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2022 Airport Master Plan
South Valley Regional Airport / U42





South Valley Regional Airport Identification and Evaluation of Alternatives

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CHAPTER 4

IDENTIFICATION AND EVALUATION OF ALTERNATIVES

4.1 INTRODUCTION

This chapter identifies and evaluates facility development alternatives for South Valley Regional Airport based on the facility requirements determined in **Chapter 3, Facility Requirements**. The primary purpose behind identifying and evaluating various alternative development options is to ensure airport facilities can meet projected activity demand levels, make efficient and effective use of available airport land, and meet FAA airfield design standards. Every potential alternative in this chapter has been thoroughly analyzed, refined, and vetted through the stakeholder involvement process to develop a plan which reflects stakeholder and community values and preferences, and integrates well with the unique operational nature and role of the South Valley Regional Airport.

Analysis of development alternatives began by defining a vision, specifically for U42 – a comprehensive view of how key stakeholders feel the airport should “look” and operate in the future. The vision considered both facilities and services. The vision includes ideas for new facilities to support anticipated growth or enhance services and the necessary improvements that must be undertaken to correct operational deficiencies. This vision was vetted through a public process described within **Appendix X, Stakeholder Visioning**. This sets the stage for an airport development plan that extends beyond the planning period identified in this study and enables long-term strategic development. For the purposes of this study, planning activity level (PAL) 3 facility needs will inform the development of an Airport Layout Plan able to guide development throughout the planning period.

A hierarchy of priority is required when analyzing airport facilities and developing alternatives. The components of the airport are broken down into leading elements and trailing elements, with leading elements considered first. Leading elements are primary facilities that require significant amounts of land and/or capital investment to implement, and whose placement and configuration must take precedence when formulating alternatives. The division between leading and trailing elements allows the initial focus of analysis to be on determining solutions for those high-cost, more demanding leading elements. The placement and decisions surrounding the leading elements influence the location and layout of the trailing elements. Note that several trailing elements for this study didn’t require an alternatives analysis. Instead, decisions were made based on the preferred alternative of leading elements.

At U42, the leading elements include the runway and supporting taxiway infrastructure. Trailing elements at the airport include aircraft storage and parking areas, such as hangars and aprons, and aeronautical support facilities, such as the fixed based operator (FBO) and flight schools. The last trailing element examined was non-aeronautical land use.

4.2 RUNWAY ALTERNATIVES

The runway alternatives were based on both immediate needs and long-range objectives. The immediate issue requiring resolution is the approach runway protection zone (RPZ) for Runway 34 that currently drapes over the West Jordan Public Works building, shown in **Figure 3-3** in the Facility Requirements chapter. That building is a public facility, and thus not a compatible land use within the RPZ. The RPZ also drapes over 7800 South, and while a public roadway within an RPZ is not preferred, it is a historical configuration that the FAA allows to stay. Relocating 7800 South was not considered in any alternative because of the high cost, potential disruption to the community, and the fact that the control of the

roadway falls outside the purview of the Airport Sponsor (SLCDA). Additionally, no alternative was specifically designed to move the RPZ off the roadway since it is a permitted condition. However, those alternatives that included moving the RPZ off, or partially off, the roadway were considered beneficial and were factored into the overall evaluation.

In determining solutions to the RPZ, alternatives must account for the current B-II critical aircraft as well as the future C-II critical aircraft. To account for the future critical aircraft, the alternatives included the following additional objectives:

- » **Extend the runway to 6,600 feet** – The current runway length is 5,862 feet. The facility requirements analysis determined a length of 6,600 feet is needed to fully support the operations of the Citation X aircraft, which was identified as the future critical aircraft for U42. Additionally, through further runway performance analysis, a runway extension to 6,600 feet was also found to provide substantial benefits for turboprop aircraft including the existing critical aircraft.
- » **Provide a 1,000-foot safety area** – To support the future C-II critical aircraft, a clear and level area beyond the departure end of Runway 16 is needed for a compliant runway safety area (RSA) and runway object free area (OFA).

4.2.1 Runway Protection Zones and Aircraft Approach Surface Determinations

RPZs are a trapezoidal area off the end of the runway that serves to enhance the protection of people and property on the ground in the event an aircraft lands or crashes beyond the runway end. Under FAA design criteria, the airport must own the landing area, have sufficient interest in the RPZ to protect them from both obstructions and incompatible land use, and must strive to attain compatible zoning around the airport to prevent incompatible land use that:

- » Could cause sufficient conflict that endangers the airport,
- » Cause it to be closed, or
- » Require substantial remedial investment to purchase conflicting developed property.

The size of the RPZ trapezoid is directly related to the aircraft approach category and visibility minimums for the specific runway. For the purpose of this report, the three sizes are termed *small*, *medium*, and *large* RPZ.

- » A small RPZ will serve aircraft approach categories (AAC) C & D with an approach visibility minimum greater than 1 mile.
- » A medium RPZ will serve all aircraft with approach visibility greater than 3/4 mile.
- » A large RPZ will serve all aircraft with an approach visibility of less than 3/4 mile.

Currently, Runway 34 has a non-precision instrument approach (RNAV-GPS) with greater than 3/4 mile visibility minimums for pilots to navigate a safe landing. This correlates to the medium RPZ with a trapezoid of 1,000 x 1,510 x 1,700 feet. Runway 16 is currently a visual runway that requires the small RPZ which has a size of 500 x 700 x 1,000 feet. The prior master plan and current Airport Layout Plan (ALP) planned to protect for a future large RPZ for Runway 34, which is used for approaches with less than 3/4 mile visibility minimums, and the medium RPZ for Runway 16.

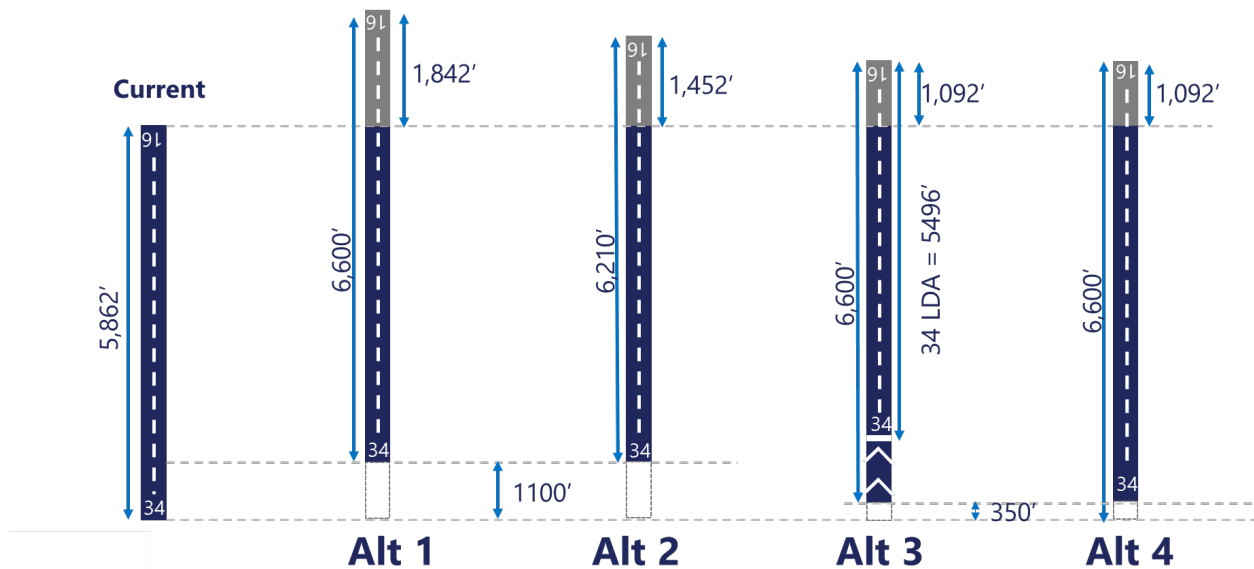
As part of this master plan, analysis was completed regarding the capability of enhancing the instrument approaches available to pilots on both runways. See **Appendix Y** for the complete report. That analysis confirmed it is feasible for Runway 34 to have an RNAV GPS approach with less than 3/4 mile visibility minimums, requiring a large RPZ. The study also concluded there is the possibility for an approach with greater than 3/4 mile visibility minimums to Runway 16, which would require the medium-sized RPZ.

Therefore, the runway alternatives analysis began with preserving future plans to enhance the instrument approaches and expand RPZ trapezoids for Runway 34 (medium to large) and Runway 16 (small to medium).

4.2.2 Runway Alternatives

Four runway alternatives were developed to analyze various ways to meet the objectives and needs of U42 today and through the future. **Figure 4-1** below provides an overall visual depiction of the alternatives. The narrative following describes the alternatives developed and the subsequent evaluation to determine the preferred alternative.

