

## Chapter 5 – Airport Alternatives Analysis

### Introduction

This chapter describes the various runway, taxiway, terminal, landside, land-use development, and aeronautical development alternatives that were created based on the needs defined in the Facility Requirements Chapter. This chapter also discusses the evaluation process used to select the preferred development alternative for each area, reviews the results of the evaluation process, and provides an overview of the composite preferred development alternative.

### Alternatives Development Process

The development of the various alternatives described in this chapter were created by reviewing the facility requirements defined in Chapter 4 and brainstorming numerous development options that could potentially satisfy the requirements. A portion of this brainstorming was accomplished through a number of design charrettes that were conducted with members of the ABI Master Plan Steering Committee (MPSC) and other Abilene Regional Airport stakeholders. The alternative ideas that were developed during the brainstorming process were then consolidated into seven runway/approach alternatives, ten taxiway development alternatives, eight terminal alternatives, one landside alternative, twelve land-use development alternatives, and four aeronautical development alternatives. Each of these alternatives then went through the formal evaluation process described in each section to select a preferred alternative for that area. The preferred alternative for each area was then combined into a composite preferred development alternative.

To help guide the development of the composite preferred alternative for ABI, each of the alternative categories discussed above were ranked in order of importance to the airport's long-term development. The ranking is shown below:

1. Runway/Approach
2. Taxiway
3. Terminal & Landside
4. Land-Use
5. Aeronautical Development

The operation of an airport centers on its airside facilities. Consequently, it is of the utmost importance for airports to ensure that their runway, approach, and taxiway needs are given the highest priority. Terminal and landside facilities are the next priority as these facilities are typically the largest non-airfield building/infrastructure facilities on the airport and are the most difficult to make significant modifications to without incurring a substantial cost. Land-Use alternatives were considered the fourth priority because non-aeronautical revenue

development is a high priority for ABI. Aeronautical development alternatives were considered the fifth priority because the areas where these facilities are established are largely based on the preferred land-use alternative that is selected for the airport.

## Runway/Approach Alternatives

This section discusses the runway/approach alternatives that were developed for ABI, the formal evaluation that was completed for the alternatives, and an overview of the preferred runway/approach alternative that was selected.

The existing Runway Design Code (RDC) for Runway 17L/35R is C-III-2,400, Runway 17R/35L is C-III-5,000, and Runway 4/22 is B-II-5,000.

### *Development Objectives*

Based on the analysis completed in the Facility Requirement Chapter, various components of ABI's runway/approach facilities need to be improved or modified to meet the current and long-term needs of ABI's users. These improvement needs are discussed in the runway/approach development objectives shown below:

- Runway/Approach Objective #1: Evaluate the feasibility of extending Runway 17R/35L or 17L/35R to at least 8,500 feet to accommodate future traffic that could fly longer routes.
- Runway/Approach Objective #2: Evaluate the feasibility of adding a GPS based precision instrument approach (or ILS) to Runway 17R and a GPS based non-precision instrument approach to Runway 35L (1 mile or  $\frac{3}{4}$  mile visibility minimums) to improve the usability of the airport during all weather conditions.
- Runway/Approach Objective #3: Evaluate the feasibility of adding a MALSR to Runway 17R to complement the proposed precision instrument approach for that runway.
- Runway/Approach Objective #4: Gain sufficient control over the land within the ultimate Runway Protection Zones (RPZs) associated with Runway 17L, 17R, 35L, and 35R.
- Runway/Approach Objective #5: Resolve the issue with the runway hold position markings associated with Runway 4/22 being located inside the Runway 4/22 Obstacle Free Zone (OFZ).
- Runway/Approach Objective #6: Physically de-couple Runway 4/22 from Runway 17L/35R.

Many of these development objectives are addressed in a different manner in each of the alternatives. However, several development objectives are addressed identically in each of the alternatives. Specifically, the following items are addressed identically in each alternative:

- Runway/Approach Objective #1: In each of the alternatives, Runway 17L/35R is the runway that is extended to 8,500 ft. in length as opposed to Runway 17R/35L. Runway 17L/35R was chosen as the runway that should be extended to 8,500 ft. because it is the runway with the lowest existing approach minimums, has fewer barriers (e.g. environmental, engineering, infrastructure, etc.) that would impact the extension, requires less land purchase, and allows for better future land-use for aeronautical and non-aeronautical development.
- Runway/Approach Objective #5: In all of the alternatives Runway 4/22 is shown as being de-commissioned at some point in the future which will resolve the issue related to the runway hold position markings being located too close to the runway centerline which allows aircraft to penetrate the runway OFZ. Currently, Runway 4/22 is infrequently used and the infrastructure associated with the runway (e.g. pavement, lighting, markings, signage, etc.) is outdated and the runway edge lighting system is not operational. Additionally, Runway 4/22 is not necessary to meet the FAA wind coverage requirements for the parallel runways and is considered a tertiary runway which limits its eligibility for AIP grant funds. Based on this information, it is recommended that Runway 4/22 be closed in the future and the area redeveloped for aeronautical and non-aeronautical land use.
- Runway/Approach Objective #6: Each of the alternatives shows the physical de-coupling of Runway 4/22 and Runway 17R/35L. This will include the removal of the Runway 4/22 pavement that is inside the Runway Safety Area (RSA) for Runway 17R/35L.

Runway/Approach Objectives #2, 3, and 4 are all addressed in different manners in each of the runway/approach alternatives.

## ***Runway/Approach Alternatives***

Based on the development objectives discussed above, the following seven runway/approach alternatives were created. Each of these alternatives portray various ways the runway/approach development objectives could be met.

### → ***Alternative #1 – Close to Status Quo***

Alternative #1 is considered “close to status quo” because the alternative includes a minimum number of infrastructure/approach changes. It is meant to be a low cost alternative for future development. In this alternative, the RPZ dimensions for each runway remain unchanged from their existing dimensions.

Specifically, this alternative includes the following improvements/changes compared to the existing runway/approach facilities:

- Decommissioning of Runway 4/22.
- Removal of Runway 4/22 pavement inside the Runway 17L/35R RSA.

- Extending Runway 17L/35R 1,302 ft. to the south to a total length of 8,500 ft. This includes the relocation of the existing MALS system for Runway 35R to accommodate runway extension, the relocation of the Runway 35R PAPI, and the purchase of 26 acres of property to protect the Runway 35R RPZ.
- Approach visibility minimums stay the same for each runway end with exception of Runway 35L. An Instrument Approach Procedure (IAP) with visibility minimums of 1 mile added to Runway 35L.
- The portions of the RPZs associated with Runway 17R and 17L that extend beyond the existing airport property line are addressed with avigation easements or property purchases. Avigation easements are considered more likely. An avigation easement has already been established for non-airport property north of TX-36 that is inside the RPZ limits for Runway 17L. An avigation easement for Runway 17R will need to be established.

Runway/Approach Alternative #1 is shown in **Figure 5-1**.

→ **Alternative #2 – Improved Approaches for Runway 17R (PIR) and 35L**

Alternative #2 investigates the impacts of adding a precision instrument approach to Runway 17R and a non-precision IAP with  $\frac{3}{4}$  mile visibility minimums to Runway 35L. The addition of these approaches greatly expand the RPZs for these runways. The new RPZ for Runway 17R would extend over the Loop 322 and TX-36 intersection. The new RPZ for Runway 35L would remain on airport property.

Specifically, this alternative includes the following improvements/changes compared to the existing runway/approach facilities:

- Decommissioning of Runway 4/22.
- Removal of Runway 4/22 pavement inside the Runway 17L/35R RSA.
- Extending Runway 17L/35R 1,302 ft. to the south to a total length of 8,500 ft. This includes the relocation of the existing MALS system for Runway 35R to accommodate runway extension, the relocation of the Runway 35R PAPI, and the purchase of 26 acres of property to protect the Runway 35R RPZ.
- Approach visibility minimums stay the same for each runway end with exception of Runway 17R and 35L. An Instrument Approach Procedure (IAP) with visibility minimums of  $\frac{3}{4}$  mile is added to Runway 35L. An IAP with precision instrument minimums ( $\frac{1}{2}$  mile) is added for Runway 17R and a MALS is installed to support the newly establish precision instrument approach for the runway.
- The portions of the RPZs associated with Runway 17R and 17L that extend beyond the existing airport property line are addressed with avigation easements or property purchases. Avigation easements are considered more likely. An avigation easement has already been established for non-airport property north of TX-36 that is inside the RPZ limits for Runway 17L. An avigation

easement for Runway 17R will need to be established. However, a sizable portion of the RPZ associated with Runway 17R extends over Loop 322 and TX-36. Consequently, the feasibility of this alternative is predicated on FAA accepting the location of these roadways inside the RPZ.

Runway/Approach Alternative #2 is shown in **Figure 5-2**.

→ **Alternative #3 – Improved Approaches for Runway 17R (PIR) and 35L with RPZs on Airport Property**

Alternative #3 studies the impacts of establishing a PIR for Runway 17R and a non-precision IAP with  $\frac{3}{4}$  mile visibility minimums to Runway 35L similar to Alternative #2. However, this alternative assumes that the RPZs for Runway 17L and Runway 17R will have to be pulled onto airport property which will require landing threshold displacements for these runway.

Specifically, this alternative includes the following improvements/changes compared to the existing runway/approach facilities:

- Decommissioning of Runway 4/22.
- Removal of Runway 4/22 pavement inside the Runway 17L/35R RSA.
- Extending Runway 17L/35R 1,302 ft. to the south to a total length of 8,500 ft. This includes the relocation of the existing MALSR system for Runway 35R to accommodate runway extension, the relocation of the Runway 35R PAPI, and the purchase of 26 acres of property to protect the Runway 35R RPZ.
- Approach visibility minimum's stay the same for each runway end with exception of Runway 17R and 35L. An Instrument Approach Procedure (IAP) with visibility minimums of  $\frac{3}{4}$  mile is added to Runway 35L. An IAP with precision instrument minimums ( $\frac{1}{2}$  mile) is added for Runway 17R and a MALSR is installed to support the newly establish precision instrument approach for the runway. The landing threshold for Runway 17R would be displaced by approximately 2,514 ft. which would require the MALSR system to be an in-pavement system.
- The portions of the RPZs associated with Runway 17R and 17L that currently extend beyond the existing airport property line would be pulled back onto airport property by displacing the landing threshold of each runway and establishing the use of declared distances. The landing threshold for Runway 17R would be displaced 2,514 ft. and the landing threshold for Runway 17L would be displaced 1,213 ft.

Runway/Approach Alternative #3 is shown in **Figure 5-3**.

→ **Alternative #4 – Improved Approaches for Runway 17R (PIR) and 35L with Runway Extensions Due to Displaced Thresholds**

Alternative #4 is a variation of Alternative #3. This alternative extends Runways 17R/35L and Runway 17L/35R to the south by the same distance the landing thresholds are displaced for Runway 17R and 17L to bring the RPZs for those runways completely on to airport property.

Specifically, this alternative includes the following improvements/changes compared to the existing runway/approach facilities:

- Decommissioning of Runway 4/22.
- Removal of Runway 4/22 pavement inside the Runway 17L/35R RSA.
- Extending Runway 17L/35R 1,302 ft. to the south to a total length of 8,500 ft. This includes the relocation of the existing MALSR system for Runway 35R to accommodate runway extension, the relocation of the Runway 35R PAPI, and the purchase of 26 acres of property to protect the Runway 35R RPZ.
- Runway 17L/35R would be extended 2,514 ft. to the south to maintain the existing Landing Distance Available (LDA) for Runway 17L of 7,203 ft.
- Approach visibility minimum's stay the same for each runway end with exception of Runway 17R and 35L. An Instrument Approach Procedure (IAP) with visibility minimums of 3/4 mile is added to Runway 35L. An IAP with precision instrument minimums (1/2 mile) is added for Runway 17R and a MALSR is installed to support the newly establish Precision Instrument Approach for the runway. The landing threshold for Runway 17L would be displaced by approximately 2,514 ft. which would require the MALSR system to be an in-pavement system.
- The portions of the RPZs associated with Runway 17R and 17L that currently extend beyond the existing airport property line would be pulled back onto airport property by displacing the landing threshold of each runway and establishing the use of declared distances. The landing threshold for Runway 17R would be displaced 2,514 ft. and the landing threshold for Runway 17L would be displaced 1,213 ft.

Runway/Approach Alternative #4 is shown in **Figure 5-4**.

→ **Alternative #5 – Close to Status Quo With RPZs on Airport Property**

Alternative #5 is a variation of Alternative #1. This alternative maintains all the RPZs at their existing dimensions but studies the impacts of pulling the existing RPZs completely onto airport property.

Specifically, this alternative includes the following improvements/changes compared to the existing runway/approach facilities:

- Decommissioning of Runway 4/22.
- Removal of Runway 4/22 pavement inside the Runway 17L/35R RSA.
- Extending Runway 17L/35R 1,302 ft. to the south to a total length of 8,500 ft. This includes the relocation of the existing MALS system for Runway 35R to accommodate runway extension, the relocation of the Runway 35R PAPI, and the purchase of 26 acres of property to protect the Runway 35R RPZ.
- Approach visibility minimum's stay the same for each runway end with exception of Runway 35L. An Instrument Approach Procedure (IAP) with visibility minimums of 1 mile is added to Runway 35L.
- The portions of the RPZs associated with Runway 17R and 17L that currently extend beyond the existing airport property line would be pulled back onto airport property by displacing the landing threshold of each runway and establishing the use of declared distances. The landing threshold for Runway 17R would be displaced 802 ft. and the landing threshold for Runway 17L would be displaced 1,213 ft.

Runway/Approach Alternative #5 is shown in **Figure 5-5**.

→ **Alternative #6 – ¾ Mile IAPs for Runway 17R and 35L with RPZs on Airport Property**

Alternative #6 studies the impacts of establishing a non-precision IAP with ¾ mile visibility minimums for Runway 17R instead of establishing a precision instrument approach. Additionally, this alternative assumes the landing thresholds for Runway 17R and 17L will be displaced to pull the RPZs onto completely onto airport property.

Specifically, this alternative includes the following improvements/changes compared to the existing runway/approach facilities:

- Decommissioning of Runway 4/22.
- Removal of Runway 4/22 pavement inside the Runway 17L/35R RSA.
- Extending Runway 17L/35R 1,302 ft. to the south to a total length of 8,500 ft. This includes the relocation of the existing MALS system for Runway 35R to accommodate runway extension, the relocation of the Runway 35R PAPI, and the purchase of 26 acres of property to protect the Runway 35R RPZ.
- Approach visibility minimum's stay the same for each runway end with exception of Runway 17R and 35L. An Instrument Approach Procedure (IAP) with visibility minimums of ¾ mile is added to Runway 17R and Runway 35L.
- The portions of the RPZs associated with Runway 17R and 17L that currently extend beyond the existing airport property line would be pulled back onto airport property by displacing the landing threshold of each runway and establishing the use of declared distances. The landing threshold for Runway 17R

would be displaced 1,574 ft. and the landing threshold for Runway 17L would be displaced 1,213 ft.

Runway/Approach Alternative #6 is shown in **Figure 5-6**.

→ ***Alternative #7 – ¾ Mile IAPs for Runway 35L***

Alternative #7 combines aspects of the other alternatives to establish an alternative that uses the existing infrastructure and property to the fullest extent possible. This alternative does not change the approaches or RPZs for Runway 17L, 17R, and 35R but adds a non-precision IAP with ¾ mile visibility minimums for Runway 35L to improve accessibility to ABI if Runway 35R is not available.

Specifically, this alternative includes the following improvements/changes compared to the existing runway/approach facilities:

- Decommissioning of Runway 4/22.
- Removal of Runway 4/22 pavement inside the Runway 17L/35R RSA.
- Extending Runway 17L/35R 1,302 ft. to the south to a total length of 8,500 ft. This includes the relocation of the existing MALS system for Runway 35R to accommodate runway extension, the relocation of the Runway 35R PAPI, and the purchase of 26 acres of property to protect the Runway 35R RPZ.
- Approach visibility minimums stay the same for each runway end with exception of Runway 35L. An Instrument Approach Procedure (IAP) with visibility minimums of ¾ mile is added to Runway 35L.
- The portions of the RPZs associated with Runway 17R and 17L that extend beyond the existing airport property line are addressed with avigation easements or property purchases. Avigation easements are considered more likely. An avigation easement has already been established for non-airport property north of TX-36 that is inside the RPZ limits for Runway 17L. An avigation easement for Runway 17R will need to be established.

Runway/Approach Alternative #7 is shown in **Figure 5-7**.

Figure 5-1  
Runway/Approach Alternative #1



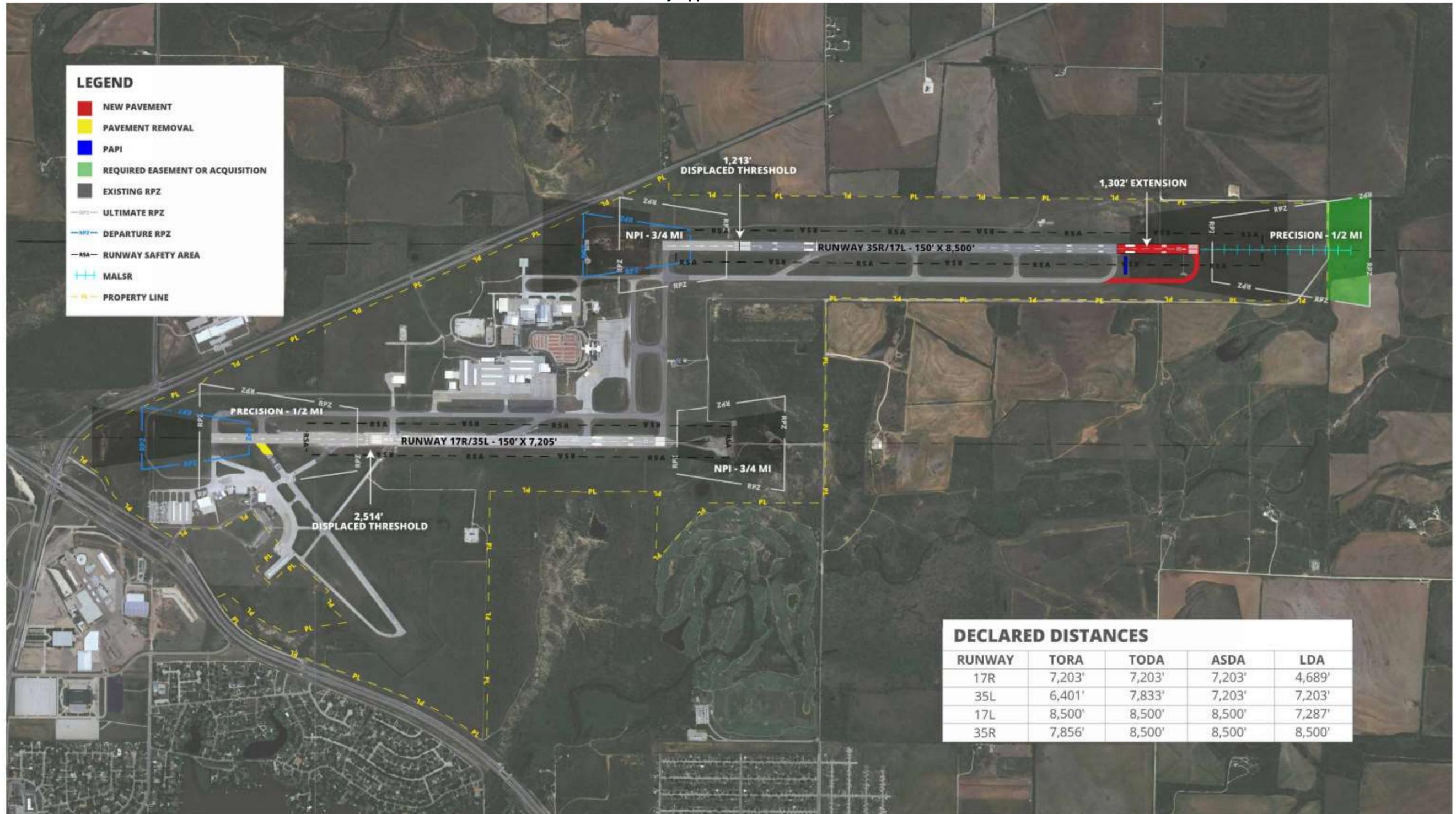
Source: Garver, 2018

Figure 5-2  
Runway/Approach Alternative #2



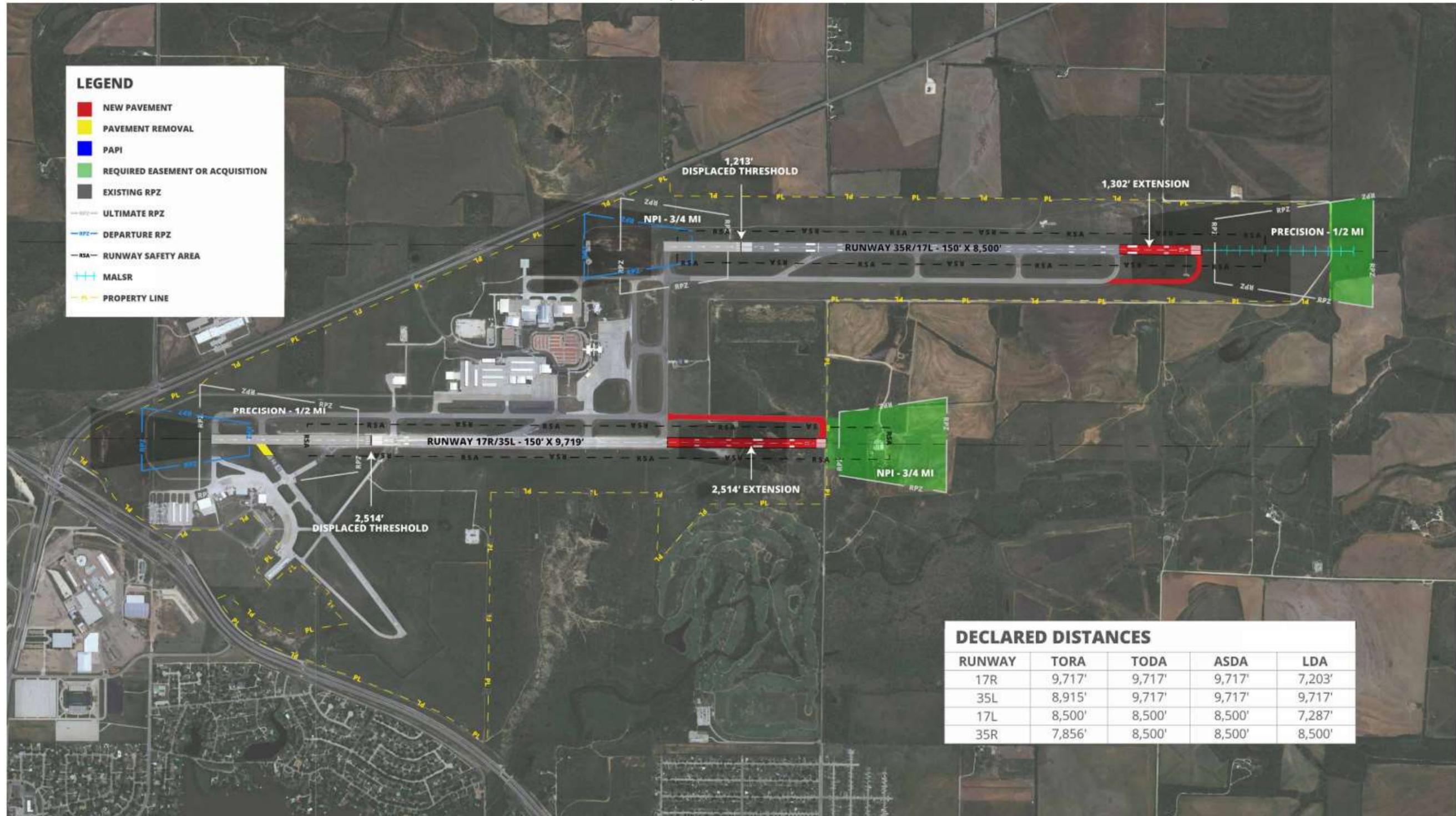
Source: Garver, 2018

Figure 5-3  
Runway/Approach Alternative #3



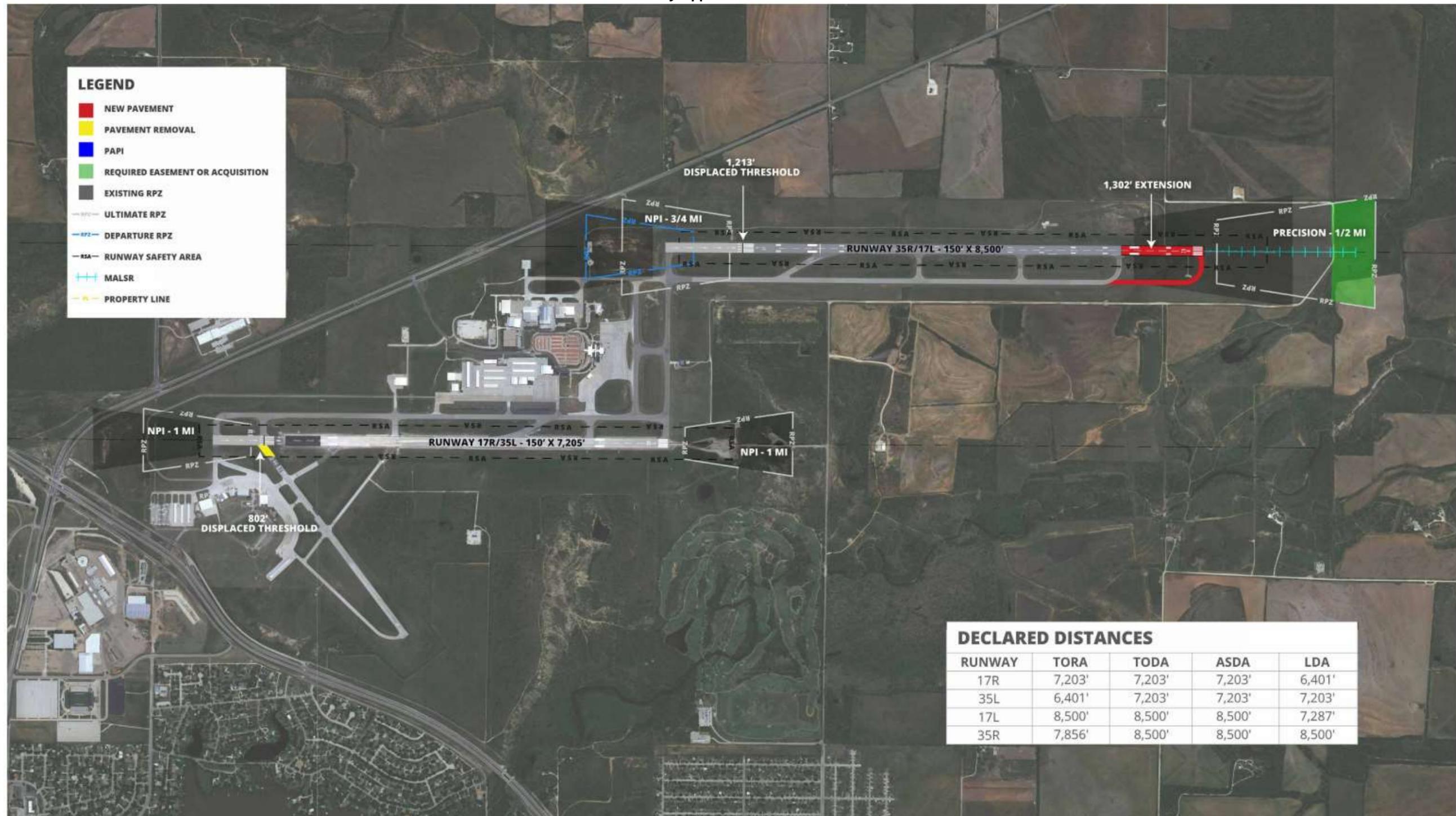
Source: Garver, 2018

Figure 5-4  
Runway/Approach Alternative #4



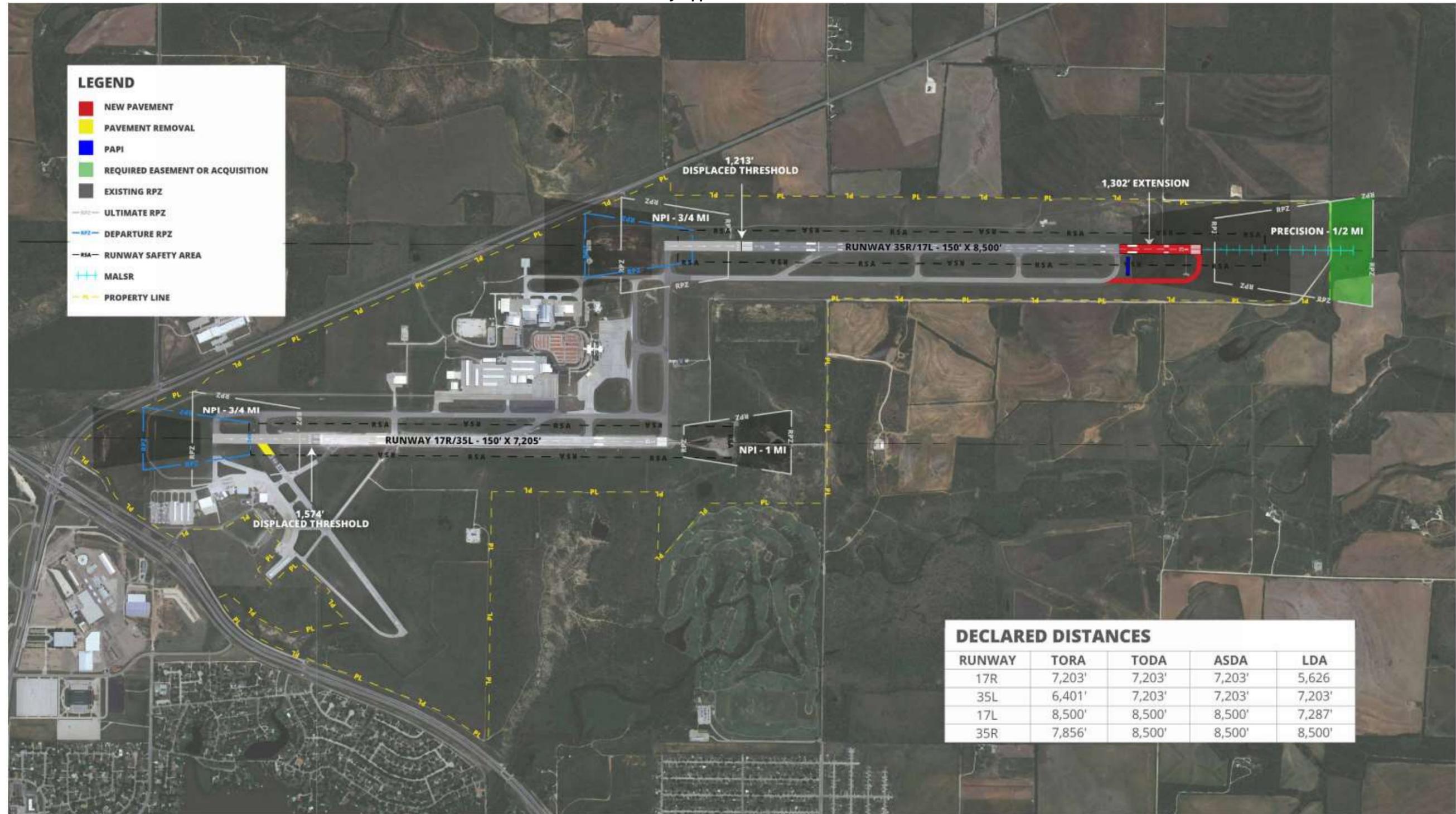
Source: Garver, 2018

Figure 5-5  
Runway/Approach Alternative #5



Source: Garver, 2018

Figure 5-6  
Runway/Approach Alternative #6



**LEGEND**

- NEW PAVEMENT
- PAVEMENT REMOVAL
- PAPI
- REQUIRED EASEMENT OR ACQUISITION
- EXISTING RPZ
- ULTIMATE RPZ
- DEPARTURE RPZ
- RUNWAY SAFETY AREA
- + MALS
- PROPERTY LINE

DECLARED DISTANCES				
RUNWAY	TORA	TODA	ASDA	LDA
17R	7,203'	7,203'	7,203'	5,626'
35L	6,401'	7,203'	7,203'	7,203'
17L	8,500'	8,500'	8,500'	7,287'
35R	7,856'	8,500'	8,500'	8,500'

Source: Garver, 2018

Figure 5-7  
Runway/Approach Alternative #7



Source: Garver, 2018

## *Runway/Approach Alternatives Evaluation*

One of the tasks of a master plan is to analyze alternatives to determine which alternative provides a realistic and feasible plan that will allow the airport to meet future demand in a safe and efficient manner. To facilitate this analysis, evaluation criteria were established and an evaluation matrix was developed showing how each alternative compared based on the evaluation criteria.

Each of the evaluation criteria are discussed in detail below.

- Ability to Meet the Established Airside Development Objectives – Does the alternative meet the established development objectives? Safety related development objectives are typically considered more important than other non-safety related objectives.
- Conformance with FAA Design Standards – Does the alternative meet all the applicable FAA design standards? Unless absolutely necessary, each proposed alternative should meet all applicable FAA design standards without requiring a Modification to Standards (MOS).
- Environmental Impacts – What impacts will the proposed alternative have on the environment? This includes water, soil, wildlife, noise, and cultural environmental factors as well as any other applicable to the airport or region. The environmental process when using Federal funds is a component for major CIP projects. The environmental process will begin in the early stages of project development and the outcome will be a key factor in how the project develops. When increasing the size of an airport to accommodate larger aircraft, noise sensitive areas need to be evaluated. Soil conditions for construction will need to be suited for airport uses. Floodplains, wetlands, endangered species and areas of cultural significance need to be avoided if possible.
- Engineering Factors/Considerations and Ease of Implementation – Are there any impediments/barriers that would prevent or make it difficult to construct this alternative (e.g. terrain, environmental, off-site land uses, etc.)? Constructability is a key factor when major expansion is expected. If there are roadblocks to development the cost usually increases and additional time is needed to complete the project. The terrain change on the site will be a factor to constructability. This category was evaluated by information gathered from site visits, review of existing available data, and aerial photographs.
- Residential and/or Business Impacts – How much of an impact will the proposed alternative have on off-airport land-use (e.g. residential, businesses, etc.)? Ideally, the off-airport impacts to existing land use should be minimal. In addition, do not limit future development if possible.
- Infrastructure Relocation Impacts – How much of an impact will the proposed alternative have on off-airport infrastructure (e.g. roads, utilities, etc.)? Ideally, the off-airport impacts to existing infrastructure should be minimal.

- Development Cost – What is the estimated cost to construct the proposed alternative? Costs estimates are order-of-magnitude costs and should be considered official engineering cost estimates. Generally, a lower cost for future development is best assuming the development can meet all the required development objectives without limiting the future growth of the airport.

A “stop light” style rating system was used for the evaluation criteria. Green indicates that the alternative has a low impact and/or meets the established requirement for that particular evaluation area. Yellow indicates that the alternative has a moderate impact and/or fails to meet some of the necessary requirements for the particular evaluation area. Red indicates that the alternative has a high impact and/or fails to meet most of the established requirements for that particular evaluation area.

In the following section, each of the seven runway/approach alternatives are analyzed based on these evaluation criteria.

**Runway/Approach Alternative Evaluation Results**

Based on evaluation criteria discussed above, the following evaluation matrix (**Table 5-1**) was developed showing the proposed rating of each alternative.

**Table 5-1**  
**Runway/Approach Evaluation Matrix**  
**Runway/Approach Development Alternative #**

<b>Evaluation Criteria</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Ability to Satisfy the Established Facility Requirements	Yellow	Green	Red	Green	Yellow	Yellow	Green
Conformance with FAA Design Standards	Green						
Environmental Impacts	Yellow	Yellow	Yellow	Red	Yellow	Yellow	Yellow
Engineering Factors/Considerations and Ease of Implementation	Green	Yellow	Red	Red	Green	Green	Green
Residential and/or Business Impacts	Green	Green	Green	Yellow	Green	Green	Green
Infrastructure Relocation Impacts (e.g. Roads, Powerlines, Utilities, etc.)	Yellow	Yellow	Yellow	Red	Yellow	Yellow	Yellow
Development Cost	\$9.5M	\$10.8M	\$13.5M	\$29.8M	\$11.9M	\$12M	\$9.6M

- Low Impact **or** Meets Requirements
- Moderate Impact **or** Fails to Meet Some Requirements
- High Impact **or** Fails to Meet Most Requirements

The ratings that each alternative received in each evaluation area are discussed in the evaluation commentary sections below.

### ***Evaluation Commentary for Alternative #1***

Alternative #1 includes a limited number of runway/approach changes. Runway 17L/35R is extended 1,302 ft. to a total length of 8,500 ft. but Runway 17R/35L remains at its existing length. Additionally, all the Instrument Approach Procedures (IAP) remain the same with the exception of Runway 35L. Runway 35L doesn't have an existing IAP. In this alternative, an IAP with 1 mile visibility minimums would be established for Runway 35L. Due to the limited number of changes, this alternative received a "green" rating in the areas of engineering factors/considerations and ease of implementation, residential and/or business impacts, and development cost. Additionally, the alternative meets all existing FAA design standards so it also received a "green" in the conformance with FAA design standards area.

Alternative #1 received a "yellow" rating for its ability to satisfy the established facility requirements because it only includes an IAP with 1 mile visibility minimums to Runway 35L instead of an approach with  $\frac{3}{4}$  mile visibility minimums. During periods of the year where IFR conditions are more common, the winds typically favor the use of Runway 35R and 35L. Runway 35R has a precision instrument approach with  $\frac{1}{2}$  mile visibility minimums but Runway 35L does not have an existing IAP. If Runway 35R is closed for unforeseen circumstances or major maintenance activities, an IAP with 1 mile visibility minimums for Runway 35L will not allow ABI to provide a comparable level of accessibility to the airport during IFR conditions due to the  $\frac{1}{2}$  mile difference in visibility minimums between the two approaches. Consequently, ABI would be better served by establishing an IAP to Runway 35L with  $\frac{3}{4}$  mile visibility minimums as opposed to 1 mile visibility minimums to ensure it can adequately accommodate existing and forecasted traffic if Runway 35R is ever closed.

Alternative #1 received a "yellow" rating for its impact on infrastructure relocation impacts. This is due to the 1,302 ft. extension of Runway 17L/35R to the south. This extension will require the relocation of County Road 109 which runs along the edge of the existing airport property line at the approach end of Runway 35R and the relocation of the existing power lines that are in the same area.

Alternative #1 received a "yellow" rating related to environmental impacts. This is due to the 1,302 ft. extension of Runway 17L/35R to the south. As part of the alternatives evaluation process, an environmental specialist reviewed the proposed extension of Runway 17L/35R for potential environmental impacts. A number of likely impacts were identified:

- Floodplain/Wetland: As previously discussed, County Road 109 and the existing powerlines will need to be relocated further to the south if the runway is extended. Additionally, the MALSR system associated with Runway 35R will also be relocated 1,302 ft. further south. These changes will likely encroach upon the 100 year floodplain and wetland area that follow a small creek bed immediately south of County Road 109.

- Farmland: A portion of the area required for the runway and parallel taxiway extension is considered “prime farmland” and could potential require mitigation if the runway and taxiway are built.
- Threatened and Endangered Species: The potential exists for the area impacted by the extension to potentially be inhabited by a protected species that may require mitigation.

In total, Alternative #1 was rated “green” in four areas and “yellow” in three areas. No areas were rated “red” for Alternative #1.

### ***Evaluation Commentary for Alternative #2***

Alternative #2 includes several runway/approach changes. Runway 17L/35R is extended 1,302 ft. to a total length of 8,500 ft. but Runway 17R/35L remains at its existing length. Additionally, a precision instrument approach is added to Runway 17R and an IAP with  $\frac{3}{4}$  mile visibility minimums is added to Runway 35L. Since this alternative has very few major infrastructure changes, it received a “green” rating in the area of residential and/or business impacts. Additionally, since this alternative meets all existing FAA design standards, the alternative also received a “green” in the conformance with FAA design standards area. Alternative #2 was also given a “green” rating for its ability to satisfy the established facility requirements because it provides an IAP with  $\frac{3}{4}$  mile visibility minimums to Runway 35L.

Alternative #2 received a “yellow” rating for its impact on infrastructure relocation impacts. This is primarily due to the 1,302 ft. extension of Runway 17L/35R to the south and the establishment of a precision instrument approach for Runway 17R. This runway extension will require the relocation of County Road 109 which runs along the edge of the existing airport property line at the approach end of Runway 35R and the relocation of the existing power lines that are in the same area. A MALSR would need to be installed for Runway 17R. The MALSR would extend over TX-36 and could impact the layout and future development of the roadway. Additionally, based on the aeronautical survey conducted as part of this Airport Master Plan study there are two poles along TX-36 and one along Loop 322 that would penetrated the FAR Part 77 surfaces for Runway 17R if a PIR is established. However, none of the penetrations are in excess of 4 feet and consequently, it is expected that the light poles would not need to be removed for the approach to be established. Several trees close to the approach end of Runway 35L were noted as penetrations of the proposed FAR Part 77 surfaces for Runway 35L. None of these penetrations are more than 6 ft. However, due to their close proximity to the Runway 35L threshold it is expected that some of these trees will need to be removed or trimmed.

