management Councils. In most cases mapping data can not fully represent the complexity of the habitats that make up EFH. This report should be used for general interest queries only and should not be interpreted as a definitive evaluation of EFH at this location. A location-specific evaluation of EFH for any official purposes must be performed by a regional expert. Please refer to the following links for the appropriate regional resources.

NMFS Northwest Regional Office
NMFS Southwest Regional Office
Pacific GIS Mapping Tool
NMFS Alaska Regional Office
Alaska GIS Mapping Tool

Query Results

Degrees, Minutes, Seconds: Latitude = 43°30'13" N, Longitude = 115°42'22" W
Decimal Degrees: Latitude = 43.50, Longitude = -114.29

The query location intersects with spatial data representing EFH and/or HAPCs for the following species/management units.

HAPCs

No Habitat Areas of Particular Concern (HAPC) were identified at the report location.

EFH Areas Protected from Fishing

No EFH Areas Protected from Fishing (EFHA) were identified at the report location.

Spatial data does not currently exist for all the managed species in this area. The following is a list of species or management units for which there

is no spatial data.
****For links to all EFH text descriptions see the complete data inventory: open data inventory -->**

Pacific Coastal Pelagic Species,
Jack Mackerel,
Pacific (Chub) Mackerel,
Pacific Sardine,
Market Squid,
Northern Anchovy - Central Subpopulation,
Northern Anchovy - Northern Subpopulation,
Pacific Highly Migratory Species,
Albacore - North Pacific,
Bigeye Thresher Shark - North Pacific,
Bigeye Tuna - Pacific,
Bluefin Tuna - Pacific,
Blue Shark - North Pacific,
Common Thresher Shark - North Pacific,
Dolphinfish (Dorado or Mahimahi) - Pacific,
Pelagic Thresher Shark - North Pacific,
Shortfin Mako Shark - North Pacific,
Skipjack Tuna - Eastern Pacific,
Striped Marlin - Eastern Pacific,
Swordfish - North Pacific,
Yellowfin Tuna - Eastern Pacific,
West Coast Salmon,
All species and stocks

APPENDIX D

Floodplains

Source: FEMA

SUN Categorical Exclusion Form
RSA Improvements

APPENDIX E

Historical, Architectural, Archaeological and Cultural Resources

Source: Idaho State Historical Society

SUN Categorical Exclusion Form
RSA Improvements

Idaho • State Historical SOCIETY

www.history.idaho.gov

November 15, 2013

RECEIVED
NOV 25 2013
HLN-ADO

Diane Stilson, P. E.
FAA Helena Airport District Office
2725 Skyway Drive, Suite 2
Helena, Montana 59602-1213

C.L. "Butch" Otter
Governor of Idaho

Janet Gallimore
Executive Director

Administration
2205 Old Penitentiary Road
Boise, Idaho 83712-8250
Office: (208) 334-2682
Fax: (208) 334-2774

Membership and Fund Development
2205 Old Penitentiary Road
Boise, Idaho 83712-8250
Office: (208) 514-2310
Fax: (208) 334-2774

Historical Museum and Education Programs
610 North Julia Davis Drive
Boise, Idaho 83702-7695
Office: (208) 334-2120
Fax: (208) 334-4059

State Historic Preservation Office and Historic Sites
Archeological Survey of Idaho
210 Main Street
Boise, Idaho 83702-7264
Office: (208) 334-3861
Fax: (208) 334-2775

Statewide Sites:
• Franklin Historic Site
• Pierce Courthouse
• Rock Creek Station and
• Stricker Homesite

Old Penitentiary
2445 Old Penitentiary Road
Boise, Idaho 83712-8254
Office: (208) 334-2844
Fax: (208) 334-3225

Idaho State Archives
2205 Old Penitentiary Road
Boise, Idaho 83712-8250
Office: (208) 334-2620
Fax: (208) 334-2626

North Idaho Office
112 West 4th Street, Suite #7
Moscow, Idaho 83843
Office: (208) 882-1540
Fax: (208) 882-1763

RE: Runway Safety Area Improvement Project, Friedman Memorial Airport (SUN)
Hailey, Idaho; Building Demolitions

Section 106 Evaluation

	The field work and documentation presented in this report meet the Secretary of the Interior's Standards.
X	No additional investigations are recommended; project can proceed as planned.
	Additional information is required to complete the project review. (See comments.)
	Additional investigations are recommended. (See comments.)