FIGURE 4-1
RUNWAY ALTERNATIVES

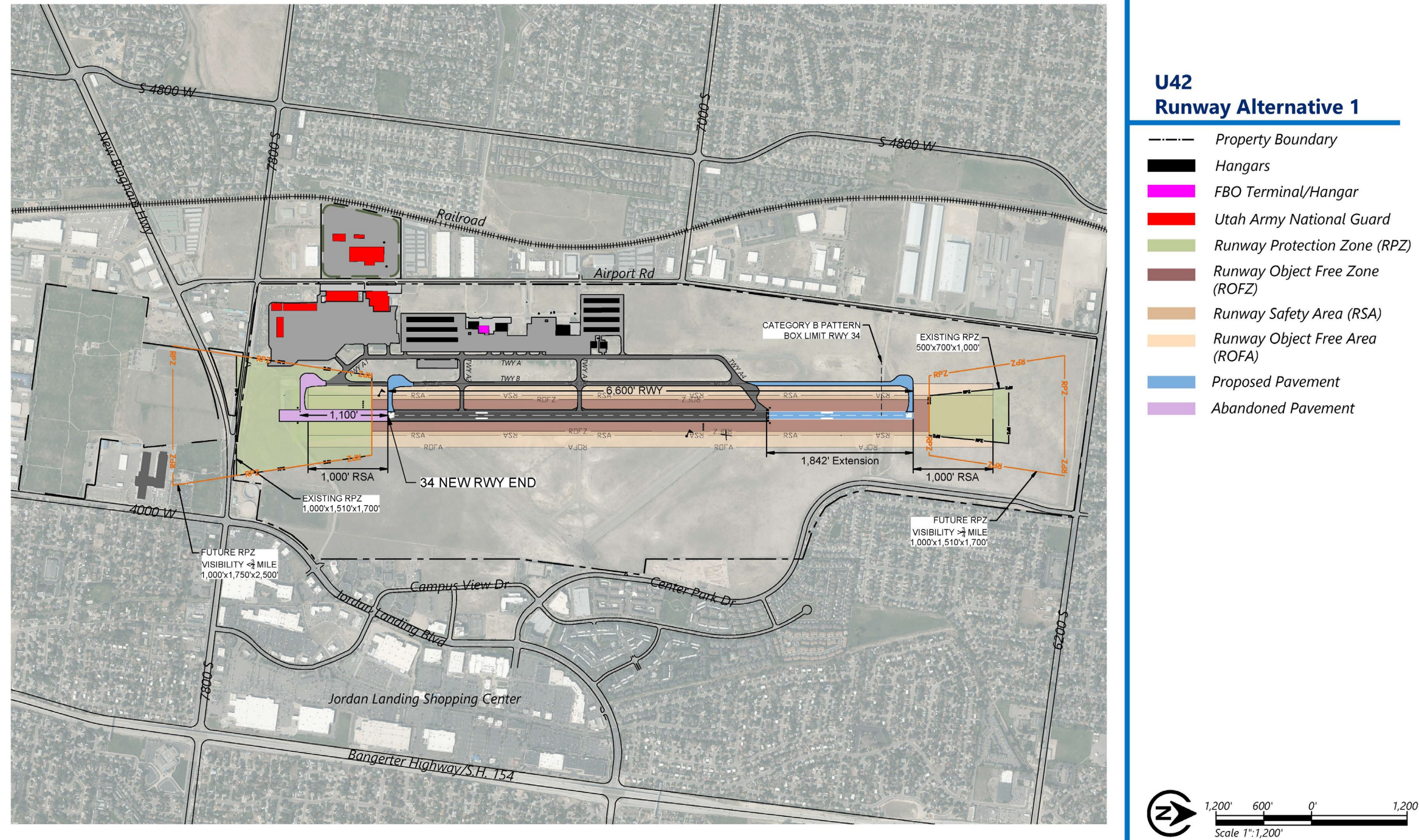


Source: RS&H, 2022

4.2.2.1 Alternative 1 – Shift Runway North and Extend by 1,842’ to 6,600’

Alternative 1 (see **Figure 4-2** on the next page) proposes shifting the runway to the north by 1,100 feet and extending the runway to the north 1,842 feet. By shifting the runway north, the existing RPZ and a future large RPZ are compatible with the existing land use and keep the RPZ off the West Jordan Public Works building. A medium sized approach RPZ for Runway 16 fits within airport property. The alternative would include demolition of Taxiway A1 between Taxiway B and the runway, as well as the southern portion of the runway up to the new Runway 34 threshold. A new A1 connector would be built perpendicular to the Runway 34 end.

FIGURE 4-2
RUNWAY ALTERNATIVE 1



Source: RS&H, 2023

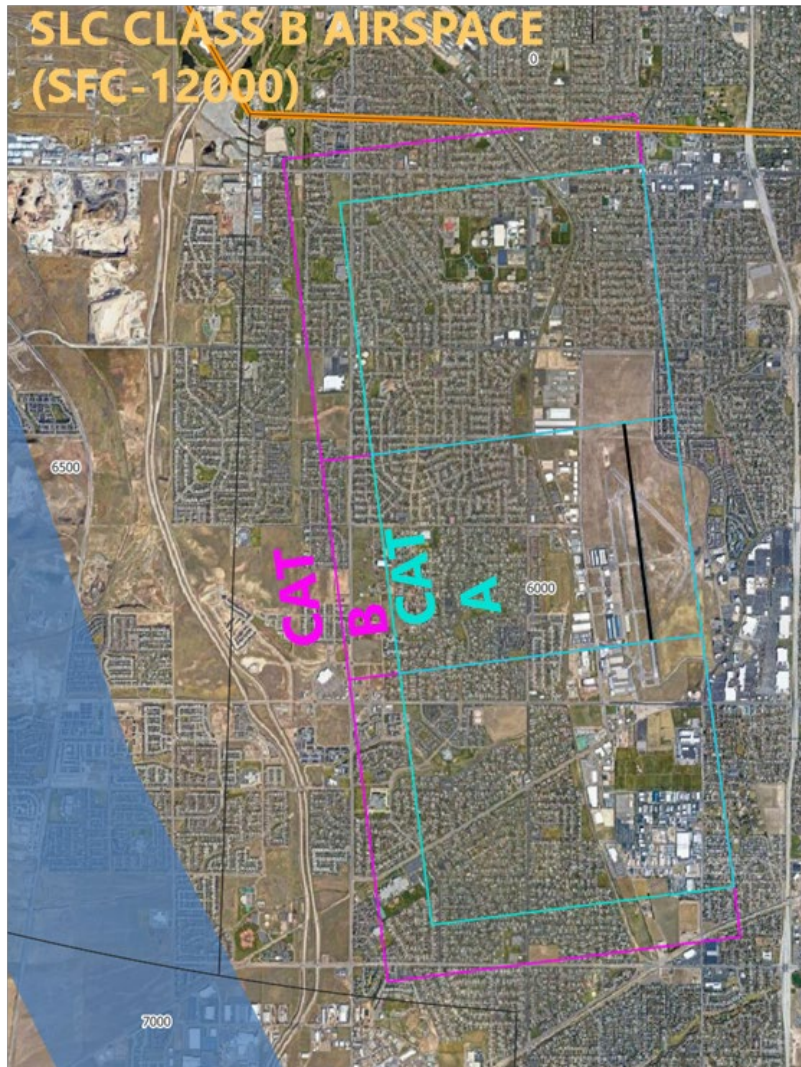
Advantages of the alternative include the following:

- » By shifting the runway 1,100 feet to the north, the current medium RPZ sits predominantly inside the airport property, north of 7800 South.
- » Overall, the alternative meets all the objectives and would serve the existing and future needs of U42.

Disadvantages of the alternative include the following:

- » Shifting the runway to the north by 1,100 feet dramatically changes how the runway integrates with the existing taxiway infrastructure and the current facilities. Runway exits may prove to be in poorly located portions of the runway. Taxi distance to the Runway 16 end is further than other alternatives.
- » With the shift of Runway 34, Part 77 surfaces will be placed over portions of Taxiway B and Taxiway A1. Part 77 Approach Surface for Non-Precision Instrument and Precision Instruments will be penetrated by aircraft on Taxiway B and Taxiway A1. This factor may require operational restrictions to prevent penetration of surfaces during arrival operations. If a precision approach was created for Runway 34, a Precision Obstacle Free Zone (POFZ) would require separate hold positions. Further study would be needed to determine if, and where, taxi hold positions would be placed.
- » Shifting and extending the runway to the north to the extent proposed in this alternative pushes the Category B traffic pattern box into the SLC Class B airspace. Categories in this regard are related to the AAC, which is correlated to aircraft speed on final approach to the runway. Category A includes small piston aircraft such as the Cessna 172. Category B includes the current critical aircraft for U42, a Beechcraft Super King Air. The conflict is depicted in **Figure 4-3** on the next page, where the magenta line (Category B pattern) crosses the double orange line (Class B airspace) at the top of the graphic. This situation would require an Airport Traffic Control Tower (ATCT) to be installed at U42, and a Class D carve out of Class B airspace be created.
- » The 1,100-foot shift to the north and 1,452-foot runway extension would naturally lead to a corresponding adjustment of the traffic pattern, placing it farther north than the other proposed alternatives under consideration. The altered traffic pattern would bring aircraft closer to the residential areas directly to the north of U42 during takeoffs and landings, resulting in an intensified noise disturbance. The extended runway accommodating larger planes would compound this issue, generating more frequent and intrusive noise events and potentially disrupting the tranquility of the community.