Alternative #2 received a “yellow” rating for its cost for development. This alternative has a higher cost compared to Alternative #1 because of the addition of the precision instrument approach for Runway 17R which will require the addition of a MALSR system for that runway.

Alternative #2 received a “yellow” rating related to environmental impacts. This is due to the 1,302 ft. extension of Runway 17L/35R to the south. As part of the alternatives evaluation

process, an environmental specialist reviewed the proposed extension of Runway 17L/35R for potential environmental impacts. A number of likely impacts were identified:

- Floodplain/Wetland: As previously discussed, County Road 109 and the existing powerlines will need to be relocated further to the south if the runway is extended. Additionally, the MALSR system associated with Runway 35R will also be relocated 1,302 ft. further south. These changes will likely encroach upon the 100 year floodplain and wetland area that follow a small creek bed immediately south of County Road 109.
- Farmland: A portion of the area required for the runway and parallel taxiway extension is considered “prime farmland” and could potential require mitigation if the runway and taxiway are built.
- Threatened and Endangered Species: The potential exists for the area impacted by the extension to potentially be inhabited by a protected species that may require mitigation.

In total, Alternative #2 was rated “green” in three areas and “yellow” in four areas. No areas were rated “red” for Alternative #2. However, the feasibility of this alternative is predicated on the FAA allowing the establishment of a precision instrument approach for Runway 17R without requiring a displacement to the Runway 17R threshold or the relocation of TX-36 or Loop 322. The establishment of a precision instrument approach for Runway 17R would greatly expand the RPZ for Runway 17R to where it would extend over the intersection of TX-36 and Loop 322.

### **Evaluation Commentary for Alternative #3**

Alternative #3 includes several runway/approach changes. Runway 17L/35R is extended 1,302 ft. to a total length of 8,500 ft. but Runway 17R/35L remains at its existing length. Additionally, a precision instrument approach is added to Runway 17L and an IAP with  $\frac{3}{4}$  mile visibility minimums is added to Runway 35L. Since this alternative has very few major infrastructure changes that expand the footprint of the airport, it received a “green” rating in the area of residential and/or business impacts. Additionally, since this alternative meets all existing FAA design standards, the alternative also received a “green” in the conformance with FAA design standards area.

Alternative #3 received a “yellow” rating for its impact on infrastructure relocation impacts. This is due to the 1,302 ft. extension of Runway 17L/35R to the south. This extension will require the relocation of County Road 109 which runs along the edge of the existing airport property line at the approach end of Runway 35R and the relocation of the existing power lines that are in the same area.

Alternative #3 received a “yellow” rating for its cost for development. This alternative has a higher cost compared to Alternative #2 because of the addition of the in-pavement MALSR for Runway 17R and marking, lighting, signage, and charting changes that would be required related to the displacement of the runway thresholds.

Alternative #3 received a “yellow” rating related to environmental impacts. This is due to the 1,302 ft. extension of Runway 17L/35R to the south. As part of the alternatives evaluation process, an environmental specialist reviewed the proposed extension of Runway 17L/35R for potential environmental impacts. A number of likely impacts were identified:

- Floodplain/Wetland: As previously discussed, County Road 109 and the existing powerlines will need to be relocated further to the south if the runway is extended. Additionally, the MALSR system associated with Runway 35R will also be relocated 1,302 ft. further south. These changes will likely encroach upon the 100 year floodplain and wetland area that follow a small creek bed immediately south of County Road 109.
- Farmland: A portion of the area required for the runway and parallel taxiway extension for Runway 17L/35R is considered “prime farmland” and could potential require mitigation if the runway and taxiway are built.
- Threatened and Endangered Species: The potential exists for the area impacted by the extension to potentially be inhabited by a protected species that may require mitigation.

Alternative #3 received a “red” rating for its ability to satisfy the established facility requirements because the displacement of the threshold for Runway 17R would shorten the runways Landing Distance Available (LDA) to less than 5,000 feet which could potential present a safety and usability issue for some of the larger jet aircraft that currently use the airport.

Alternative #3 also received a “red” in the engineering factors/considerations and ease of implementation category due to the in-pavement MALSR system that would be needed for the precision instrument approach for Runway 17R. While technically possible, installing an entire MALSR system in an in-pavement configuration would make the system very difficult to maintain and would require trenching through the existing runway pavement for installation.

In total, Alternative #3 was rated “green” in two areas, “yellow” in three areas, and “red” in 2 areas.

#### **Evaluation Commentary for Alternative #4**

Alternative #4 includes several runway/approach changes. Runway 17L/35R is extended 1,302 ft. to a total length of 8,500 ft. and Runway 17R/35L is extended 2,514 ft. to compensate for the displacement of the Runway 17R landing threshold. Additionally, a precision instrument approach is added to Runway 17R and an IAP with  $\frac{3}{4}$  mile visibility minimums is added to Runway 35L. Since this alternative expands the footprint of the airport significantly it received a “yellow” rating for its residential and/or business impacts. This alternative was not given a “red” rating in this area because none of the areas required for this expansion are heavily populated or have large-scale commercial developments however, implementation of this alternative would limit future commercial development in the vicinity.

Alternative #4 received a “red” rating for its impact on infrastructure relocation. This is due to the 1,302 ft. extension of Runway 17L/35R to the south and the extension of Runway 17R/35L to

the south. The extension of Runway 17L/35R will require the relocation of County Road 109 which runs along the edge of the existing airport property line at the approach end of Runway 35R and the relocation of the existing power lines that are in the same area. The extension of Runway 17L/35R will require the relocation of Industrial Blvd. and the existing power lines that run along Industrial Blvd.

Alternative #4 received a “red” rating for its cost for development. This alternative has a higher cost than any other alternative as it includes two runway extensions.

Alternative #4 received a “red” rating related to environmental impacts. This is due to the 1,302 ft. extension of Runway 17L/35R and the 2,514 extension of Runway 17R/35L. As part of the alternatives evaluation process, an environmental specialist reviewed the proposed extension of both runways for potential environmental impacts. A number of likely impacts were identified:

- Floodplain/Wetland: As previously discussed, County Road 109 and the existing powerlines will need to be relocated further to the south if Runway 17L/35R is extended. Additionally, the MALSR system associated with Runway 35R will also be relocated 1,302 ft. further south. These changes will likely encroach upon the 100 year floodplain and wetland area that follow a small creek bed immediately south of County Road 109. The extension of Runway 17R/35L will have similar impacts as there is an established wetland area and floodplain that would be impacted by the extension.
- Farmland: A portion of the area required for the runway and parallel taxiway extension for Runway 17L/35R and Runway 17R/35L are considered “prime farmland” and could potential require mitigation if the runway and taxiway are built.
- Threatened and Endangered Species: The potential exists for the area impacted by the extension to potentially be inhabited by a protected species that may require mitigation.

Since this alternative meets all existing FAA design standards, the alternative received a “green” in the conformance with FAA design standards area. Alternative #4 also received a “green” rating for its ability to meet the established facility requirements.

Alternative #4 received a “red” in the engineering factors/considerations and ease of implementation category due to the in-pavement MALSR system that would be needed for the PIR for Runway 17R. While technically possible, installing an entire MALSR system in an in-pavement configuration would make the system very difficult to maintain and would require trenching through the existing runway pavement for installation.

In total, Alternative #4 was rated “green” in two areas, “yellow” in one area, and “red” in four areas.

### **Evaluation Commentary for Alternative #5**

Alternative #5 includes a limited number of runway/approach changes. Runway 17L/35R is extended 1,302 ft. to a total length of 8,500 ft. but Runway 17R/35L remains at its existing length. Additionally, all the Instrument Approach Procedures (IAP) remain the same with the exception of Runway 35L. Runway 35L doesn't have an existing IAP. In this alternative, an IAP with 1 mile visibility minimums would be established for Runway 35L. Due to the limited number of changes, this alternative received a "green" rating in the areas of engineering factors/considerations and ease of implementation and residential and/or business impacts. Additionally, the alternative meets all existing FAA design standards so the alternative also received a "green" in the conformance with FAA design standards area.

Alternative #5 received a "yellow" rating for its ability to satisfy the established facility requirements because it only includes an IAP with 1 mile visibility minimums to Runway 35L instead of an approach with  $\frac{3}{4}$  mile visibility minimums and because of the displacements to the landing thresholds for Runway 17R and 17L. During periods of the year where IFR conditions are more common, the winds typically favor the use of Runway 35R and 35L. Runway 35R has a Precision Instrument Approach with  $\frac{1}{2}$  mile visibility minimums but Runway 35L does not have an existing IAP. If Runway 35R is closed for unforeseen circumstances or major maintenance activities, an IAP with 1 mile visibility minimums for Runway 35L will not allow ABI to provide a comparable level of accessibility to the airport during IFR conditions due to the  $\frac{1}{2}$  mile difference in visibility minimums between the two approaches. Consequently, ABI would be better served by establishing an IAP to Runway 35L with  $\frac{3}{4}$  mile visibility minimums as opposed to 1 mile visibility minimums to ensure it can adequately accommodate existing and forecasted traffic if Runway 35R is ever closed. The landing threshold displacements needed to bring the RPZs fully onto airport property are not desirable either as it shortens the landing distance available to aircraft using Runway 17R and 17L.

Alternative #5 received a "yellow" rating for its impact on infrastructure relocation impacts. This is due to the 1,302 ft. extension of Runway 17L/35R to the south. This extension will require the relocation of County Road 109 which runs along the edge of the existing airport property line at the approach end of Runway 35R and the relocation of the existing power lines that are in the same area.

Alternative #5 received a "yellow" rating related to environmental impacts. This is due to the 1,302 ft. extension of Runway 17L/35R to the south. As part of the alternatives evaluation process, an environmental specialist reviewed the proposed extension of Runway 17L/35R for potential environmental impacts. A number of likely impacts were identified:

- Floodplain/Wetland: As previously discussed, County Road 109 and the existing powerlines will need to be relocated further to the south if the runway is extended. Additionally, the MALSR system associated with Runway 35R will also be relocated 1,302 ft. further south. These changes will likely encroach upon the 100 year

floodplain and wetland area that follow a small creek bed immediately south of County Road 109.

- Farmland: A portion of the area required for the runway and parallel taxiway extension is considered “prime farmland” and could potential require mitigation if the runway and taxiway are built.
- Threatened and Endangered Species: The potential exists for the area impacted by the extension to potentially be inhabited by a protected species that may require mitigation.

Alternative #5 received a “yellow” rating for its cost for development. This alternative has a higher cost compared to Alternative #1 because of the lighting, signage, and marking changes that would be required to displace the Runway 17R and Runway 17L landing thresholds.

In total, Alternative #5 was rated “green” in three areas and “yellow” in four areas. No areas were rated “red” for Alternative #5.

### **Evaluation Commentary for Alternative #6**

Alternative #6 includes a limited number of runway/approach changes. Runway 17L/35R is extended 1,302 ft. to a total length of 8,500 ft. but Runway 17R/35L remains at its existing length. Additionally, all the Instrument Approach Procedures (IAP) remain the same with the exception of the approaches for Runway 17R and Runway 35L. Runway 35L doesn’t have an existing IAP and Runway 17R has an IAP with 1 mile visibility minimums. In this alternative, an IAP with ¾ mile visibility minimums would be established for both Runway 17R and Runway 35L. Due to the limited number of changes, this alternative received a “green” rating in the areas of engineering factors/considerations and ease of implementation and residential and/or business impacts. Additionally, the alternative meets all existing FAA design standards so the alternative also received a “green” in the conformance with FAA design standards area.

Alternative #6 received a “yellow” rating for its ability to satisfy the established facility requirements because of the displacements to the landing thresholds for Runway 17R and 17L. The landing threshold for Runway 17L would be displaced 1,213 ft. and the landing threshold for Runway 17R would be displaced 1,574 ft. These displacements would shorten the Landing Distance Available (LDA) for both runways to less than 6,000 ft. (5,985 ft. for Runway 17L and 5,626 ft. for Runway 17R) which is not desirable.

Alternative #6 received a “yellow” rating for its impact on infrastructure relocation impacts. This is due to the 1,302 ft. extension of Runway 17L/35R to the south. This extension will require the relocation of County Road 109 which runs along the edge of the existing airport property line at the approach end of Runway 35R and the relocation of the existing power lines that are in the same area.

Alternative #6 received a “yellow” rating related to environmental impacts. This is due to the 1,302 ft. extension of Runway 17L/35R to the south. As part of the alternatives evaluation

process, an environmental specialist reviewed the proposed extension of Runway 17L/35R for potential environmental impacts. A number of likely impacts were identified:

- Floodplain/Wetland: As previously discussed, County Road 109 and the existing powerlines will need to be relocated further to the south if the runway is extended. Additionally, the MALSR system associated with Runway 35R will also be relocated 1,302 ft. further south. These changes will likely encroach upon the 100 year floodplain and wetland area that follow a small creek bed immediately south of County Road 109.
- Farmland: A portion of the area required for the runway and parallel taxiway extension is considered “prime farmland” and could potential require mitigation if the runway and taxiway are built.
- Threatened and Endangered Species: The potential exists for the area impacted by the extension to potentially be inhabited by a protected species that may require mitigation.

Alternative #6 received a “yellow” rating for its cost for development. This alternative has a higher cost compared to Alternative #6 because of the additional obstruction clearing/marketing/lighting that may be required for the newly established  $\frac{3}{4}$  mile IAPs for Runway 17R and Runway 35L.

In total, Alternative #6 was rated “green” in three areas and “yellow” in four areas. No areas were rated “red” for Alternative #6.

### ***Evaluation Commentary for Alternative #7***

Alternative #7 includes a limited number of runway/approach changes. Runway 17L/35R is extended 1,302 ft. to a total length of 8,500 ft. but Runway 17R/35L remains at its existing length. Additionally, all the Instrument Approach Procedures (IAP) remain the same with the exception of the approach for Runway 35L. Runway 35L doesn't have an existing IAP. In this alternative, an IAP with  $\frac{3}{4}$  mile visibility minimums would be established for Runway 35L. Due to the limited number of changes, this alternative received a “green” rating in the areas of engineering factors/considerations and ease of implementation, residential and/or business impacts, and its development cost. Additionally, the alternative meets all existing FAA design standards so the alternative also received a “green” in the conformance with FAA design standards area.

Alternative #7 received a “green” rating for its ability to satisfy the established facility requirements because the alternative maintains the existing runway lengths during the short-term and provides a  $\frac{3}{4}$  mile visibility approach to Runway 35L which will improve accessibility to ABI during times when Runway 35R is not available for use.

Alternative #7 received a “yellow” rating for its impact on infrastructure relocation impacts. This is due to the 1,302 ft. extension of Runway 17L/35R to the south. This extension will require the relocation of County Road 109 which runs along the edge of the existing airport property line at

the approach end of Runway 35R and the relocation of the existing power lines that are in the same area.

Alternative #7 received a “yellow” rating related to environmental impacts. This is due to the 1,302 ft. extension of Runway 17L/35R to the south. As part of the alternatives evaluation process, an environmental specialist reviewed the proposed extension of Runway 17L/35R for potential environmental impacts. A number of likely impacts were identified:

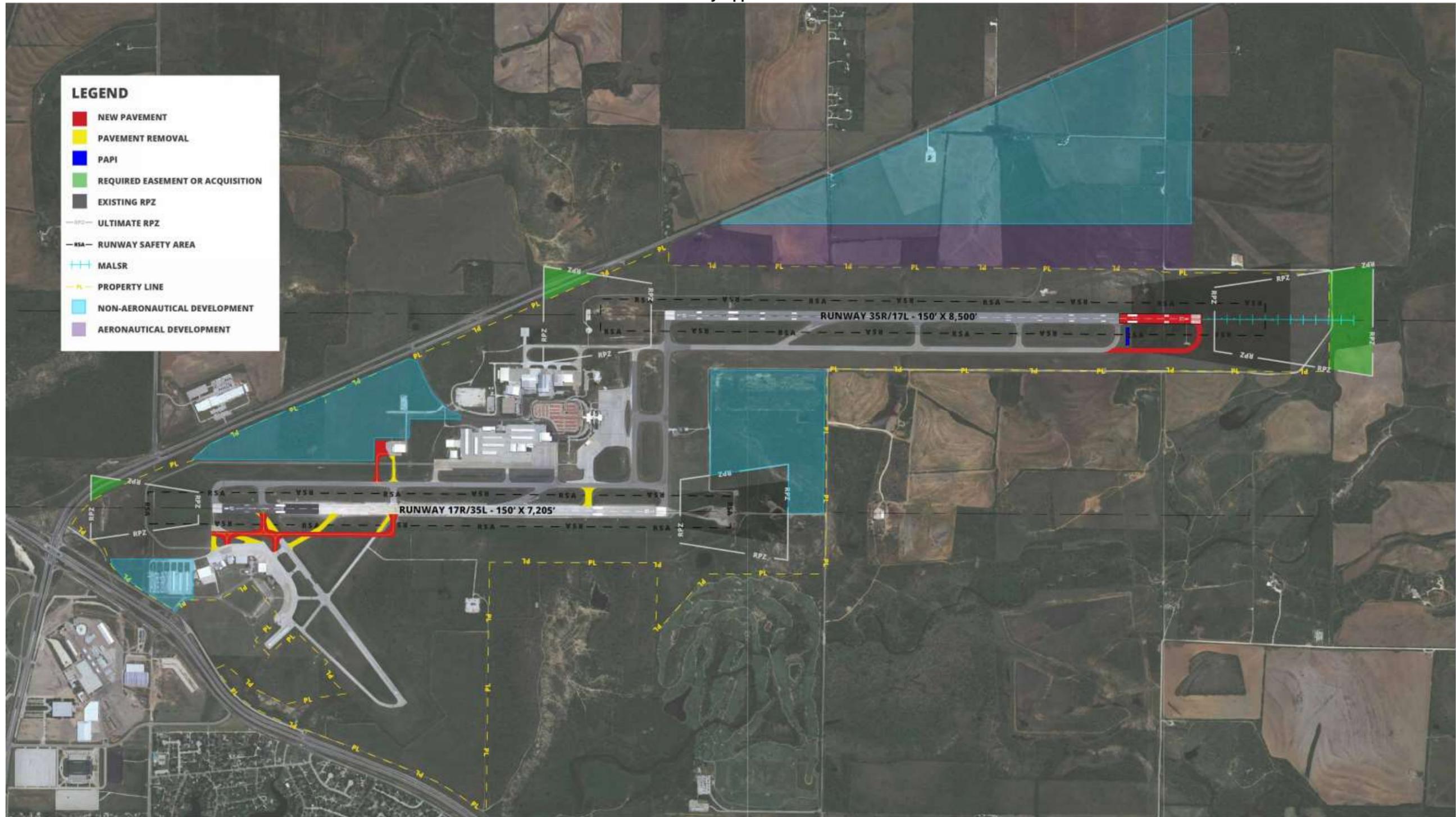
- Floodplain/Wetland: As previously discussed, County Road 109 and the existing powerlines will need to be relocated further to the south if the runway is extended. Additionally, the MALSR system associated with Runway 35R will also be relocated 1,302 ft. further south. These changes will likely encroach upon the 100 year floodplain and wetland area that follow a small creek bed immediately south of County Road 109.
- Farmland: A portion of the area required for the runway and parallel taxiway extension is considered “prime farmland” and could potential require mitigation if the runway and taxiway are built.
- Threatened and Endangered Species: The potential exists for the area impacted by the extension to potentially be inhabited by a protected species that may require mitigation.

In total, Alternative #7 was rated “green” in five areas and “yellow” in two areas. No areas were rated “red” for Alternative #7.

### ***Preferred Runway/Approach Alternative***

Based on the runway/approach alternatives evaluation analysis described above and discussion with the Master Plan Steering Committee (MPSC) and ABI stakeholders, Alternative #7 was selected as the preferred development alternative. Alternative #7 provides a realistic future development plan that will meet the facility requirements established in the previous chapter. The preferred runway/approach alternative is shown as **Exhibit 5-8**.

Figure 5-8  
Preferred Runway/Approach Alternative



Source: Garver, 2018

## Taxiway Alternatives

Once an airport's preferred runway/approach alternative has been selected, the taxiway system can be analyzed to determine the modifications that should be made to best accommodate the projected aeronautical demand for the airport. ABI's existing taxiway system has been well planned out and sufficiently meets the needs of current users. As aeronautical traffic is not expected to increase significantly at ABI during the forecast period, it is not expected that additional taxiways will need to be added to improve airfield capacity or efficiency. Consequently, the taxiway development objectives that need to be addressed in this taxiway alternative analysis for ABI are:

- Taxiway Development Objective #1: Improve taxiway fillets designed to the outdated ADG based taxiway design standards to the current TDG based design standards as taxiways are rehabilitated. This issue primarily exists along Taxiway Delta and the taxiways associated with the Northwest GA Ramp.
- Taxiway Development Objective #2: Resolve the direct ramp to runway access issues that currently exist on Taxiways A1, A2, A3, C1, C3, and R.

Since Taxiway Development Objective #1 is a fillet design issue related to changes in design standards, an alternative analysis does not need to be completed to determine the best way to meet this objective. Instead, as taxiways are reconstructed at ABI as part of the airport's regular pavement maintenance program, an analysis should be completed to determine the fillet improvements that need to be made to bring the pavement in alignment with current FAA fillet design standards.

Consequently, the focus of this taxiway alternative analysis is Taxiway Development Objective #2 which relates to resolving the existing direct ramp to runway access issues occurring on the airfield. This issue exists on Taxiways A1, A2, and A3 as all of these taxiways allow direct access from the northwest GA ramp to Runway 4/22. However, since Runway 4/22 is expected to be permanently decommissioned at some point during the forecast period is anticipated that the direct ramp to runway access issue with associated with Taxiways A1, A2, and A3 will all be resolved by the decommissioning of Runway 4/22.

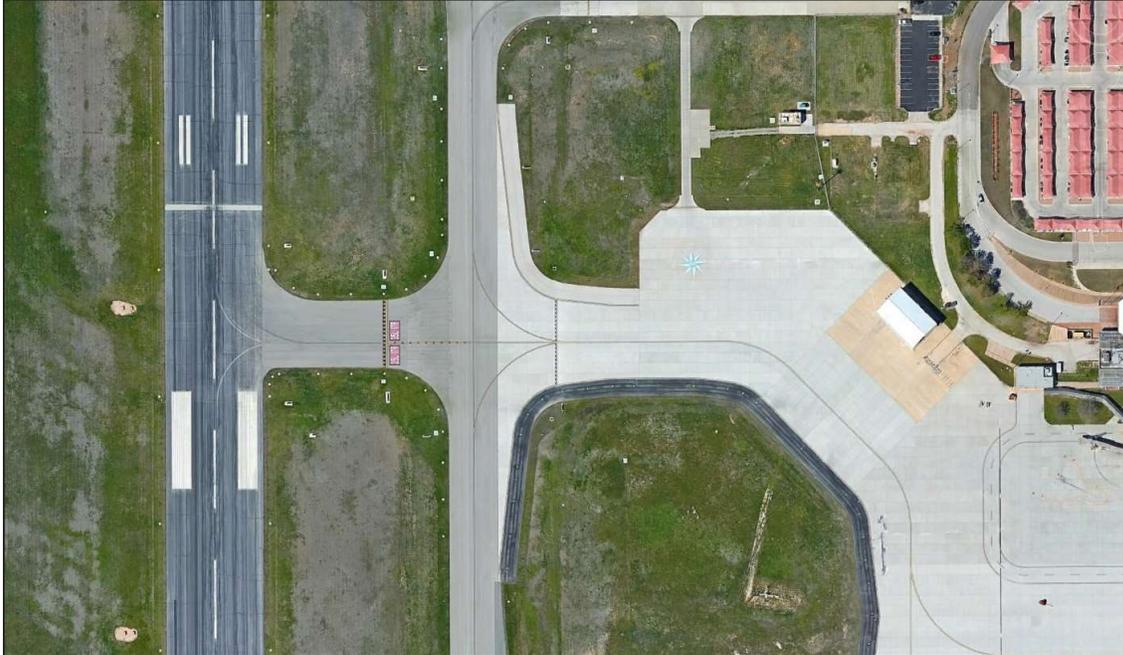
The direct ramp to runway access issue also exists on Taxiway C1, C3, and R at their intersections with Runway 17R/35L and resolving this issue will be the primary focus of the taxiway alternative analysis.

### *Taxiway C1 and Runway 17R/35L*

**Figure 5-9** depicts the direct ramp to runway access issue occurring at Taxiway C1 and Runway 17R/35L. Taxiway C1 allows direct ramp access from the air carrier ramp to Runway 17R/35L

without requiring aircraft to make a turn. This taxiway is primarily used by aircraft exiting Runway 17R after landing to access the air carrier ramp.

**Figure 5-9**  
**Taxiway C1 Intersection with Runway 17R/35L**



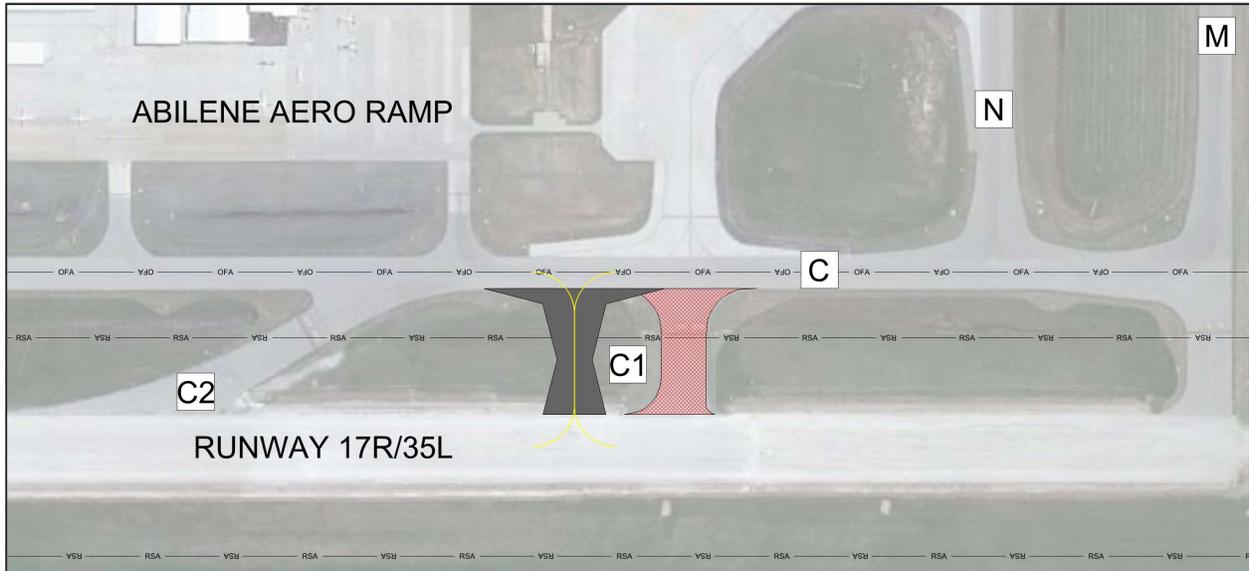
**Source:** Garver, 2018.

To resolve this issue, five potential alternatives were created and analyzed. Each of the five potential alternatives are described below.

### **Alternatives**

Alternative #1 includes the removal of the existing Taxiway C1 and the relocation of that taxiway north of its existing location as shown in **Figure 5-10**. The relocation of Taxiway C1 between Taxiway C and Runway 17R/35L will resolve the direct ramp to runway access issue.

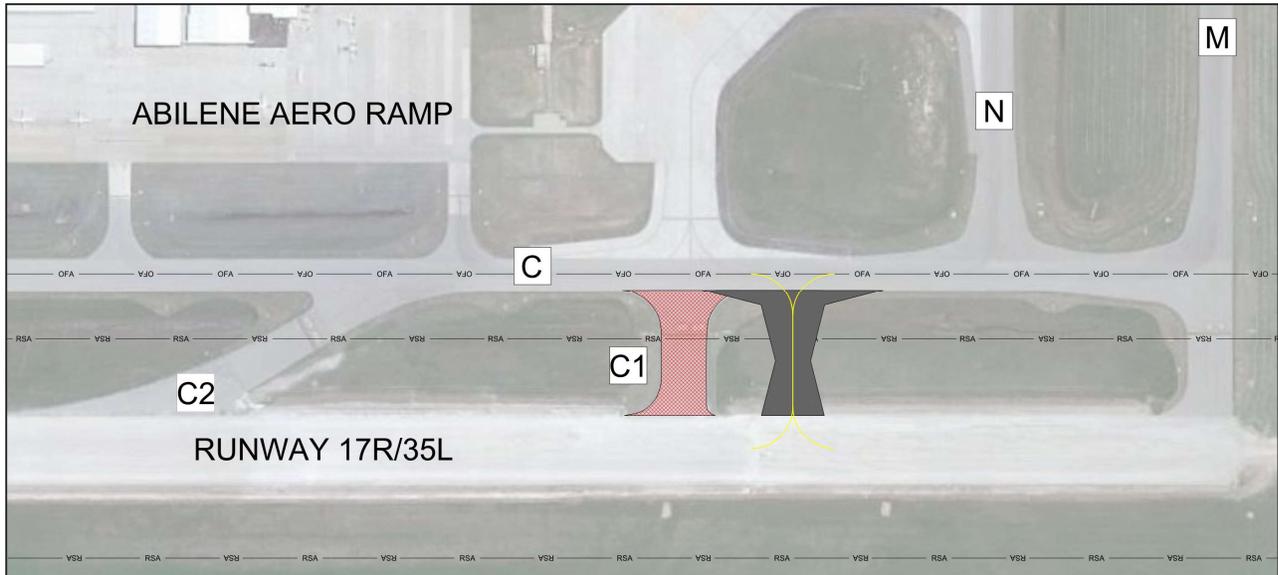
Figure 5-10  
TWY C1 Alternative #1



Source: Garver, 2018.

Alternative #2 includes the removal of the existing Taxiway C1 and the relocation of that taxiway south of its existing location as shown in **Figure 5-11**. The relocation of Taxiway C1 between Taxiway C and Runway 17R/35L will resolve the direct ramp to runway access issue.

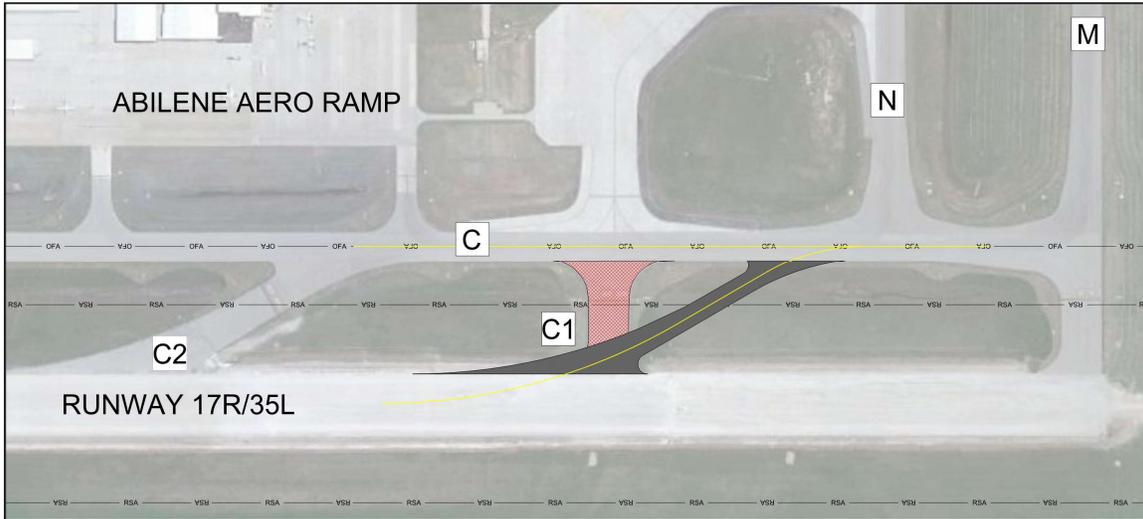
Figure 5-11  
TWY C1 Alternative #2



Source: Garver, 2018.

Alternative #3 includes the removal of the existing Taxiway C1 and the construction of a new high-speed exit taxiway as shown in **Figure 5-12**. The relocation of Taxiway C1 between Taxiway C and Runway 17R/35L will resolve the direct ramp to runway access issue.

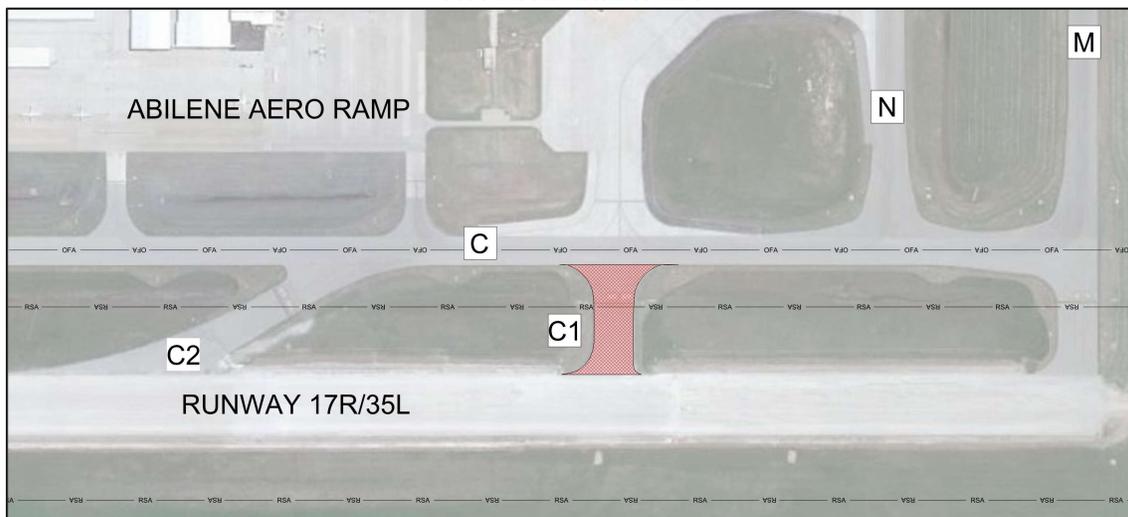
**Figure 5-12**  
**TWY C1 Alternative #3**



Source: Garver, 2018.

Alternative #4 includes the removal of the existing Taxiway C1 as shown in **Figure 5-13**. No replacement taxiway would be constructed in this alternative. The removal of Taxiway C1 between Taxiway C and Runway 17R/35L will resolve the direct ramp to runway access issue.

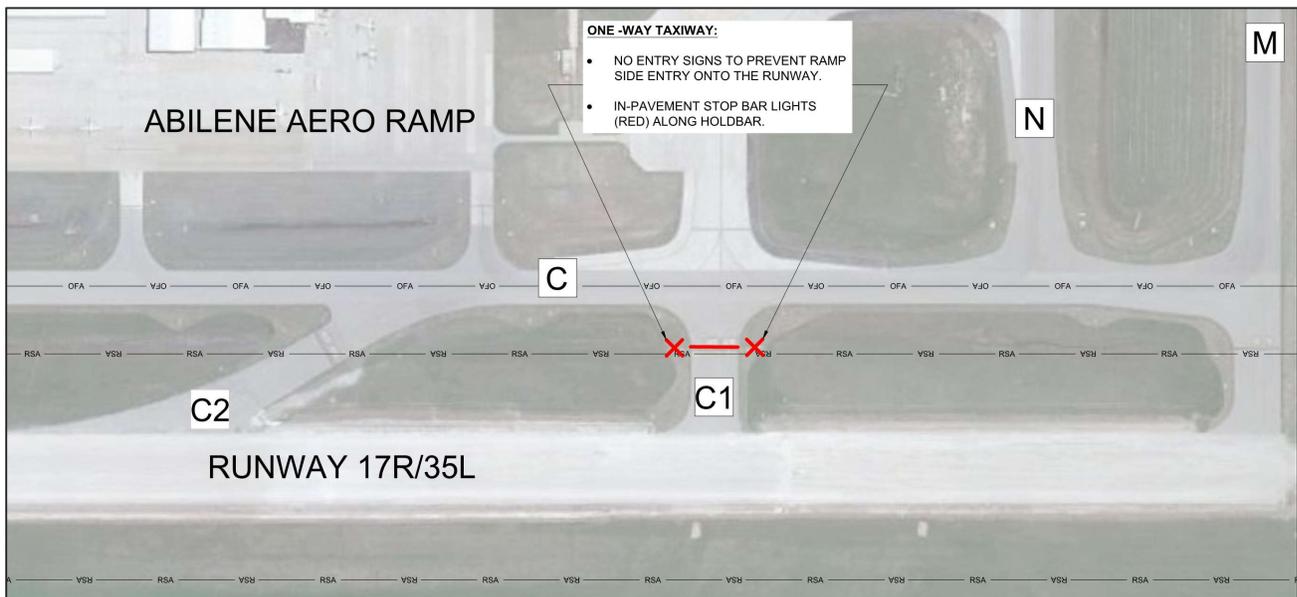
**Figure 5-13**  
**TWY C1 Alternative #4**



Source: Garver, 2018.

Alternative #5, shown in **Figure 5-14**, keeps Taxiway C1 at its existing location but makes it a “one-way” taxiway so that it can only be used by aircraft exiting Runway 17R/35L. For this alternative “no-entry” signs and a stop bar light system would be installed along the runway hold position marking to indicate to pilots approaching from the ramp that the taxiway is not available for their use. This alternative would require an FAA Approved Modification to Standards (MOS) as this taxiway configuration is non-standard.

**Figure 5-14**  
**TWY C1 Alternative #5**



Source: Garver, 2018.

### Alternative Evaluation Criteria

To evaluate the alternatives, many of the same criteria used to evaluate the runway/approach alternatives were used including:

- ➔ Ability to Meet the Established Airside Development Objectives
- ➔ Conformance with FAA Design Standards
- ➔ Environmental Impacts
- ➔ Engineering Factors/Considerations and Ease of Implementation
- ➔ Development Cost

A general description each of these evaluation criteria is contained in the runway/approach alternatives section. In addition to these evaluation criteria, impact on airfield efficiency/capacity was added as an evaluation area for the taxiway alternatives analysis. Ideally, alternatives should enhance or maintain airfield efficiency/capacity and not reduce it.

Similar to the runway/approach alternative evaluation, a “stop light” style rating system was used for the evaluation. Green indicates that the alternative has a low impact and/or meets the established requirement for that particular evaluation area. Yellow indicates that the alternative has a moderate impact and/or fails to meet some of the necessary requirements for the particular evaluation area. Red indicates that the alternative has a high impact and/or fails to meet most of the established requirements for that particular evaluation area.

### Taxiway C1 Alternative Evaluation Results

Based on evaluation criteria discussed above, the following evaluation matrix (Table 5-2) was developed showing the proposed rating of each alternative.

**Table 5-2**  
**Taxiway C1 Alternative Evaluation Matrix**

Evaluation Criteria	Taxiway C/C1				
	1	2	3	4	5
Ability to Satisfy the Established Facility Requirements	Green	Green	Green	Green	Green
Conformance with FAA Design Standards	Green	Green	Green	Green	Red
Environmental Impacts	Green	Green	Green	Green	Green
Engineering Factors/Considerations and Ease of Implementation	Yellow	Yellow	Yellow	Green	Yellow
Impact on Airfield Efficiency/Capacity	Green	Green	Green	Yellow	Green
Development Cost	\$1.05M	\$1.05M	\$1.33M	\$0.59M	\$50,000



- Low Impact **or** Meets Requirements



- Moderate Impact **or** Fails to Meet Some Requirements



- High Impact **or** Fails to Meet Most Requirements

The ratings that each alternative received in each evaluation area are discussed in the evaluation commentary sections below.

**Evaluation Commentary for Alternative #1, #2, and #3**

Alternatives 1, 2, and 3 all provide similar solutions to resolve the direct ramp to runway access issue that currently exists. Each of these alternatives were rated “green” for their ability to satisfy the establish facility requirements, conformance with FAA design standards, and environmental impacts. Each of these alternatives also received a “green” rating for their impact on airfield efficiency/capacity because they will provide a similar or slightly elevated (Alternative #3) level of capacity. Each of these alternatives received a “yellow” rating in the evaluation areas of development cost and engineering factors/considerations and ease of implementation. The alternatives all received a lower rating in the latter category due to the closures of Runway 17R/35L that would be required to remove the existing taxiway and reconstruct the new taxiway.

Each of these alternatives were rated “green” in four areas and “yellow” in two areas. No areas were rated “red” for these alternatives.

**Evaluation Commentary for Alternative #4**

Alternative #4 includes the removal of Taxiway C1 and does not include the reconstruction of a replacement taxiway. This alternative was rated “green” for its ability to satisfy the establish facility requirements, conformance with FAA design standards, and environmental impacts. The alternative also received a “green” rating related to engineering factors/considerations and ease of implementation as this alternative would require fewer closures of Runway 17R/35L to complete compared to Alternatives 1, 2, and 3. This alternative also received a “green” rating for its overall development cost as it is \$0.5 million less expensive than Alternatives 1, 2, and 3.

It should also be noted that as an alternative to removing the existing pavement, this taxiway could be closed, the edge lighting removed, no-entry signs installed in-place of the runway hold position signs, and surface painted X's installed on each end of the taxiway. This would close the taxiway to aircraft traffic but still allow vehicles to use it as necessary. This option would further reduce the cost of this alternative.