Identification of Historic Properties (36 CFR 800.4):

X	No historic properties were identified within the project area.
	Property is not eligible.
	Property is listed in National Register of Historic Places.
	Property is eligible for listing in the National Register of Historic Places. Criterion: __A __B __C __D Context for evaluation:
X	*No historic properties* will be affected within project area.

If you have any questions, feel free to contact me at 208-334-3847 or travis.pitkin@ishs.idaho.gov.

Comments: No Historic Properties will be affected by the proposed demolitions.

Travis Pitkin, M.S.
Curator of Archaeology

Pomeroy, Chris

From: Diane.Stilson@faa.gov
Sent: Wednesday, December 11, 2013 2:51 PM
To: Pomeroy, Chris
Cc: Steve.Engebrecht@faa.gov; Diane.Stilson@faa.gov
Subject: Fw: Additional Scope for Runway Safety Area Project at SUN

Chris,

See below for the response from Idaho SHPO on the additional scope (land purchase and demo of two buildings) for the RSA project at SUN.

Please include this in the supporting documentation for the Cat-Ex.

Thanks,

Diane Stilson, P.E.
Civil Engineer
Environmental Protection Specialist
FAA, Helena Airports District Office
2725 Skyway Drive, Suite 2
Helena, MT 59602
Ph: (406) 449-5422
Fax: (406) 449-5274
----- Forwarded by Diane Stilson/ANM/FAA on 12/11/2013 02:49 PM -----

From: Travis Pitkin <Travis.Pitkin@ishs.idaho.gov>
ANM-HLN-ADO, Helena, MT
To: Diane Stilson/ANM/FAA@FAA,
Date: 12/11/2013 11:51 AM
Subject: RE: Additional Scope for Runway Safety Area Project at SUN

Hi Diane,

Thank you for sending information regarding the .42 acre land acquisition described below. We agree the two properties scheduled for demolition meet none of the National Register criteria and our original project finding of No Historic Properties (11/15/2013) remains unchanged.

Travis Pitkin
Curator of Archaeology
Idaho SHPO
210 Main Street
Boise, Idaho 83702
208-334-3847 ext. 106

From: Diane.Stilson@faa.gov [mailto:Diane.Stilson@faa.gov]
Sent: Monday, November 25, 2013 9:57 AM
To: Travis Pitkin

Cc: Diane.Stilson@faa.gov
Subject: Additional Scope for Runway Safety Area Project at SUN

Travis,

Thank you for your response regarding the runway safety area improvement project at Friedman Memorial Airport (SUN), Hailey, Idaho.

Late last week, I received some additional information regarding a .42 acre land acquisition that was found to be necessary in order to align Taxiway B to the West. I've attached two maps which show the location of this property. This property acquisition will be included in Phase I of this project.

According to the research that has been done, the property is commercial property that previously supported a local masonry business which is no longer in business. The land is currently unoccupied and owned by the bank, which has listed it for sale. Two structures (a shop and shed) will be demo'ed under the proposed project. A records search has shown that they were built in 1978 and determined that neither of these structures meet the criteria for listing in the National Register of Historic Places.

Based on this information, we have concluded the additional scope of this project (land purchase of .42 acres) will not change our original determination, and therefore no historic properties will be affected by the Runway Safety Area Improvement Project at SUN.

Please review this finding and the enclosed documentation and provide either your concurrence or non-concurrence on this determination.