FIGURE 4-3
SLC CLASS B AIRSPACE



Source: LEAN, RS&H, 2022

4.2.2.2 Alternative 2 – Shift Runway North and Extend by 1,452’ to 6,210’

Alternative 2 proposes shifting the runway to the north by 1,100 feet and extending the runway to the north 1,452 feet, as shown in **Figure 4-4**. By shifting the runway north, the existing RPZ and a future large RPZ are compatible with the existing land use since the RPZ is kept off the West Jordan Public Works building. A medium sized approach RPZ for Runway 16 fits within airport property. The alternative would include demolition of Taxiway A1 between Taxiway B and the runway, as well as the southern portion of the runway up to the new Runway 34 threshold. A new A1 connector would be built perpendicular to Runway 34 end. The 1,452-foot extension prevents the Category B pattern box from penetrating into SLC Class B airspace, and thus no ATCT tower would be needed.

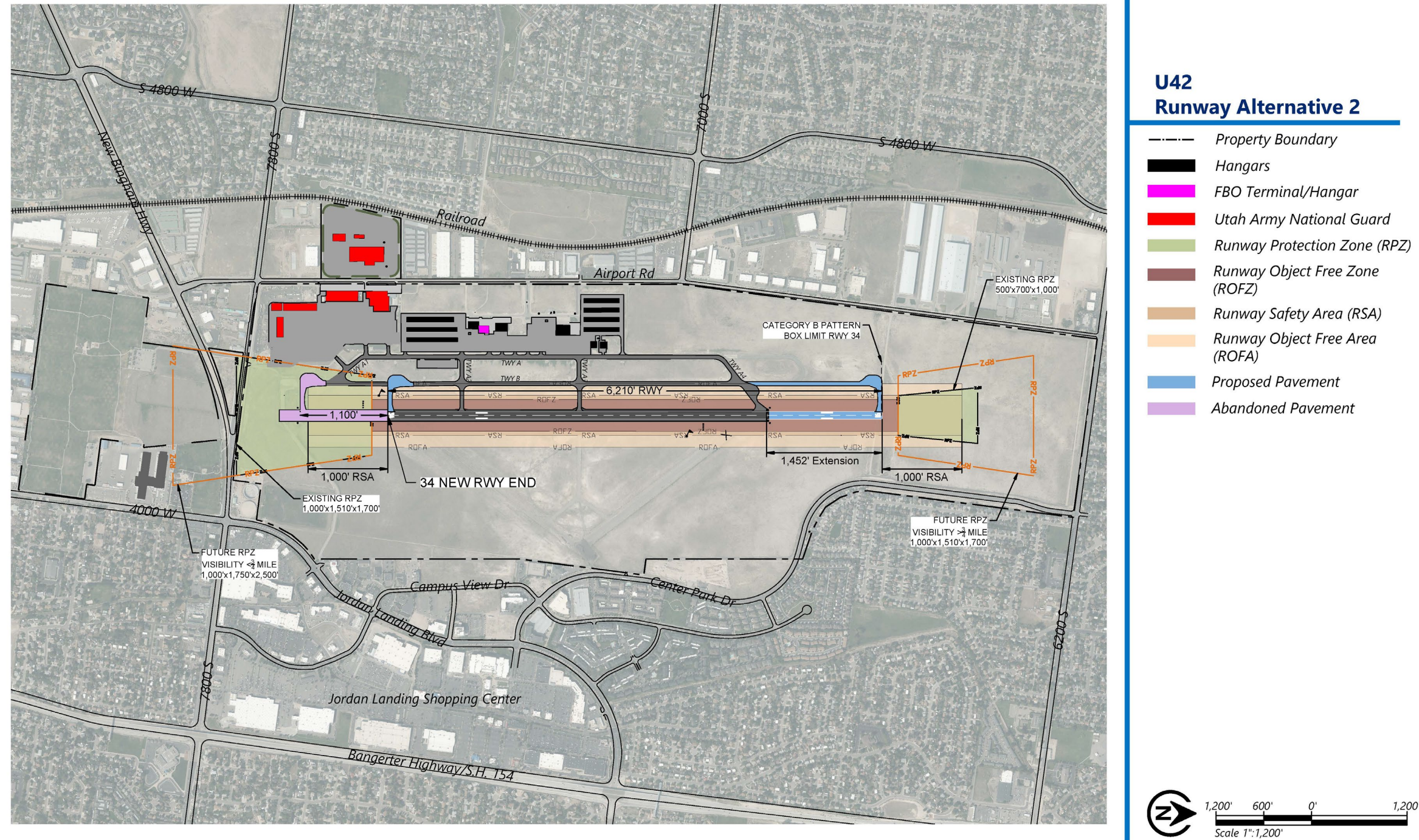
Advantages of the alternative include the following:

- » By shifting the runway 1,100 feet to the north, the current medium RPZ sits predominantly inside airport property, north of 7800 South.
- » The alternative meets the objectives of providing an OFA and RSA for future C-II critical aircraft, and for ensuring compliant RPZs.

Disadvantages of the alternative include the following:

- » The alternative does not meet the preferred runway length requirements of 6,600 feet.
- » Shifting the runway to the north by 1,100 feet dramatically changes how the runway integrates with the existing taxiway infrastructure and the current facilities. Runway exits may prove to be in poorly located portions of the runway. Taxi distance to the Runway 16 end is further than other alternatives.
- » The relocated approach surfaces for Runway 34 would fall over portions of Taxiway A1 and the Army Guard ramp. This could create the need for operational restrictions to prevent penetration of surfaces during arrival operations. It is likely that Taxiway A1, A, and B adjacent to the Guard ramp, and the entrance to Runway 34 would require further adjustments beyond what is shown in the alternative, to ensure safe and efficient aircraft flow. Further study would be required.

FIGURE 4-4
RUNWAY ALTERNATIVE 2



Source: RS&H, 2023

4.2.2.3 Alternative 3 – Extend Runway by 1,092' and Implement Declared Distances

Alternative 3 uses declared distances to achieve compliant RPZs and provides an OFA and RSA for C-II standards, as shown in **Figure 4-5** on the next page. The Runway 34 end would be shifted north by 350 feet, providing a compliant C-II RSA and OFA on the south end of the runway. That shift also ensures the Runway 16 departure RPZ is clear of the West Jordan Public Works building.

Taxiway A1 would be relocated to the new Runway 34 end. The Runway 34 threshold would be displaced by 750 feet, which would move the existing RPZ off the West Jordan Public Works building and allow room for a future large RPZ to be established if the Runway 34 approach was enhanced to <3/4 mile minimums. Finally, to achieve 6,600 feet for departure operations, the runway would be extended to the north by 1,092 feet.

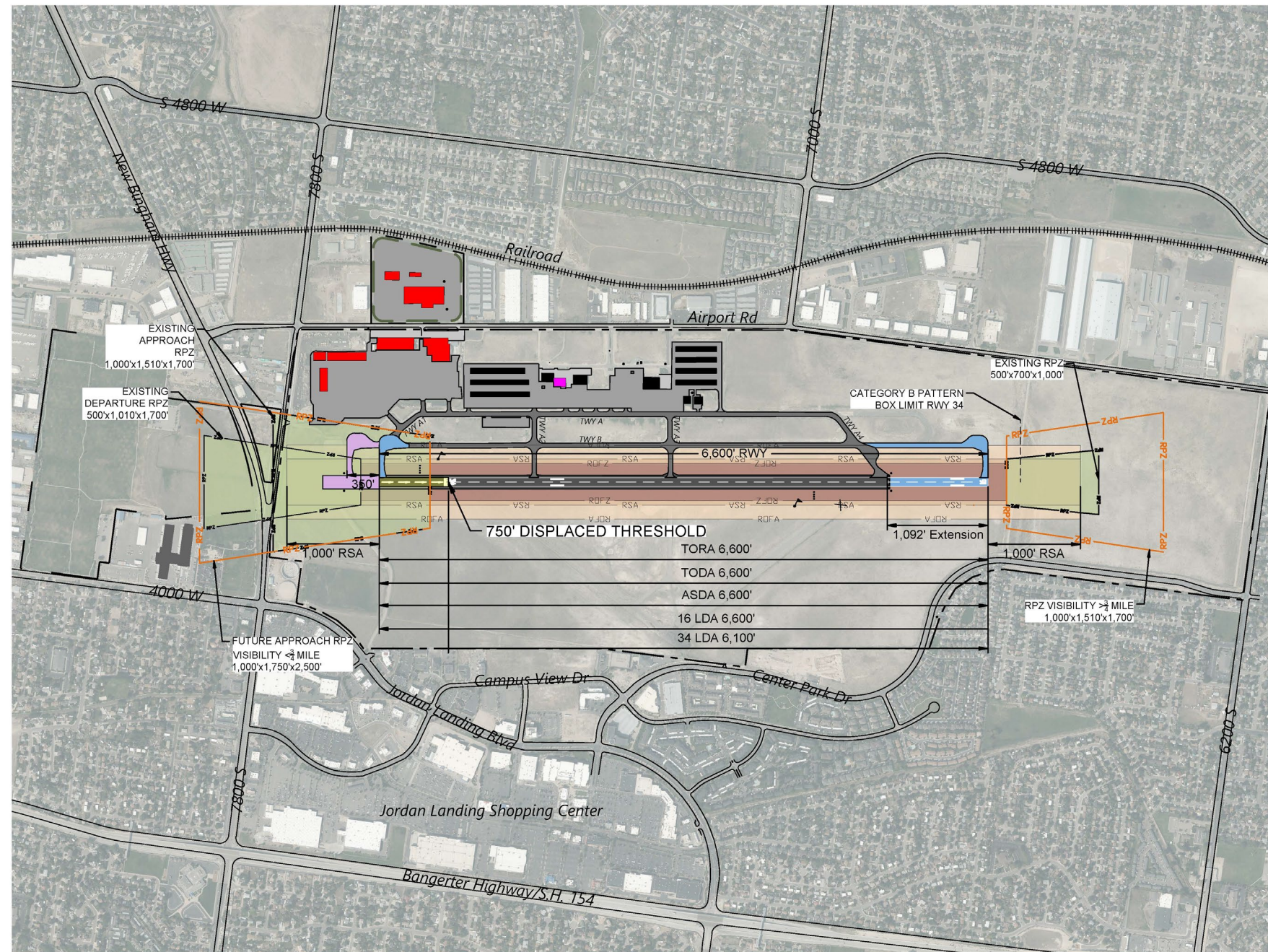
Advantages of the alternative include the following:

- » With a runway shift to the north, the usefulness of existing taxiway connectors is maintained, albeit A1 which would need to be relocated to the new Runway 34 end.
- » The runway extension is less length than proposed in Alternatives 1 and 2, which minimizes changes in taxi times and fuel burn for aircraft departing Runway 16. The overall cost of implementation is also minimized.
- » The current medium sized RPZ for Runway 34 will fall mostly north of 7800 South, inside the airport property.
- » Overall, the alternative meets all the objectives and would serve the existing and future needs of U42.

Disadvantages of the alternative include the following:

- » The use of displaced thresholds is not preferred. Per FAA AC 150/5300-13B, *Airport Design*, paragraph H.1.1, the "preferred condition is a runway fully meeting design standards without the need for declared distances." Unless this alternative was found to be the only feasible solution, it could not be considered as the preferred alternative.
- » The landing distance available to pilots landing Runway 34 would be 6,100 feet.

FIGURE 4-5
RUNWAY ALTERNATIVE 3

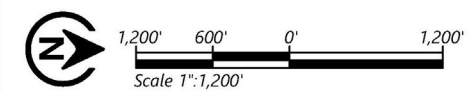


U42 Runway Alternative 3

- Property Boundary
- Hangars
- FBO Terminal/Hangar
- Utah Army National Guard
- Runway Protection Zone (RPZ)
- Runway Object Free Zone (ROFZ)
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Proposed Pavement
- Displaced Threshold

Notes:

1. TORA- Takeoff Run Available
2. TODA- Takeoff Distance Available
3. ASDA- Accelerate Stop Distance Available
4. LDA- Landing Distance Available



Source: RS&H, 2023

4.2.2.4 Alternative 4 – Shift Runway North and Extend by 1,092' to 6,600'

A detailed analysis was completed (see **Appendix X**) regarding the feasibility and benefits of enhancing the instrument approaches available to pilots to both runways. It concluded that instrument approach enhancements are possible but that changes to the current flight procedure could negatively impact aircraft separations on north flow to SLCIA, and only a nominal increase in aircraft operations could be anticipated if enhancements were made to the instrument approach procedures for Runway 34. Therefore, it is not cost effective to shift the runway further north to preserve land on airport property for a future large RPZ. This analysis also confirmed that the lack of instrument approaches to Runway 16 is a significant shortcoming of the airport during IFR conditions and protecting for a future medium sized RPZ is recommended so future instrument approach enhancements can be made.

Based on this detailed airspace and instrument procedure analysis, Alternative 4 features a 350-foot runway shift so the existing medium RPZ is clear of the West Jordan Public Works building, and a 1,092-foot extension to provide 6,600 feet of runway distance, while preserving for a medium sized RPZ on the Runway 16 end. This alternative is shown in **Figure 4-6**.

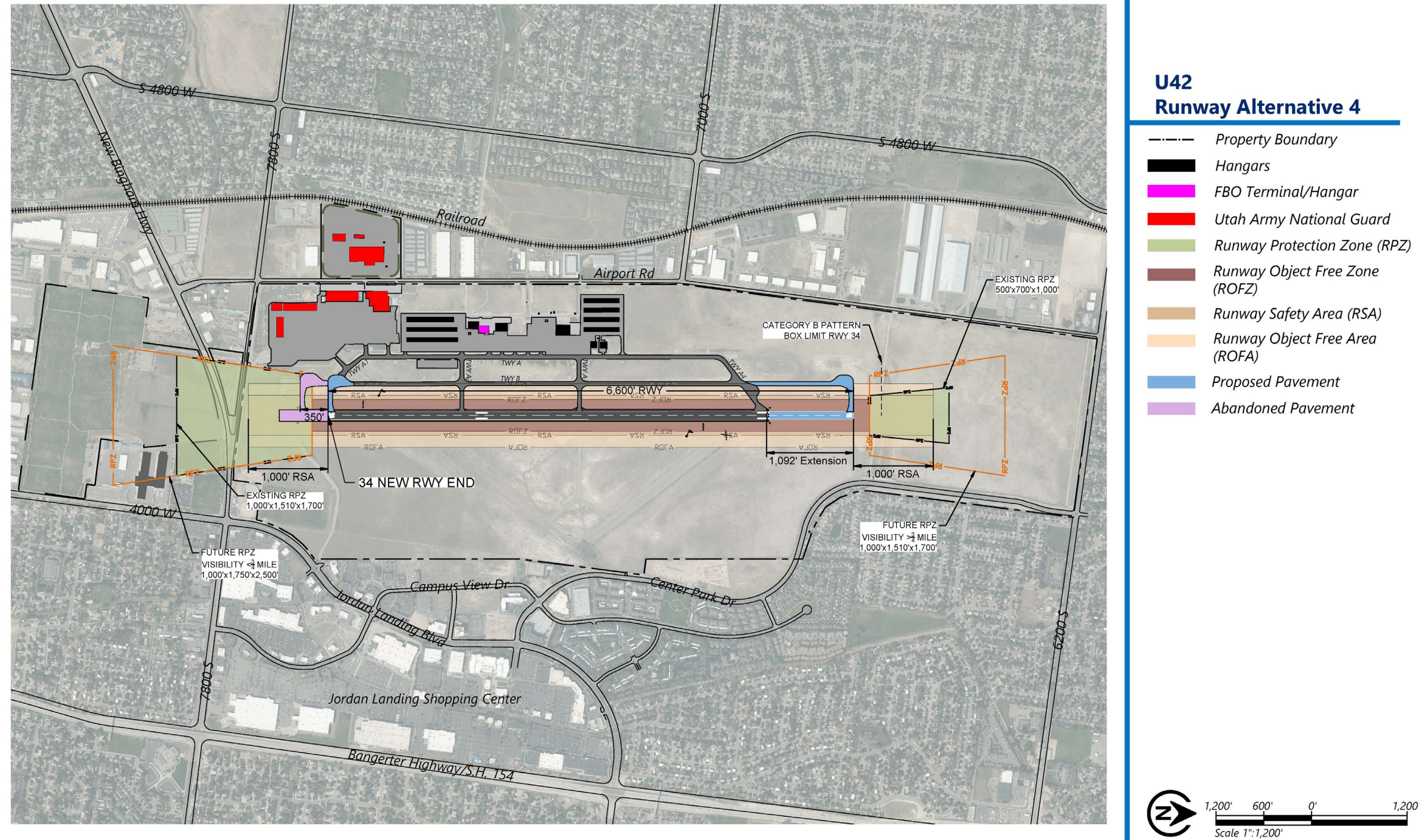
Advantages of the alternative include the following:

- » With a minimum runway shift to the north, the usefulness of existing taxiway connectors is maintained, albeit A1 which would need to be relocated to the new Runway 34 end.
- » The runway extension is less length than proposed in Alternative 1 and 2, which minimizes changes in taxi times and fuel burn for aircraft departing Runway 16. The overall cost of implementation is also minimized.
- » No declared distances are used, which meets FAA standards and recommendations.
- » The ability to enhance the instrument approach procedure is preserved by protecting for a medium sized RPZ on the Runway 16 end.

Disadvantages of the alternative include the following:

- » The configuration complicates, if not prevents, future enhancements to instrument approach procedures (reduce minimums to below 3/4 mile visibility) by not protecting for a large sized RPZ on the Runway 34 end.

FIGURE 4-6
RUNWAY ALTERNATIVE 4



Source: RS&H, 2023

4.2.3 Runway Alternative Evaluation

Each of the runway alternatives were evaluated for their performance against specific evaluation criteria. That criterion is described below with additional narrative summarizing how each alternative was scored.

Evaluation Criteria and Assessment:

- » Airspace Integration: How does the alternative work with the existing airspace in the Salt Lake Valley?
 - Alternative 2, 3, and 4 all integrate equally well with the current airspace.
 - Alternative 1 will move the Category B traffic pattern box into the SLC Class B airspace. This feature will require an ATCT at U42 and a Class D airspace carve-out of the Class B where the airspace is impacted.