This alternative received a “yellow” rating for its impact on airfield efficiency/capacity because the closure of Taxiway C1 is expected to increase Runway Occupancy Time (ROT) for large aircraft landing on Runway 17R. However, since aeronautical activity is not expected to grow significantly during the forecast period and airfield capacity is not expected to be an issue, the removal or closure of Taxiway C1 should not significantly affect ABI's airfield capacity.

In total, Alternative #4 received a “green” rating in five areas and “yellow” rating in one area. No areas were rated “red” for this alternatives.

### ***Evaluation Commentary for Alternative #5***

Alternative #5 includes the installation of a light stop bar along the runway hold position marking for Runway 17R/35L and the installation of no-entry signs on each side of the taxiway in place of the existing runway hold position signs. This alternative would essentially make Taxiway C1 a “one-way” taxiway where aircraft would only be allowed to exit Runway 17R/35L using the taxiway but would be prohibited from entering Runway 17R/35L using the taxiway.

This alternative was rated “green” for its ability to satisfy the establish facility requirements and environmental impacts. This alternative also received a “green” rating in the areas of development cost and impact on airfield efficiency and capacity as this is the cheapest of the five alternatives and would maintain the airfield capacity at its existing level.

The alternative received a “yellow” rating related to engineering factors/considerations and ease of implementation as the existing taxiway pavement would need to be trenched through to install the stop bar light system and electrical control modifications might be required to ensure the stop bar light remained illuminated at all times.

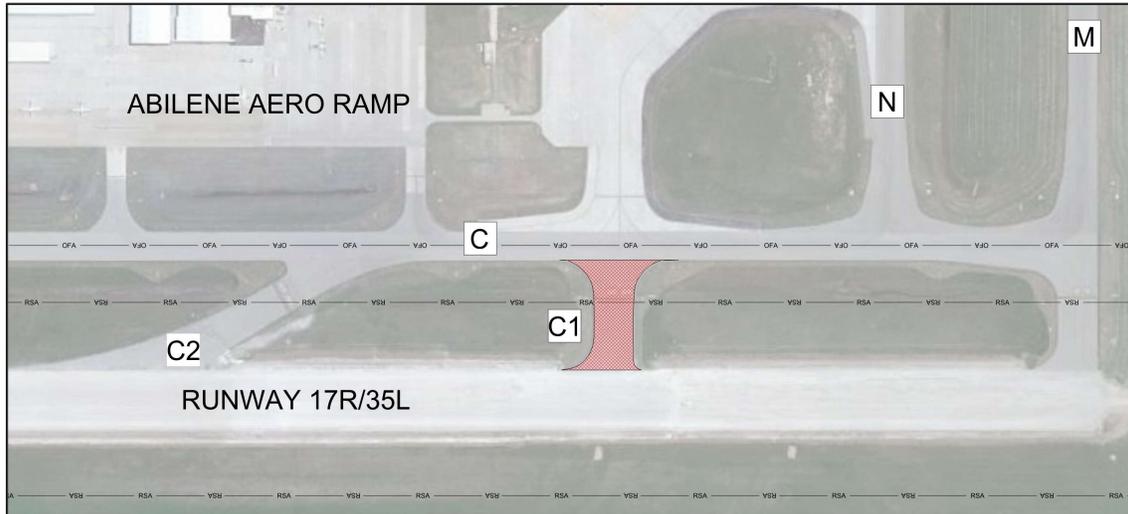
Alternative #5 received a “red” rating for its conformance with FAA design standards as this is not a standard taxiway configuration (e.g. a one-way taxiway) and use of a stop bar light system. Consequently, this alternative would require an FAA approved Modification to Standards (MOS) to be implemented. It should be noted that the FAA has granted MOS's for similar taxiway configurations when a history of runway incursions with a particular taxiway exists.

In total, Alternative #5 received a “green” rating in four areas, a “yellow” rating in one area, and a “red” rating in one area.

### ***Preferred C1 Alternative***

Based on the results of the taxiway alternative analysis and feedback from the MPAC and ABI Stakeholders, Alternative #4 was selected as the preferred development alternative. The preferred alternative is shown as **Figure 5-15**.

**Figure 5-15**  
**TWY C1 Preferred Alternative**



Source: Garver, 2018.

### ***Taxiway C3 and Runway 17R/35L***

**Figure 5-16** depicts the direct ramp to runway access issue occurring at Taxiway C3 and Runway 17R/35L. Taxiway C3 allows direct ramp access from an Abilene Aero hangar to Runway 17R/35L without requiring aircraft to make a turn. This taxiway is primarily used by smaller aircraft exiting Runway 35L after landing to access Abilene Aero. The taxiway is infrequently used by aircraft crossing Runway 17R/35L to Taxiway S or vice-versa.

**Figure 5-16**  
**Taxiway C1 Intersection with Runway 17R/35L**



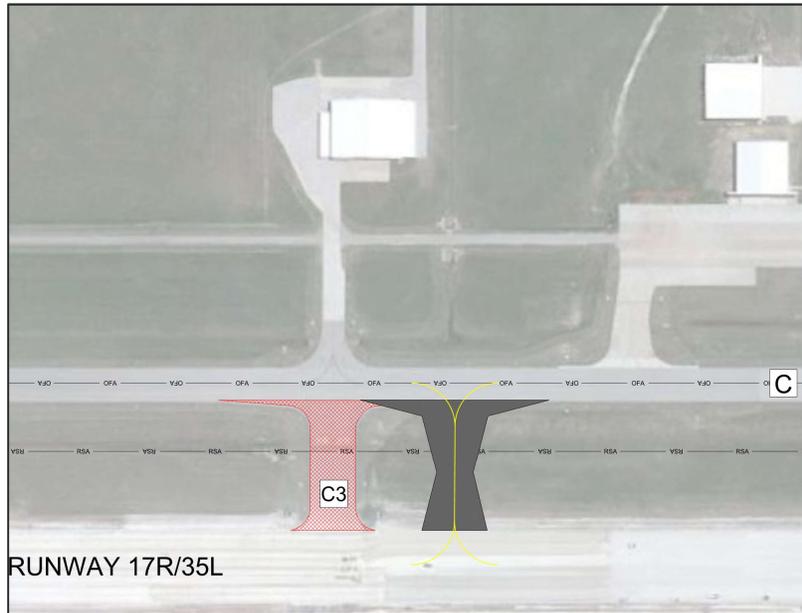
Source: Garver, 2018.

To resolve this issue, three potential alternatives were created and analyzed. Each of the three potential alternatives are described below.

**Alternatives**

Alternative #1 includes the removal of the existing Taxiway C3 and the relocation of that taxiway south of its existing location as shown in **Figure 5-17**. The relocation of Taxiway C3 between Taxiway C and Runway 17R/35L will resolve the direct ramp to runway access issue.

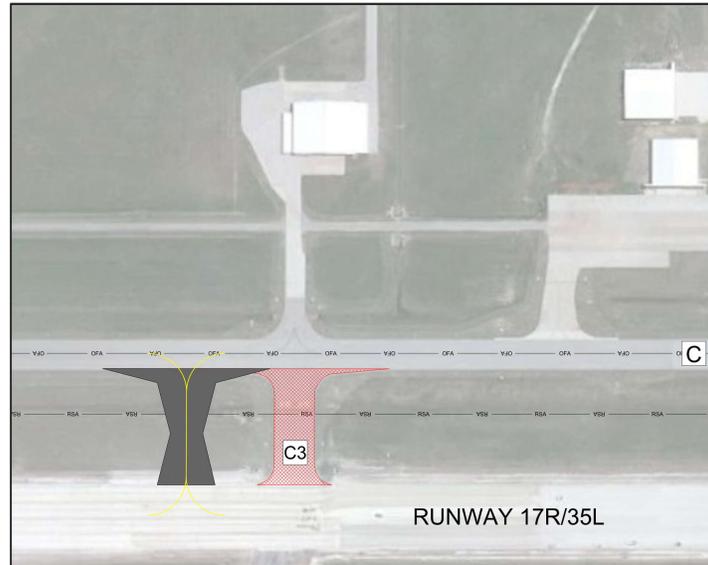
**Figure 5-17**  
**TWY C Alternative #1**



**Source:** Garver, 2018.

Alternative #2 includes the removal of the existing Taxiway C3 and the relocation of that taxiway north of its existing location as shown in **Figure 5-18**. The relocation of Taxiway C3 between Taxiway C and Runway 17R/35L will resolve the direct ramp to runway access issue.

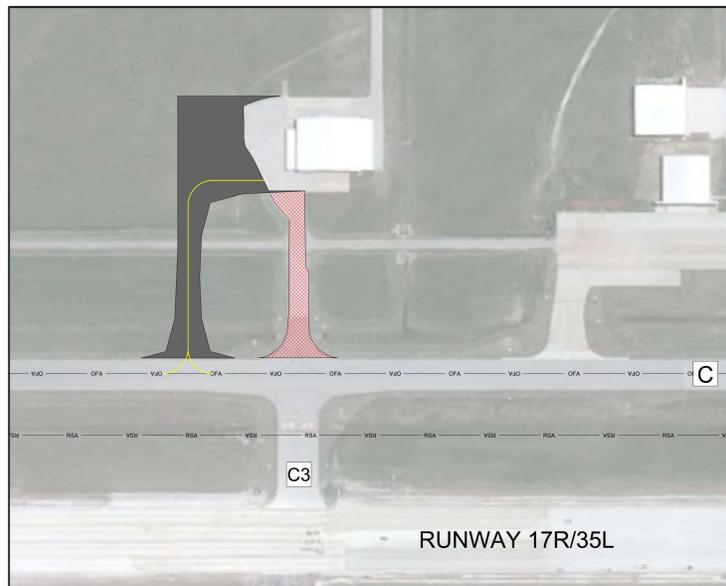
**Figure 5-18**  
**TWY C3 Alternative #2**



Source: Garver, 2018.

Alternative #3 leaves Taxiway C3 at its currently location and expands the ramp surrounding the hangar to the north to allow for the construction of a new taxilane to connect the ramp to Taxiway C. This alternative is shown in **Figure 5-19**. The relocation of the taxilane to a new location will resolve the direct ramp to runway access issue.

**Figure 5-19**  
**TWY C3 Alternative #3**



Source: Garver, 2018.

**Taxiway C3 Alternative Evaluation Results**

The same evaluation criteria that were used to analyze the Taxiway C1 alternative were used to evaluate the Taxiway C3 alternatives. Based on evaluation criteria, the following evaluation matrix (**Table 5-3**) was developed showing the proposed rating of each alternative.

**Table 5-3  
Taxiway C3 Alternatives Evaluation Matrix**

Evaluation Criteria	Taxiway C/C3		
	1	2	3
Ability to Satisfy the Established Facility Requirements	Green	Green	Green
Conformance with FAA Design Standards	Green	Green	Green
Environmental Impacts	Green	Green	Green
Engineering Factors/Considerations and Ease of Implementation	Yellow	Yellow	Green
Impact on Airfield Efficiency/Capacity	Yellow	Yellow	Green
Development Cost	\$1.05M	\$1.05M	\$1.6M

-  - Low Impact **or** Meets Requirements
-  - Moderate Impact **or** Fails to Meet Some Requirement
-  - High Impact **or** Fails to Meet Most Requirements

The ratings that each alternative received in each evaluation area are discussed in the evaluation commentary sections below.

**Evaluation Commentary for Alternative #1 and #2**

Alternatives 1 and 2 both provide similar solutions to resolve the directly ramp to runway access issue that currently exists. Each of these alternatives were rated “green” for their ability to satisfy the establish facility requirements, conformance with FAA design standards, and environmental impacts. Both of these alternatives also received a “green” rating for development costs as they the cheapest of the alternative options.

Alternatives 1 and 2 received “yellow” ratings for their impact on airfield efficiency/capacity because relocating Taxiway C1 will eliminate the Taxiway C3/S crossing point for Runway 17R/35L. These alternatives also received a “yellow” rating in the engineering factors/considerations and ease of implementation area due to the runway closures that will be required to remove the existing pavement and construct the new taxiway.

These alternatives were rated “green” in four areas and “yellow” in two areas. No areas were rated “red” for these alternatives.

#### Evaluation Commentary for Alternative #4

Alternative #4 received “green” ratings for its ability to meet the establish facility requirements, conformance with FAA design standards, and environmental impacts. The alternative also received a “green” rating for its impact on airfield efficiency/capacity as it maintains the existing Taxiway C3/S crossing point of Runway 17R/35L. Engineering factors/considerations and ease of implementation were also rated “green” as no runway closures would be required under this option.

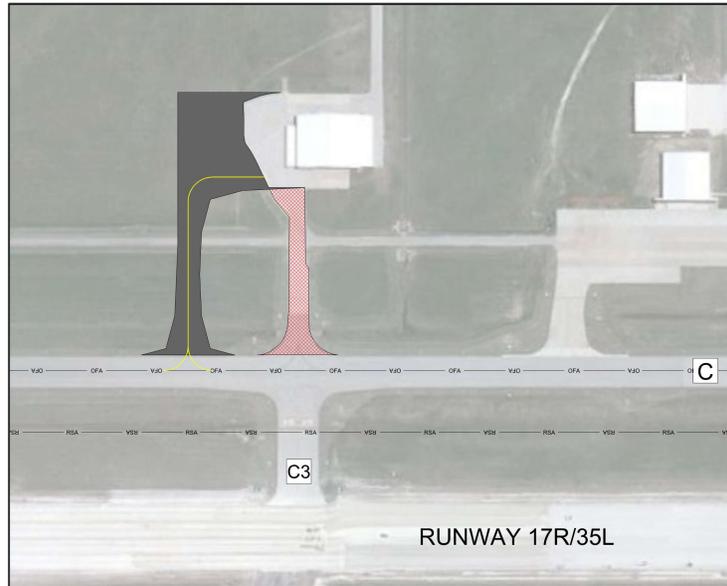
However, this alternative has the highest expected cost which resulted in a “yellow” rating in the development cost category.

In total, Alternative #3 received a “green” rating in five areas and “yellow” rating in one area. No areas were rated “red” for this alternatives.

#### **Preferred C3 Alternatives**

Based on the results of the taxiway alternative analysis and feedback from the MPSC and ABI Stakeholders, Alternative #4 was selected as the preferred development alternative. The preferred alternative is shown as **Exhibit 5-20**.

**Figure 5-20**  
**TWY C3 Preferred Alternative**



Source: Garver, 2018.

***Taxiway R and Runway 17R/35L***

**Figure 5-21** depicts the direct ramp to runway access issue occurring at Taxiway R and Runway 17R/35L. Taxiway R allows direct ramp access from the Northwest GA ramp to Runway 17R/35L without requiring aircraft to make a turn. This taxiway is used by aircraft both entering and existing Runway 17R/35L depending on the flow of operations.

Figure 5-21  
Taxiway R Intersection with Runway 17R/35L



Source: Garver, 2018.

To resolve this issue, two alternatives were developed. However, rather than comparing these alternatives, the first alternative is meant to be a near-term solution while the second alternative is a long-term solution that would occur as part of the future re-development/expansion of the Northwest GA Ramp. Both alternatives are described in the section below.

### **Alternatives**

Alternative #1A is the near-term solution that includes the installation of a surface painted “no-taxi” island on the ramp prior to where the Northwest GA Ramp and Taxiway R intersect. This alternative is shown as **Figure 5-22**. The installation of this “no-taxi” island is an excellent low cost solution that will resolve the direct ramp to runway access issue. The estimated cost for this alternative is expected to be approximately \$10,000.

**Figure 5-22**  
**TWY R Alternative #1A**



Source: Garver, 2018.

Alternative #1B includes the removal of many of the existing taxiways west of Runway 17R/35L and the redevelopment of a new parallel taxiway system that would mirror the parallel taxiway configuration used on the east side of Runway 17R/35L. The proposed parallel taxiway configuration could be extended further to the south to accommodate additional development in the future. This alternative is shown in **Figure 5-23**.

**Figure 5-23**  
**TWY C3 Alternative #1B**



Source: Garver, 2018.

## Land-Use and Development Alternatives

Land-use designations at an airport are an important factor that should be considered as part of an airport's long-term development strategy. In general, any land that could reasonably be needed for aeronautical purposes should be reserved for aeronautical development in the future even if it is outside the 20-year planning horizon. Any land that is not reasonably expected to be needed for aeronautical purposes in the future should be considered for a non-aeronautical land-use designation which, if granted, creates opportunities for potential non-aeronautical developments on airport property that can greatly increase an airport's potential revenue.

Non-aeronautical revenue generation is a significant priority for ABI to help support the financial health of the airport moving forward. Consequently, in the development of the proposed land-use alternatives, some aggressive non-aeronautical land use alternatives were proposed for consideration.

For ABI's land-use alternatives analysis, five different locations were identified to be studied to establish future aeronautical and non-aeronautical land use designations. These locations include the undeveloped areas:

- South of Airport Blvd. Along TX-36
- North of Airport Blvd. Along TX-36
- East of Runway 17L/35R
- Northwest GA Ramp Area
- Southern Area Between the Parallel Runways

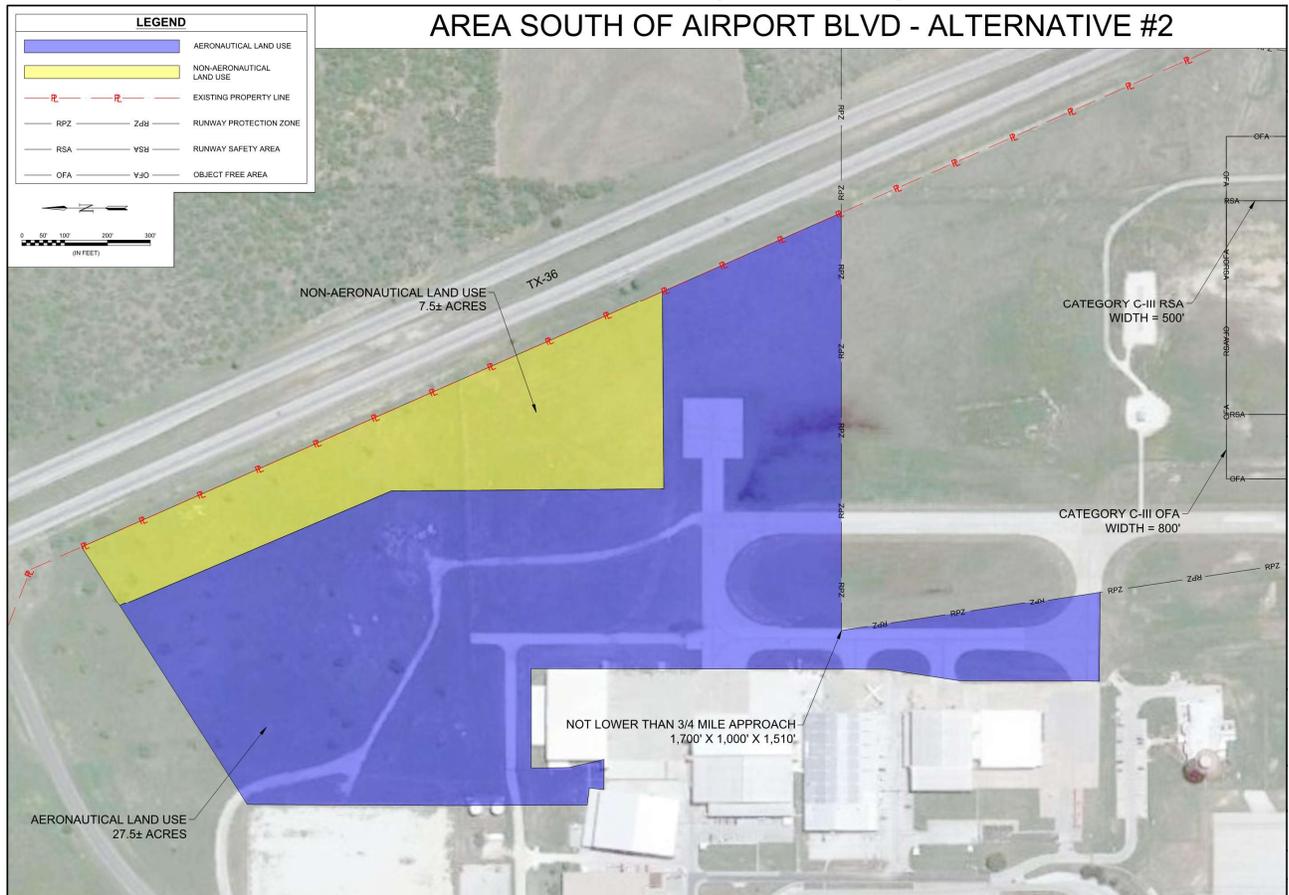
In each of these locations, various land use alternatives were developed and discussed with the Master Plan Steering Committee (MPSC) to determine the alternative for each area that presented the highest and best use of the available land in each area. Based on the forecast of aeronautical demand presented in Chapter 3, it is anticipated that all of the alternatives presented will provide sufficient space for future aeronautical development at ABI.

### ***Land-Use Alternatives - South of Airport Blvd. Along TX-36***

There are approximately 35 acres of developable land in the undeveloped area south of Airport Blvd. and west of TX-36. The extended centerline for Runway 17L/35R runs through this property which limits the potential for significant development in much of the area due to height restrictions associated with the use of the runway and potential noise sensitivity issues. Additionally, the area is immediately adjacent to the Eagle Aviation Services Inc. (EASI) area which is a major tenant on the airfield. Consequently, the non-aeronautical development potential for this area is limited.

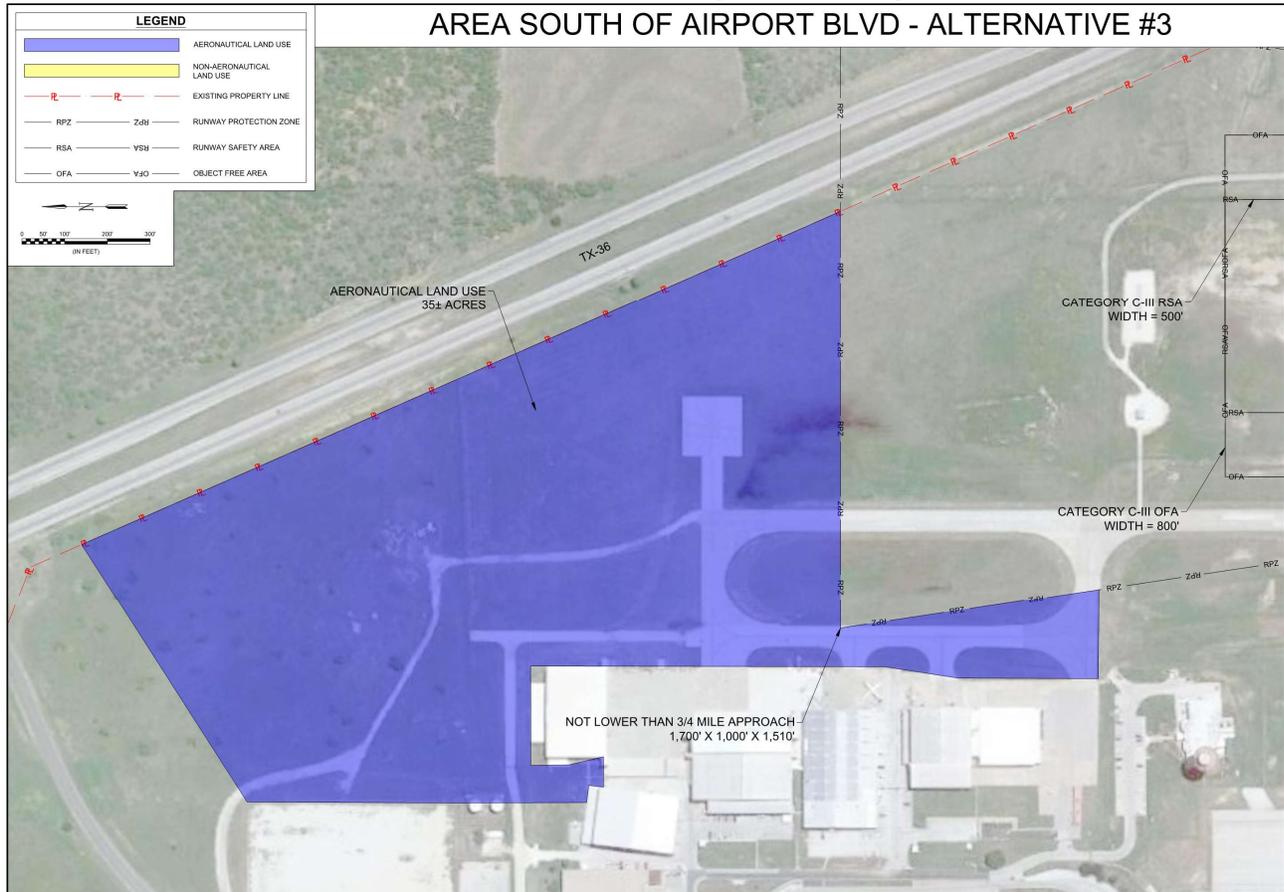


**Figure 5-25**  
**Land-Use Alternative #2- South of Airport Blvd. Along TX-36**



Source: Garver, 2018.

**Figure 5-26**  
**Land-Use Alternative #3- South of Airport Blvd. Along TX-36**



Source: Garver, 2018.

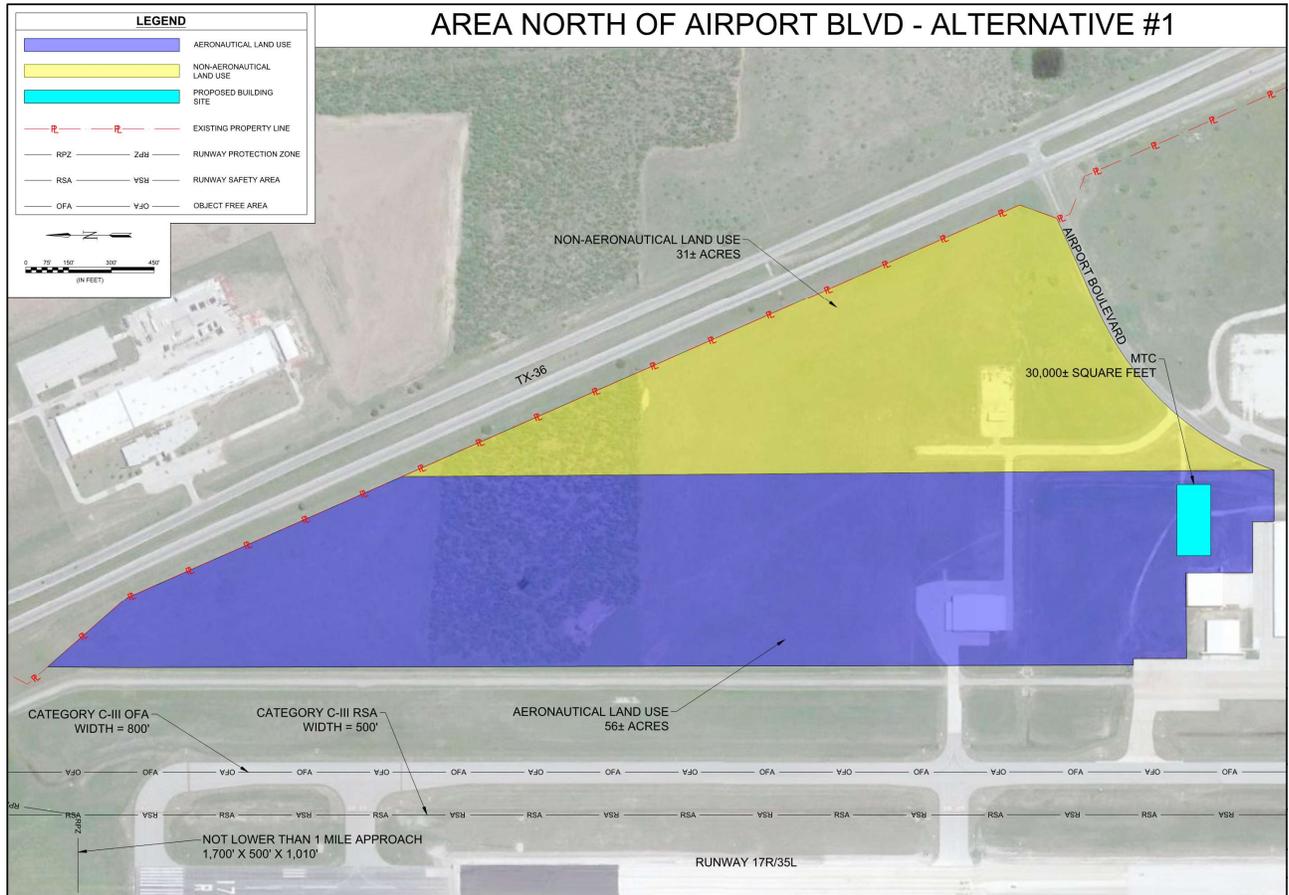
Based on discussions with the MPAC and ABI stakeholders, Land-Use Alternative #3 was selected as the preferred land-use alternative for this area.

### **Land-Use Alternatives - North of Airport Blvd. Along TX-36**

There are approximately 87 acres of developable land in the undeveloped area north of Airport Blvd. and west of TX-36. This area is well positioned for future non-aeronautical development such as light retail, gas stations, and restaurants because of its location along TX-36 and proximity to Loop 322. Consequently, all the land-use alternatives for this area are aggressive non-aeronautical land-use options.

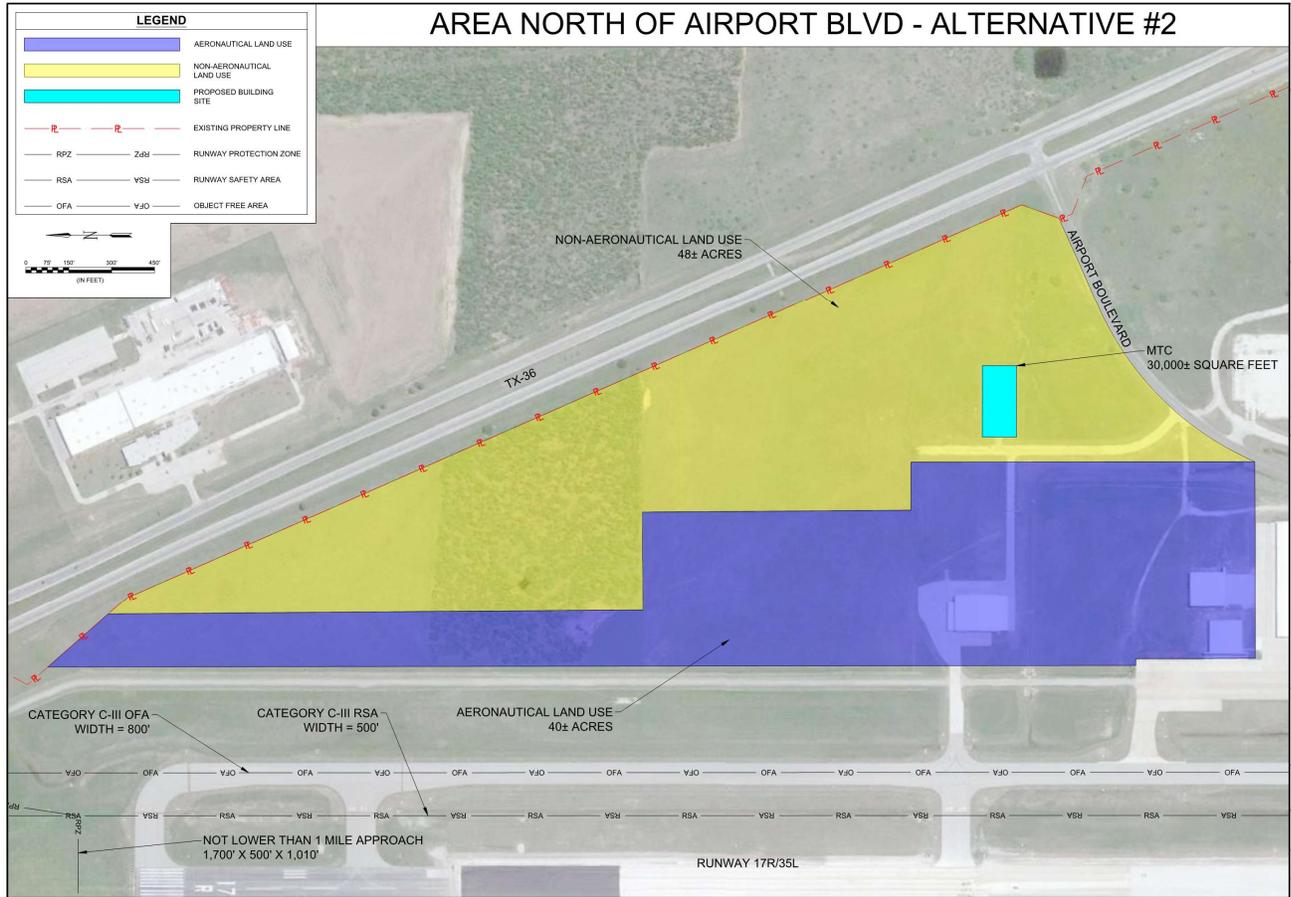
The three Land-Use Alternatives for this area are shown in **Figure 5-27, 5-28, and 5-29.**

**Figure 5-27**  
**Land-Use Alternative #1 - North of Airport Blvd. Along TX-36**



Source: Garver, 2018.

**Figure 5-28**  
**Land-Use Alternative #2- North of Airport Blvd. Along TX-36**



Source: Garver, 2018.

**Figure 5-29**  
**Land-Use Alternative #3 - North of Airport Blvd. Along TX-36**



Source: Garver, 2018.

Based on discussions with the MPAC, Land-Use Alternative #3 was selected as the preferred land-use alternative for this area.

### **Land-Use Alternatives - East of Runway 17L/35R**

There are approximately 476 acres of developable land in the area between Runway 17L/35R and TX-36. Approximately 78 acres of this area is already owned by the airport and 398 acres of it are not owned by the airport. The 78 acres owned by the airport are immediately east of Runway 17L/35R inside the existing perimeter fence. A few residences currently exist on the 398 acres that are not owned by the airport. Other than the residences, the area is largely undeveloped.

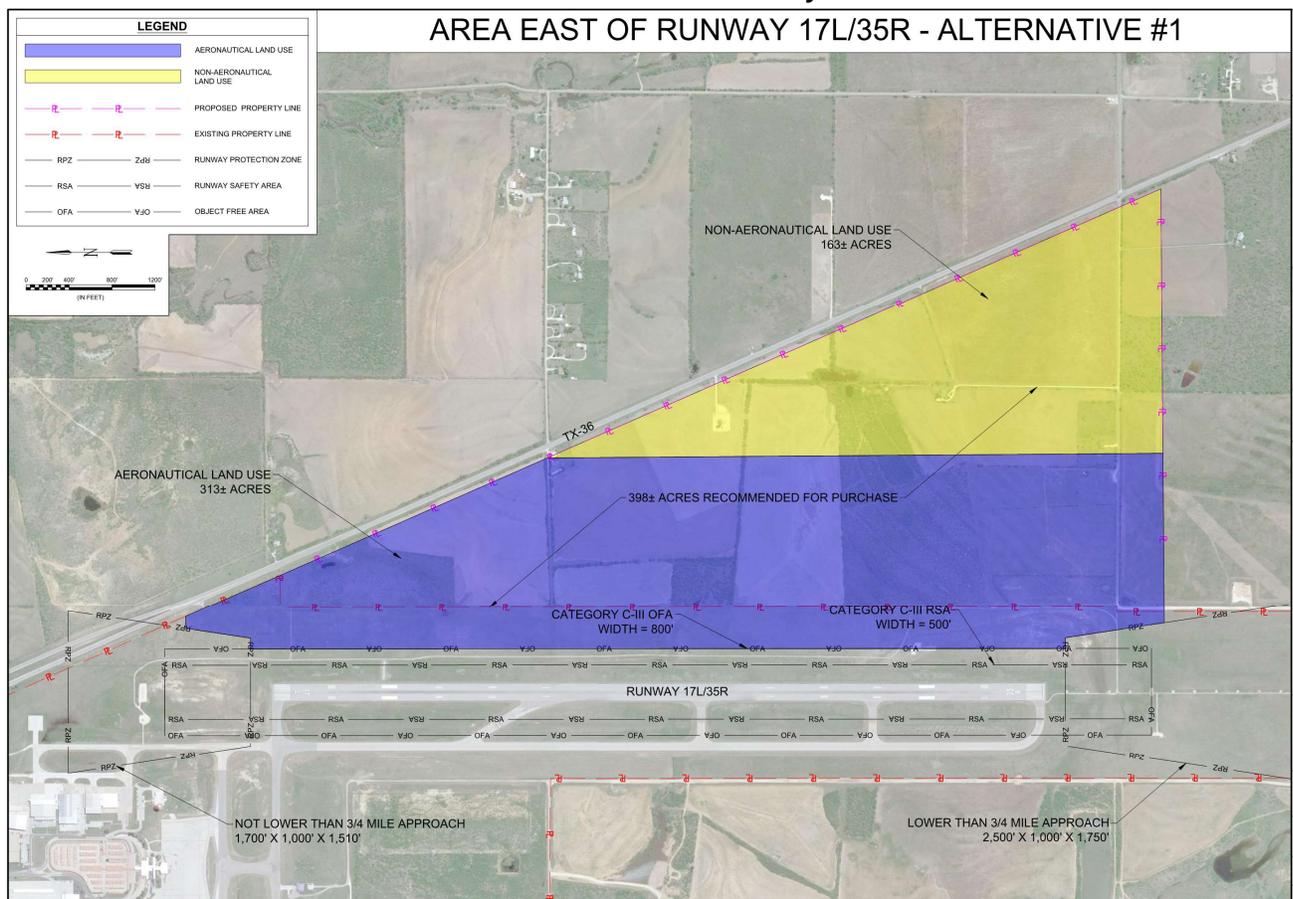
As much of this property is not owned by the airport and there are numerous other locations for development on property the airport currently owns, the development of this area is considered a lower priority. However, the portion of this area adjacent to Runway 17L/35R is

well suited for a major aeronautical development such as a heavy Maintenance, Repair, and Overhaul (MRO) business or a large cargo operation. Additionally, depending on how drones are integrated into the National Airspace System (NAS), this area could provide a suitable site for a drone operations for cargo and other non-passenger activities as it provides good access to Runway 17L/35R but would largely keep drones off of the taxiways and on-field facilities used by piloted aircraft. Drone activity involving passengers or Vertical Takeoff and Landing (VOTL) vehicles should be located in the vicinity of the terminal for roadway and parking access. Alternatives for those drone operations will be discussed in the landside alternatives section.

If this land is ever purchased and used for future development it is recommended that a portion of the property close to TX-36 be used for non-aeronautical development.

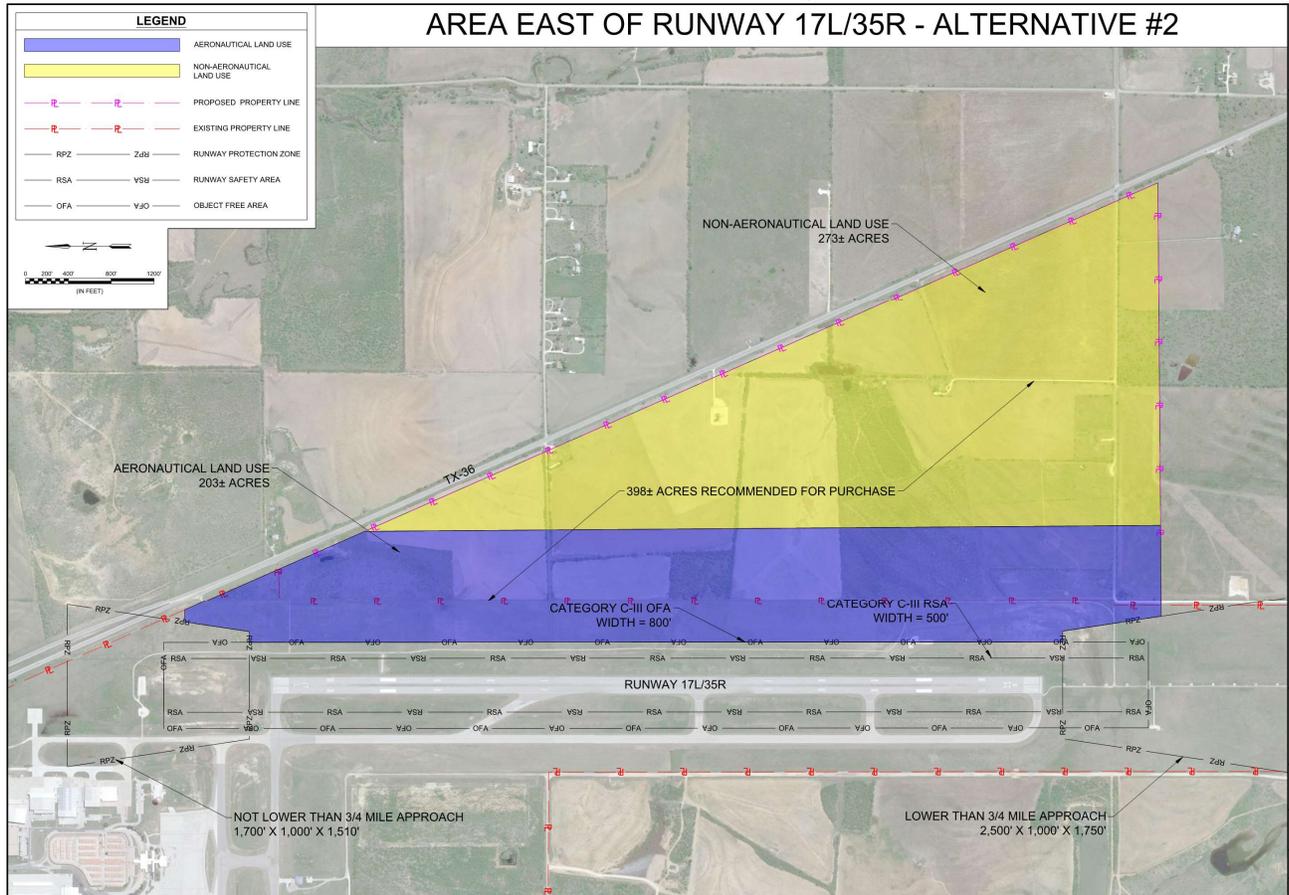
The two Land-Use Alternatives for this area are shown in **Figure 5-30 and 5-31**.