Thank you,

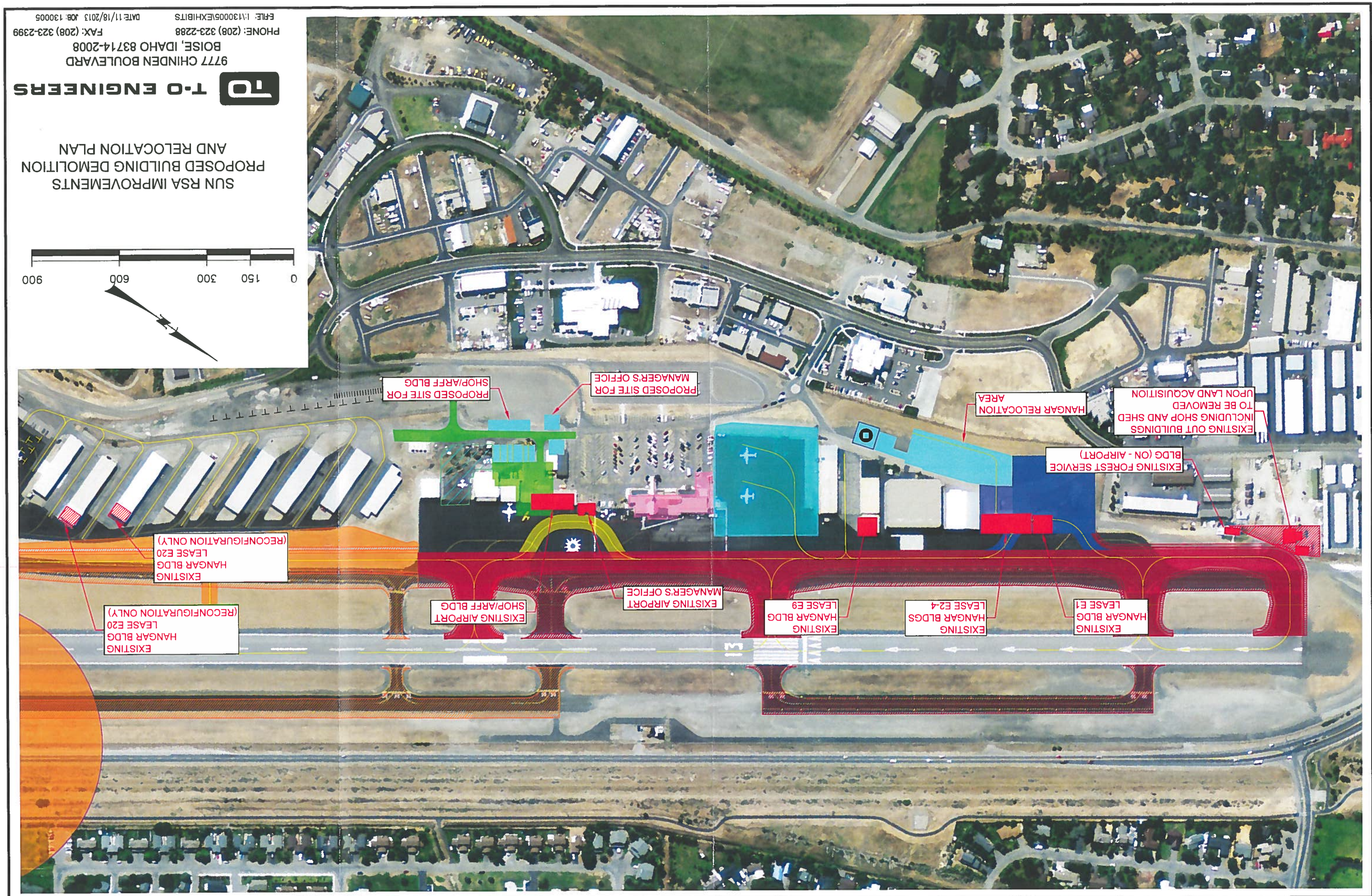
Diane Stilson
Civil Engineer
Environmental Protection Specialist
FAA, Helena Airports District Office
2725 Skyway Drive, Suite 2
Helena, MT 59602
Ph: (406) 449-5422
Fax: (406) 449-5274

APPENDIX F

2012 and 2017 Noise Contours

Source: FMAA/Mead & Hunt

SUN Categorical Exclusion Form
RSA Improvements



SUN RSA IMPROVEMENTS
PROPOSED BUILDING DEMOLITION
AND RELOCATION PLAN

T-O ENGINEERS
9777 CHINDEN BOULEVARD
BOISE, IDAHO 83714-2008
PHONE: (208) 323-2288 FAX: (208) 323-2399

FILE: I:\13000S\EXHIBITS DATE 11/18/2013 JOB: 13000S

I:\13000S\Acaddwg\Sheets\Exhibits\BUILDING DEMO\Building Relocation Plan 2.dwg , 11/19/2013 11:49:57 AM , Fetchinger, Brett , DWG To PDF.pc3