- » Aircraft Performance: Does the alternative enhance or degrade departure capability for the fleet mix at U42?
 - Preliminary alternatives were analyzed by LEAN Corporation to determine how each would be able to serve large turboprop (Super King Air type aircraft), large cabin business jets (Global Express G5000/6000 type aircraft), and small cabin business jets (Cessna Citation 560XLS type aircraft). The analysis examined the likelihood of success for departures to various destinations, as explained in detail in **Appendix Y**¹. Overall, Alternative 2 performed the worst comparably to the other alternatives due to the decrease in runway length. Alternatives 1, 3, and 4 provide comparable performance.
 - Alternative 3 performed comparatively well for departure performance. However, Runway 34 landings would have a shorter distance available than other alternatives. While that factor doesn't present limitations to the runway's utility, it is less preferred than the other options that have a greater runway landing distance available.

- » Land Use Integration: How does the alternative work with the existing land uses on the north and south sides of the airport?
 - Alternatives 1 and 2 provide compliant RPZs and allow flexibility for an approach below 3/4 mile minimum visibility to Runway 34 to be implemented in the future. However, these options shift the runway substantially to the north, which has greater degree of change to flight tracks, including those over the residential areas of Kearns. This is not preferred when compared to Alternative 3 and 4.
 - Alternative 3 scores best when considering planning for a Runway 34 approach with less than 3/4 mile visibility minimums.
 - Alternative 4 scores similar to Alternative 3 when not planning for the approach to Runway 34 with less than 3/4 mile visibility minimums. Ultimately, it was determined not

¹ The LEAN Corporation analysis of Alternative 3 was based on a preliminary configuration that included only 738 feet of extension to the north and no overall runway shift to the north. While viable, that configuration would require declared distances for Runway 16 to protect for a C-II safety area, provide for a compliant departure RPZ, and would subsequently provide less TORA/TODA for Runway 16 than 6,600 feet. That configuration was discarded and revised to what is presented in this document. The results of the LEAN analysis overall were inferred to judge performance of the final Alternative 3 described in this chapter.

to plan for below 3/4 mile minimums, because, after deeper analysis, it was concluded instrument approach enhancements could impact aircraft separation on north flow to SLCIA, while only minimally increasing instrument aircraft operations at U42.

- » Facility Integration: How does each alternative's new runway configuration work with the existing taxiway, apron, and hangar infrastructure?
 - Alternatives 1 and 2 move the runway to the north substantially farther than Alternatives 3 and 4. That shift creates an imbalance of airport facilities relative to the runway ends. Operational flows on the south end would become more complex, which would be exacerbated by the amount of Army Guard helicopter traffic in that area.
 - Alternatives 3 and 4 work well with existing and future planned facilities.
- » ROM Costs: When compared, what is each alternative's rough order magnitude cost for implementation?
 - Alternatives 1 and 2 are estimated to have greater cost implications than Alternatives 3 and 4 due to the greater degree of runway shift. The shift would incur additional costs associated with taxiway construction and taxiway reconfiguration.
- » Carbon Footprint: When compared, how does each alternative impact taxi distance, and subsequently carbon emissions.
 - Alternatives 1 and 2 will require greater taxi distance to/from the Runway 16 end, therefore increasing overall emissions when compared to Alternatives 3 and 4.
- » FAA Preferences: Does the alternative meet the standards, recommendations, and preferences of design outlined in AC 150/5300-13B, *Airport Design*.
 - Alternative 3 uses declared distances which, per FAA, is not allowed unless it is the only solution available. This study validated other solutions are viable, which eliminates Alternative 3 from being considered as the preferred alternative.

The decision to plan only for approaches with greater than 3/4 visibility minimums stems from the following factors:

- » Analysis of historical weather conditions at U42 determined that the current approaches at U42 allow nearly hub-airport level reliability for arriving aircraft. The airport typically has approximately 95 percent or greater chance of being open to arrivals with its current approaches that have greater than 3/4 mile visibility minimums. This data suggests approaches with lower visibility minimums are not needed to maintain the utility of the airport.
- » The reliability of U42 for arrivals reduces and/or eliminates the possibility of FAA funding NAVAIDS such as a localizer, glide slope, and/or approach lighting systems, as well as approach procedures that could enable lower minimums. Additional lighting enhancements would not be advantageous unless daily commercial operations were expected. As a result, the responsibility for funding those improvements would fall on SLCDA. Therefore, such enhancements are not being pursued or are recommended.

- » U42’s role within the SLCDA airport system is to relieve general aviation traffic from SLCIA. It is anticipated that only high-performance business aircraft will typically operate in weather conditions where minimums were below 3/4 mile. In those conditions, it is assumed operators would prefer to use SLCIA due to its longer runways, instrument approaches and NAVAIDS, and hub-airport level of snow removal and reporting.

Together, these factors negate the need to plan for an approach to Runway 34 with below 3/4 mile minimums.

Alternative 4 was carried forward as the preferred alternative. That alternative scored favorable in every evaluation category, as shown in **Table 4-1**. After significant comprehensive analysis, including cost benefit analysis, stakeholder engagement, and public input, the decision was made to score Alternative 4 as “Favorable” for land use integration. That scoring accounts for the collective decision to not protect for enhanced instrument approach procedures to Runway 34 that would allow for visibility minimums to drop below 3/4 mile. Had this decision not been made, a different alternative would have been required. Alternative 4 would not have met the primary objective of providing land use integration and compatibility.

TABLE 4-1
RUNWAY ALTERNATIVE EVALUATION

	Runway Alternative 1 <i>Shift N into Class B</i> 6,600'	Runway Alternative 2 <i>Shift N w/out Class B</i> 6,210'	Runway Alternative 3 <i>Declared Distances</i> 6,600'	Runway Alternative 4 <i>No RPZ enhancement</i> 6,600'
Airspace Integration	Yellow	Green	Green	Green
Aircraft Performance	Green	Yellow	Yellow	Green
Land Use Integration	Yellow	Yellow	Green	Green
Facility Integration	Red	Red	Green	Green
ROM Costs	Yellow	Yellow	Green	Green
Carbon Footprint	Yellow	Yellow	Green	Green
FAA Preferences	Green	Green	Red	Green

Favorable ■ Less Favorable ■ Least Favorable ■

Source: RS&H, 2023

4.2.4 Environmental Analysis of Runway Alternatives

The analysis in this section is to advise SLCDA of potential environmental impacts associated with the four runway alternatives described in **Section 4.2.2**. The following sections identify the applicable environmental resource categories described in Section 4-1 of FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, and describe the appropriate level of National Environmental Policy Act (NEPA) documentation for each alternative. Environmental resource categories include:

- » Air Quality
- » Biological Resources
- » Climate

- » Coastal Resources
- » Department of Transportation Act, Section 4(f)
- » Farmlands
- » Hazardous Materials, Solid Waste, and Pollution Prevention
- » Historical, Architectural, Archaeological, and Cultural Resources
- » Land Use
- » Natural Resources and Energy Supply
- » Noise and Noise-Compatible Land Use
- » Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks
- » Visual Effects
- » Water Resources (includes Wetlands, Floodplains, Surface Waters, Groundwater, and Wild and Scenic Rivers)

Only those environmental resource categories that could be affected by the four runway alternatives are described below. The four runway alternatives would all have the same environmental resource categories that could be affected and are described together.

Air Quality: A temporary increase in air pollutant emissions from construction vehicles and equipment would occur during construction of any runway alternative. A construction emissions inventory may be necessary for the NEPA documentation. Additionally, the change in aircraft fleet mix combined with the forecast increase operations at the airport and changes to airspace designations may require an operational air quality emissions analysis for the NEPA documentation associated with any runway alternative.

Biological Resources: Threatened and endangered species and migratory birds, have the potential to be found at the airport. In addition, each runway alternative is proposed on undisturbed, pervious land. Therefore, a biological survey may be necessary for the NEPA documentation associated with any runway alternative.

Climate: Implementation of any runway alternative would result in a temporary increase in emissions from construction vehicles and equipment, and a permanent increase in emissions related to the forecast increase in aircraft operations and change to the aircraft fleet mix. An estimate of GHG emissions could be included in the construction and operational emission inventory as part of the NEPA documentation associated with any Runway Alternative.

Department of Transportation Act, Section 4(f): The Utah Youth Sports Complex is a Section 4(f) resource and is on SLCD A U42 property. Implementation of any runway alternative has the potential for the constructive use of the resource due to increase in aircraft noise at the Section 4(f) resource. Any impacts to the Section 4(f) resource would be included in the NEPA documentation associated with any runway alternative.

Hazardous Materials, Solid Waste, and Pollution Prevention: Construction associated with any runway alternative would generate solid waste. Waste would be handled and disposed of according to federal, state, and local rules and regulations.