**Figure 5-30**  
**Land-Use Alternative #1- East of Runway 17L/35R**



Source: Garver, 2018.

**Figure 5-31**  
**Land-Use Alternative #2 – East of Runway 17L/35R**



Source: Garver, 2018.

Based on discussions with the MPAC, Land-Use Alternative #1 was selected as the preferred land-use alternative for this area.

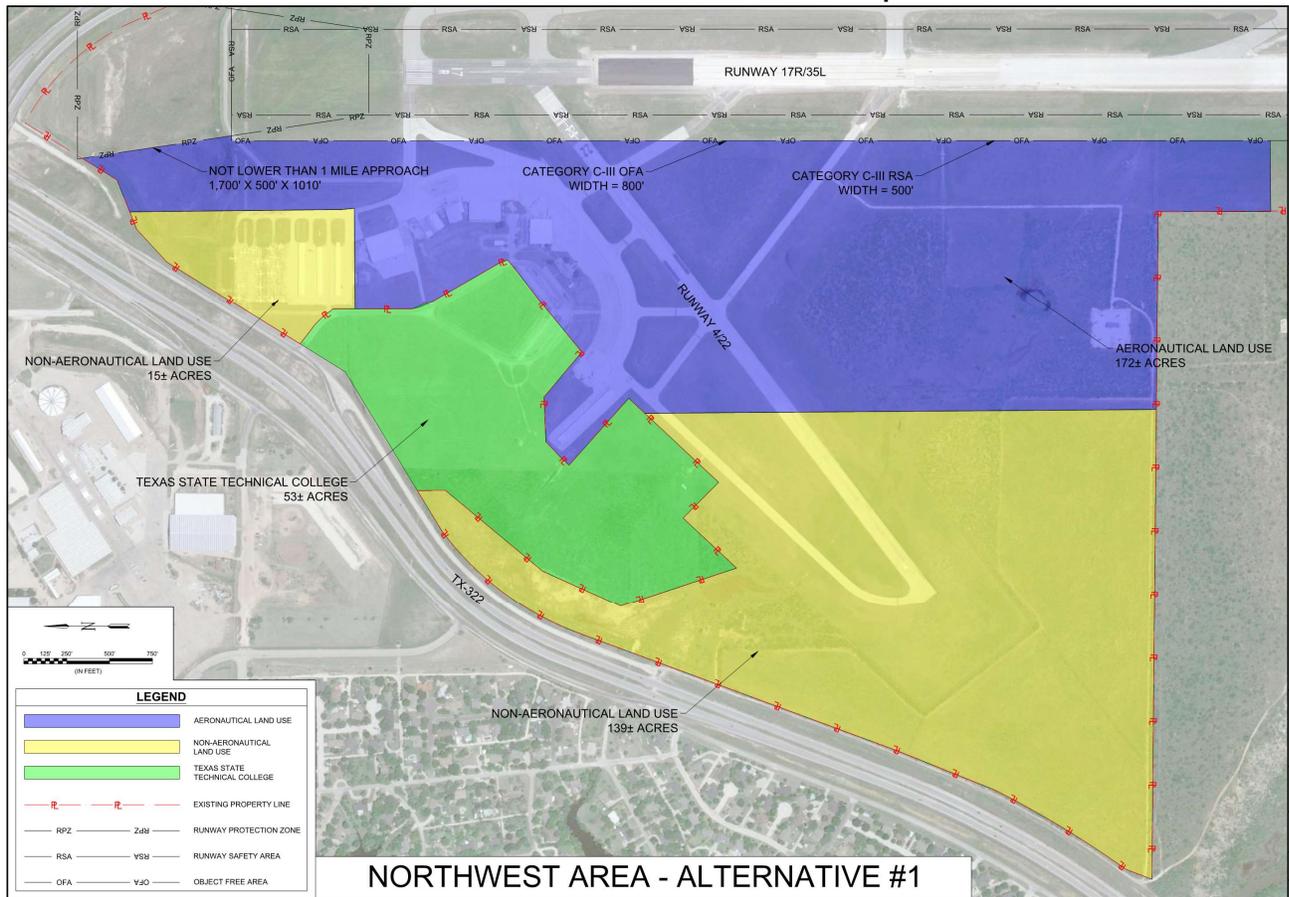
### **Land-Use Alternatives – Northwest GA Ramp**

As previously discussed, it is expected that Runway 4/22 will be closed at some point during the forecast period. When this occurs, ABI plans to re-develop this area into a blend of aeronautical and non-aeronautical developments. There is approximately 326 acres of land in this area that could be developed or re-developed.

Due to this properties proximity to TX-36, Loop 322, and the TSTC development, a portion of this area is well suited for non-aeronautical development such as hotels, light retail, gas stations, and restaurants.

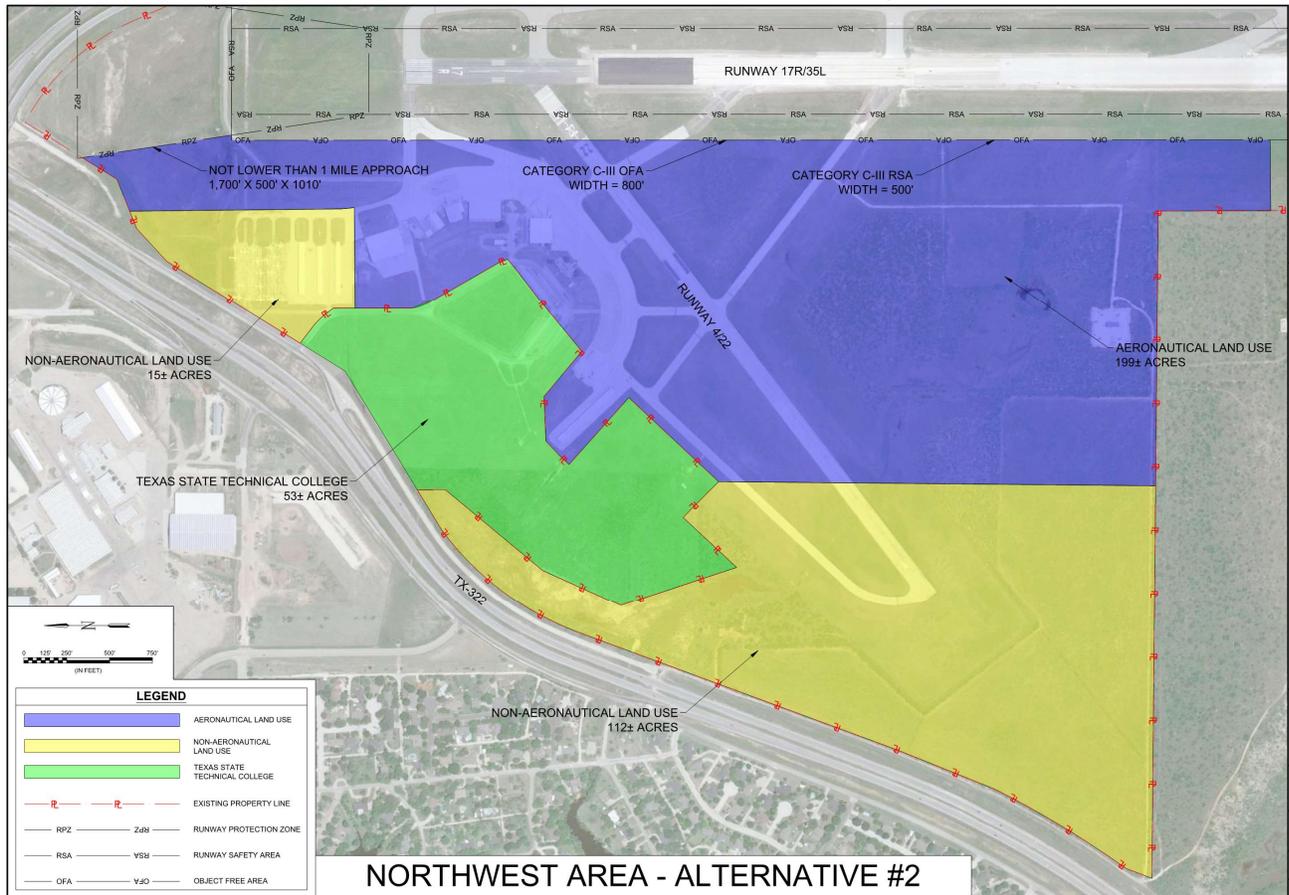
The four Land-Use Alternatives for this area are shown in **Figure 5-32, 5-33, 5-34 and 5-35.**

**Figure 5-32**  
**Land-Use Alternative #1- Northwest GA Ramp**



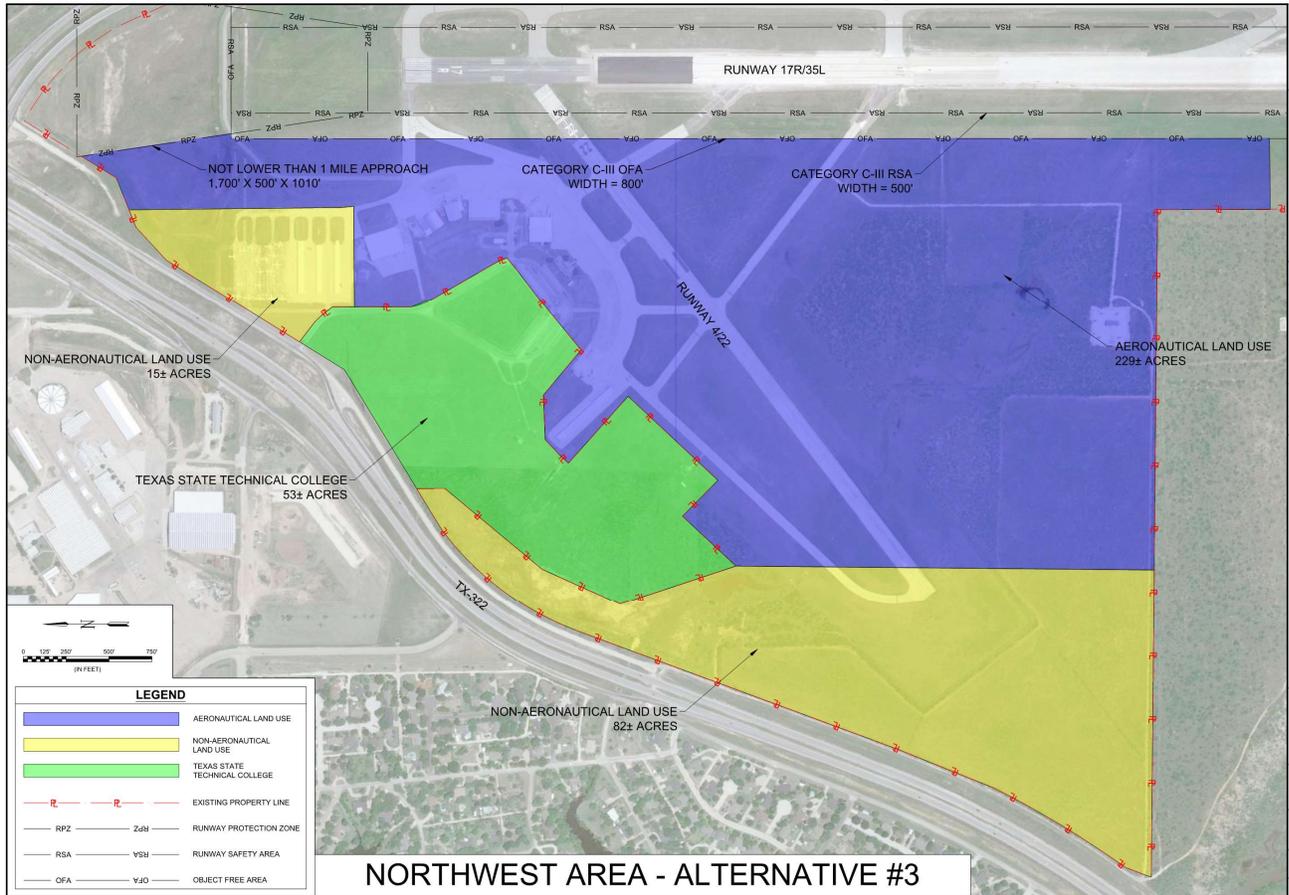
Source: Garver, 2018.

**Figure 5-33**  
**Land-Use Alternative #2 - Northwest GA Ramp**



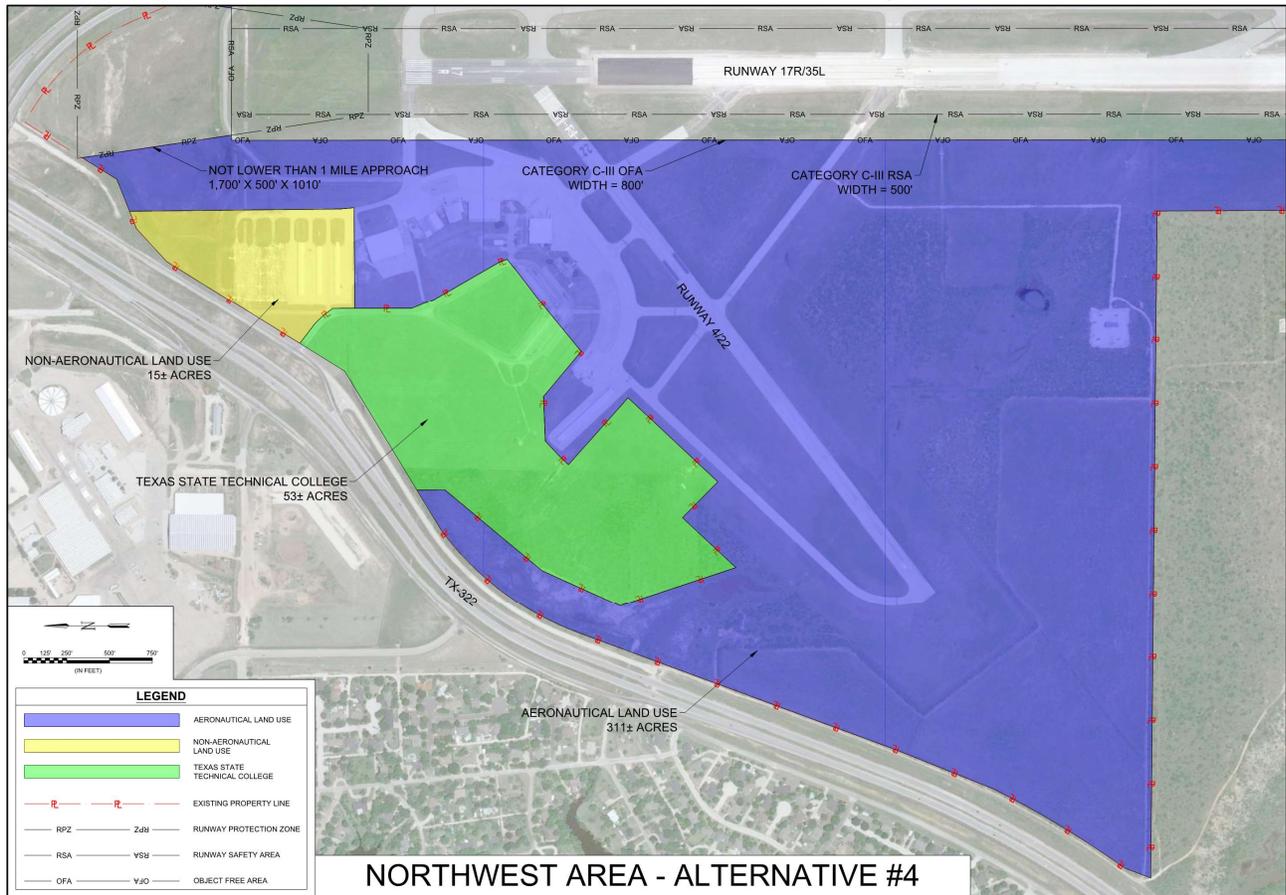
Source: Garver, 2018.

**Figure 5-34**  
**Land-Use Alternative #3 - Northwest GA Ramp**



Source: Garver, 2018.

**Figure 5-35**  
**Land-Use Alternative #4 - Northwest GA Ramp**



Source: Garver, 2018.

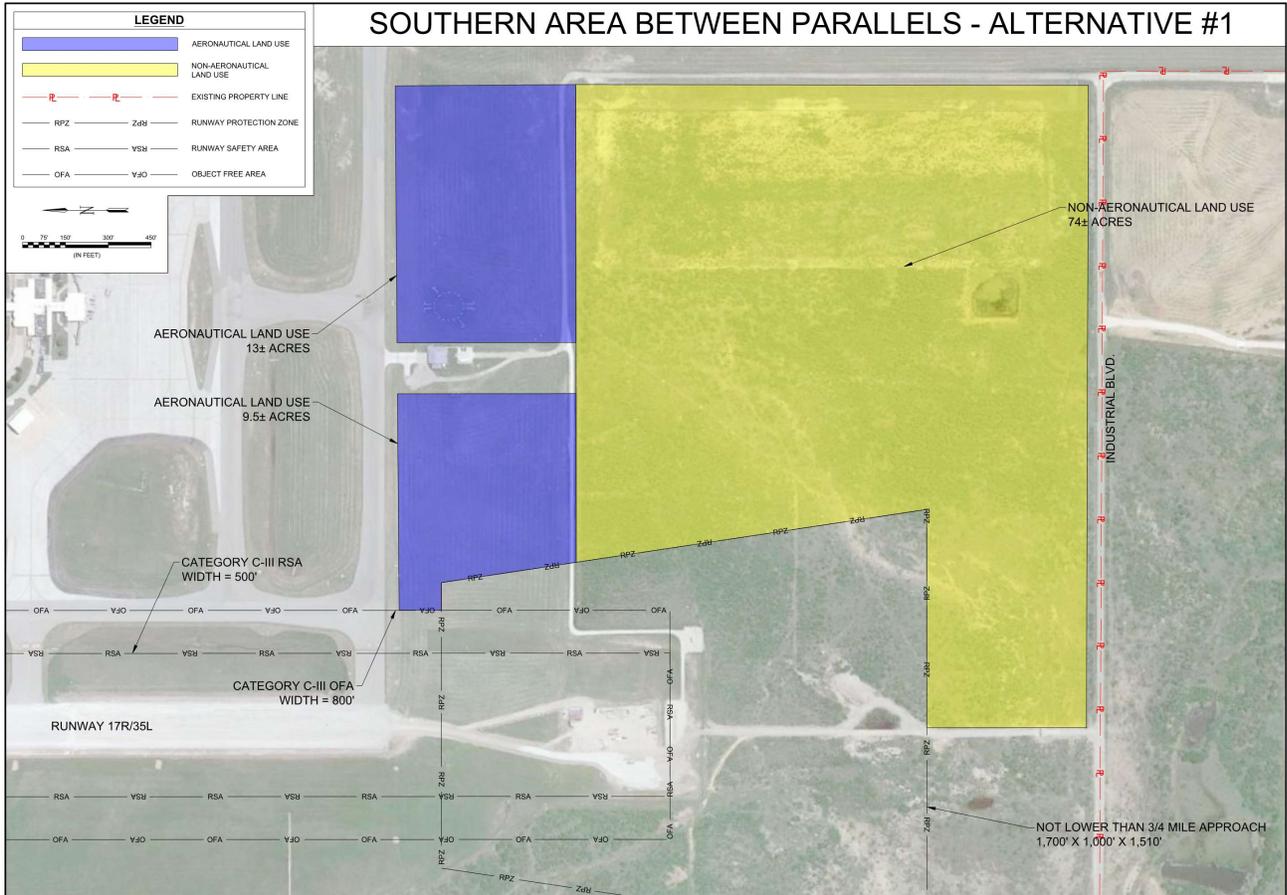
Based on discussions with the MPAC, Land-Use Alternative #4 was selected as the preferred land-use alternative for this area.

### **Land-Use Alternatives – Southern Area Between the Parallel Runways**

There is approximately 96.5 acres of airport property located between the offset parallel runways that could be used for a blend of aeronautical and non-aeronautical development. This area can be accessed using Industrial Blvd. It is recommended that the properties to the east and west of the existing ARFF station and immediately south of Taxiway M be used for aeronautical development while the property south of the airport’s perimeter road is used for non-aeronautical development. The non-aeronautical portion of the property in this area is well suited for some type of industrial development.

Only one land-use alternative as developed for this area. The alternative is shown in **Figure 5-36**.

**Figure 5-36**  
**Land-Use Alternative - Southern Area Between the Parallel Runways**



Source: Garver, 2018.

## Terminal and Landside Alternatives

This section explores alternative concepts for terminal area development to meet the facility requirements for terminal and landside facilities presented in the previous chapter. The development process began with high-level concepts showing potential expansion or renovation of functional areas within the terminal building as per facility requirements in Scenario 4. These concepts were reviewed by the Master Plan Steering Committee (MPSC) and then further refined to create a series of development alternatives for the terminal.

### Facility Requirements Summary

The facility requirements analysis, summarized in **Table 5-4**, identified three major functional areas of the existing terminal building that need to be expanded significantly to meet future demand in Scenario 4 – departure holdroom area, Security Screening Checkpoint (SSCP) and baggage screening. The high-level concepts addressed potential expansion of these areas.

**Table 5-4**  
**Terminal Facilities Requirements Summary**

Description	Existing Terminal	Scenario 1 2022	Scenario 2 2027	Scenario 3 2032	Scenario 4 2037
Airline Functions					
Ticket Counter Area	626	277	300	316	335
<i>Ticket Counter Length (7 Positions)</i>	52	28.4	30.8	32.4	34
Ticket Counter Queuing	1,166	412	447	470	499
Curbside Baggage Check	-	60	65	68	72
<i>Baggage Claim Area / Odd size Area</i>	1,716	1,420	1,540	1,620	1,720
<i>Baggage Claim Frontage</i>	116	99.4	107.8	113.4	120
<i>Oversized Bag Claim</i>	0	8	8	8	8
Baggage Service Office	79	204	221	232	247
Outbound Baggage	1,868	1,775	1,925	2,025	2,150
Inbound Baggage	935	838	909	956	1,015
Airline Operations / Airline Ticket Office	2,476	2,071	2,274	2,371	2,538
Departures Lounges (Holdrooms)	1,530	4,192	4,192	4,192	4,192
<i>Jet Gates</i>	2	2	2	2	2
Subtotal Airline Functions	10,396	11,248	11,873	12,250	12,769

	Concessions					
	Concessions (Food / Beverage)	1,244	486	534	557	596
	Concessions (News / Gifts / Sundry)	768	324	356	371	397
	Concessions (Concession Storage)	253	162	178	186	199
	Ground Transportation	-	360	396	412	441
	Information	144	-	-	-	-
	Rental Car Counters	755	1,351	1,483	1,547	1,656
	Subtotal Concessions	3,164	2,683	2,947	3,073	3,289
	Secure Public Area					
	SSCP	734	2,400	2,400	2,400	2,400
	SSCP Queuing	392	400	400	400	400
	Circulation	2,653	1,500	1,500	1,500	1,500
	Restrooms	351	497	539	567	602
	Bag Screen Room	164	2,500	2,500	2,500	2,500
	TSA Offices / Training / Restrooms	175	99	108	113	120
	TSA Break	338	209	226	238	253
	Airport Administration / Training	3,781	4,081	4,081	4,081	4,231
	Other	-	-	-	-	-
	Subtotal Secure Public Area	8,588	11,686	11,754	11,800	12,006
	Non-Secure Public Area					
	Circulation - Ticketing	647	618	670	705	748
	Circulation - Baggage Claim	516	710	770	810	860
	Circulation - General	8,526	1,801	1,978	2,062	2,207
	Restrooms	1,133	426	462	486	516
	Other	-	126	138	144	155
	Subtotal Non-Secure Public Area	10,822	3,681	4,018	4,207	4,486
						-
	Non-Public Area					-
	Loading Dock	-	88	92	94	98

Storage	50	293	306	313	325
Maintenance	486	293	306	313	325
Mech. / Elec. / Bldg. Systems	4,522	3,516	3,671	3,760	3,906
Subtotal Non-Public Area	5,058	4,190	4,375	4,480	4,655
Grand Total	38,028	33,488	34,966	35,810	37,204

### Concept Development

High-level terminal development concepts were presented to the MPSC in the facility requirements meeting. A workshop was conducted during the meeting so that the committee members could comment on the concepts and provide their own ideas and inputs. The following paragraphs describe these concepts which served as a precursor to the detailed alternatives presented later in this chapter.

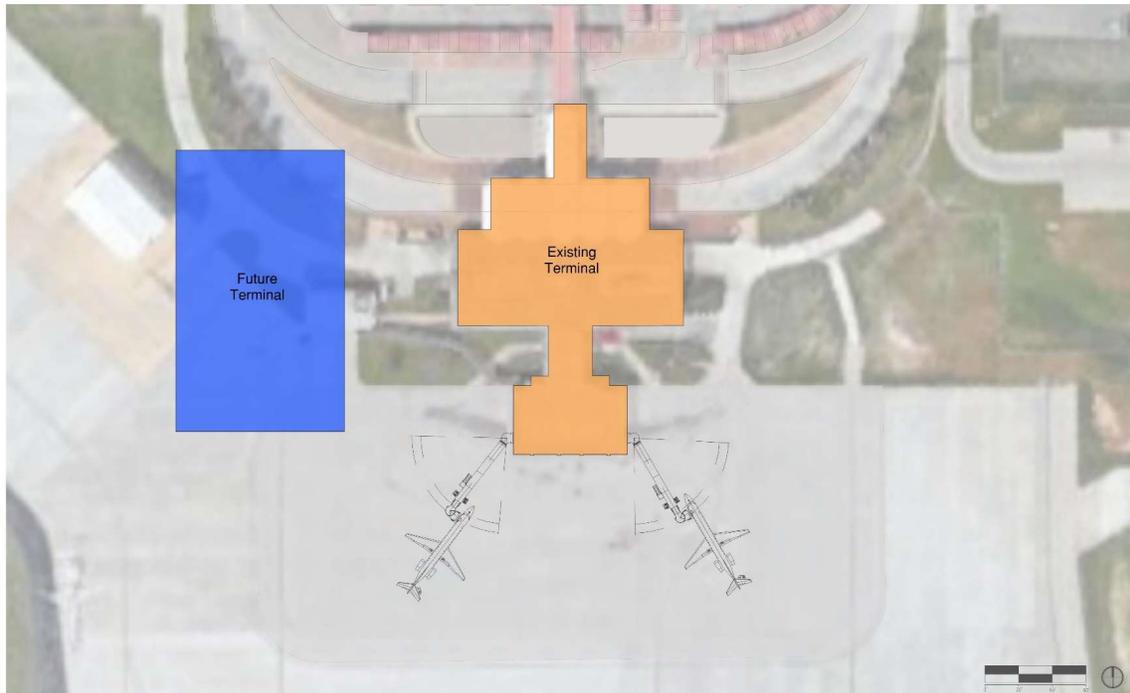
#### New Terminal

The new terminal concept considered a brand-new terminal on a greenfield site that is independent of the existing terminal building. The new terminal would have the capacity to accommodate all future traffic across the entire 20-year planning horizon and can be constructed independently of existing airport operations. The existing terminal building would be demolished after the new terminal is fully operational.

A feasible site for a new terminal building was identified west of the existing terminal as shown in **Figure 5-37** on the next page. A new terminal building in this location would require a realignment of existing airport roads such as ‘Airport Boulevard’ or construction of a new access road to reach the new terminal building curbside. The new terminal building would also require the expansion of existing utilities, in addition to a renovation of landside facilities to better serve the new terminal building. Modifications and expansion of airside infrastructure such as taxiways and the apron would also be required to accommodate aircraft operations at the new terminal location.

Since the existing building was designed to be incrementally expanded and facility requirements for future Scenario 4 could be met by maximizing the site of the existing terminal building, the MPSC expressed concern that a new terminal option overlooked the expansion possibilities of the existing building. In addition, the cost and time needed to build a new terminal would be too high compared to an incremental expansion/renovation of the existing terminal. As a result, the MPSC discarded the option of a new terminal and decided to retain the existing terminal building.

**Figure 5-37**  
**New Terminal**



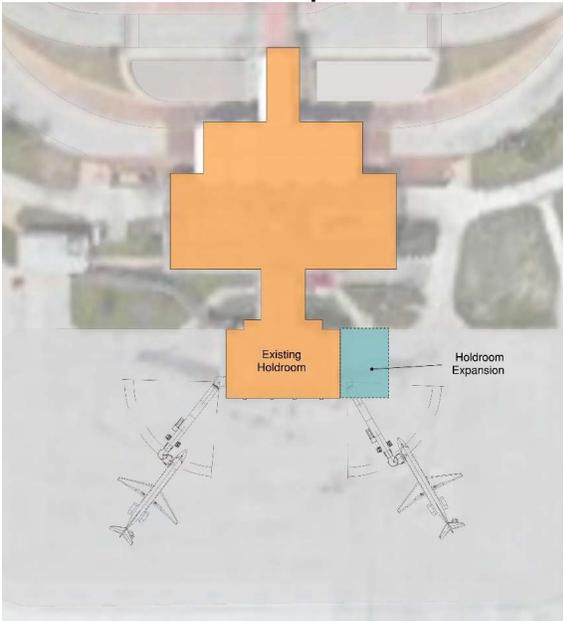
Source: Corgan 2018

### **Holdroom Expansion**

These concepts show the potential expansion concepts of the existing holdroom. **Figure 5-38** shows expansion to the east and **Figure 5-39** shows expansion to the west. **Figure 5-40** shows a concept expanding the holdroom to both the east and west and **Figure 5-41** shows the potential expansion of existing holdroom to the south.

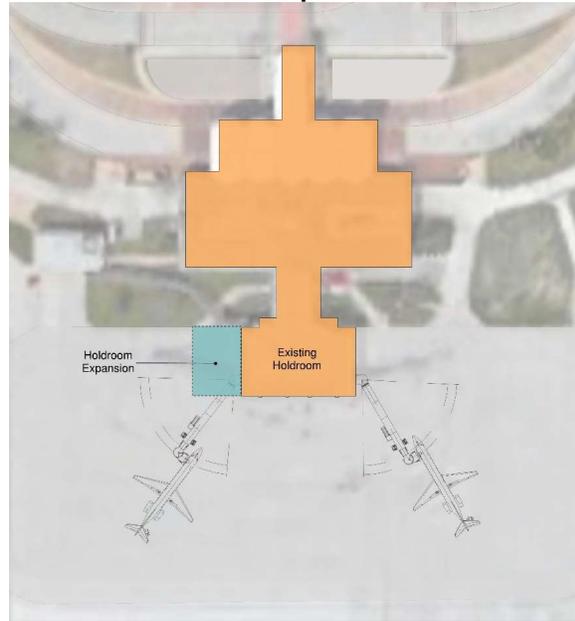
The committee noted that there may be challenges to relocate the east aircraft parking position if expansion occurs to the east. A holdroom expansion to the east would shift the position further east and impact a non-contact aircraft parking position used for weather diversions. A holdroom expansion to the south is a feasible option that would limit impacts to other facilities on the ramp and in the terminal.

**Figure 5-38**  
**Holdroom Expansion - East**



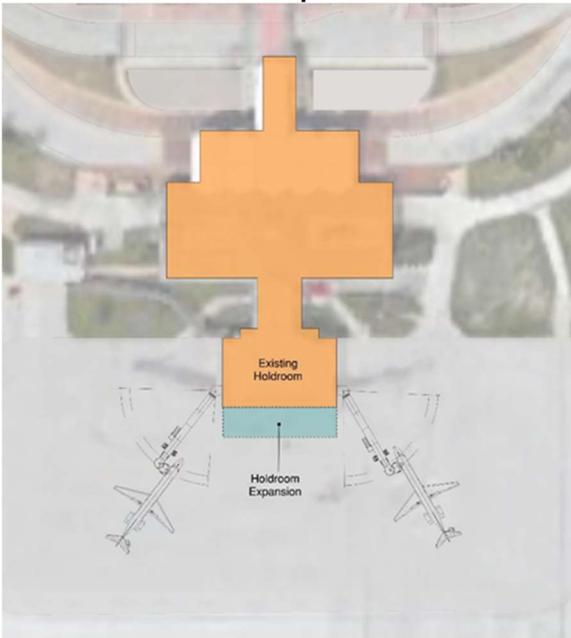
Source: Corgan 2018

**Figure 5-39**  
**Holdroom Expansion - West**



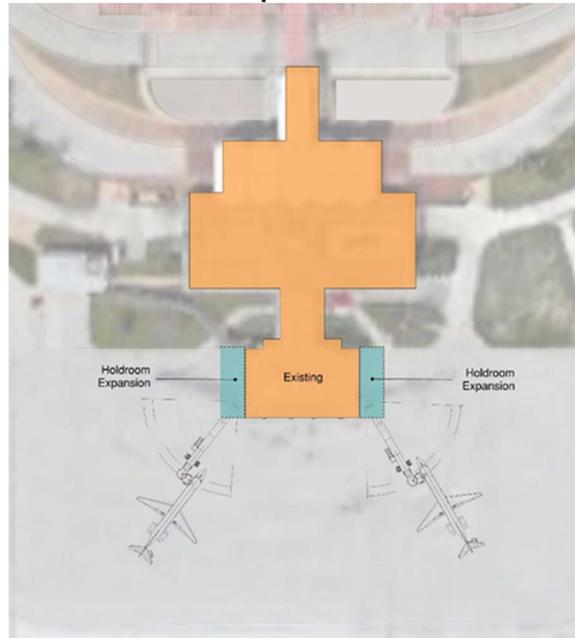
Source: Corgan 2018

**Figure 5-40**  
**Holdroom Expansion - South**



Source: Corgan 2018

**Figure 5-41**  
**Holdroom Expansion - East & West**

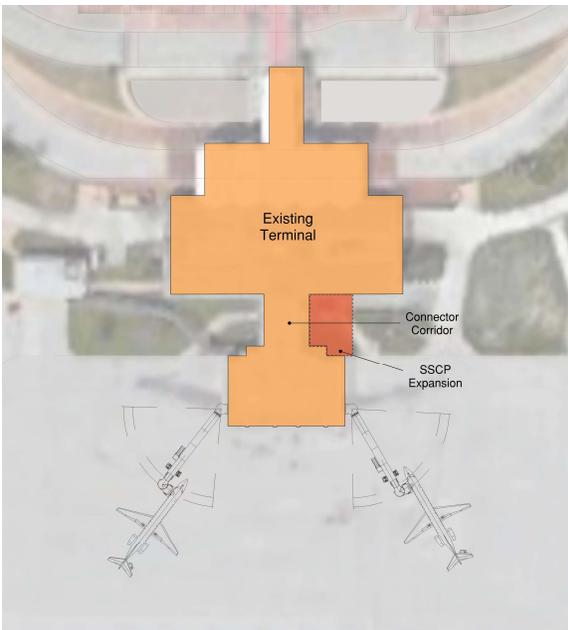


Source: Corgan 2018

**Infill Expansion**

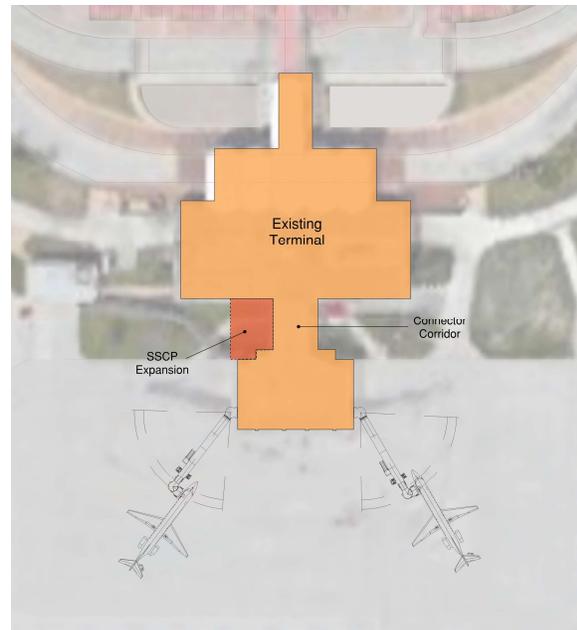
Infill expansion concepts show the expansion of other functional areas such as Security Screening Checkpoint (SSCP) and Baggage Handling Systems (BHS). **Figure 5-42** shows expansion to the east of the connector corridor and **Fig 5-43** shows expansion to the west of the connector corridor. **Figure 5-44** shows a relocation and expansion of the existing SSCP south into the existing holdroom. This concept would be paired with a holdroom expansion to the south. **Figure 5-45** shows a BHS expansion to the east of the existing BHS and **Fig 5-46** shows a BHS expansion to the south of the existing BHS.

**Figure 5-42  
Infill SSCP - East**



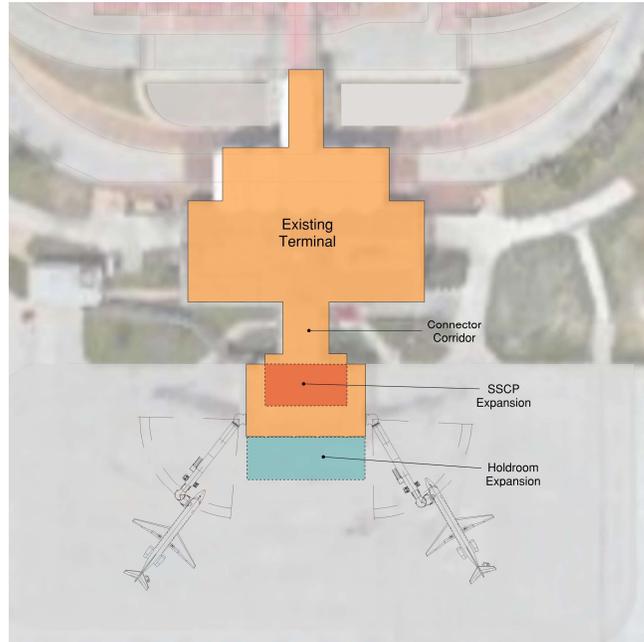
Source: Corgan 2018

**Figure 5-43  
Infill SSCP - West**



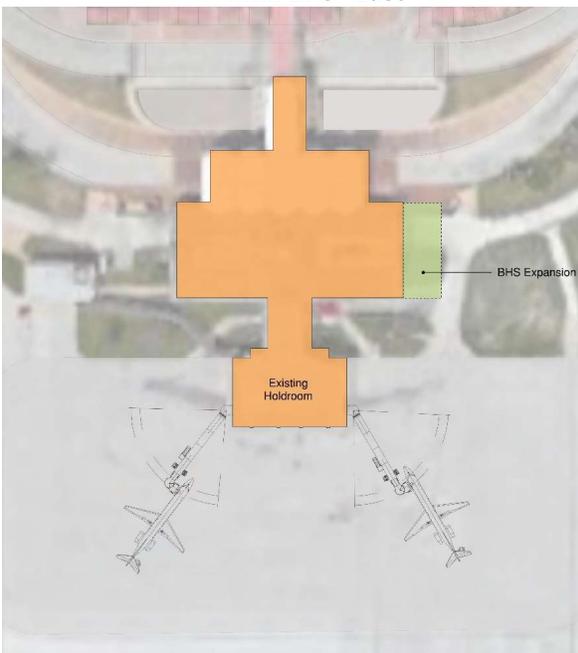
Source: Corgan 2018

**Figure 5-44**  
**Infill SSCP - South**



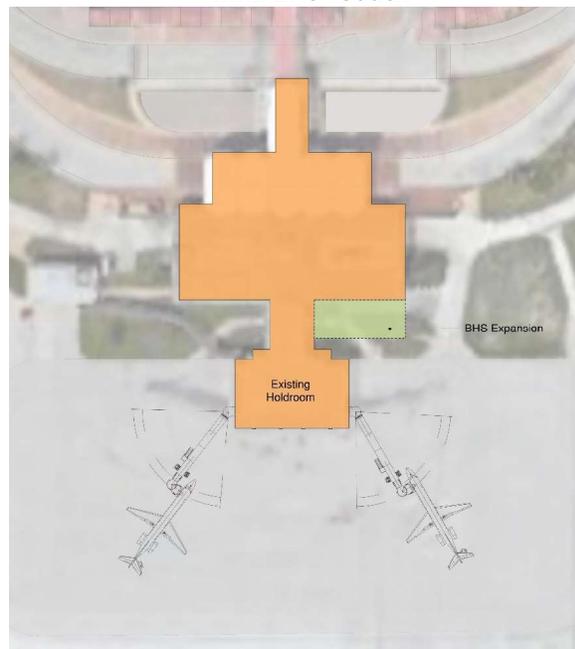
Source: Corgan 2018

**Figure 5-45**  
**Infill BHS - East**



Source: Corgan 2018

**Figure 5-46**  
**Infill BHS - South**



Source: Corgan 2018

### **Concept Development Conclusion**

The discussion generated by the concepts defined above were used to provide guidance for the detailed alternatives development process discussed in the remainder of this section.