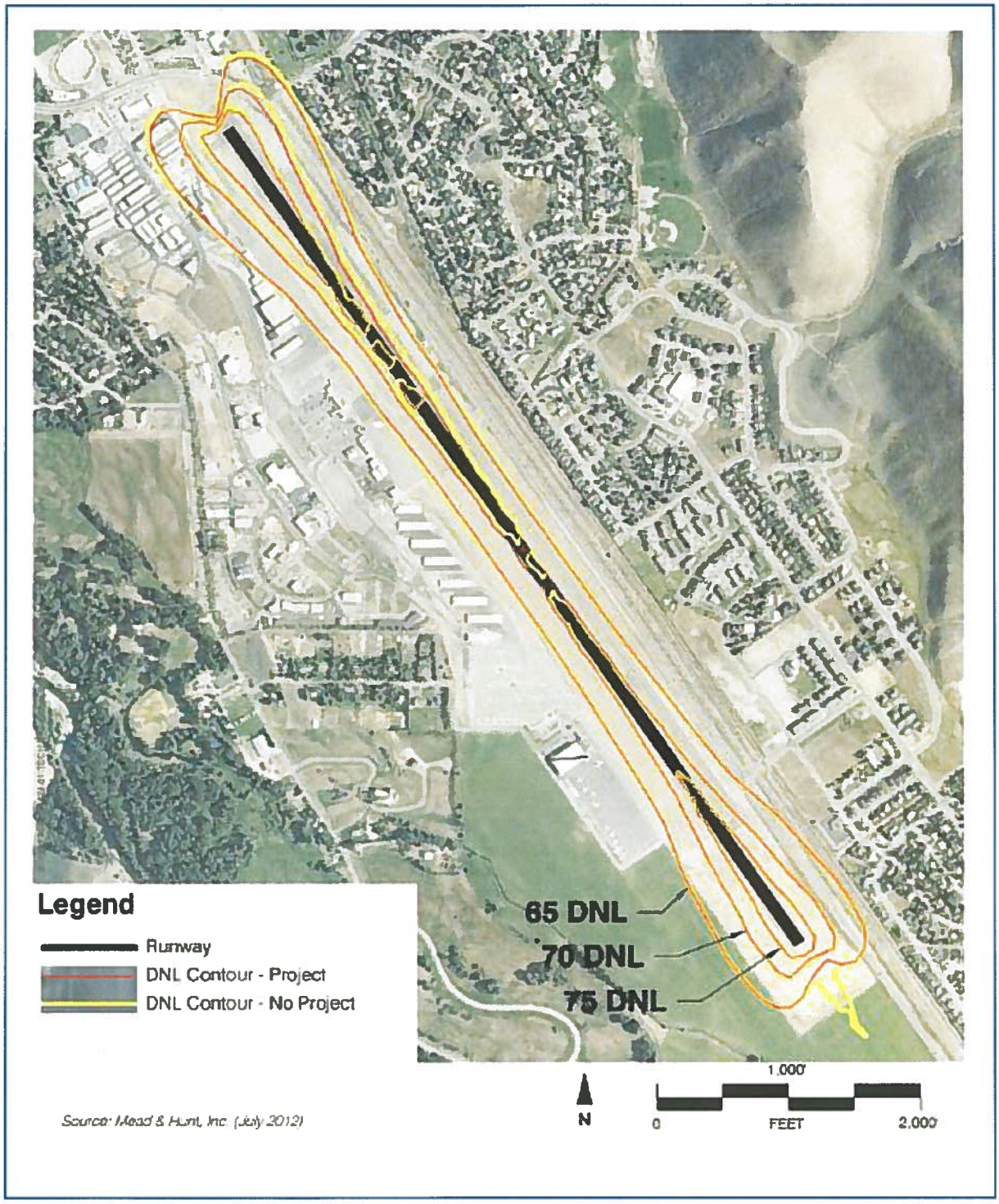