Noise and Noise-Compatible Land Use: The aviation noise contours are anticipated to change with the implementation of any runway alternative. It is recommended that the SLCDCA model new noise contours that account for the runway extension using the most recent version of the Aviation Environmental Design Tool (AEDT). Residential land uses near the airport and Section 4(f) resources on SLCDCA U42 property, may be sensitive to aircraft noise associated with U42. New noise contours that account for the changes anticipated at the airport for each runway alternative should be prepared to see if any new noise sensitive resources are within the 65 dB DNL² noise contours, and if so, if any of those resources would experience a significant noise impact.

Socioeconomic, Environmental Justice, and Children’s Environmental Health and Safety Risks: Minority and low-income populations exist in the airport vicinity. NEPA documentation would require a determination of whether any impacts resulting from any runway alternative would disproportionately affect minority or low-income populations.

Water Resources (Floodplains): There are 100-year floodplains close to the existing Runway 34 end at the airport. NEPA documentation would require detailed analysis of any impacts to floodplains resulting from implementation of any runway alternative.

NEPA Documentation Guidance: The reconstruction, resurfacing, extension, strengthening, or widening of an existing runway can be categorically excluded (CATEX) under FAA Order 1050.1F, paragraph 5-6.4(e), provided that the project would not cause significant erosion or sedimentation, would not cause a significant noise increase over noise sensitive area, or cause significant impacts to air quality, and if no, extraordinary circumstances exist. If any of these conditions exist, then an Environmental Assessment (EA) could be required.

4.2.5 Long-Range Runway and Airspace Adjustment Conclusions

At the onset of this master plan study, there were questions from tenants and SLCDCA staff regarding if adjusting the runway orientation could provide benefit (i.e., better deconflict U42 from SLCIA), and if an east traffic pattern was possible. With the assistance of LEAN Corporation, the planning team determined the following answers:

- » **Runway Reorientation:** The potential runway orientations were limited by the available airport property boundaries necessary to maintain the existing pavement length. The feasible range included a maximum clockwise rotation of 2.5° and a counterclockwise rotation of 15.5°, all while keeping the existing runway length of 5,862 feet intact. The initial orientation explored was the Runway 16-34 configuration. Under this setup, the runway at U42 would align entirely parallel to Runways 16R-34L and 16L-34R at SLCIA. This alignment would facilitate closely spaced parallel

² Day-Night Sound Level (DNL) is based on sound levels measured in relative intensity of sound decibels (dB) on the A-weighted scale (dBA) over a time-weighted average normalized to a 24-hour period. DNL has been widely accepted as the best available method to describe aircraft noise exposure.

operations between the two airports. However, implementation would necessitate the establishment of an ATCT at U42 and significant modifications to the airspace system.

The second configuration that was considered, Runway 14-32, represented the most significant counterclockwise rotation achievable within the confines of U42's property boundary. The Runway 14-32 configuration provides 18° of separation from SLCIA Runways 16R-34L and 16L-34R. Additional rotation in the counterclockwise direction would likely entail the acquisition and demolition of external buildings, rendering it impractical. This shift would induce conflicts on the northwest side of the airport between U42 and the VFR corridor that runs parallel between the airport and the Oquirrh Mountains. Any potential gain would be marginal, whereas impacts to the airport and community would be extensive. Impacts would include new flight tracks over residential areas, RPZ areas in land not owned by SLCDA, creation of new approach and departure procedures, potential obstruction mitigation and/or impacts, and taxiway reconfiguration. Additional rotation in the counterclockwise direction would likely entail the acquisition and demolition of external buildings, rendering it impractical.

An initial assessment of instrument procedure feasibility was conducted for both the potential Runway 14-32 and Runway 16-34 orientations. The analysis affirmed that both orientations could support full RNAV (GPS) approaches that maintain current approach minimums and RNAV departures. However, the analysis related to the reorientation of runways indicated that substantial capacity gains between U42 and SLCIA would not be realized without the installation of an ATCT and comprehensive redesign of the surrounding airspace. Considering these factors, a runway reorientation was ruled out for future consideration.

- » **East Traffic Pattern:** A GA traffic pattern on the east side of the airport was found to be incompatible with SLC operations. FAA staff confirmed an east side traffic pattern would not be supported due to the conflicts that would arise with SLCIA arrival and departure traffic. If an east side pattern was implemented, a safe separation could not be maintained between U42 aircraft in the pattern and commercial airliners operating in/out of SLCIA. For this reason, an east side GA pattern for was not considered for implementation in the future.

However, the Utah Army National Guard consistently conducts rotor wing aircraft patterns at substantially lower altitudes compared to fixed-wing traffic, often flying at or below 5,500' mean sea level (MSL). This practice, prevalent across various airports nationwide, would ensure the necessary vertical separation between rotor wing aircraft on the east side of the airport and the inbound SLCIA traffic on its final approach over the pattern area. Given this context, the consideration of an east side pattern specifically tailored for rotor wing military operations of the Utah Army National Guard holds merit and should be thoroughly explored. Incorporating military traffic could be seamlessly accomplished by utilizing the Bangerter Transition to merge into the pattern. This approach would establish a clear demarcation between military helicopter operations and the aircraft within the standard GA pattern at U42. Changes to the GA VFR traffic patterns are not recommended. Considering the anticipated increase in traffic volume, this adjustment holds the potential to significantly elevate operational safety for both military and GA

users of the airport. It is important to note that the implementation of a distinct east traffic pattern intended solely for military operations would not impact the existing GA traffic patterns at U42. Further exploration of the Utah Army National Guard proposed east traffic pattern for military use only is recommended.

4.2.6 Taxiway Deficiency Solutions

The facility requirements outlined taxiway deficiencies. This section describes how those non-standard taxiway deficiencies will be corrected and incorporated into the preferred development plan.

- » Taxiway A2 and A3 connect the apron directly to the runway. To date, direct access has not proven to be a source of runway incursions. It was found best to relocate sections of A2 and A3 between Taxiway B and the runway when the preferred runway alternative is implemented. This will allow the runway exits to be situated in the optimal location considering the runways shift and extension. This solution also allows the portions of A2 and A3 between the apron and Taxiway B to remain in place, which preserves the flow and efficiency of today's apron configuration.
- » The non-standard Taxiway A4 entrance to the runway should be corrected when that taxiway requires reconstruction. If timing allows, it is recommended that the realignment be completed after the preferred runway alternative is implemented so the portion of A4 between Taxiway B and the runway can be placed optimally to serve as a runway exit. The portion between Taxiway A and Taxiway B may be placed in a different location to serve future hangar development efficiently.
- » The apron south of Taxiway A2 is not built to FAA standard and the apron concrete on the north end is within the Taxiway A2 TOFA. This apron can remain through the planning period, however the TOFA should be marked so no aircraft or vehicles are parked within the Taxiway A2 TOFA.

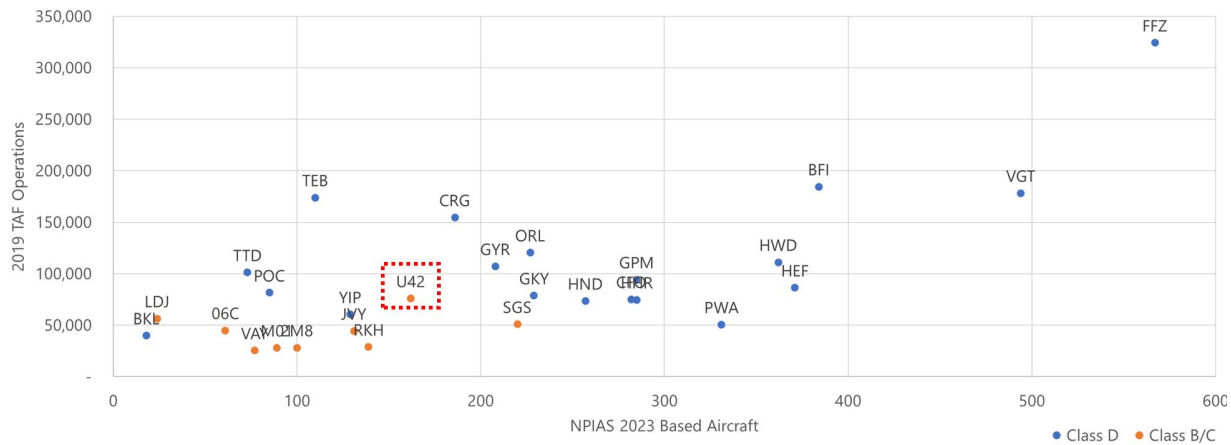
4.3 ATCT VALIDATION AND SITING

The 2006 Airport Master Plan examined the need and potential location for a future ATCT at U42. The need to plan for an ATCT at U42 was confirmed as part of this study. The validation was based on a comparison analysis which examined 27 other airspaces in the US that are comparable to U42. Comparable airspaces in this regard include:

- » Hub airports with adjacent Class C/D airspace
- » Secondary airports with runway alignments in conflict to the hub airport
- » Airspaces with known ATC challenges and/or restrictions per NBAA, AOPA, and FAA feedback

FAA TAF operations data and based aircraft data was collected and then compared for each of the 27 airspaces. Of those 27 airspaces, 18 included a Class D resolution, which means the secondary airport (akin to U42) had an ATCT in place. **Table 4-2** shows the data for each of those airports and is color coded according to if the airport has an ATCT tower. The data indicates that airports with similar airspace challenges as U42 generally have an ATCT if they have more than 200 based aircraft and/or 80,000 operations. At the time of this writing, U42 had approximately 71,000 annual operations and 177 based aircraft. It is expected that U42 will exceed the 200 based aircraft/80,000 annual operations benchmarks within the early portion of the planning period.