### ***Passenger Terminal Alternatives Descriptions***

The high-level concepts for terminal development were further refined to create detailed terminal alternatives. A workshop was conducted with the MPSC to assess the alternatives on April 25, 2018. The goal of the workshop was to obtain the committee's input and suggestions on various alternative schemes for terminal development. Evaluation of these alternatives included consideration of ownership costs, capital costs and operational efficiency.

The alternatives discussed in the workshop can be classified into four "families" of alternatives:

1. No Expansion
2. Limited Build
3. Infill Expansion
4. Full Expansion

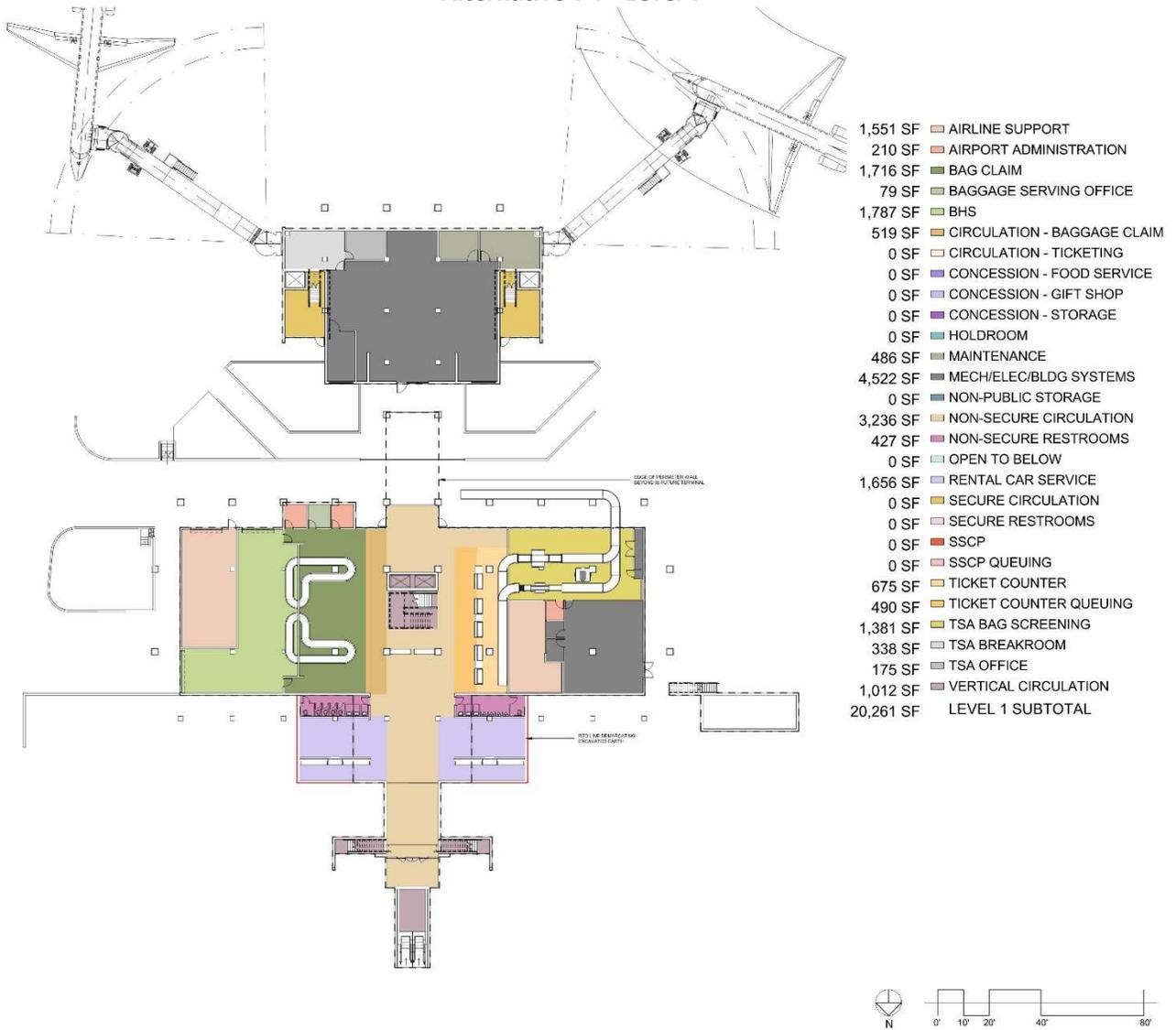
### **Description: Alternative 1 - No Expansion**

Based on square footage requirements for future demand required in Scenario 4, the existing building currently has sufficient floor area to meet the total area requirement. However, as explained in the earlier sections of this chapter, specific functional areas have insufficient square footage to meet future area requirements. The no expansion alternative attempts to meet square footage requirements for these specific functional areas by reallocating space within the existing terminal building without expanding the building footprint.

**Figure 5-47** and **Figure 5-48** show floor plans for level 1 and level 2 respectively for the no-expansion alternative. With the objective of reallocating space, the secure side holdroom is expanded into the connector corridor and the SSCP is relocated to the northern section of the terminal building. Relocating the SSCP also requires relocating ticketing and bag screening to the west side of the lower level. This option presents challenges with secure side circulation and does not provide enough square footage for the SSCP and queuing area.

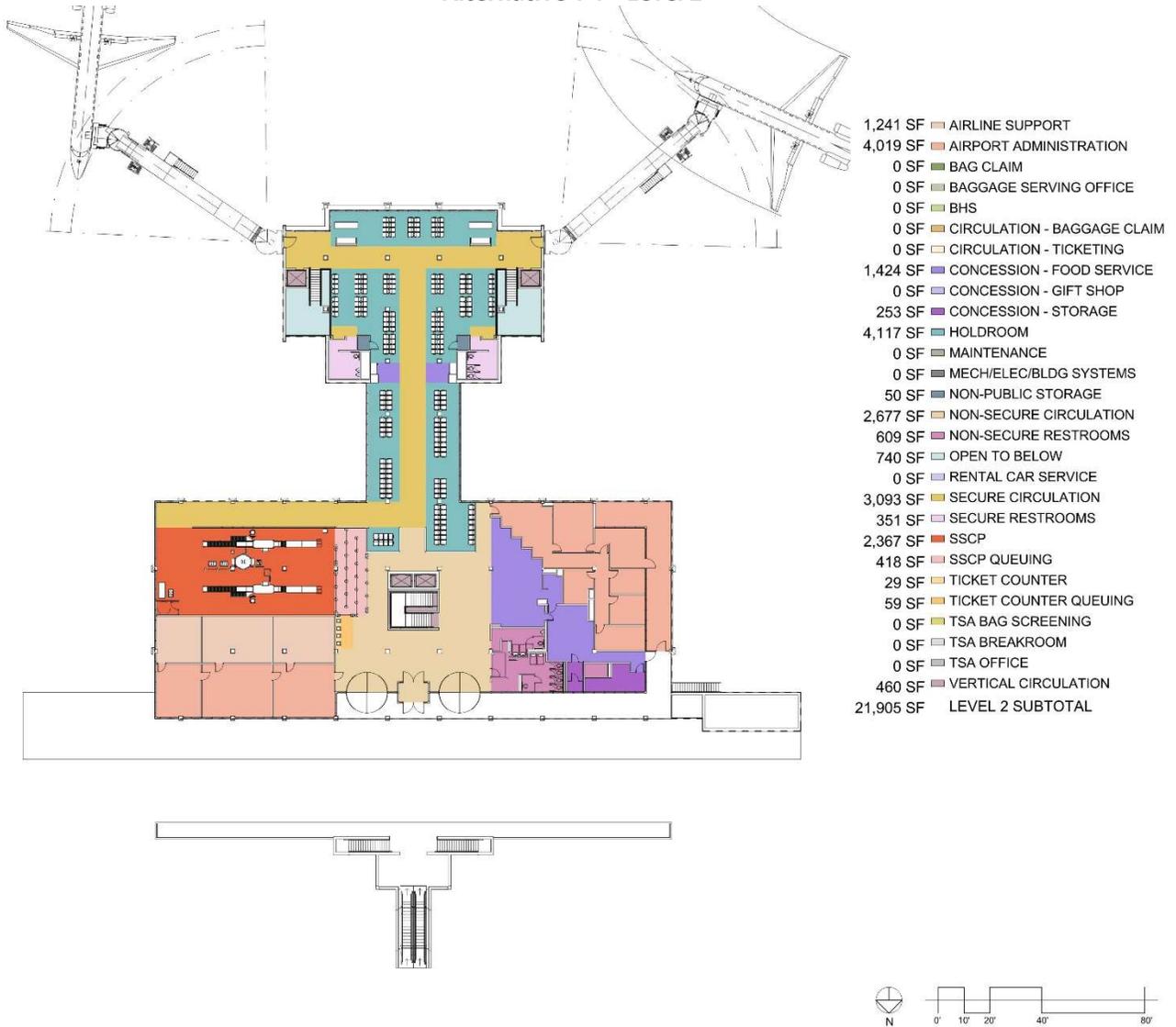
Another concern with the no expansion option is allocating sufficient space within the existing terminal building to accommodate the required space for rental car counters. The design team identified the possibility of widening the rental car space on the first floor underneath the upper level roadway. However, this approach would require a major excavation project under the existing upper level roadway to accommodate the rental car counters, which would demand a significant financial investment.

Figure 5-47  
Alternative 1-1 - Level 1



Source: Corgan 2018

Figure 5-48  
Alternative 1-1 - Level 2



Source: Corgan 2018

***Description: Alternative 2 - Limited Build***

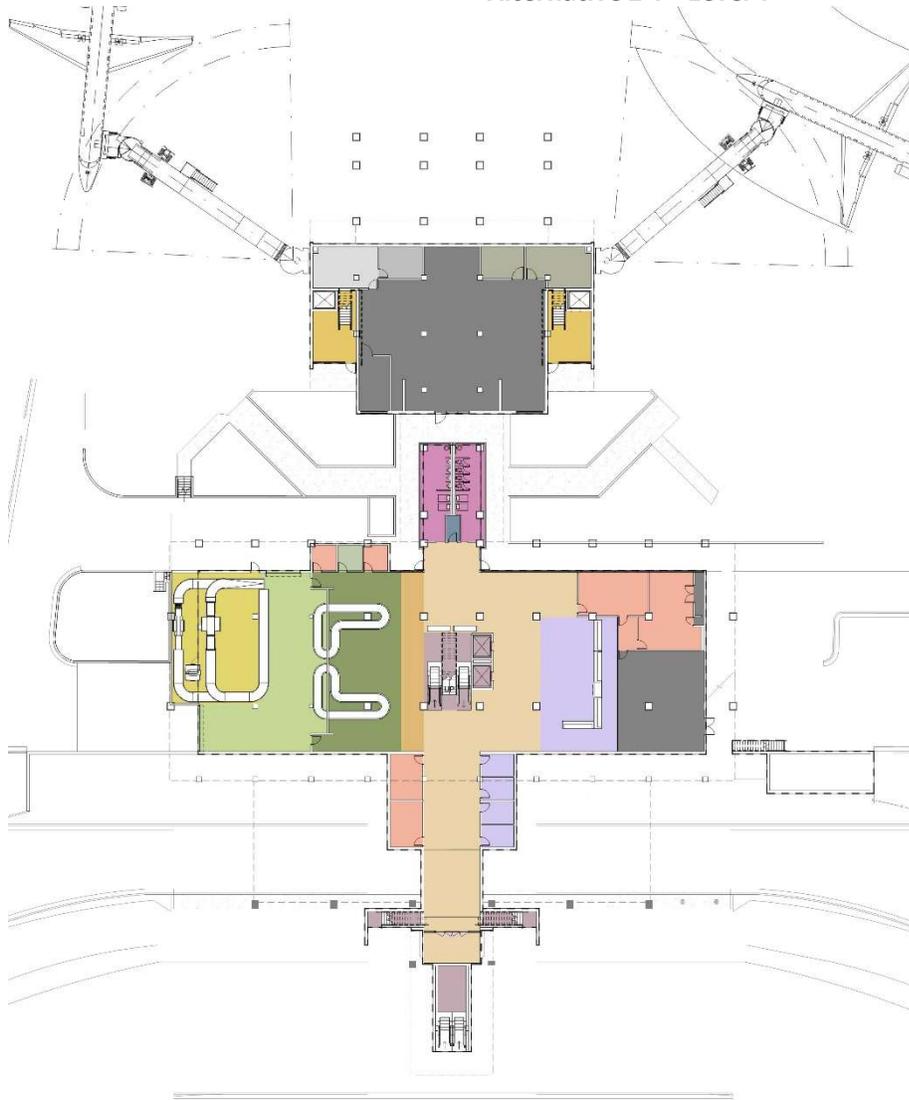
Limited build alternatives consider the reallocation of functional spaces inside existing terminal building with minimal building expansion. These options stemmed from findings in the facility requirements chapter which concluded that even though the total square footage within the existing terminal building is sufficient to meet requirements throughout the planning horizon, specific functional areas lack the necessary square footage. Therefore, while retaining the existing building configuration, the building needs to be expanded to add space to the functions deficient in square footage. A common theme with all the limited build alternatives is the removal of the retail area located on level 2 south of the central staircase. Elimination of the retail area provides a clear line of sight through the terminal and improves intuitive wayfinding.

In all the limited build alternatives, vertical circulation deficiencies were addressed by relocating the existing escalators into the space currently occupied by the large central staircase. A new single staircase was added in between the 2 escalators and 2 new large elevators were added adjacent to the escalators forming a central vertical core in the middle of the terminal building.

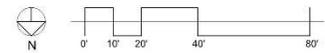
**Alternative 2-1**

**Figure 5-49** depicts floor plan of level 1 for Alternative 2-1 and **Figure 5-50** depicts level 2. Alternative 2-1 rotates the ticketing area 90 degrees so that it faces towards the middle of the terminal and adds check-in kiosks to reduce the required footprint for the ticketing area. The holdroom is expanded south to increase capacity and the baggage room is expanded east to accommodate an in-line baggage screening explosives detection system (EDS).

Figure 5-49  
Alternative 2-1 - Level 1

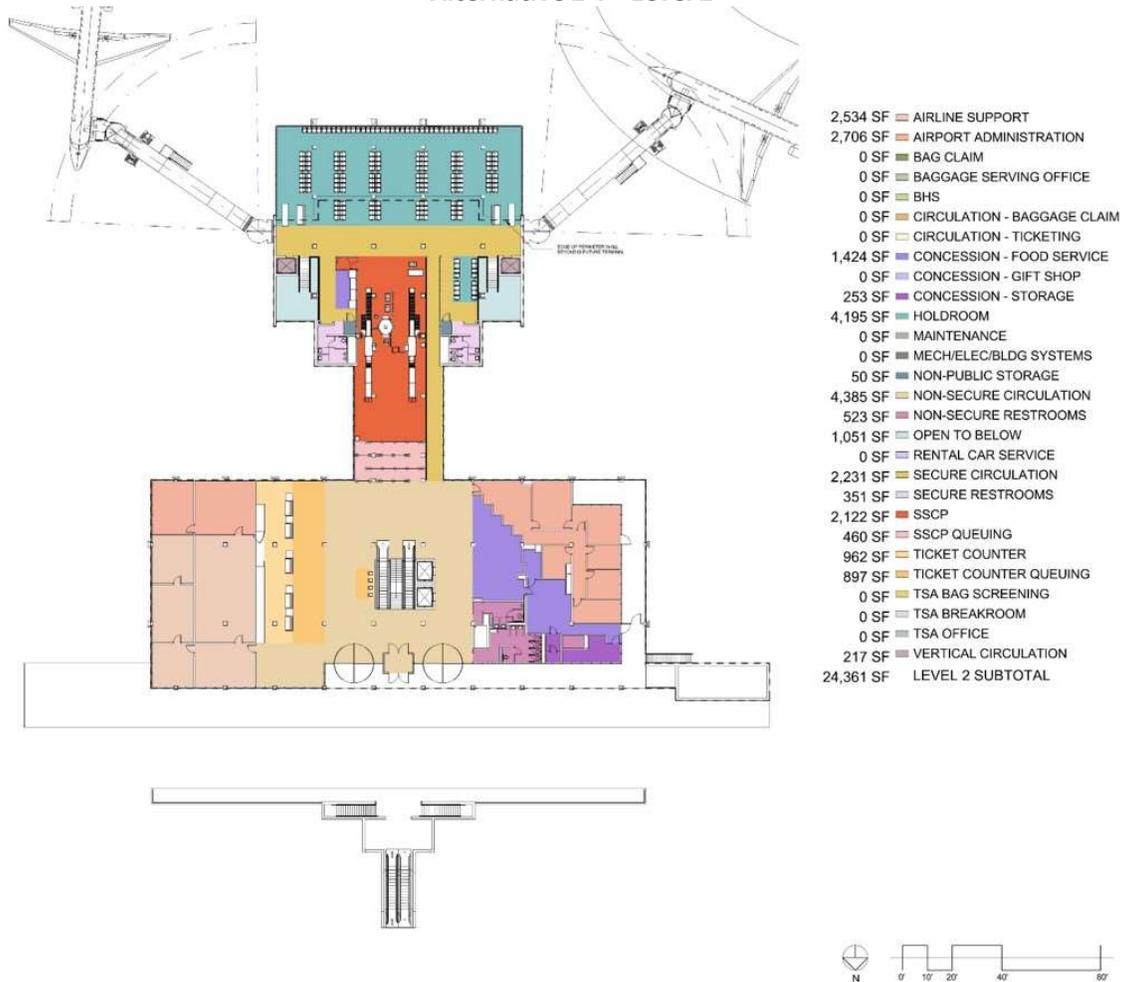


- 0 SF AIRLINE SUPPORT
- 1,514 SF AIRPORT ADMINISTRATION
- 1,716 SF BAG CLAIM
- 79 SF BAGGAGE SERVING OFFICE
- 1,812 SF BHS
- 516 SF CIRCULATION - BAGGAGE CLAIM
- 0 SF CIRCULATION - TICKETING
- 0 SF CONCESSION - FOOD SERVICE
- 0 SF CONCESSION - GIFT SHOP
- 0 SF CONCESSION - STORAGE
- 0 SF HOLDROOM
- 486 SF MAINTENANCE
- 4,417 SF MECH/ELEC/BLDG SYSTEMS
- 45 SF NON-PUBLIC STORAGE
- 3,996 SF NON-SECURE CIRCULATION
- 716 SF NON-SECURE RESTROOMS
- 0 SF OPEN TO BELOW
- 1,685 SF RENTAL CAR SERVICE
- 0 SF SECURE CIRCULATION
- 0 SF SECURE RESTROOMS
- 0 SF SSCP
- 0 SF SSCP QUEUING
- 0 SF TICKET COUNTER
- 0 SF TICKET COUNTER QUEUING
- 1,452 SF TSA BAG SCREENING
- 338 SF TSA BREAKROOM
- 175 SF TSA OFFICE
- 1,209 SF VERTICAL CIRCULATION
- 20,155 SF LEVEL 1 SUBTOTAL



Source: Corgan 2018

Figure 5-50  
Alternative 2-1 - Level 2

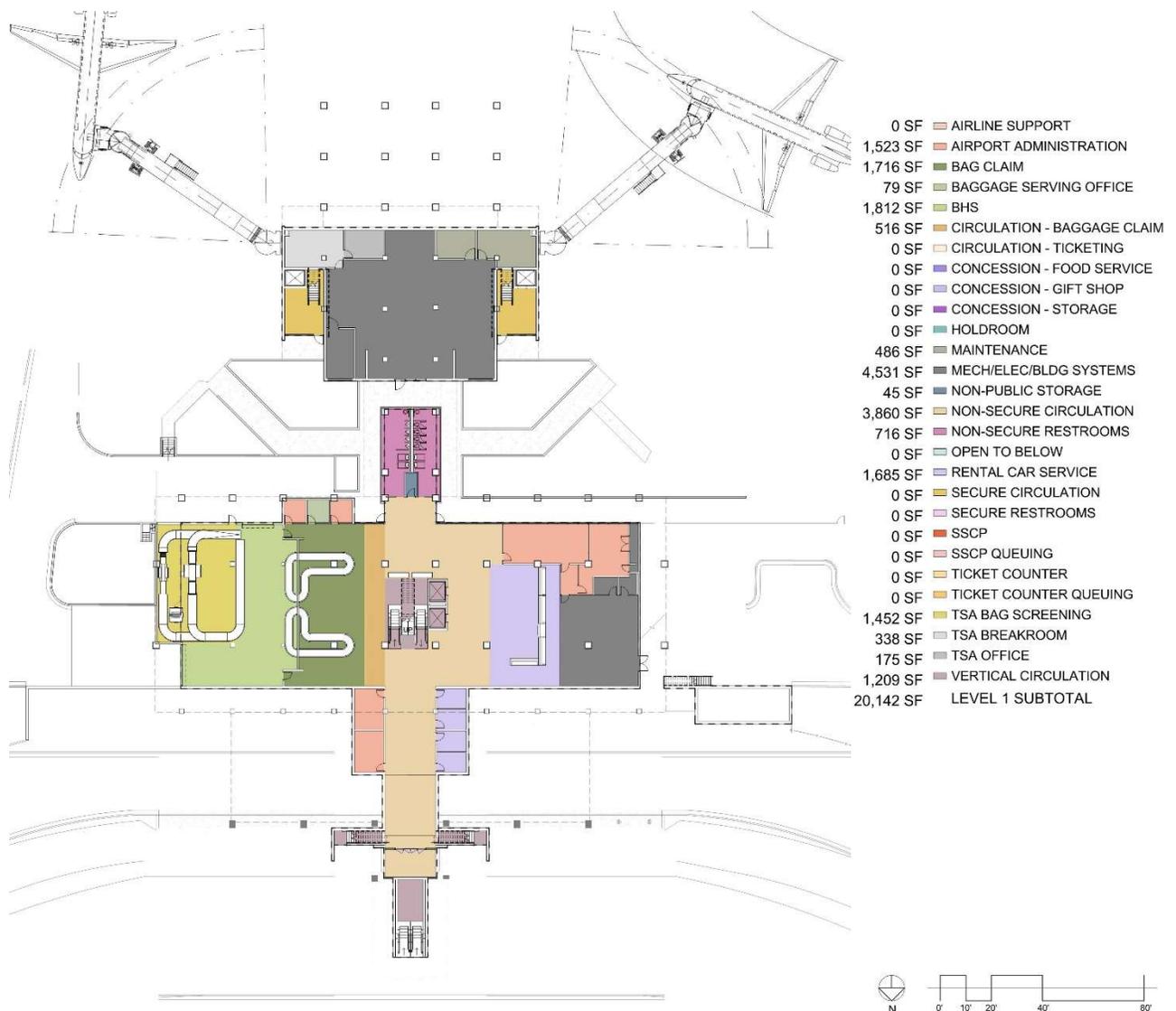


Source: Corgan 2018

Alternative 2-2

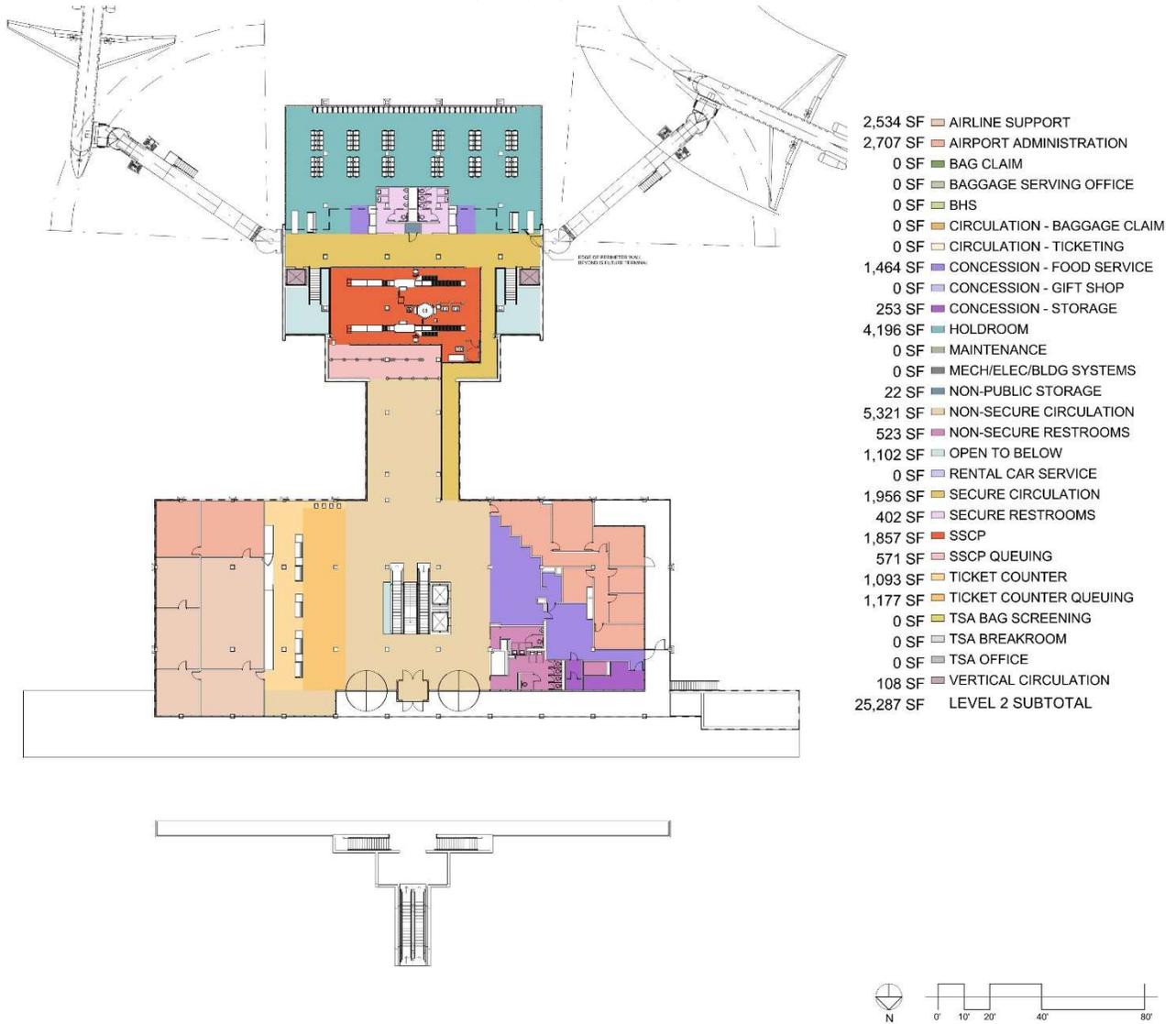
Alternative 2-2 incorporates the same design as Alternative 2-1 with the exception of the layout and location of the SSCP. In Alternative 2-2, the SSCP is pushed south into the holdroom and rotated 90 degrees. This location for the SSCP requires the relocation of the secure side restrooms and a larger expansion of the holdroom to meet requirements. **Figure 5-51** depicts the floor plan for level 1 and **Figure 5-52** depicts the floor plan for level 2.

**Figure 5-51**  
**Alternative 2-2 - Level 1**



Source: Corgan 2018

**Figure 5-52**  
**Alternative 2-2 - Level 2**

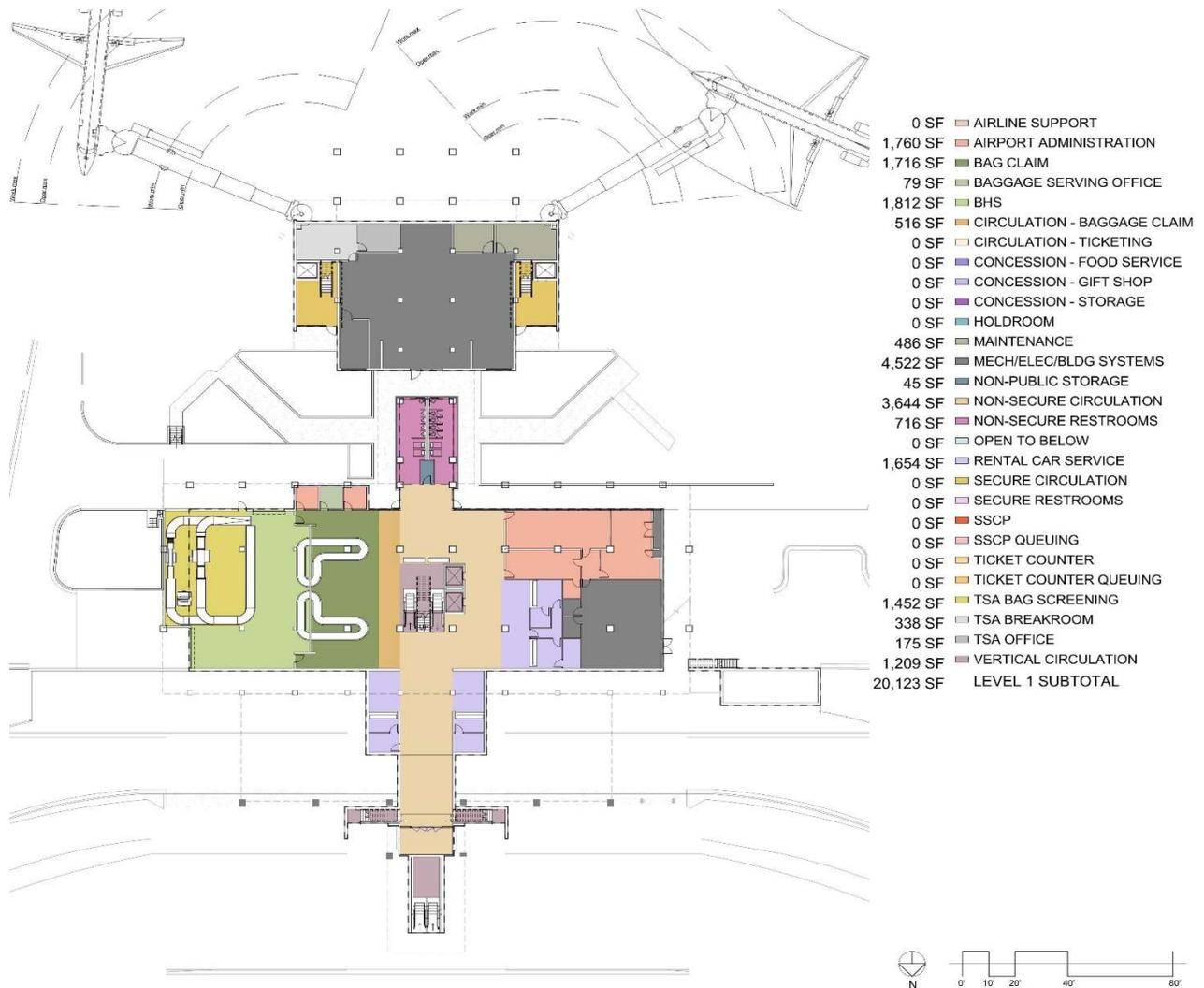


Source: Corgan 2018

Alternative 2-3

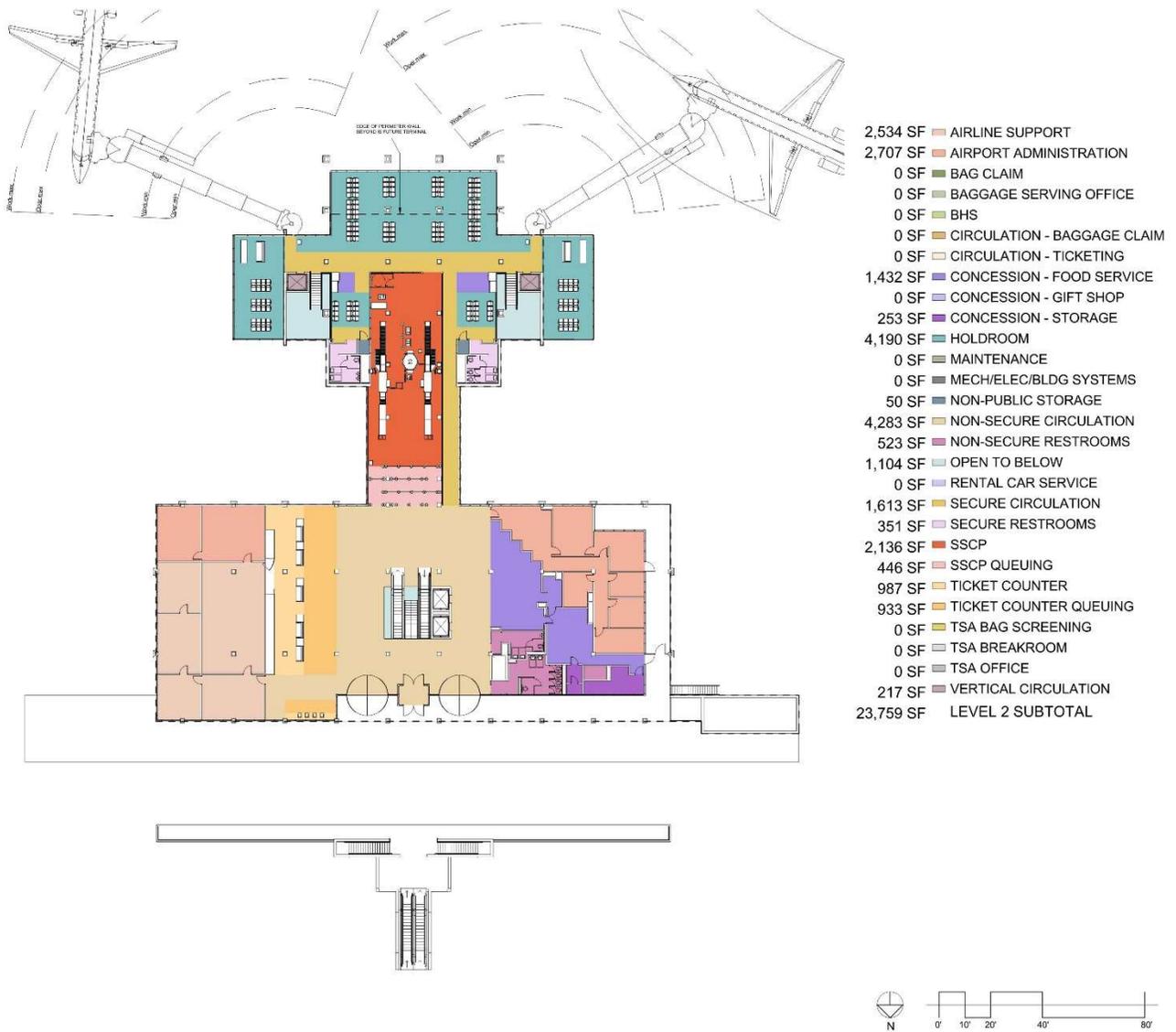
Alternative 2-3 is the same design as Alternative 2-1 with the exception of how the holdroom is expanded and the location of the rental car counters on level 1. In Alternative 2-3, small expansions are made to the holdroom in multiple directions – east, south and west – instead of a large expansion in a single direction. This approach requires a shift in the rotunda location for the passenger boarding bridges (PBB) at both gates. **Figure 5-53** depicts the floor plan for level 1 and **Figure 5-54** depicts the floor plan for level 2.

**Figure 5-53**  
Alternative 2-3 – Level 1



Source: Corgan 2018

**Figure 5-54**  
**Alternative 2-3 - Level 2**

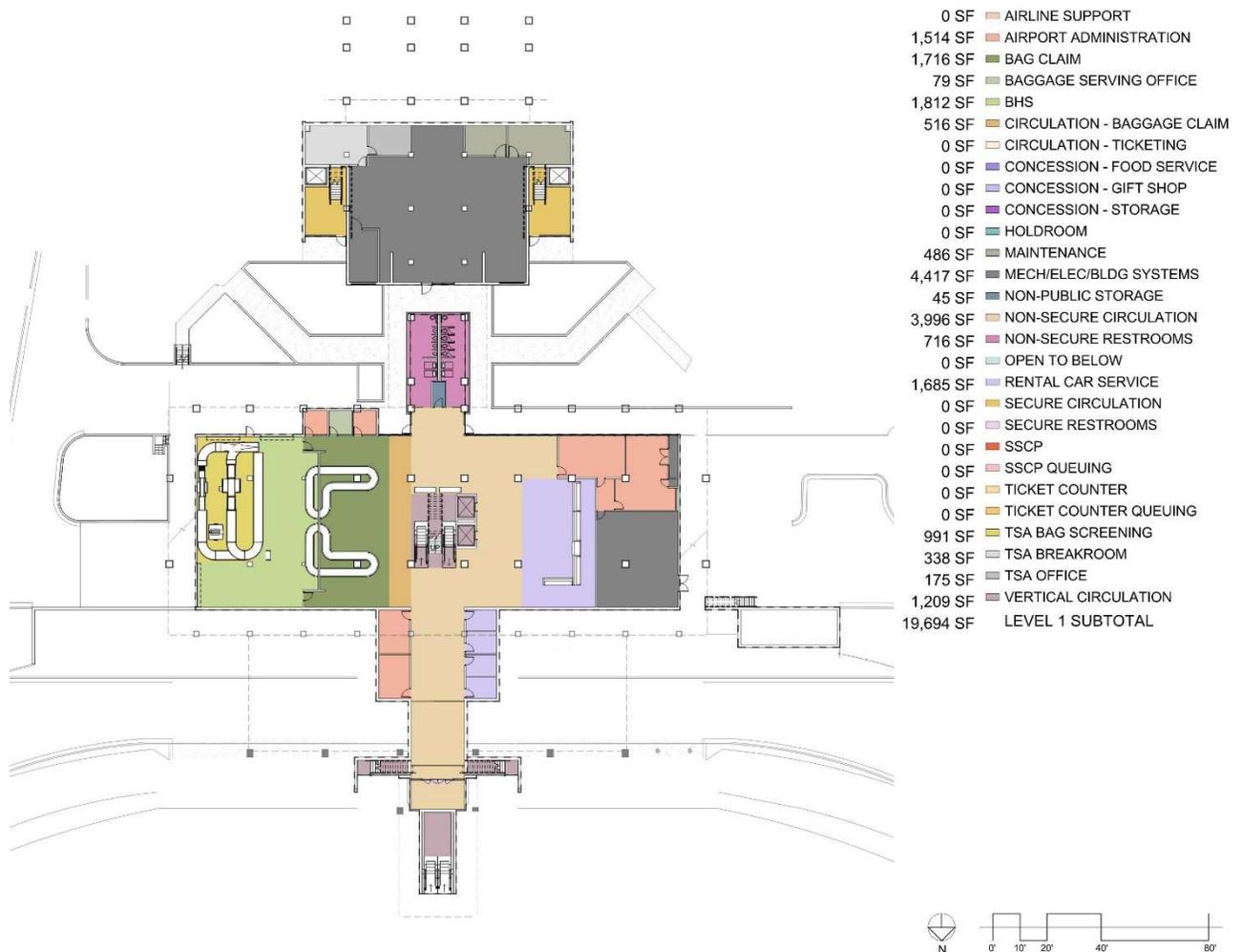


Source: Corgan 2018

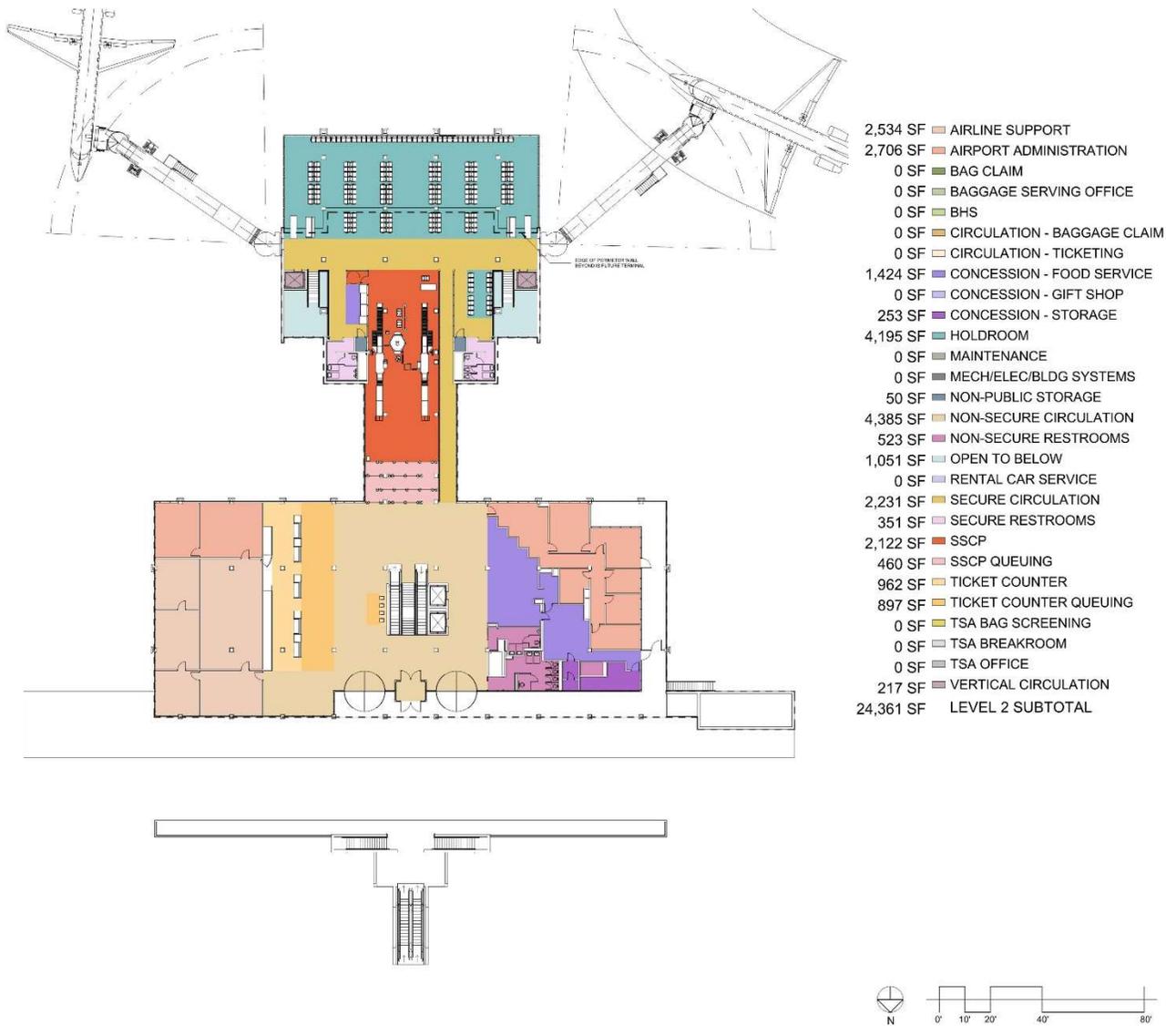
Alternative 2-4

Alternative 2-4 is a similar design to Alternative 2-1 with the exception of how the 2 in-line baggage screening systems are installed. In this alternative, the BHS is designed within a smaller space, without expansion of existing building. **Figure 5-55** depicts the floor plan for level 1 of and **Figure 5-56** depicts the floor plan for level 2.