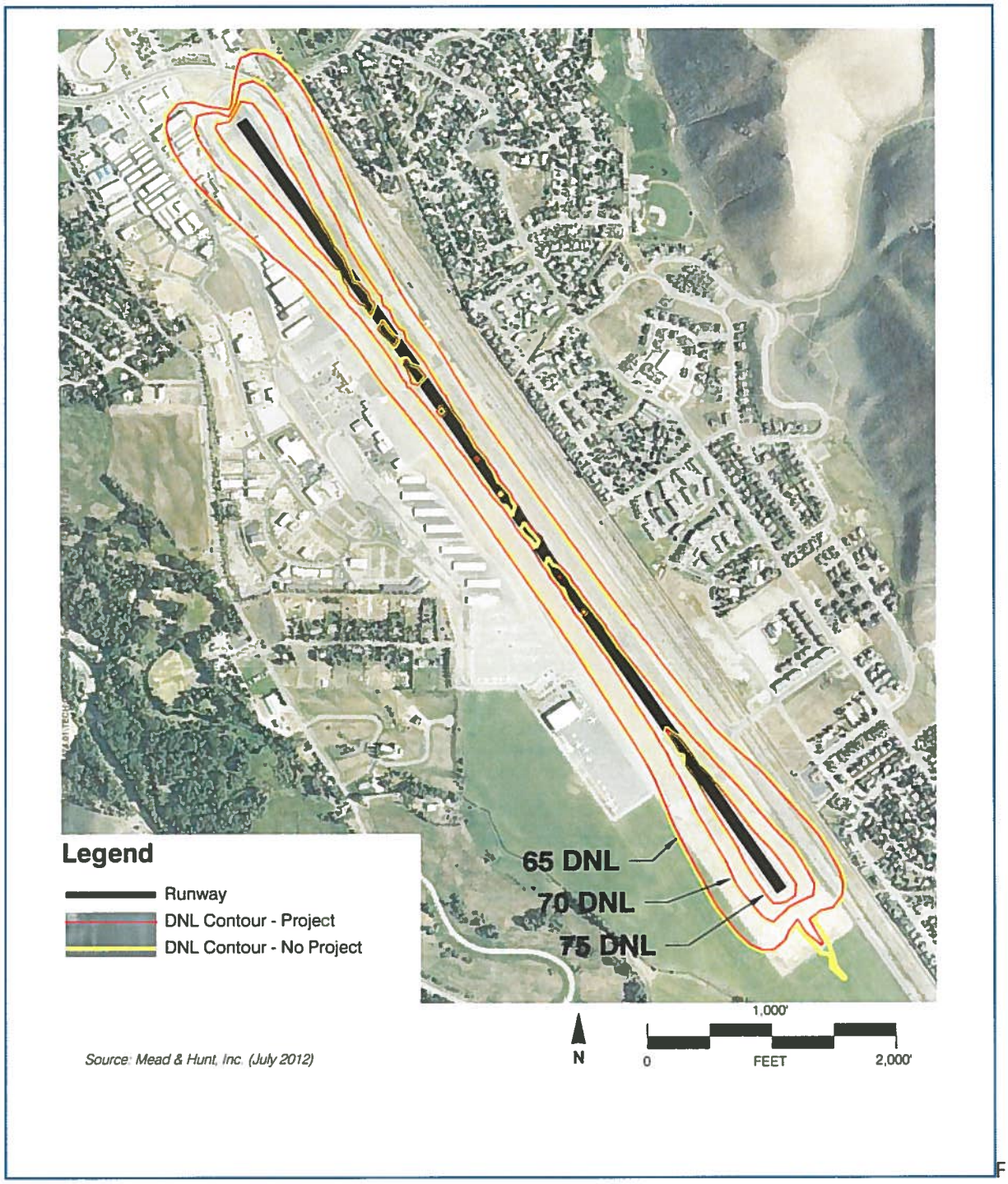