**TABLE 4-2
BASED AIRCRAFT AND OPERATIONS COMPARISON BY AIRPORT**



Source: LEAN, RS&H, 2023

Notes: Class D is an airport with an ATCT. Class B/C are airports without an ATCT.

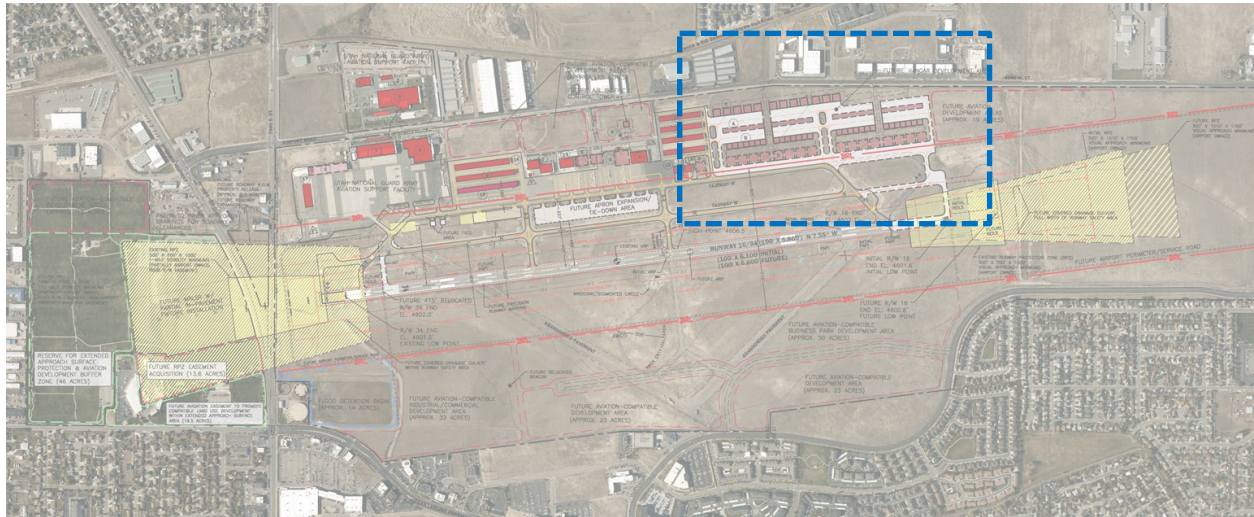
The analysis validated that an ATCT should continue to be planned for at U42. Three sites have been reserved for potential siting. Based on airspace limitations and UANG operations, the east side of the airport preferred over the west side of the airport. Thus, two of the three sites are on the east side. These sites will need to be further analyzed in a future according to FAA Order 6480.B, *Airport Traffic Control Tower Siting Process*. It is recommended SLCDCA continue to coordinate with FAA, and that FAA complete an FAA ATCT Siting Study. The primary benefits of an ATCT at U42 are:

- » An ATCT would enhance safety of the airspace and the operation on the field. U42 has a high count of diverse general aviation operations (flight training, business, national defense) for any single runway airport with typical busy days seeing 6 to 8 aircraft in the pattern simultaneously. That level of congestion, mixed with an already compressed airspace due to terrain and the SLC Class B airspace, creates a complex operating environment that would benefit from the added level of safety provided by ATCT management of local airspace.
- » The implementation of an ATCT at U42 carries the potential to notably strengthen approach and departure procedures by fostering heightened coordination between the future tower and the SLC TRACON (S56). This scenario would offer the chance to introduce a new RNAV Standard Instrument Departure (SID), ensuring the safe and efficient northbound routing of aircraft taking off from either Runway 16 or Runway 34 at U42. This initiative would contribute to addressing the overall inefficiency stemming from the existing departure procedures that are limited to southbound routes from the airport. Furthermore, the collaboration of S56 and a functional ATCT would allow for the potential of incorporating a Charted Visual Flight Procedure (CVFP) for Runway 16 as part of the effort to enhance arrival access.

4.4 AIRCRAFT PARKING AND STORAGE

The PAL 3 facility requirements determined the need to provide roughly 35 acres for hangar development. The 2006 Master Plan and Airport Layout Plan identified future aircraft hangar development in the northwest quadrant of the airport property, as noted in within the dashed blue box in **Figure 4-7**.

FIGURE 4-7
AIRCRAFT PARKING AND STORAGE

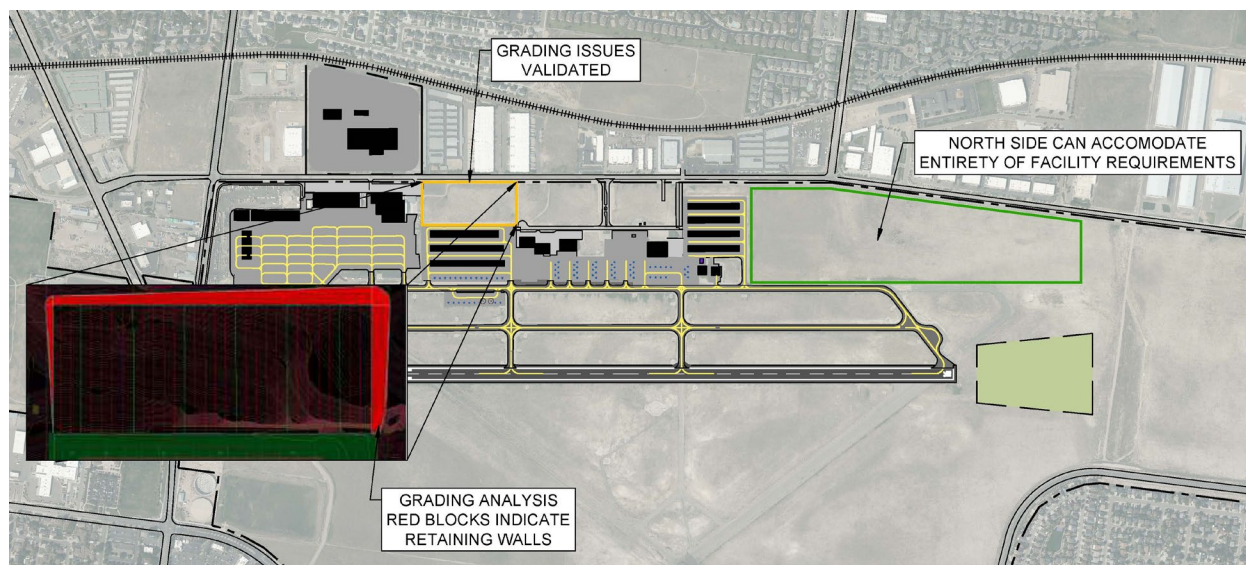


Source: 2006 Airport Layout Plan

That area includes more than 40 acres suitable for hangar development and was validated as being able to accommodate all future aircraft storage requirements at U42 through the planning period. The northwest quadrant was carried forward in this plan as the primary area designated for future hangar development.

Other areas on the west side of the airport were further explored for their ability to accommodate aircraft storage including the area behind the row of T-hangars identified with the orange box in **Figure 4-8**. It was envisioned that T-hangar and/or apron space could be tied into existing taxiway infrastructure. However, grading challenges were identified that, while not unsurmountable, would add significant site-work cost to allow development. To continue to add T-hangar rows to that site, a retention wall would be required which, at its tallest, would be approximately 10 to 15 feet high. Considering that the northwest portion of the airport can accommodate the entirety of aircraft storage requirements for PAL 3 and that areas exist for infill between the current large hangars and the FBO, all other open lots on the west side were deemed appropriate for other uses.