**Figure 5-55**  
Alternative 2-4 - Level 1



**Figure 5-56**  
**Alternative 2-4 - Level 2**

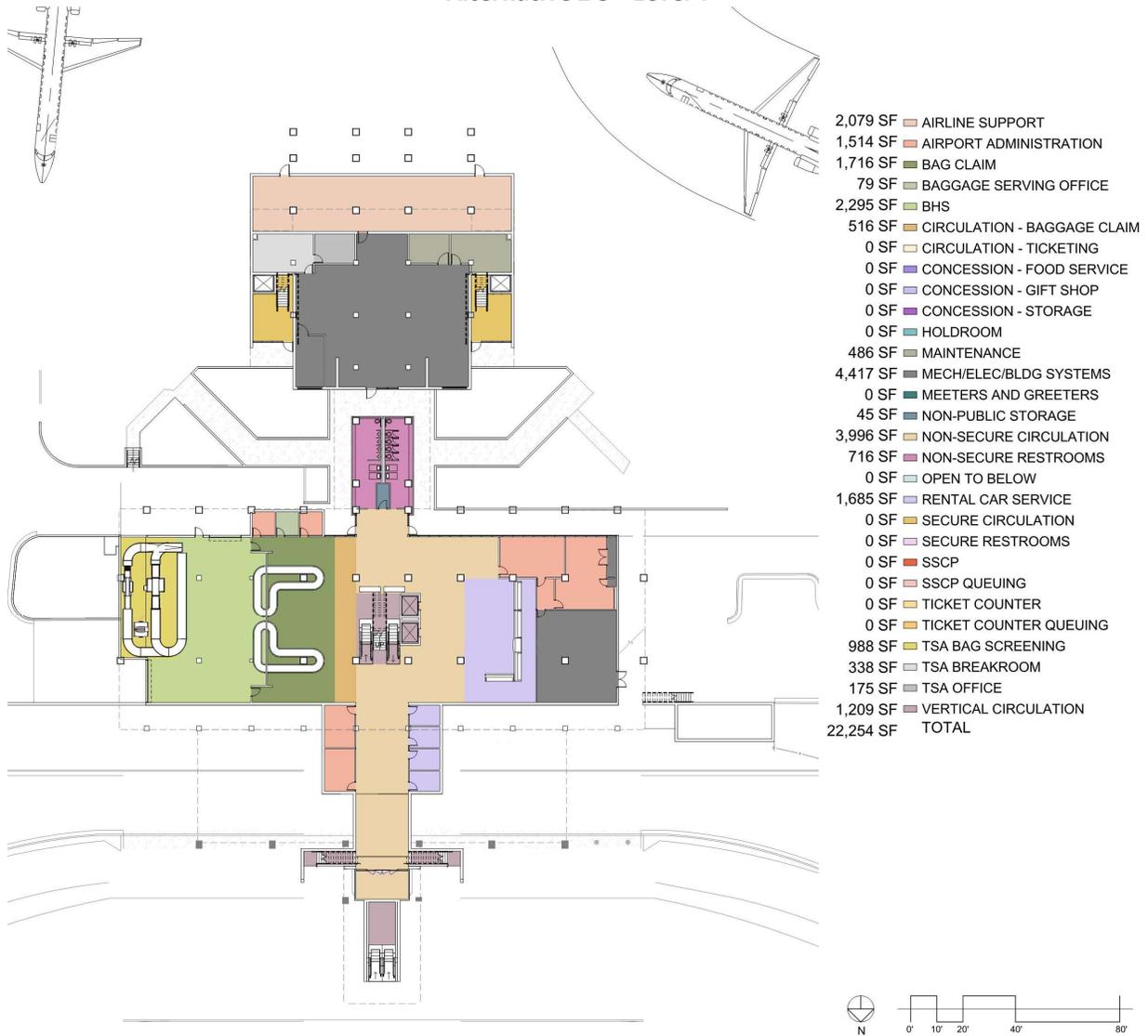


Source: Corgan 2018

### Alternative 2-5

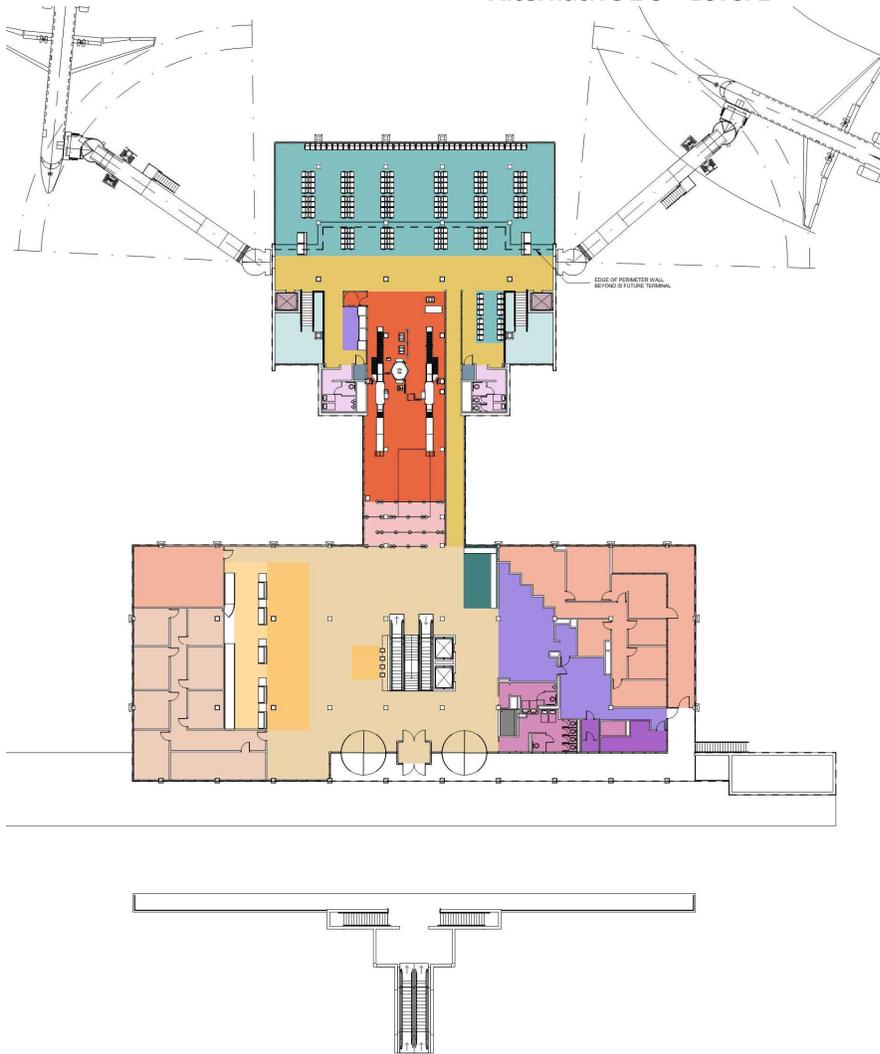
Alternative 2-5 is a similar design to Alternative 2-4. On level 1, the same layout shown in Alternative 2-4 is used with the exception of the new in-line baggage screening system occupying larger space compared to Alternative 2-4, by expanding the existing building to the east. This alternative also adds airline support space on the apron underneath the holdroom expansion. On level 2, the same layout as Alternative 2-4 is used with the exception of the ticketing area. In Alternative 2-5, the office space is reduced behind ticketing which allows for the counters to shift eastward and out of the central lobby, providing a more open space as a result of this. **Figure 5-57** depicts the floor plan for level 1 of alternative 2-5 and **Figure 5-58** depicts the floor plan for level 2.

Figure 5-57  
Alternative 2-5 - Level 1

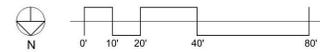


Source: Corgan 2018

Figure 5-58  
Alternative 2-5 - Level 2



2,157 SF	AIRLINE SUPPORT
3,277 SF	AIRPORT ADMINISTRATION
0 SF	BAG CLAIM
0 SF	BAGGAGE SERVING OFFICE
0 SF	BHS
0 SF	CIRCULATION - BAGGAGE CLAIM
0 SF	CIRCULATION - TICKETING
1,420 SF	CONCESSION - FOOD SERVICE
0 SF	CONCESSION - GIFT SHOP
253 SF	CONCESSION - STORAGE
4,195 SF	HOLDROOM
0 SF	MAINTENANCE
59 SF	MECH/ELEC/BLDG SYSTEMS
268 SF	MEETERS AND GREETERS
50 SF	NON-PUBLIC STORAGE
4,619 SF	NON-SECURE CIRCULATION
523 SF	NON-SECURE RESTROOMS
1,051 SF	OPEN TO BELOW
0 SF	RENTAL CAR SERVICE
2,231 SF	SECURE CIRCULATION
351 SF	SECURE RESTROOMS
2,122 SF	SSCP
460 SF	SSCP QUEUING
878 SF	TICKET COUNTER
1,020 SF	TICKET COUNTER QUEUING
0 SF	TSA BAG SCREENING
0 SF	TSA BREAKROOM
0 SF	TSA OFFICE
217 SF	VERTICAL CIRCULATION
25,152 SF	TOTAL



Source: Corgan 2018

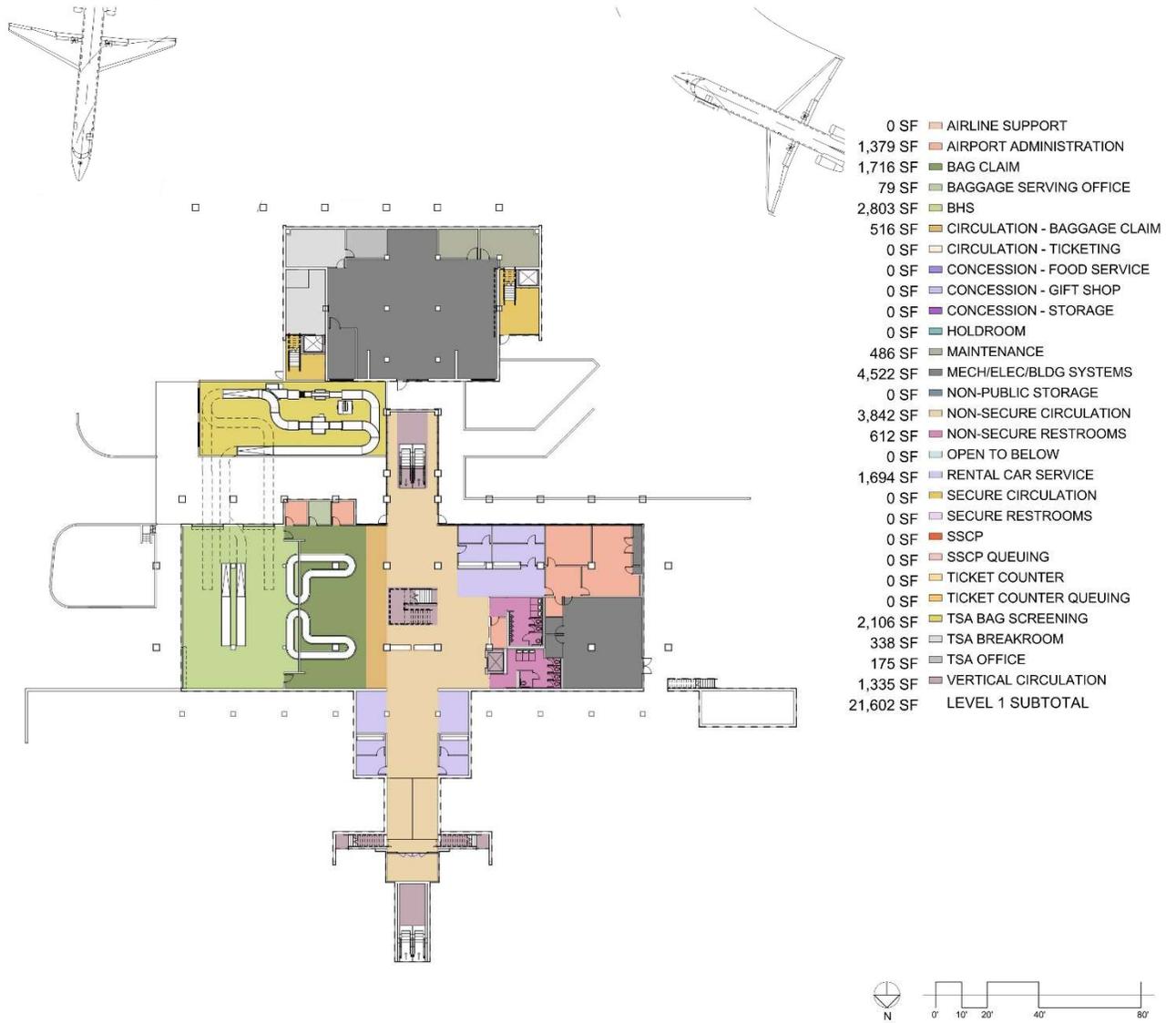
**Description: Alternative 3 - Infill Expansion**

The objective of the infill expansion alternatives were to resolve existing issues by providing larger expansions to the holdroom area, the connector corridor and renovating less area compared to limited-build alternatives. As in limited build alternatives, a common theme for all infill alternatives is the removal of the central retail concessions area on level 2. All 3 infill expansion alternatives require the relocation of 1 PBB rotunda, increasing the complexity of constructability and implementation of the proposed layout.

**Alternative 3-1**

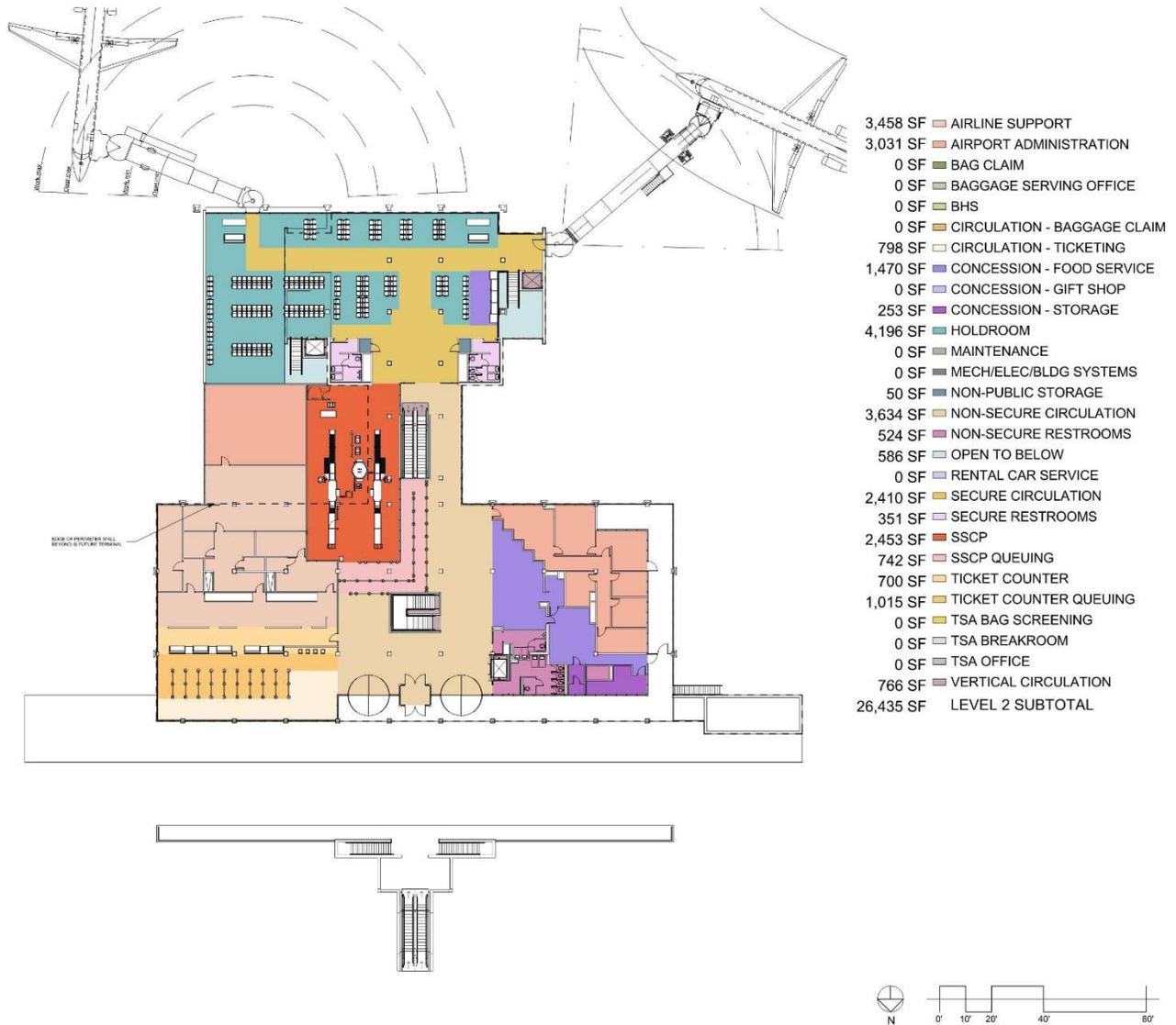
The main factor of infill Alternative 3-1 is the expansion of the bag room area to the south, joining it with the holdroom area. Level 1 of the expansion area is to accommodate a dual in-line bag screening system whereas level 2 of the expansion is utilized by airline offices, airport administration and the expanded SSCP. The holdroom is expanded east to accommodate area requirements and requires a relocation of the PBB rotunda. **Figure 5-59** depicts a floor plan of level 1 for Alternative 3-1 and **Figure 5-60** depicts level 2.

Figure 5-59  
Alternative 3-1 - Level 1



Source: Corgan 2018

**Figure 5-60**  
**Alternative 3-1 - Level 2**

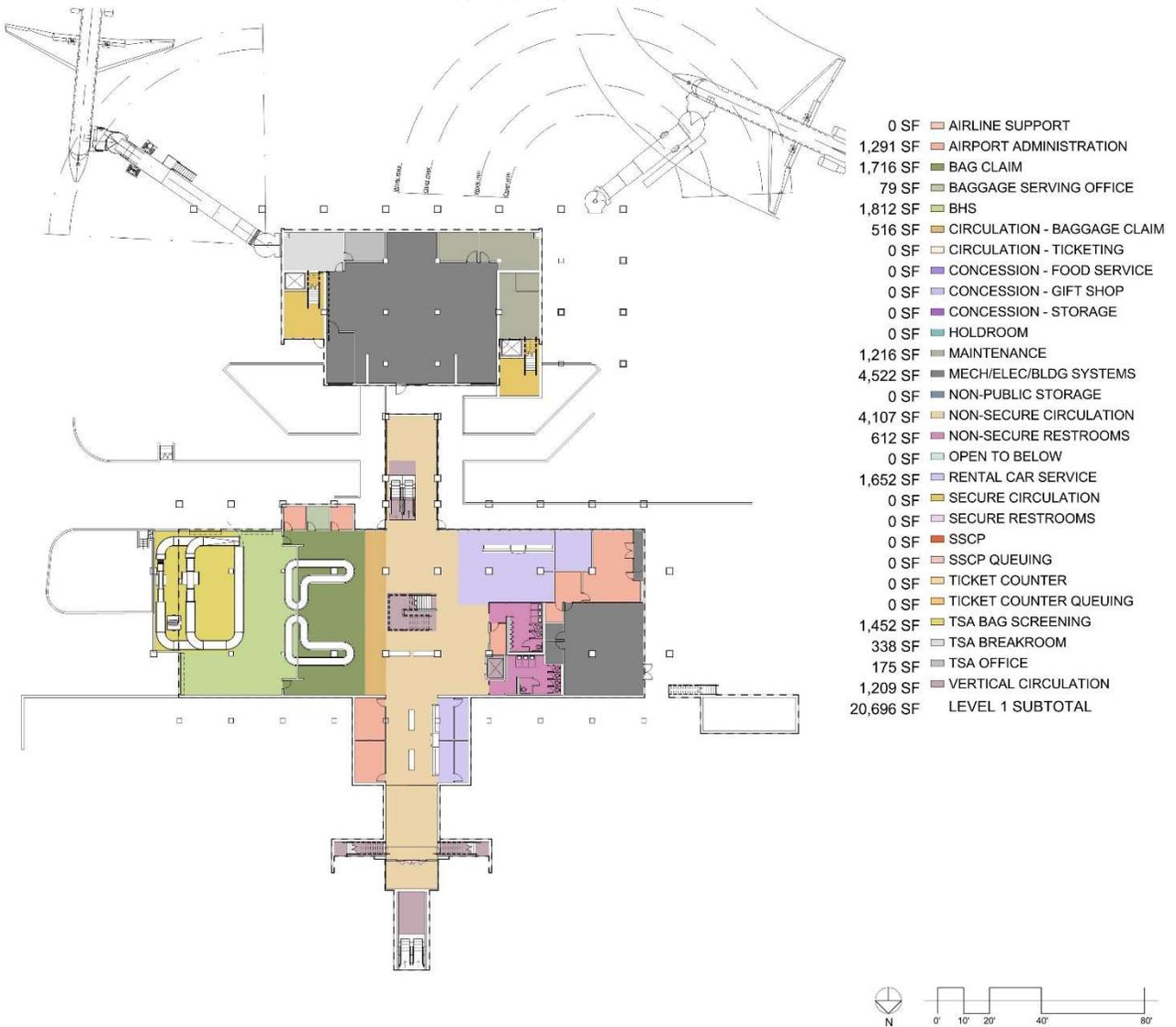


Source: Corgan 2018

Alternative 3-2

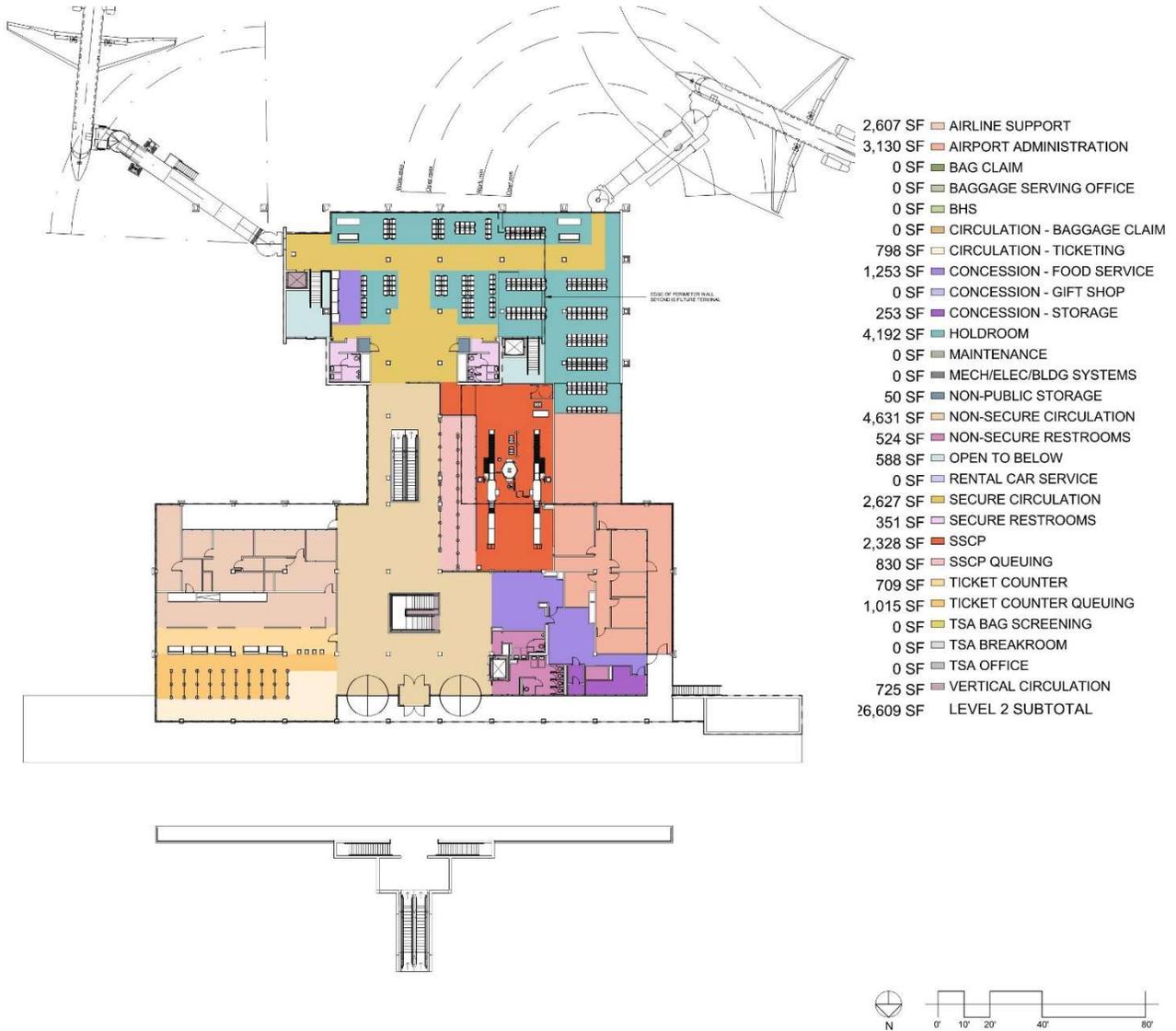
Infill Alternative 3-2 includes a minor expansion on the east side of the bag room to accommodate a dual in-line bag screening system and a significant expansion on level 2. The level 2 expansion is to the west of the connector corridor where airport administration space and room for an expanded SSCP is added. The holdroom is expanded to the west and PBB rotunda is shifted. **Figure 5-61** depicts a floor plan of level 1 for alternative 3-2 and **Figure 5-62** depicts level 2.

**Figure 5-61**  
Alternative 3-2 - Level 1



Source: Corgan 2018

Figure 5-62  
Alternative 3-2 - Level 2

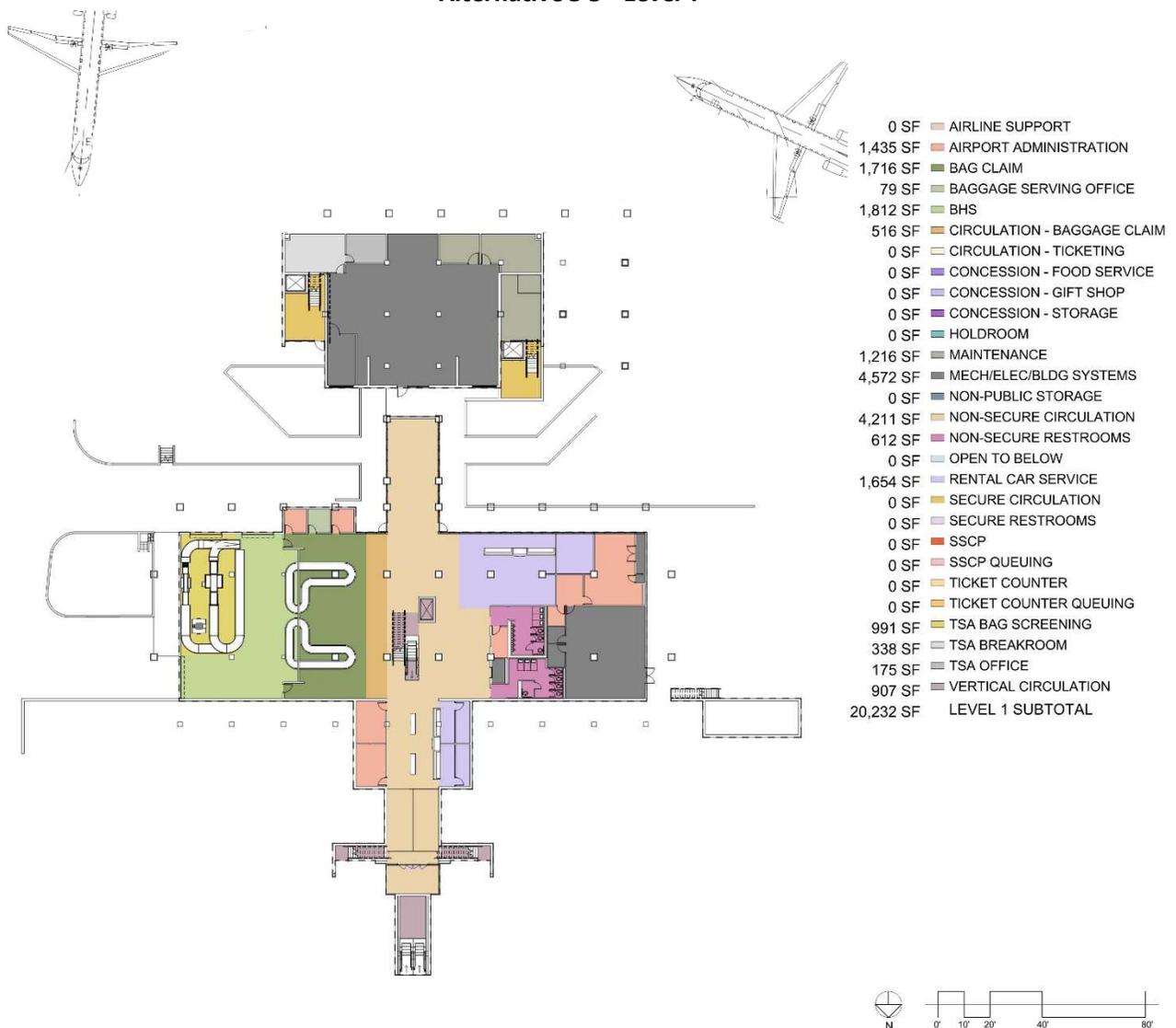


Source: Corgan 2018

Alternative 3-3

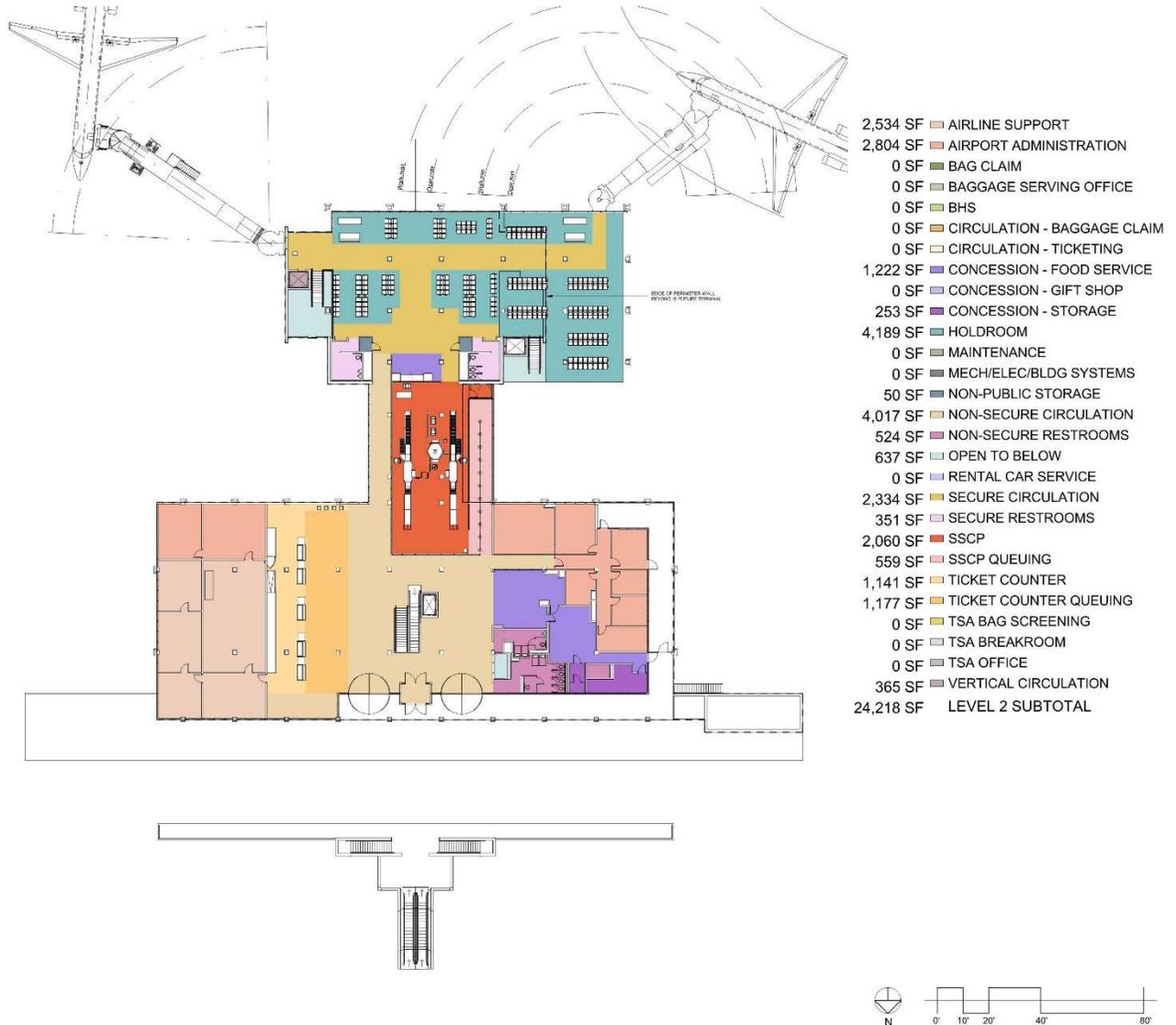
Infill Alternative 3-3 consists of a west expansion of the connector corridor on level 2, forming the same layout as in alternative 3-2. Different from Alternative 3-2 is the ticketing area which is rotated 90 degrees and faces west into the main terminal area. On level 1, the dual in-line bag screening system is compact and located in the southeast corner of the bag room alleviating the need for expansion. **Figure 5-63** depicts a floor plan of level 1 for Alternative 3-3 and **Figure 5-64** depicts level 2.

**Figure 5-63**  
Alternative 3-3 - Level 1



Source: Corgan 2018

Figure 5-64  
Alternative 3-3 - Level 2



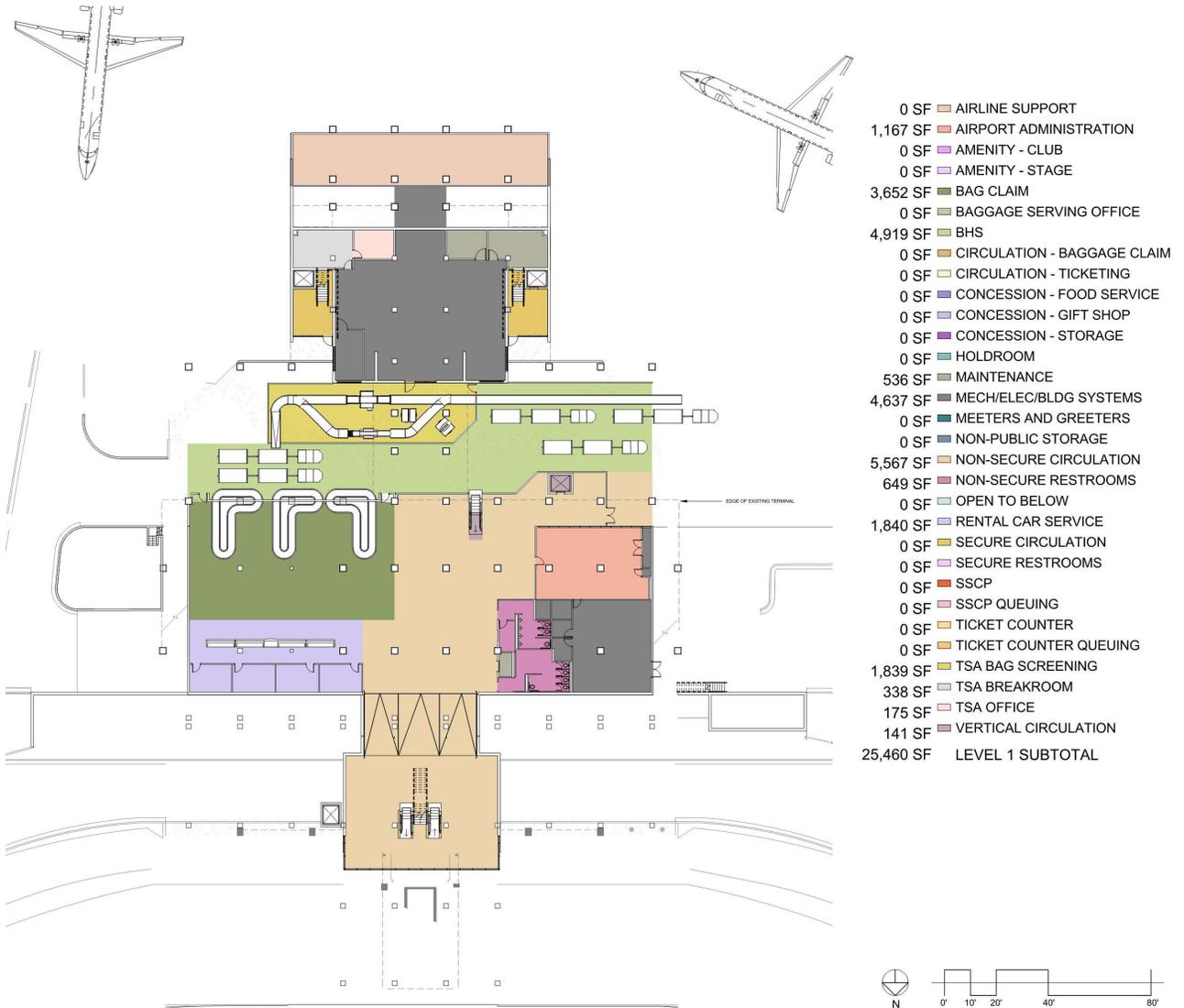
Source: Corgan 2018

**Description: Alternative 4 - Full Expansion**Alternative 4-1

Developed as a result of input received from airport staff, Alternative 4-1 features a significant reallocation of existing terminal building space and a major expansion adding new space. A major component of this alternative is the elimination of the upper level departures curbs, converting the lower level curbs into both a departures and arrivals curbs. Inside the terminal building, the alternative features an enlarged SSCP, enlarged baggage claim, ticketing and airport administration areas and the inclusion of new community spaces and VIP lounge.