FIGURE 4-4

NOISE CONTOUR COMPARISON 2012



FIG

FIGURE 4-5

NOISE CONTOUR COMPARISON 2017

APPENDIX G

Socio-Economic Impacts
Building Demolitions/Relocation Plan

Source: T-O Engineers

SUN Categorical Exclusion Form
RSA Improvements

APPENDIX H

Wetlands

Source: USFWS

SUN Categorical Exclusion Form
RSA Improvements

U.S. Fish and Wildlife Service

National Wetlands Inventory

Friedman Memorial Airport

Aug 26, 2013

Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

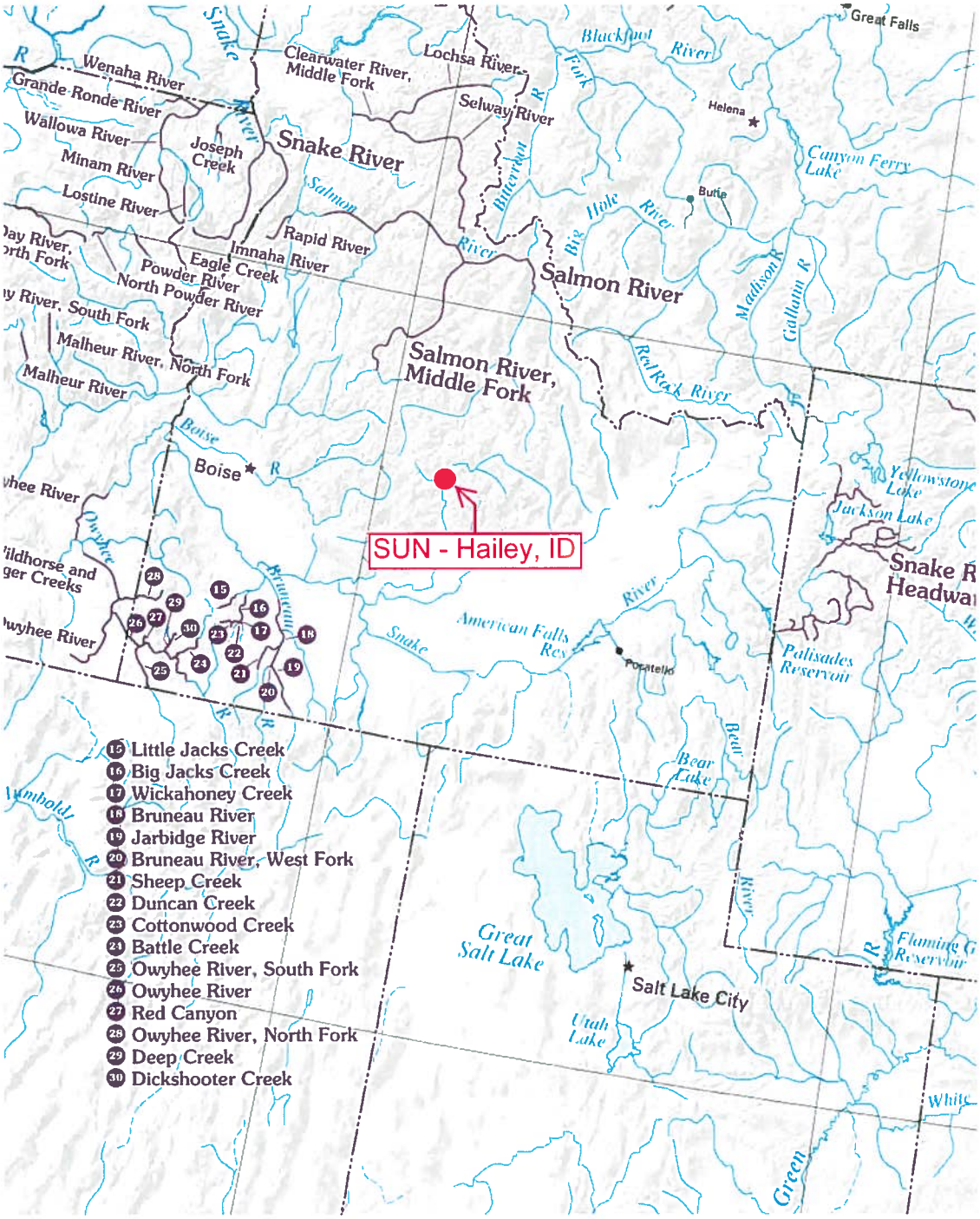
User Remarks:

APPENDIX I

Wild and Scenic Rivers – Blaine County, Idaho

Source: US National Wild and Scenic River System

SUN Categorical Exclusion Form
RSA Improvements


SUN - Hailey, ID
Great Falls
Helena
Butte
Boise
Pocatello
Salt Lake City
Snake River
Salmon River
Salmon River, Middle Fork
Clearwater River, Middle Fork
Lochsa River
Selway River
Wenaha River
Grande Ronde River
Wallowa River
Minam River
Lostine River
Joseph Creek
Imnaha River
Rapid River
Eagle Creek
Powder River
North Powder River
Malheur River, North Fork
Malheur River
Blackfoot River
Canyon Ferry Lake
Big Hole River
Madison R.
Gallatin R.
Red Rock River
Yellowstone Lake
Jackson Lake
Snake River Headwaters
American Falls Res.
Palisades Reservoir
Bear Lake
Great Salt Lake
Utah Lake
Flaming Gorge Reservoir
White
Green
15 Little Jacks Creek
16 Big Jacks Creek
17 Wickahoney Creek
18 Bruneau River
19 Jarbidge River
20 Bruneau River, West Fork
21 Sheep Creek
22 Duncan Creek
23 Cottonwood Creek
24 Battle Creek
25 Owyhee River, South Fork
26 Owyhee River
27 Red Canyon
28 Owyhee River, North Fork
29 Deep Creek
30 Dickshooter Creek