FIGURE 4-8
AIRCRAFT STORAGE ON THE WEST SIDE OF THE AIRPORT



Source: RS&H, 2023

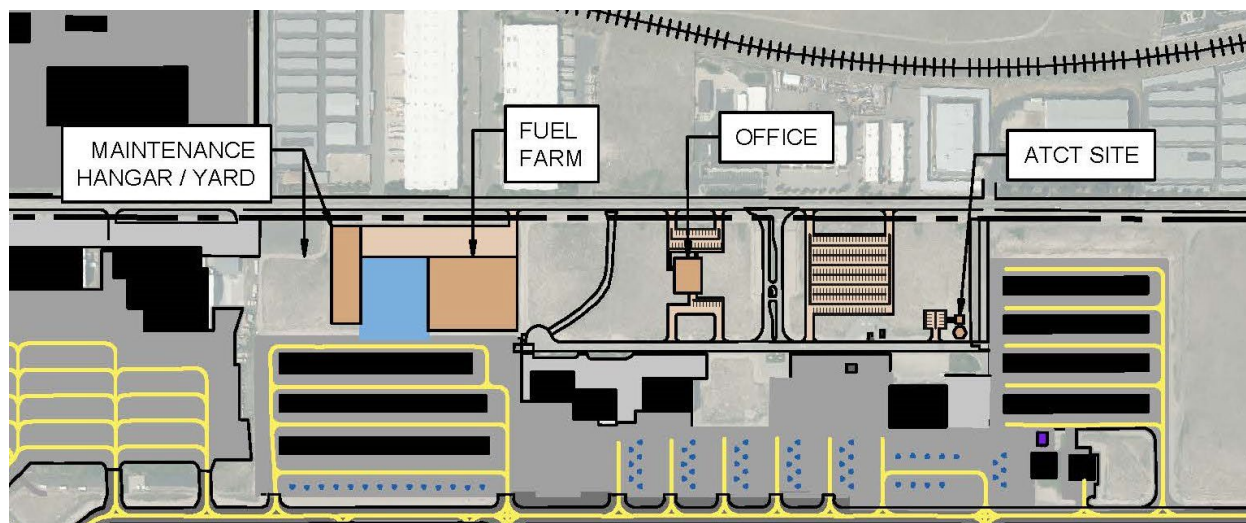
4.5 AIRPORT SUPPORT FACILITIES

The facility requirements analysis determined that the airport maintenance and SRE building, which today is within a portion of a hangar, is not in an optimal location as the space would be better used for aircraft storage. Additionally, the existing fuel farm is poorly located and requires expansion, and additional vehicle parking is needed to support the current and future businesses and facilities on the west side of the airport.

Figure 4-9 shows open land areas that were examined for use. As noted in the section above, the 5-acre parcel on the left side of the diagram (south side) was determined to be a costly site for development for aircraft parking/storage. However, that site is optimal for relocation of the airport fuel farm and airport maintenance. Facilities on that site can be easily connected to both the landside and airside portions of the airport. A fuel farm in that location can allow room for tanker trucks to efficiently access the location from Airport Road. The middle parcel is ideal for additional parking to serve the existing and future businesses in that area. Additionally, nonaeronautical use such as an office building and/or restaurant may be practical to further support flight school or another aeronautical-related business.

The northern site (on the right of the diagram) is the site previously reserved for an ATCT in the 2006 Master Plan. This is being carried forward in this study as one of three potential sites for an ATCT. Until a final decision is made for an ATCT site, the parcel is suggested to be used for additional parking. A parking lot is a relatively low-cost development that can be removed in the future if the site is ultimately selected for an ATCT.

FIGURE 4-9
AIRPORT SUPPORT FACILITY DEVELOPMENT OPPORTUNITIES



Source: RS&H, 2023

The facility requirements also identified the need to determine if the aircraft wash rack location was optimal or if a different location would be more advantageous. It was determined the wash rack location should stay in place. The issues with circulation to/from the wash rack can be resolved with a different apron configuration. Various apron configurations were explored to examine the potential for opening circulation to current and future large hangars while maintaining and/or expanding tie-down areas. Overall, it was concluded that in the future, a taxi route for ADG II aircraft should be implemented in front of all the hangars on the main apron to allow better flow if/ when new hangar development in the area materializes. With that type of circulation route, the wash rack would then become more easily accessible.

There are a myriad of ways the apron can be reconfigured in the future, and an optimal configuration will be dependent on the type and use of hangar development in the area and SLCDAs preference for preserving tie-down locations. During the stakeholder engagement process, several apron expansion options were considered and remain viable solutions depending on how private hangars and FBO expansions occur. These apron expansion options are available in **Appendix Z**. Thus, it is outside the scope of this study to select a new configuration for the apron as that would be premature. As developments are proposed, it is recommended the apron configuration be studied further and reconfigured as necessary. Additionally, it is recommended that if tie-downs on the existing apron are displaced, new areas are created adjacent to new developments in the northern portion of the airport.

4.6 COMPREHENSIVE PREFERRED ALTERNATIVE

The comprehensive preferred alternative for developing South Valley Regional Airport is a coordinated facilities plan which addresses needs up to and beyond the forecast demand facility requirements. **Figure 4-10** shows the preferred comprehensive plan for development at U42.

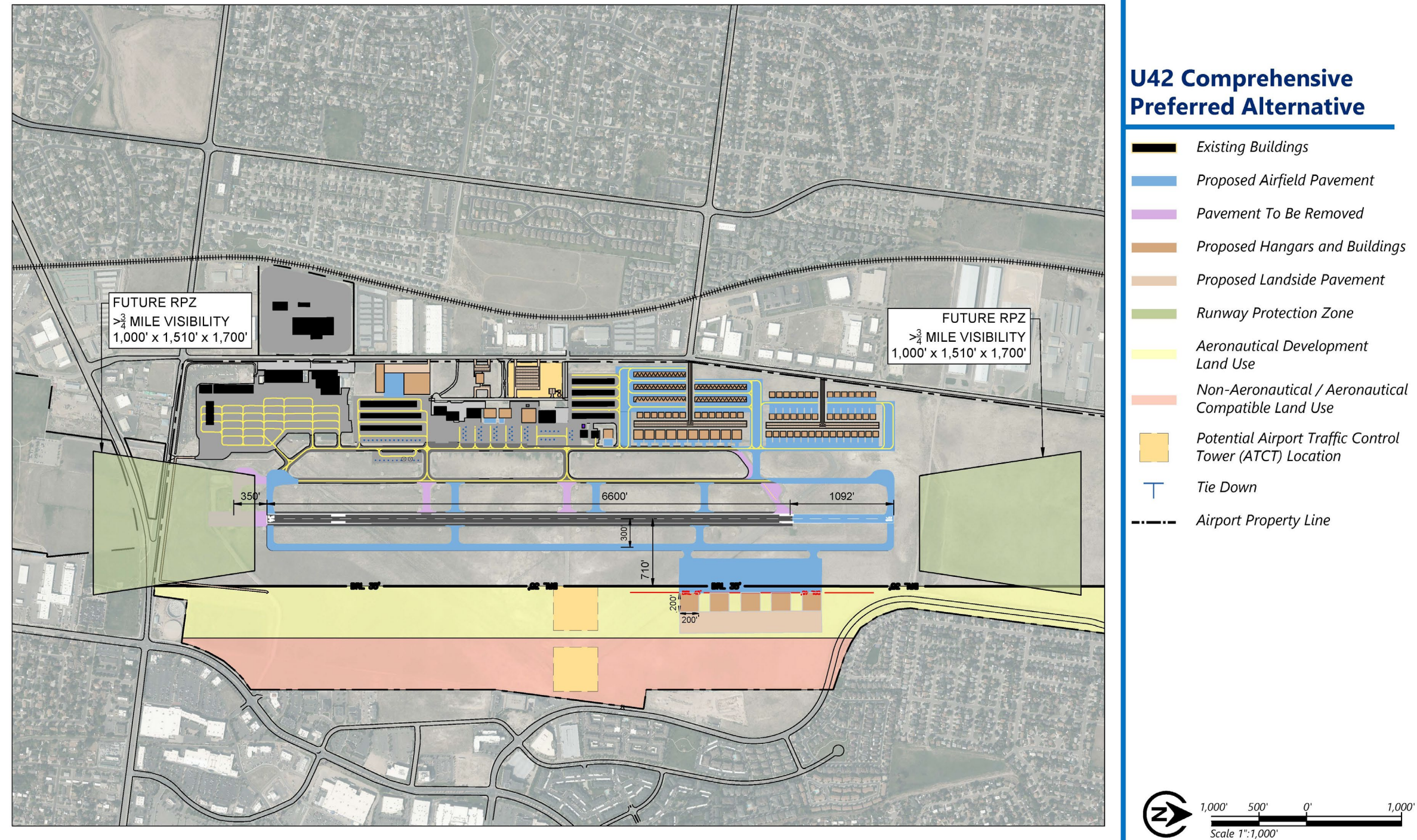
The development strategy for the west side of the airport remains consistent with the original concept created in the 2006 Master Plan study. However, the development strategy for the east side of the airport

has been refined. It was determined that the east side of the airport should consider an aeronautical campus development to better support the role U42 plays in the system of airports for SLCDCA and the growing West Jordan community. The refined strategy is to encourage an aeronautical campus that could accommodate aviation research and development facilities, flight training services, and aviation-related manufacturing or assembly. To preserve for an aeronautical campus, the long-term conceptual layout includes a full-length parallel taxiway on the east side of the airport. While the need for a full-length taxiway is unlikely to be within the 20-year planning period, the concept ensures separation standards and flexibility will remain available as this development occurs over time.

Along the east parallel taxiway, the land will be preserved for future aeronautical use, while the remaining land farther to the east and adjacent to the airport property line will become available for aviation-compatible nonaeronautical uses. This configuration was determined to be a prudent balance for allowing land to be used for non-aeronautical revenue-producing purposes while safeguarding that enough land is preserved to ensure aeronautical uses will not be limited beyond this study's planning horizon.

This comprehensive preferred alternative optimizes the use of all available airport land for both aeronautical and non-aeronautical purposes to support the SLCDCA system of airports. This comprehensive development plan provides facilities that allow U42 to fulfill its general aviation reliever system role safely and efficiently while providing facilities for airport users and supporting economic development within the local community.

FIGURE 4-10
COMPREHENSIVE PREFERRED ALTERNATIVE



Source: RS&H, 2023