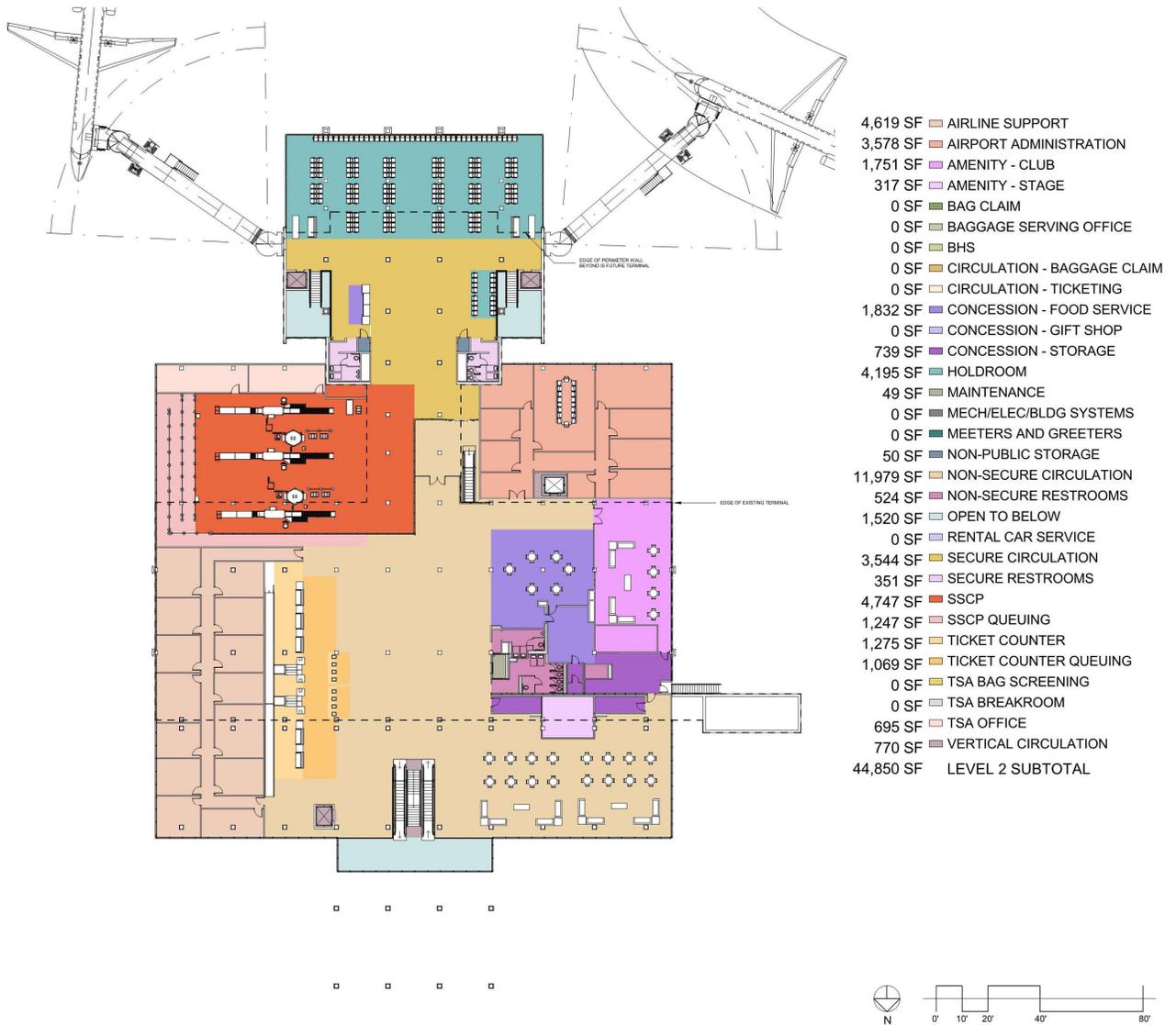
**Figure 5-65** shows level 1 of Alternative 4-1 and **Figure 5-66** shows level 2.

Figure 5-65  
Alternative 4-1 - Level 1



Source: Corgan 2018

Figure 5-66  
Alternative 4-1 - Level 2



Source: Corgan 2018

## ***Terminal Alternatives Evaluation Matrix***

The matrix shown in **Figure 5-67** was developed to compare and evaluate all terminal alternatives against each other using defined criteria based upon ABI's priorities and each alternative's ability to meet facility requirements. The matrix allows all alternatives to be evaluated in a comprehensive manner, identifying pros and cons of each alternative. The matrix includes alternatives from each family:

1. No Expansion
2. Limited Build
3. Infill Expansion
4. Full Expansion

Alternatives are compared using 4 main categories of evaluation criteria which include:

- Functional Areas – Evaluates how alternatives meet facility requirements identified in the facility requirements chapter.
- Wayfinding/Passenger Experience – Evaluates alternatives with regards to passenger experience including walk distances, conflicting passenger flows and intuitive wayfinding.
- Constructability – Evaluates alternatives on the ease of construction including phase-ability and impacts on operations.
- Cost – Compares rough order of magnitude cost estimates for all alternatives based on general square footage rates for new construction or renovations including approximately 20% contingency.

### **Evaluation: Alternative 1 - No Expansion**

The no expansion alternative meets all functional area facility requirements by renovating 20,753 sq. ft. of existing terminal building and a small expansion of 4,138 sq. ft. The area to be renovated is significantly larger in this alternative compared to other alternatives, but the expansion is significantly smaller. Vertical circulation is facilitated by removing all existing escalators, retaining the existing central staircase and adding 2 new elevators adjacent to the existing staircase, where the retail concessions area is located today.

Alternative 1-1 provides arriving passengers with a short, direct and intuitive path of 343 ft. from either boarding gate on upper level to the exit via revolving doors on the northern end of the upper level. The relocation of ticketing to level 1 creates a longer walking distance of 687 ft. for departing passengers, from the terminal building entrance on the northern end of the lower level to any of the boarding gates on the upper level. This path requires changing levels when passengers are departing.

This alternative provides a solution to conflicting passenger flows at check-in areas, bag screening, SSCP queuing, general circulation and rental car queuing areas where existing passenger flows within these areas cross one another.

Since this alternative relies on renovating most of the existing terminal building, constructability challenges can be expected since all modifications are dependent on each other, therefore making it difficult to phase construction. The implementation of this alternative may cause significant disruptions to operations as the terminal expands through the future scenarios.

The rough order of magnitude cost estimated for Alternative 1-1 is \$12 million, lower than any other alternatives.

### ***Evaluation: Alternative 2 - Limited Build***

#### Alternative 2-1

Alternative 2-1 meets most functional area facility requirements with the exception of the area required for an expanded SSCP. The design in Alternative 2-1 provides a 2-lane SSCP in an area of 2,122 sq. ft. Alternative 2-1 includes 6,488 sq. ft. of new building footprint and 18,877 sq. ft. of renovated space inside the existing terminal building.

Alternative 2-1 will enhance the passenger experience as they pass through ABI's renovated terminal. This alternative provides walking distances under 500 ft. for both arriving and departing passengers and minimal level changes (maximum of 1), passengers have a direct and intuitive path to make their way through ABI's facility. Alternative 2-1 also resolves conflicting passenger flows at check-in areas, bag screening, SSCP queuing, general circulation and rental car queuing areas.

Alternative 2-1 presents minor constructability issues, specifically with incremental development due to an expansion being required before the new in-line BHS system can be implemented. This alternative is estimated to have minimal impact on operations, although a temporary exit from the holdroom will be required for arriving passengers to accommodate SSCP modifications.

The rough order of magnitude cost estimate for Alternative 2-1 is \$12.7 million.

#### Alternative 2-2

Alternative 2-2 meets most functional area facility requirements but falls short on the square footage requirements for the SSCP. The design in Alternative 2-2 includes a 2-lane SSCP in an area of 1,857 sq. ft., creating a compact working space for screeners. This alternative comprises of 7,401 sq. ft. of new building expansion and 19,779 sq. ft. of renovated space inside the existing terminal building making this alternative a larger project compared to Alternative 2-1.

Alternative 2-2 will enhance the passenger experience with walking distances close to 500 ft. for both arriving and departing passengers, minimal level changes (maximum of 1) passengers have a direct and intuitive path to make their way through the terminal. This alternative also resolves conflicting passenger flows at check-in areas, bag screening, SSCP queuing, general circulation and rental car queuing areas.

Characteristics of Alternative 2-2 include constructability and spatial dependency challenges, specifically related to phasing. Before the SSCP can be modified and expanded, the secure-side restrooms have to be relocated, which cannot occur until the holdroom expansion is complete. When the interior renovations take place to achieve complete reorientation and expansion of the existing SSCP, passenger screening processes for scheduled flights may be moderately impacted.

The rough order of magnitude cost for Alternative 2-2 is \$13.7 million.

### Alternative 2-3

Similar to other limited build alternatives, Alternative 2-3 meets most functional area facility requirements. However, similar to Alternative 2-1, the area provided for the SSCP is slightly under the area requirement for an expanded SSCP. The design provides a 2 lane SSCP in an area of 2,136 sq. ft. This alternative comprises of 5,854 sq. ft. of new building expansion and 18,469 sq. ft. of renovated space inside the existing terminal building making this alternative a smaller project compared to Alternatives 2-1 and 2-2.

This alternative will enhance the passenger experience. This alternative provides walking distances close to 500 ft. for both arriving and departing passengers, minimal level changes (maximum of 1), passengers have a direct and intuitive path to make their way through the facility. A possible concern is that passengers on level 1 may have trouble finding their respective rental car counter since the rental car companies are separated. This alternative also resolves issues with conflicting passenger flows at check-in areas, bag screening, SSCP queuing, general circulation and rental car queuing areas.

Alternative 2-3 is expected to have moderate constructability issues, specifically with the proposed holdroom expansion, which will require a relocation of the passenger boarding bridges (PBBs) rotundas at both gates. The relocation of the PBB rotundas can be expected to cause an impact on operations as airlines will have to temporarily ground-load aircraft as PBBs are shut down and relocated during construction. However, the proposed holdroom expansion does have the advantage that the 3 different sections can be independently added under a phased construction.

The rough order of magnitude cost estimate for Alternative 2-3 is \$15.5 million which includes relocating 2 PBB rotundas.

#### Alternative 2-4

Alternative 2-4 meets most functional area facility requirements with the exception of the area requirements for an expanded SSCP and BHS. The proposed 2-lane SSCP occupies a 2,122 sq. ft. area. For BHS, requirements state a need for 2,500 sq. ft. The proposed area for BHS accommodating 2 in-line baggage screening systems is only 991 sq. ft. which provides a very small space for screeners to perform inspections on bags. Alternative 2-4 includes 6,027 sq. ft. of new building footprint and 18,877 sq. ft. of renovated space inside the existing terminal building, very similar to Alternative 2-1.

This alternative will improve the passenger experience. This alternative provides walking distances under 500 ft. for both arriving and departing passengers, minimal level changes (maximum of 1), passengers will have a direct and intuitive path to make their way through ABI's facility. Alternative 2-4 also resolves conflicting passenger flows at check-in areas, bag screening, SSCP queuing, general circulation and rental car queuing areas.

Alternative 2-4 is expected to have very few constructability issues, as all modifications can be implemented independently. This alternative is estimated to have minimal impact on operations, although a temporary exit from the holdroom will be required for arriving passengers to accommodate for SSCP modifications.

The rough order of magnitude cost estimate for Alternative 2-4 is \$12.4 million.

#### Alternative 2-5

Alternative 2-5 meets most functional area facility requirements with the exception of the area requirements for the expanded SSCP and BHS. The 2-lane SSCP is approximately 2,122 sq. ft. For the BHS, requirements state a need for 2,500 sq. ft.; however, the 2 in-line systems are located in a 988 sq. ft. area which creates a compact working space for screeners. Alternative 2-5 includes 9,378 sq. ft. of new expansion which is significantly larger than other limited build alternatives and 14,812 sq. ft. of renovated space inside the existing terminal building, which is significantly less than other limited build alternatives. This is due to the addition of airline support space on the lower level with direct apron access underneath the expansion covering the apron which reduces the office space behind ticketing counters and shifts the ticketing layout away from the center of the building.

This alternative will improve the passenger experience. This alternative provides walking distances under 500 feet for both arriving and departing passengers, minimal level changes (maximum of 1), passengers are given a direct and intuitive path to make their way through ABI's facility. Conflicting passenger flow issues are solved at check-in areas, bag screening, SSCP queuing, general circulation and rental car queuing areas where existing passenger flows with these areas are in conflict with one another.

Alternative 5 is expected to have very few constructability issues, as all modifications can be implemented separately. This alternative is estimated to have minimal impact on operations, although a temporary exit from the holdroom will be required for arriving passengers to accommodate for SSCP modifications.

The rough order of magnitude cost estimate for Alternative 2-5 is \$12.6 million.

### **Evaluation: Alternative 3 - Infill Expansion**

#### Alternative 3-1

Alternative 3-1 meets most functional area facility requirements with the exception of the 2 in-line BHS layout. The design team provided a BHS system in a layout where bag screening occupies 2,106 sq. ft., which is relatively large compared to other alternatives. Infill expansion Alternative 3-1 includes 10,009 sq. ft. of new building space and renovation of 14,200 sq. ft.

Existing vertical circulation is retained except the existing elevator is replaced with a larger elevator in the same location.

This alternative provides arriving passengers with a short of 367 ft., however, the path is not intuitive as many existing issues such as the location of the down escalator close to the holdroom exit are still present. The departure path remains the same as today although it is easier for passengers to find their way, in large part due to the removal of the retail concessions. Infill expansion Alternative 3-1 solves most issues with conflicting passenger flows at bag screening, SSCP queuing, general circulation and rental car queuing. Existing conflicts with passenger circulation in check-in areas are still present in the proposed layout.

The relocation of 1 PBB rotunda creates moderate issues in implementation and would impact operations as disruptions are expected at the gate where the PBB will be relocated. Airlines will have to temporarily ground load aircraft while the holdroom expansion is completed and the PBB activated at its new location.

Rough order of magnitude cost estimate for Alternative 3-1 equals \$13.9 million which includes relocating 1 PBB rotunda.

#### Alternative 3-2

Alternative 3-2 meets all functional area facility requirements with 9,277 sq. ft. of new building space and 14,465 sq. ft. of renovated space. Existing vertical circulation is retained with the exception of the existing elevator, which is replaced with a larger elevator in the same location.

Alternative 3-2 provides arriving passengers with a short walking distance of 370 ft. However, the path is not intuitive as many existing issues such as the location of the down escalator close

to the holdroom exit are still present. The departure path of 615 ft. is longer than today although it is easier for passengers to find their way, in large part due to the removal of the retail concessions. This alternative also resolves most conflicting passenger flows at bag screening, SSCP queuing, general circulation and rental car queuing areas. Existing conflicts with passenger circulation in check-in areas are still present in the proposed layout.

The relocation of 1 PBB rotunda creates challenges in project implementation and would impact operations as disruptions are expected at the gate where the PBB will be relocated. Airlines will have to temporarily ground load aircraft while the holdroom expansion is completed and the PBB activated in its new location.

Rough order of magnitude cost estimate for Alternative 3-2 equals \$13.5 million which includes relocating 1 PBB rotunda.

### Alternative 3-3

Infill expansion Alternative 3-3 meets most functional area facility requirements with the exception of the 2-lane SSCP layout and the 2 in-line bag screening systems layout. The proposed SSCP expansion covers an area of 2,060 sq. ft. The design team provided a BHS system in a layout where bag screening occupies 991 sq. ft., which leaves little room for working environment and is smaller compared to other alternatives. Infill expansion Alternative 3-3 includes 6,422 sq. ft. of new building space and renovation of 19,061 sq. ft.

Existing vertical circulation is removed and replaced with a single vertical circulation core in place of the existing the central staircase. The proposed vertical circulation core includes a single down escalator, a single staircase adjacent to the escalator and 1 new elevator adjacent to the escalator.

Arriving and departing passenger paths are moderately long at 524 ft. and 516 ft. respectively. However, circulation paths for are direct and intuitive except for the path for arriving passengers on the lower level where rental car counters are divided into separate locations. Infill expansion Alternative 3-1 solves issues with conflicting passenger flows in check-in, bag screening, SSCP queuing and rental car queuing areas. Existing conflicts with passenger circulation in general circulation areas are still present in the proposed layout where passenger flows cross each other.

The relocation of 1 PBB rotunda presents moderate challenges in project implementation and would impact operations as disruptions are expected at the gate where the PBB will be relocated. Airlines will have to temporarily ground load aircraft while the holdroom expansion is completed and the PBB activated in its new location.

Rough order of magnitude cost estimate for Alternative 3-3 equals \$13.8 million which includes relocating 1 PBB rotunda.

**Evaluation: Alternative 4 - Full Expansion**Alternative 4-1

The full expansion meets all functional area facility requirements and exceeds requirements for areas such as the SSCP where a 3-lane SSCP is provided covering an area of 4,747 sq. ft. The full expansion includes 32,282 sq. ft. of new building space and 27,641 sq. ft. of renovated space.

Existing vertical circulation is removed and replaced with a vertical core located near the building entrance. The vertical core includes dual escalators and a staircase located between the dual escalators. One new elevator is installed adjacent to the ticketing area and one new elevator is installed adjacent to the airport administration entrance. A single downward escalator is installed at the holdroom exit to be used by arriving passengers to descend to the bag claim area on level 1.

This option provides arriving passengers with a short and intuitive path of 393 ft. The path for departing passengers is moderately long compared to other alternatives at 559 ft. but remains within industry standards of 1,000 linear ft. for maximum unassisted walk distance. The departures path requires passengers to make one level change to reach check-in and SSCP. The alternative solves all conflicting passenger flow issues in check-in, bag screening, SSCP queuing, general circulation and rental car queuing areas.

The major expansion in different sections of the building facilitate ease of constructability and implementation for this alternative. The development of this alternative is expected to have limited impacts on operations with a temporary holdroom exit required to accommodate the expansion and relocation of the SSCP.

The rough order of magnitude cost estimate for this major renovation and expansion project is expected to be \$32.9 million not including the cost of roadway modifications required to the terminal approach roadway and curb.

**Alternative Evaluation Conclusion**

The selected preferred terminal development alternative is identified and discussed in the Recommended Terminal Area Development section.

Figure 5-67  
Terminal Alternatives Evaluation Matrix

Abilene Regional Airport Comparison Matrix CORGAN June 21, 2018												
		FACILITY REQ.	1-1	2-1	2-2	2-3	2-4	2-5	3-1	3-2	3-3	4-1
<b>1 FUNCTIONAL AREAS</b>												
A	Holdroom	4,192 SF	4,117 SF	4,195 SF	4,196 SF	4,190 SF	4,195 SF	4,195 SF	4,196 SF	4,192 SF	4,189 SF	4,195 SF
	Gates	2	2	2	2	2	2	2	2	2	2	2
	Relocated PBB Rotunda	0	0	0	0	2	0	0	1	1	1	0
B	Security Screening Checkpoint (SSCP)	2,400 SF	2,367 SF	2,122 SF	1,857 SF	2,136 SF	2,122 SF	2,122 SF	2,453 SF	2,328 SF	2,060 SF	4,747 SF
	SSCP Lanes	2	2	2	2	2	2	2	2	2	2	3
C	Baggage Screening	2,500 SF	1,381 SF	1,452 SF	1,452 SF	1,452 SF	991 SF	988 SF	2,106 SF	1,452 SF	991 SF	1,839 SF
	In-line Explosives Detection System	2	2	2	2	2	2	2	2	2	2	2
D	Additional Square Footage	0	4,138	6,488	7,401	5,854	6,027	9,378	10,009	9,277	6,422	32,282
E	Renovated Square Footage	0	20,753	18,877	19,779	18,469	18,877	14,812	14,200	14,465	19,061	27,641
F	Vertical Cores	-										
	Escalators	-	Removed existing	Relocated to replace central staircase	Relocated to replace central staircase	Relocated to replace central staircase	Relocated to replace central staircase	Relocated to replace central staircase	Retained	Relocated	Removed existing 1 new down escalator to replace central staircase	1 down at holdroom exit Dual escalators located at building entrance
	Staircase	-	Retained	Removed existing New single stair between escalators	Removed existing New single stair between escalators	Removed existing New single stair between escalators	Removed existing New single stair between escalators	Removed existing New single stair between escalators	Retained	Retained	Removed existing Single stair added adjacent to escalator	Remove existing. Staircase located in between dual escalators
	Elevator	-	Removed existing 2 new adjacent to staircase	Removed existing 2 new adjacent to escalators	Removed existing 2 new adjacent to escalators	Removed existing 2 new adjacent to escalators	Removed existing 2 new adjacent to escalators	Removed existing 2 new adjacent to escalators	Replace with larger elevator in same location	Replace with larger elevator in same location	Remove existing 1 new adjacent to escalator	Remove existing. 1 new by ticketing and 1 new by airport administration
<b>2 WAYFINDING/PASSENGER EXPERIENCE</b>												
A	Passenger Walk Distance (feet)	-										
	Departing Passengers	-	687	412	424	415	412	456	550	615	524	559
	Arriving Passengers	-	343	498	529	500	498	389	367	370	516	393
B	Conflicting Passenger Flows	-										
	Check-in	-	Resolved	Resolved	Resolved	Resolved	Resolved	Resolved	Not Resolved	Not Resolved	Resolved	Resolved
	Bag Screening	-	Resolved	Resolved	Resolved	Resolved	Resolved	Resolved	Resolved	Resolved	Resolved	Resolved
	SSCP Queuing	-	Resolved	Resolved	Resolved	Resolved	Resolved	Resolved	Resolved	Resolved	Resolved	Resolved
	General Circulation	-	Resolved	Resolved	Resolved	Resolved	Resolved	Resolved	Resolved	Resolved	Not Resolved	Resolved
	Rental Car Queue	-	Resolved	Resolved	Resolved	Resolved	Resolved	Resolved	Resolved	Resolved	Resolved	Resolved
C	Direct and Intuitive Path	-										
	Departing Passengers	-										
	Level 1	-	NO	YES	YES	YES	YES	YES	NO	NO	YES	YES
	Level 2	-	YES	YES	YES	YES	YES	YES	NO	NO	YES	YES
	Arriving Passengers	-										
	Level 1	-	YES	YES	YES	NO	YES	YES	NO	NO	NO	YES
	Level 2	-	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
<b>3 CONSTRUCTABILITY</b>												
	Incremental Development	-	DIFFICULT	MODERATE	MODERATE	MODERATE	EASY	EASY	MODERATE	MODERATE	MODERATE	EASY
	Summary	-	All modifications are dependent on each other and dividing renovations into separate phases is not feasible.	Expansion required to accommodate baggage screening room.	Holdroom has to expand before secure-side restrooms can move and SSCP modified.	Requires relocation of both PBB rotundas to accommodate holdroom expansion.	All modifications can be made separately increasing ease of implementation.	All modifications can be made separately increasing ease of implementation.	Holdroom expansion requires relocation of 1 PBB rotunda.	Holdroom expansion requires relocation of 1 PBB rotunda.	Holdroom expansion requires relocation of 1 PBB rotunda.	All modifications can be made separately increasing ease of implementation.
	Construction Impact on Operations	-	SIGNIFICANT	LIMITED	MODERATE	SIGNIFICANT	LIMITED	LIMITED	MODERATE	MODERATE	MODERATE	LIMITED
	Summary	-	Check-in, bag screening and SSCP operations to be significantly impacted.	Temporary exit from holdroom for arriving passengers to accommodate SSCP modifications.	Temporary exit from holdroom for arriving passengers to accommodate SSCP modifications. SSCP operations also impacted.	Passenger boarding will have to be ground loading for all gates while PBBs are shut down and relocated with holdroom expansion.	Temporary exit from holdroom for arriving passengers to accommodate SSCP modifications.	Temporary exit from holdroom for arriving passengers to accommodate SSCP modifications.	Passenger boarding will have to be ground loading for 1 gate while PBBs are shut down and relocated with holdroom expansion.	Passenger boarding will have to be ground loading for 1 gate while PBBs are shut down and relocated with holdroom expansion.	Passenger boarding will have to be ground loading for 1 gate while PBBs are shut down and relocated with holdroom expansion.	Temporary exit from holdroom for arriving passengers to accommodate SSCP modifications.
<b>4 COST</b>												
A	New Construction	-	\$2,600,000	\$4,100,000	\$4,700,000	\$3,700,000	\$3,800,000	\$5,900,000	\$6,300,000	\$5,800,000	\$4,000,000	\$20,300,000
B	Renovation	-	\$9,400,000	\$8,600,000	\$9,000,000	\$8,400,000	\$8,600,000	\$6,700,000	\$6,500,000	\$6,600,000	\$8,700,000	\$12,600,000
C	Total	-	\$12,000,000	\$12,700,000	\$13,700,000	\$15,500,000	\$12,400,000	\$12,600,000	\$13,900,000	\$13,500,000	\$13,800,000	\$32,900,000

Source: Corgan 2018

## *Landside Alternatives*

Landside alternatives addressed requirements for landside facilities identified in the facility requirements chapter. Alternatives revolved mainly around identifying possible on-airport locations for a rental car maintenance facility as well as efforts to address line of sight issues within the geometry of Airport Boulevard and Airport Parking Circle.

### **Rental Car Service/Maintenance Facility**

Rental car companies identified the need for an on-site facility where they could perform preventative and light maintenance on their vehicles as well as get vehicles ready for customers. The new rental car service/maintenance facility would house 4 maintenance bays (1 for every rental car company) and a 5<sup>th</sup> bay that would serve as a car wash. Six locations were identified for the location of this facility as shown in **Figure 5-68**.

#### Location 1

This location is located south of Airport Boulevard to the east of Bonanza Drive. Access to this location would be from Airport Boulevard.

#### Location 2

This location is located on the south side of a large abandoned lot to the east of Airport Boulevard. Access to this location would be through a frontage road branching off Airport Boulevard.

#### Location 3

This location is located on the east end of the Rental Car overflow parking lot located to the east of Airport Boulevard. Access to this location would be through a frontage road branching off Airport Boulevard.

#### Location 4

This location is located east of Bonanza Drive to the south of an existing airport maintenance facility. Access to this location would be from Bonanza Drive.

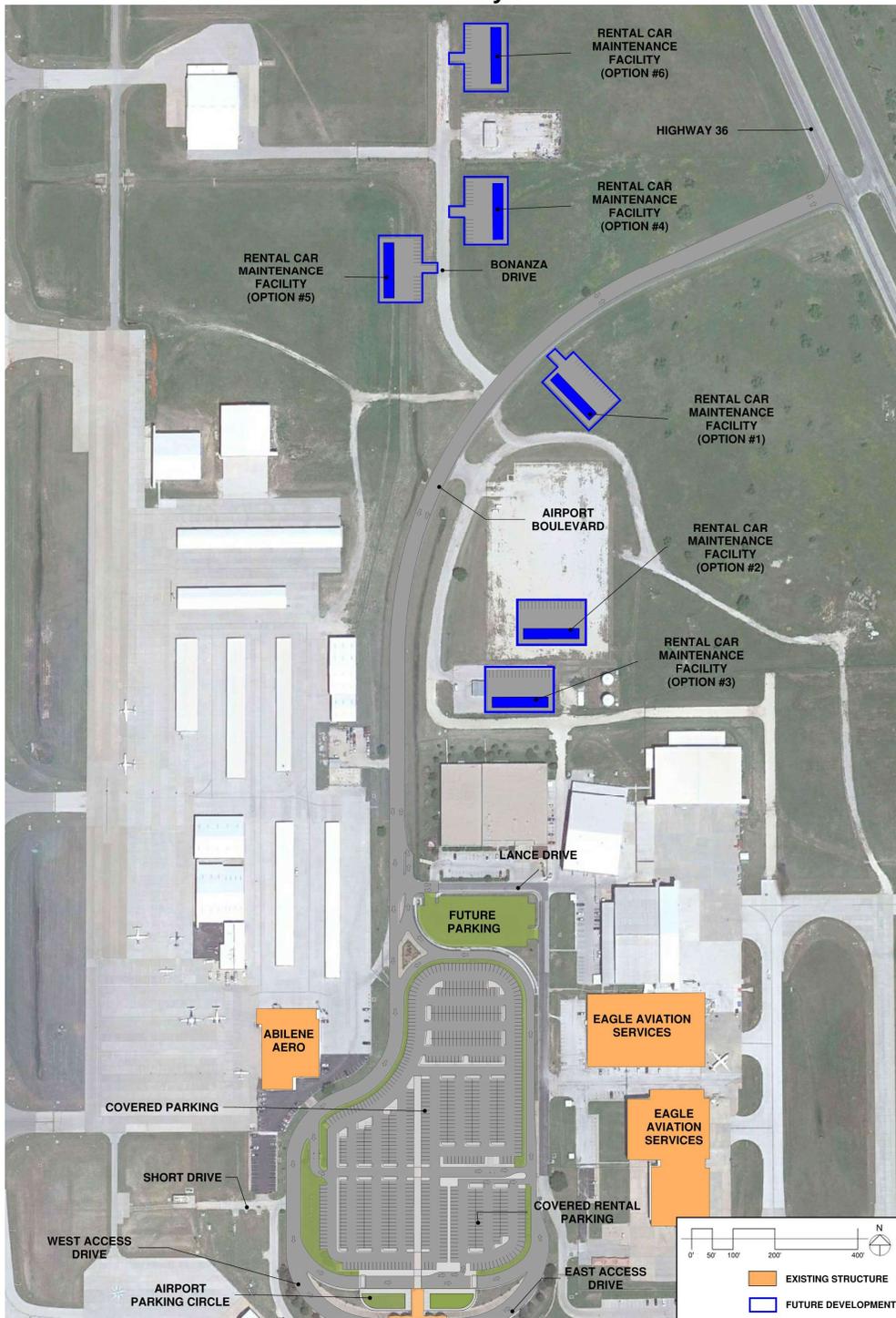
#### Location 5

This location is located west of Bonanza Drive opposite location 4. Access to this location would be from Bonanza Drive.

#### Location 6

This location is located east of Bonanza Drive to the north of an existing airport maintenance facility. Access to this location would be from Bonanza Drive.

Figure 5-68  
Rental Car Maintenance Facility Location Alternatives



Source: Corgan 2018

## *Recommended Terminal Area Development*

In order to develop a comprehensive terminal area plan, the next step was to select one of the terminal development alternatives and pair it with appropriate landside alternative. After conducting a comparative analysis of the alternatives and input from the Master Plan Steering Committee, Alternative 4-1 was selected as the preferred alternative for terminal development. This alternative requires modifications to the geometry of roadways approaching the terminal and terminal curbsides.

### ***Terminal***

The recommended terminal alternative selected is Alternative 4-1, shown in **Figure 5-69** and **Figure 5-70**, requires significant expansion and renovation of existing terminal building. It provides a central main entrance into the terminal on the lower level, eliminating the need for upper level roadway. As the building gains significant square footage, it offers enlarged SSCP and enlarged baggage claim, ticketing and airport administration areas. It also provides additional space for community events and offers designated area for a VIP lounge.

#### Ticketing Area

The ticketing area is located on the upper level oriented north-south and facing west. It consists of 5 check-in counters and 8 self-check-in kiosks. Two self-bag-drop machines are provided in the center. The counters including movement area behind them cover 1,275 sq ft.

The queueing area in front of the counters covers 1,069 sq ft. Departing passengers can access the ticketing area by taking escalators at the main entrance on the lower level, located on the northern end of the building. They enter a large open space inviting them into the terminal and can choose to go to check-in counters or walk straight towards the SSCP.

#### TSA Security Screening Checkpoint

The SSCP is located on the east side of the terminal oriented east west. It follows the standard TSA checkpoint layout and consists of three lanes. It covers an area of 4,747 sq ft. exceeding the facility requirements. The queuing area begins just south of ticketing counters. It measures 1,247 sq ft., which is sufficient for three lanes. 695 sq ft. of office space is provided for TSA. The SSCP entrance is clearly visible to departing passengers coming up to level 2 because of the open space in the center. After passing through checkpoint, passengers are directed intuitively into the holdroom area.

Arriving passengers can exit the holdroom via a corridor located west of the SSCP. The corridor is equipped with double doors for added security. Its proximity to the checkpoint makes it visible for the TSA personnel allowing them to monitor the corridor from the SSCP.

### Holdrooms

Holdrooms are expanded towards the south increasing the existing building footprint and would cover existing apron area between the two aircraft parking positions. The holdroom area measures 4,195 sq ft. which meets facility requirements. The existing boarding doors for the two gates are retained in their current position, eliminating the need to relocate passenger boarding bridges. 3,554 sq ft. of secure circulation space is gained making the holdroom area more spacious and appealing.

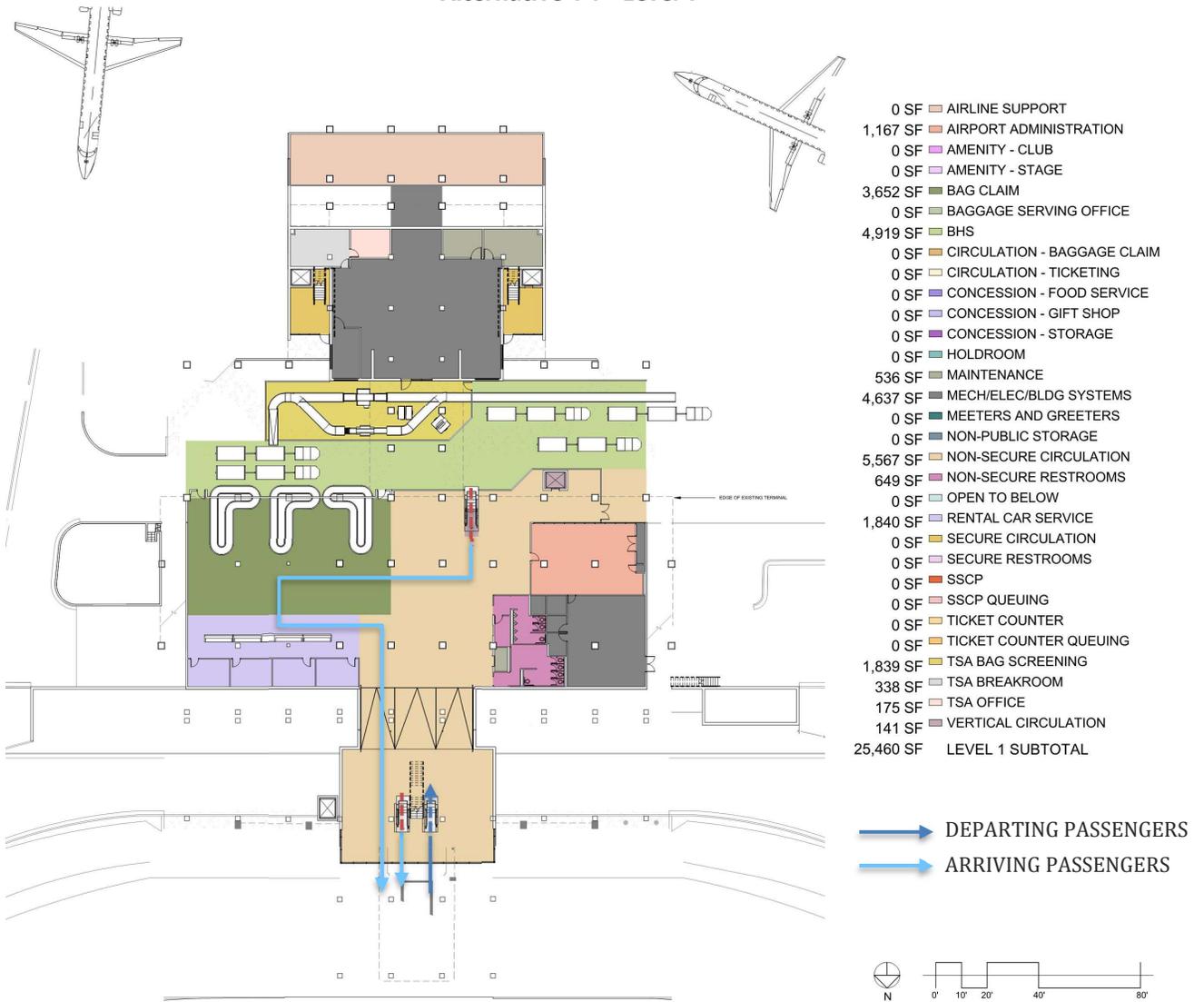
### Concessions and Other Amenities

Non-secure concession space is located on the west side of the upper level. The existing retail space in the center is eliminated. The general location of the restaurant is retained with slight reconfiguration of the seating area. Existing kitchen and storage rooms for the restaurant are retained. The large open space between concessions and ticketing counters can act as a waiting area for meeters and greeters. On the secure side, a concession space is provided that can house a pop-up concession or compact coffee shop or a sandwich shop. Total area combining secure and non-secure concessions measures 1,832 sq ft.

The existing office space behind the restaurant is redesigned to accommodate a VIP lounge. Passengers in the lounge can enjoy natural light and distant views outside the terminal. Entrance to the lounge is provided just south of concessions. The lounge space measures 1,751 sq ft.

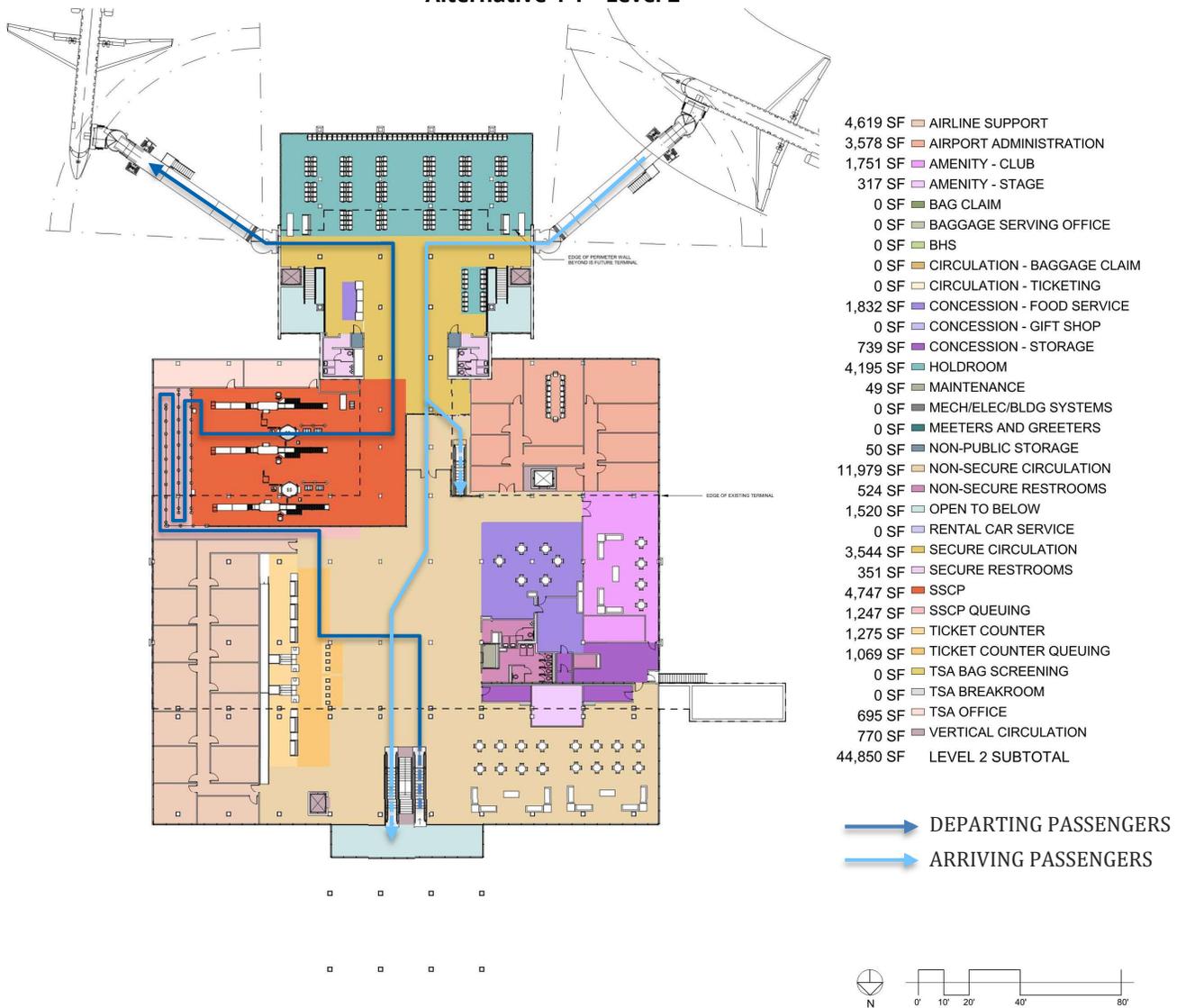
In addition to these amenities, a designated gathering hall is provided in the north-west section of the terminal. It consists of a stage facing north with the restaurant kitchen to the south. Various community activities and entertainment performances can be organized in this space. It can also be used by the airport administration for conducting public meetings.

Figure 5-69  
Alternative 4-1 - Level 1



Source: Corgan 2018

**Figure 5-70**  
**Alternative 4-1 – Level 2**



Source: Corgan 2018

### Baggage Handling System (BHS)

The BHS, located on the lower level, comprises of bag screening, circulation area for bag carts and the baggage claim area. The inbound and outbound baggage make-up areas are oriented east west passing underneath the existing connector corridor. The bag screening room is located just north of the mechanical room in the northern section of the terminal building. It consists of 2 in-line EDS machines that are fed by conveyor belts coming from the ticketing area on the upper level. After going through the EDS machines, outbound baggage would be picked on west side of the terminal. Sufficient circulation space and make-up area is provided for two carts to stage behind each other to pick up outbound baggage. The inbound baggage area is located to the east side of the terminal building. 3 flat-plate devices can be accommodated in the provided area.

### Baggage Claim and Rental Car Services

The baggage claim area located in the eastern section of the terminal measures 3,652 sq ft. The area exceeds the facility requirements. Arriving passengers coming down from the southern escalator can access the bag claim directly to their right as they arrive on the lower level. Four rental car counters are provided on the north of bag claim with dedicated office space. The counters are clearly visible to arriving passengers once they are on the lower level.

### Airport Administration Office Areas

The office spaces are primarily located on the upper level. Offices for airport administration are located in the south-west section of the upper level. The space can accommodate eight offices, a conference room, a breakroom and a reception area. Total area allocated to airport administration measures 3,578 sq ft. Offices for airline employees take up the eastern section of the upper level configured in a linear layout and located conveniently behind ticketing counters. Total area occupied by airline office space measures 4,619 sq ft. Both the airline as well as airport administration office spaces would receive plenty of natural light offering views outside the terminal building. The existing offices for TSA and and breakroom on the lower level are retained. As the upper level is expanded south, the area underneath the upper level expansion can be used as support space or office space for airline employees working on the ramp.

### **Landside**

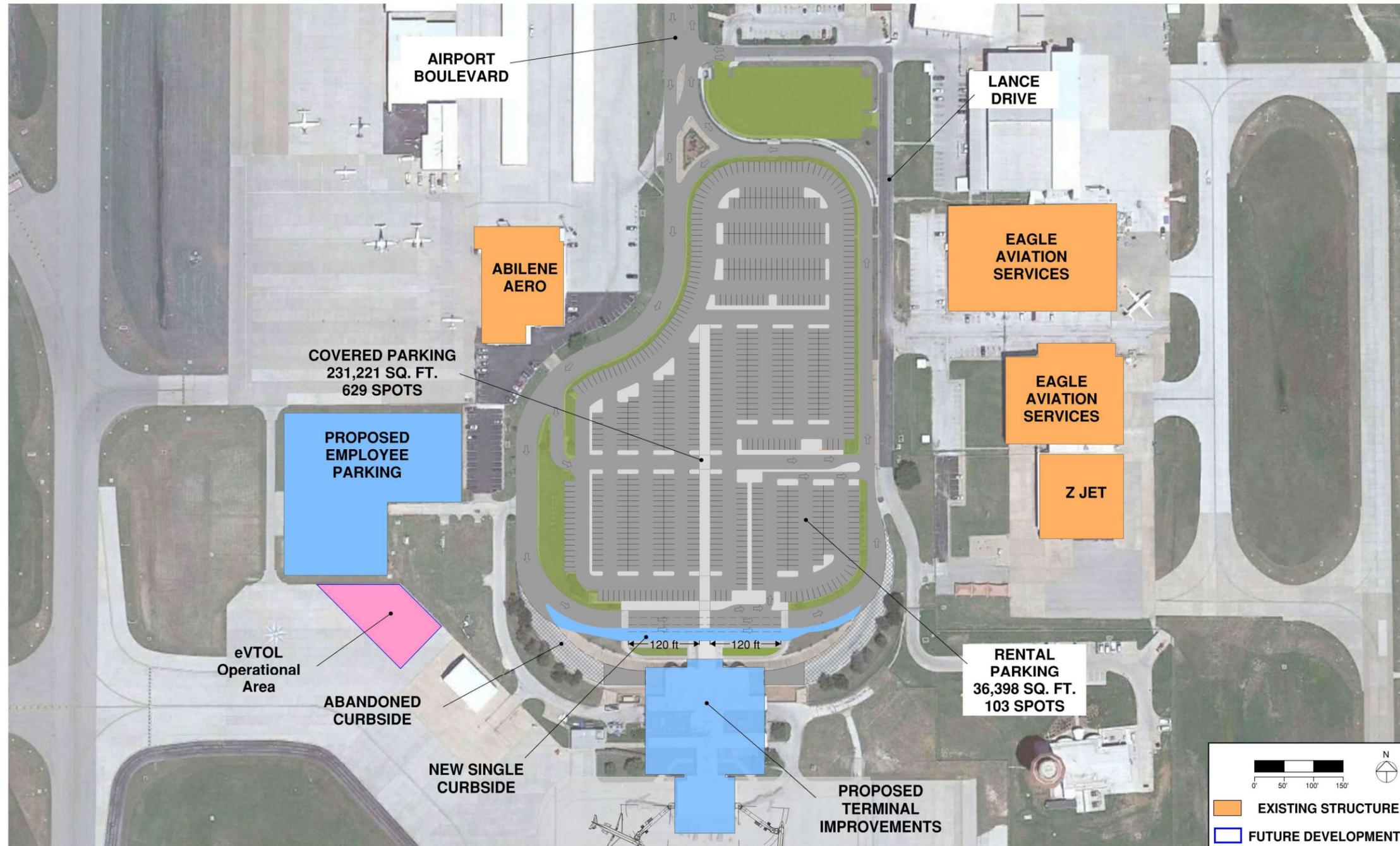
The preferred terminal alternative includes a redevelopment of the airport roadway geometry and curbside as shown in **Figure 5-71**. Existing airport curbside consists of a 2 level curbside with arrivals on the lower level and departures on the upper level. The proposed development changes curbside to a single curbside with all traffic directed to the lower level where there are 2 curbs laid out side by side with a pedestrian crosswalk to divide them. Each curb has a linear length of 120 ft. which is sufficient to meet facility requirements for departures and arrivals curb identified as 65 ft. and 108 ft. respectively. The existing lower level roadway is widened

towards the terminal providing a total width of 51 ft. that includes 3 12-ft. wide lanes and a 15-ft. wide curb for vehicles to park and unload/load.

The geometry of airport parking circle is adjusted to provide a wider and smoother turn into the curbside which serves to improve existing line of sight issues when driving along airport parking circle.

In anticipation of developing UAS technology and future demand for TNC type operations of Vertical Takeoff and Landing (VTOL) vehicles, space will be reserved in the terminal area to accommodate such developing technologies. Between Abilene Aero's FBO area and the main passenger terminal there is space available for accommodating VTOL or UAS passenger operations that provides convenient roadway access and parking for those operations as well as separation from commercial service activities and sterile passenger areas of the terminal.

Figure 5-71  
Proposed Landside Roadway Geometry

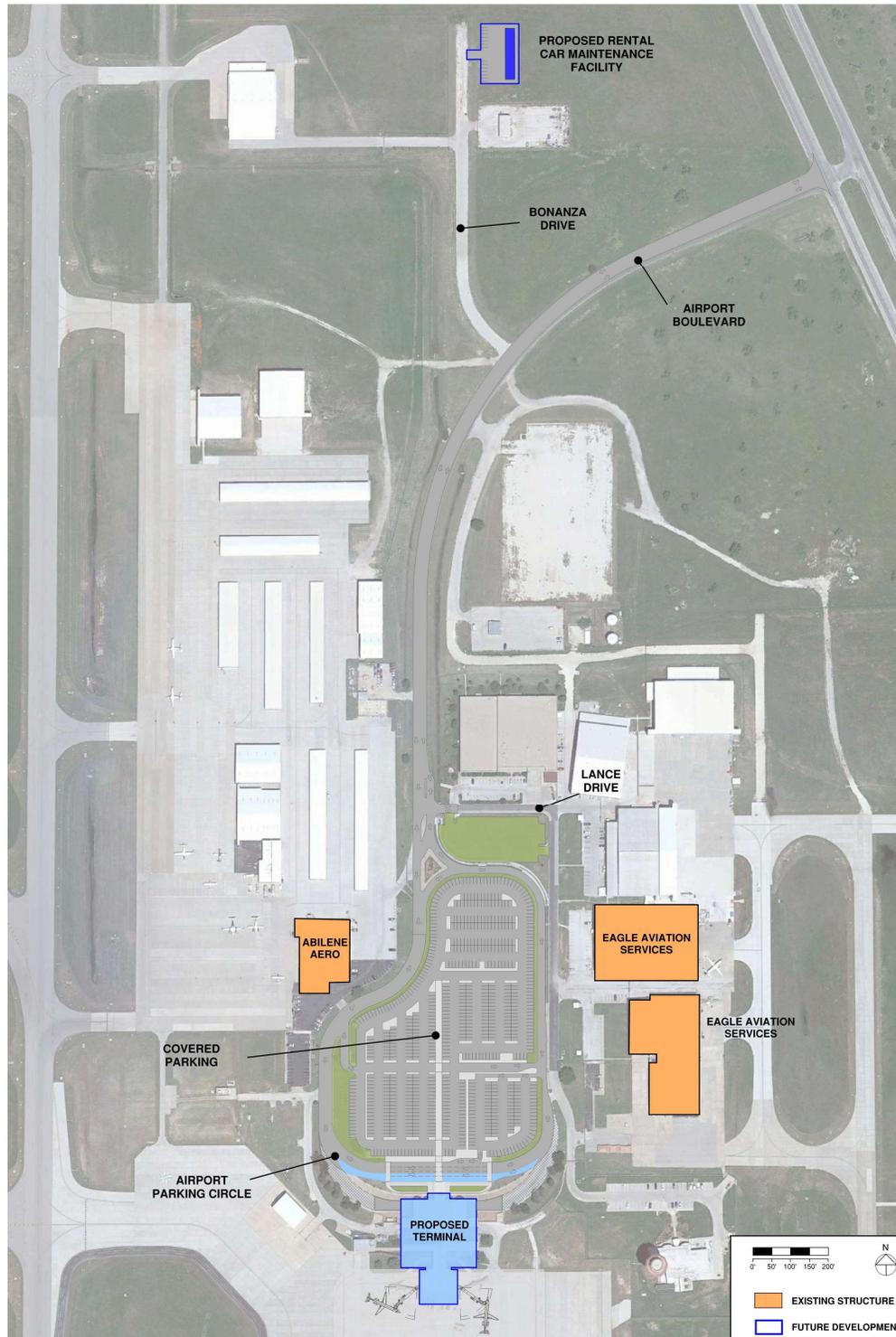


Source: Corgan 2018

**Site Plan**

**Figure 5-72** on the next page displays a terminal area site plan showing the proposed terminal development, proposed roadway geometry and other landside developments. For landside facilities, Location 6 was selected as the preferred location for the rental car maintenance facility. This location's close proximity to an existing airport maintenance facility provides a feasible connection to existing utilities. The location also allows the land on both sides of Airport Boulevard just south of Highway 36 to be allocated for non-aeronautical development.

Figure 5-72  
Proposed Terminal Area Site Plan



Source: Corgan 2018

## Aeronautical Facility Development Alternatives

An airport's aeronautical facilities include its FBOs, corporate hangars, T-hangars, aircraft Maintenance, Repair, and Overhaul (MRO) facilities, and any Specialized Aviation Service Operations (SASO) which include flight training, aerial photography, and other specialized commercial aeronautical operations. At ABI, these facilities include the Abilene Aero facilities, the Eagle Aviation Services, Inc. facilities, and other general aviation or maintenance operations located at ABI.

### *Development Objectives*

As discussed in the forecast chapter, the growth of general aviation activity and based aircraft at ABI is expected to be relatively flat during the forecast period. Consequently, it is possible that the existing general aviation facilities at ABI may be able to accommodate the majority of anticipated demand with minimal expansion. However, it is important that ABI is prepared from a planning perspective to accommodate potential growth in case demand increases. With this considered, the following development objectives were established in the Facility Requirements Chapter to guide the aeronautical facility alternative development process.

- Identify sites and configurations for potential box hangar development.
- Identify sites for limited t-hangar development. The need for T-hangars is expected to be limited as there are currently several empty t-hangar units and the number of single engine piston aircraft on the field are expected to decline in alignment with the nationwide decline in single engine piston aircraft.
- Identify site for potential ramp expansion.
- Establish an expansion plan for EASI facility.

Each of these development objectives will to addressed in the various alternatives that are described throughout the remainder of this section.

### *Aeronautical Facility Development Alternatives*

Based on the development objectives discussed above, the following four alternatives were created. Each of these alternatives portray various ways the aeronautical development objectives could be met.

- ***Alternative #1***
  - Area South of Airport Blvd. and North of the Existing EASI Facility
    - Taxilane E expansion to the north
    - New ramp area.
    - Four (4) new box hangars (200 ft. x 150 ft.)
    - Parking for employees
  - Abilene Aero Area

- Six (6) new box hangars (150 ft. x 150 ft.)
- Existing ramp expansion to the north.
- South Airfield Development Area Between Parallels
  - Four (4) new box hangars (200 ft. x 200 ft.)
  - New roadway to hangars extending from Industrial Blvd.
- Runway 4/22 Redevelopment Area
  - Hangar and ramp development along existing Runway 4/22 (12 box hangars – 200 ft. x 200 ft.)
  - T-Hangar development south of new box hangar development.
  - Removal of existing T-hangar facility located close to new TSTC development.
  - Roadway connecting Navajo Trail to Industrial Blvd.

Aeronautical Facility Development Alternative #1 is shown in **Figure 5-72**.

→ **Alternative #2**

- Area South of Airport Blvd. and North of the Existing EASI Facility
  - Taxilane E expansion to the north
  - New ramp area.
  - Four (4) new box hangars (200 ft. x 150 ft.)
  - Parking for employees
- Abilene Aero Area
  - Six (6) new box hangars (150 ft. x 150 ft.)
  - Existing ramp expansion to the north.
- South Airfield Development Area Between Parallels
  - Four (4) new box hangars (200 ft. x 200 ft.)
  - New roadway to hangars extending from Industrial Blvd.
- Runway 4/22 Redevelopment Area
  - Hangar and ramp development along existing Runway 4/22 (10 box hangars – 200 ft. x 200 ft.) with two expansion pods (6 hangars in one pod and 5 hangars in second pod)
  - T-Hangar development south of new box hangar development.
  - Removal of existing T-hangar facility located close to new TSTC development.
  - Roadway connecting Navajo Trail to Industrial Blvd.

Aeronautical Facility Development Alternative #2 is shown in **Figure 5-73**.

→ **Alternative #3**

- Area South of Airport Blvd. and North of the Existing EASI Facility
  - Taxilane E expansion to the north
  - New ramp area.
  - Four (4) new box hangars (200 ft. x 150 ft.)
  - Parking for employees

- Abilene Aero Area
  - T-Hangar Development
- South Airfield Development Area Between Parallels
  - Four (4) new box hangars (200 ft. x 200 ft.)
  - New roadway to hangars extending from Industrial Blvd.
- Runway 4/22 Redevelopment Area
  - Hangar and ramp development in three 8 hangar pods along proposed western parallel taxiway for Runway 17R/35L.
  - T-Hangar development west of new box hangar development.
  - Removal of existing T-hangar facility located close to new TSTC development.
  - Roadway connecting Navajo Trail to Industrial Blvd.

Aeronautical Facility Development Alternative #3 is shown in **Figure 5-74**.

→ **Alternative #4**

- Area South of Airport Blvd. and North of the Existing EASI Facility
  - Taxilane E expansion to the north
  - New ramp area.
  - Four (4) new box hangars (200 ft. x 150 ft.)
  - Parking for employees
- Abilene Aero Area
  - Six (6) new box hangars (150 ft. x 150 ft.)
  - Existing ramp expansion to the north.
- South Airfield Development Area Between Parallels
  - Four (4) new box hangars (200 ft. x 200 ft.)
  - New roadway to hangars extending from Industrial Blvd.
- Runway 4/22 Redevelopment Area
  - Hangar and ramp development along existing Runway 4/22 (24 box hangars – 200 ft. x 200 ft.) with proposed taxilane.
  - Removal of existing T-hangar facility located close to new TSTC development.
  - Roadway connecting Navajo Trail to Industrial Blvd.

Aeronautical Facility Development Alternative #4 is shown in **Figure 5-75**.

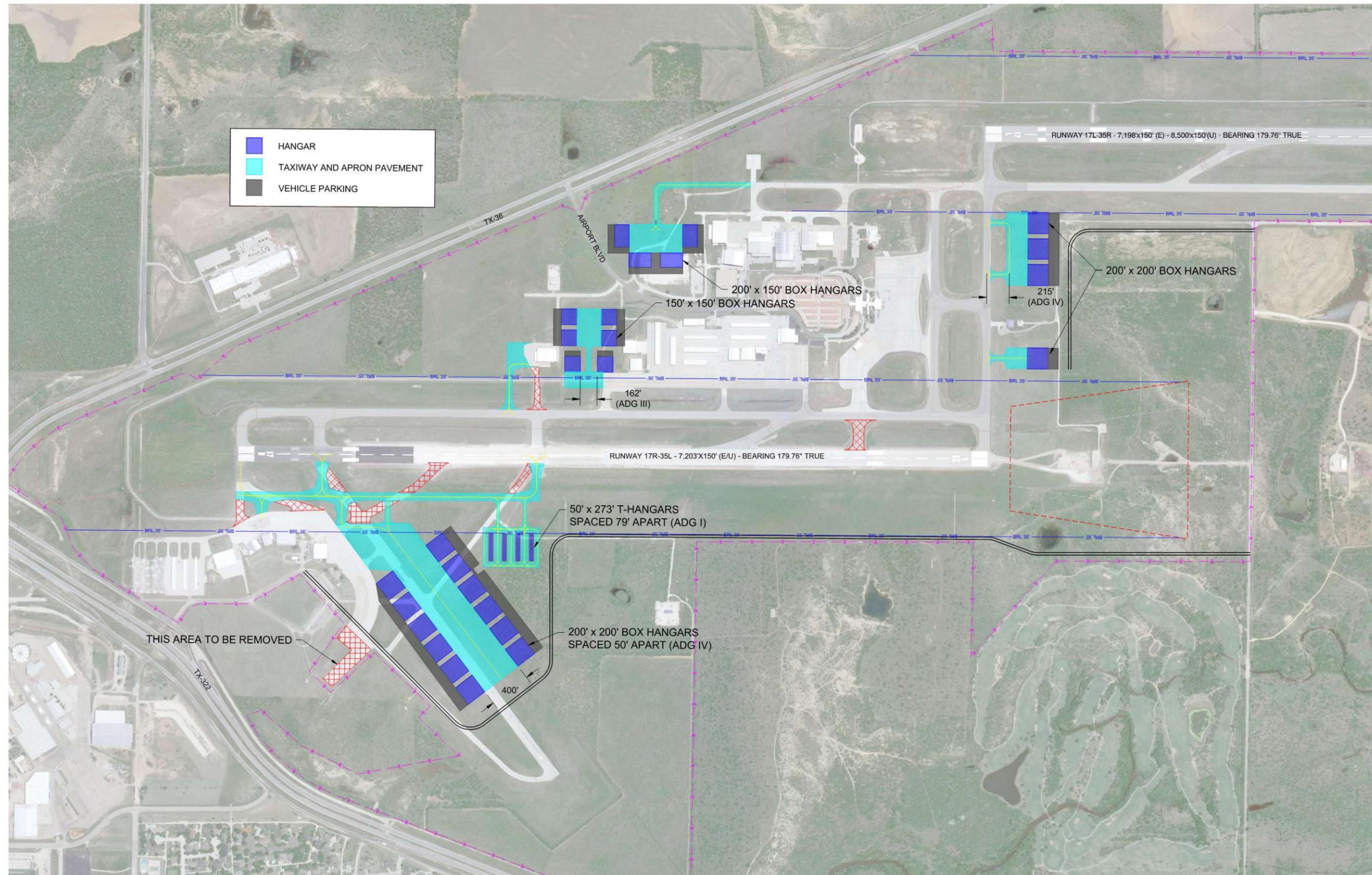
→ **Alternative #5**

- Area South of Airport Blvd. and North of the Existing EASI Facility
  - Taxilane E expansion to the north
  - New ramp area.
  - Four (4) new box hangars (200 ft. x 150 ft.)
  - Parking for employees
- Abilene Aero Area
  - Six (6) new box hangars (150 ft. x 150 ft.)

- Existing ramp expansion to the north.
- South Airfield Development Area Between Parallels
  - Four (4) new box hangars (200 ft. x 200 ft.)
  - New roadway to hangars extending from Industrial Blvd.
- Runway 4/22 Redevelopment Area
  - Hangar and ramp development parallel Taxiway R.
  - Removal of existing T-hangar facility located close to new TSTC development.
  - Roadway connecting Navajo Trail to Industrial Blvd.
  - Former 4/22 Runway and taxiway area available for redevelopment to industrial and/or commercial use.

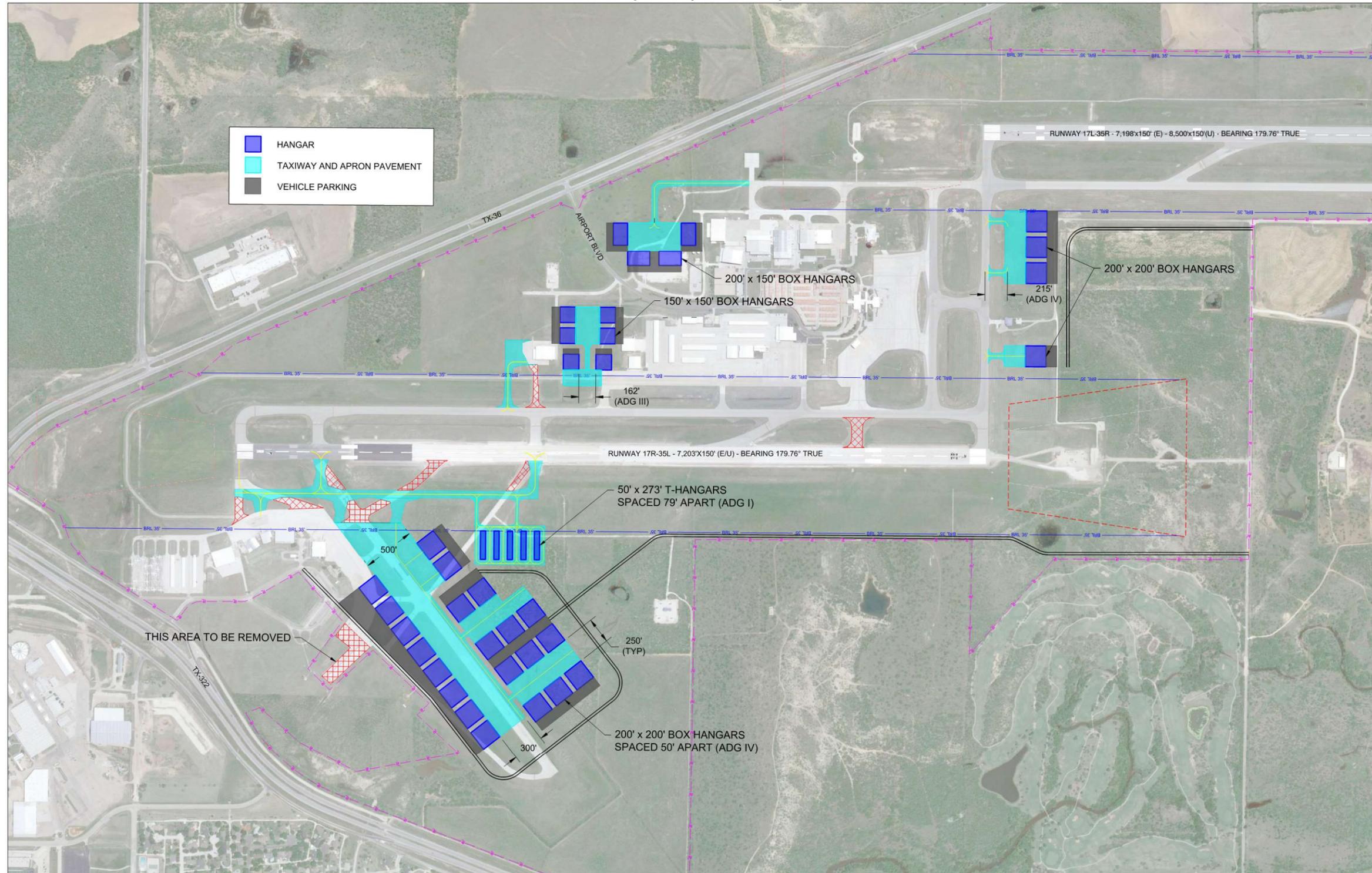
Aeronautical Facility Development Alternative #5 is shown in **Figure 5-76**.

Figure 5-72  
Aeronautical Facility Development Alternative #1



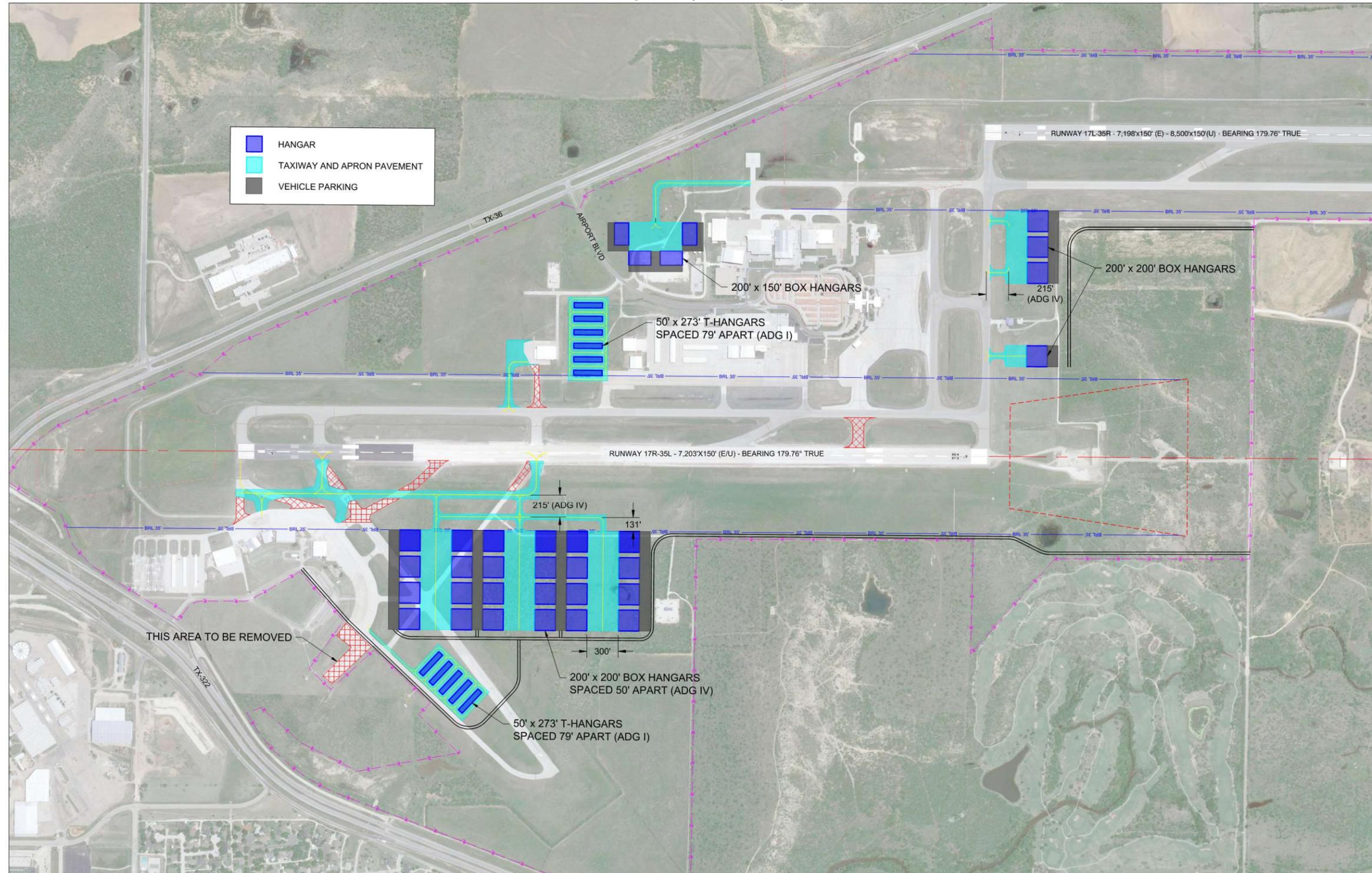
Source: Garver, 2018

Figure 5-73  
Aeronautical Facility Development Facility Alternative #2



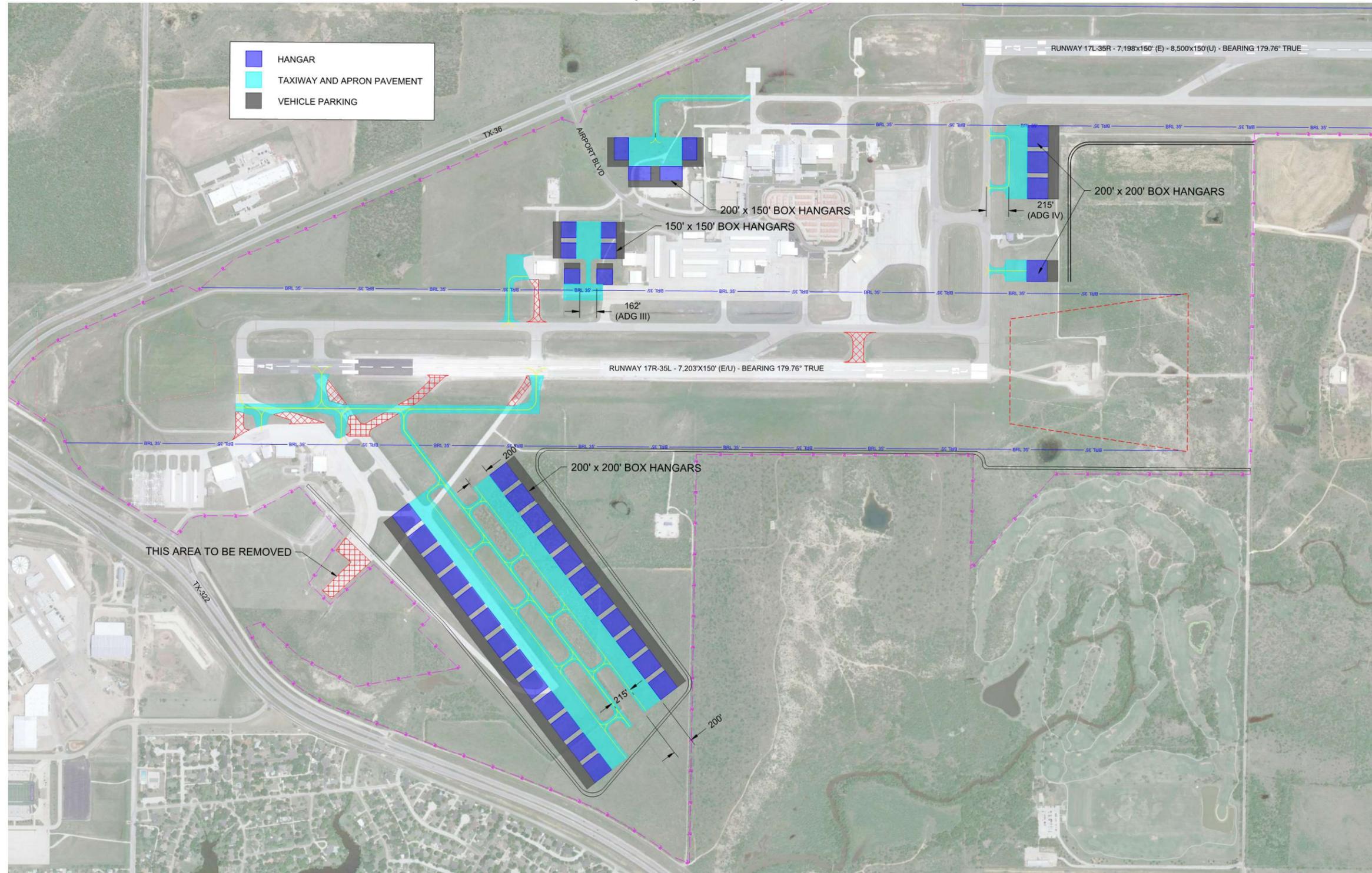
Source: Garver, 2018

Figure 5-74  
Aeronautical Facility Development Facility Alternative #3



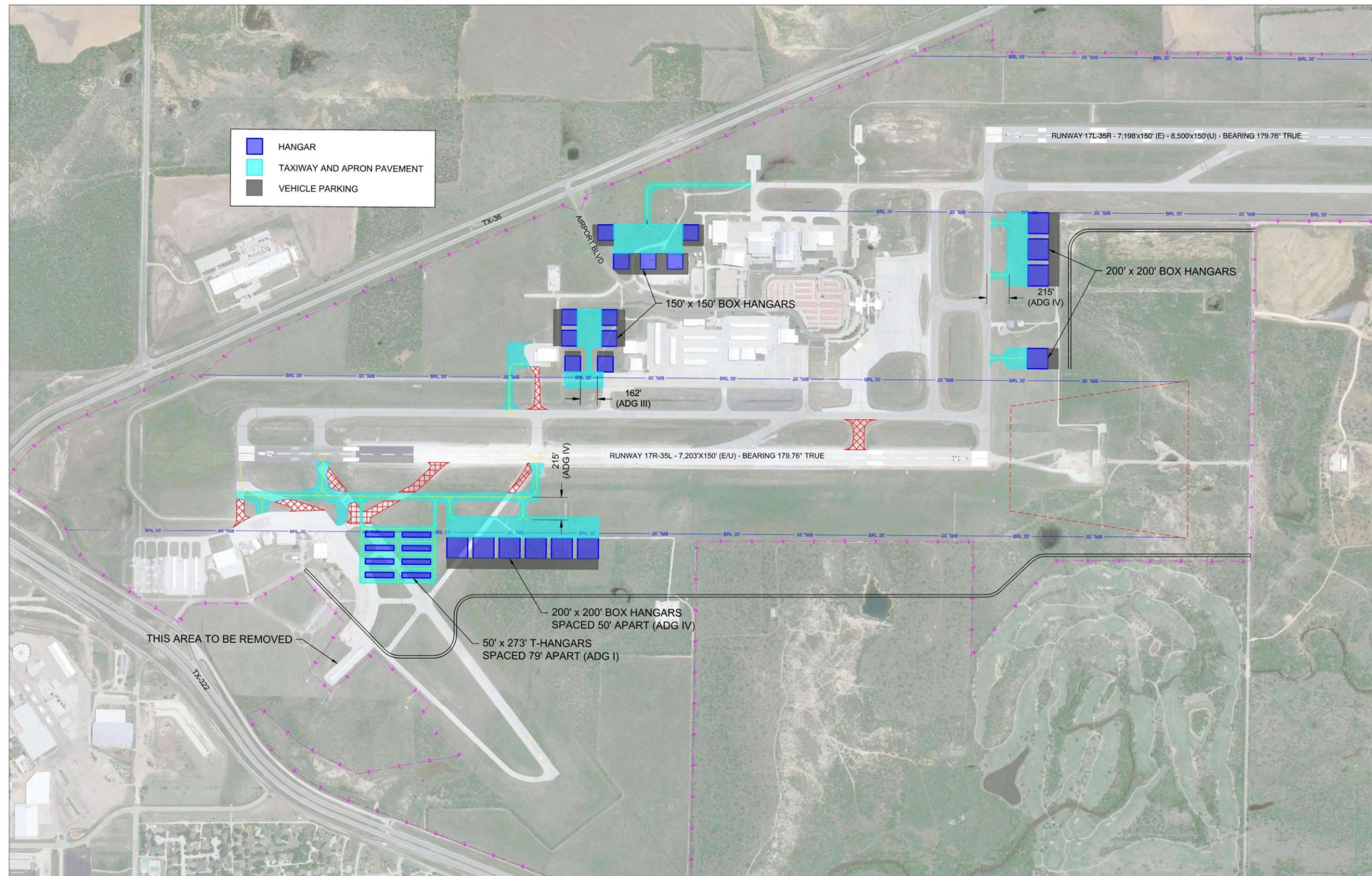
Source: Garver, 2018

Figure 5-75  
Aeronautical Facility Development Facility Alternative #4



Source: Garver, 2018

Figure 5-76  
Aeronautical Facility Development Facility Alternative #5



Source: Garver, 2018

## *Aeronautical Facility Development Alternatives Evaluation*

One of the tasks of a master plan is to analyze alternatives to determine which alternative provides a realistic and feasible plan that will allow the airport to meet future demand in a safe and efficient manner. To facilitate this analysis, evaluation criteria were established and an evaluation matrix was developed showing how each aeronautical facility development alternative compared based on the evaluation criteria. The evaluation criteria are discussed below.

The following criteria are rated on a Good, Fair, and Poor scale:

- Scalability – Does the alternative allow for the incremental expansion of aeronautical facilities to meet demand? Ideally, development plans should allow for aeronautical facilities to grow at the rate demand dictates without requirement substantial non-revenue producing developments (e.g. large ramp area, long taxilanes, substantial roadway developments, etc.).
- Maximize Utilization of Existing Airport Infrastructure – How much of an impact will the proposed aeronautical facility development alternative have on existing airport infrastructure (e.g. existing ramps, taxiways, runways, etc.)? Ideally, alternatives should make good use of the existing airport infrastructure.
- Limit Non-Revenue Producing Development – How much non-revenue producing development (e.g. taxilanes, ramps, roadways, etc.) are required compared to how much revenue producing development (e.g. hangars, leasable ramp, etc.) is provided? Ideally, alternatives should limit the amount of non-revenue producing space needed for the amount of revenue producing space it provides.
- Ability to Accommodate Additional Expansion – Does the alternative allow the opportunity for additional expansion beyond what is shown in the development alternative? Ideally, alternatives should be able to accommodate additional growth beyond what is shown in the future.
- Environmental Considerations – What impacts will the development alternative have on the environment? This includes water, soil, wildlife, noise, and cultural environmental factors as well as any other applicable to the airport. The environmental process when using Federal funds is a component for major CIP projects. The environmental process will begin in the early stages of project development and the outcome will be a key factor in how the project develops. Soil conditions for construction will need to be suited for airport uses. Floodplains, wetlands, endangered species and culturally significant areas need to be avoided if possible.
- Ability to Meet the Established Aeronautical Facility Development Objectives – Does the alternative meet the aeronautical facility development objectives?
- Maximization of Ultimate Development Capacity – Does the alternative maximize the ultimate development capacity of the airport? Alternatives should be in a configuration that allow for the ultimate development of all developable areas of the airport.

In the following section, each of the four aeronautical facility development alternatives are analyzed based on these evaluation criteria. The majority of the analysis focuses on evaluating the alternative layouts for the Runway 4/22 re-development area as there is little variation between the alternatives for the other development areas.

***Aeronautical Facility Development Alternatives Evaluation Results:***

Based on evaluation criteria discussed above, the following matrix (Table 5-5) was developed showing the proposed rating of each alternative.

**Table 5-5  
General Aviation and Aircraft Maintenance Facility Alternatives Evaluation Results**

Alternative #	Scalability	Maximize Utilization of Existing Infrastructure	Limit Non-Revenue Producing Development	Ability to Accommodate Additional Expansion	Environmental Considerations	Ability to Meet Facility Requirements	Maximization of Ultimate Development Capacity
1	Green	Yellow	Yellow	Yellow	Green	Green	Yellow
2	Green	Green	Yellow	Yellow	Green	Green	Green
3	Green	Yellow	Green	Yellow	Green	Green	Yellow
4	Green	Green	Yellow	Yellow	Green	Green	Green
5	Green	Yellow	Yellow	Green	Green	Green	Green

- Low Impact or Meets Requirements
- Moderate Impact or Fails to Meet Some Requirements
- High Impact or Fails to Meet Most Requirements

Commentary regarding the results of the evaluation process are provided below.

Evaluation Commentary for Alternative #1

Alternative #1 includes a linear hangar development along Runway 4/22 and a roadway connecting Navajo Trail to Industrial Blvd. This alternative received “green” ratings for scalability, environmental considerations, and ability to meet facility requirements. However, the alternatives received a “yellow” rating related to its ability to maximize the ultimate development capacity of the area and its ability accommodate additional expansion. These ratings were given because the proposed alternative fails to utilize the vast majority of the Runway 4/22 area for development. Additionally, the establishment of the new roadway prohibits the linear expansion of the proposed development further to the west. This alternative also received a “yellow” rating related to its ability to maximize the utilization of existing infrastructure. This rating was given because much of the western portion of the existing Runway 4/22 pavement is abandoned and not used under this alternative. This alternative also received a “yellow” rating related to the amount of non-revenue producing

space it creates. This rating was given because of the large common use ramp area that is shown between the opposing hangars in the Runway 4/22 area.

#### Evaluation Commentary for Alternative #2

Alternative #2 includes a linear hangar development along Runway 4/22 and the development of two additional hangar pods to the south of the linear development. This alternative received “green” ratings for its scalability, utilization of existing infrastructure, environmental considerations, ability to meet facility requirements, and for its maximization of ultimate development capacity. The “green” ratings were given in these areas because this alternative blends a substantial use of the existing Runway 4/22 pavement with a modular development concept to maximize the development of hangars in the area. This alternative received a “yellow” rating related to its ability to accommodate additional expansion. This rating was given because the new roadway connecting Navajo Trail and Industrial Blvd. would limit further expansion to the west and leave some of the land in the Runway 4/22 area unused. This alternative also received a “yellow” rating related to the amount of non-revenue producing development required. This rating was given because of the common use ramp area that would need to be developed to connect the linear hangar development with the pod hangar developments.

#### Evaluation Commentary for Alternative #3

Alternative #3 includes the development of three pods of 8 hangars along the proposed realignment of Taxiway Romeo. Utilizing a pod development configuration minimizes the amount of non-revenue producing development required to enable hangar development. Consequently, this alternative received “green” ratings for its scalability, small amount of non-revenue producing development required, environmental considerations, and its ability to meet facility requirements. This alternative received a “yellow” rating for its utilization of existing infrastructure as the alternative abandons the majority of the existing Runway 4/22 pavement. For the same reason, this alternative also received a “yellow” rating related to maximization of the area’s ultimate development capacity. Finally, this alternative received a “yellow” rating related to its ability to accommodate additional expansion as the roadway system needed to connect the hangar pods will greatly limit the potential for future expansion. This alternative also showed the potential development of additional T-hangars in the Abilene Aero area as opposed to the development of additional box hangars. Since the demand for T-hangars at ABI is expected to be limited in the future, the T-hangar development option for the Abilene Aero area was eliminated.

#### Evaluation Commentary for Alternative #4

Alternative #4 includes a long linear hangar development along the existing Runway 4/22 pavement with a common taxiway in between the two rows of hangars. This alternative received “green” ratings for its scalability, maximization of existing infrastructure, environmental considerations, ability to meet facility requirements, and maximization of the

area's ultimate development capacity. This alternative received a "yellow" rating related to the amount of non-revenue producing development required and its ability to accommodate additional expansion in the future.

#### Evaluation Commentary for Alternative #5

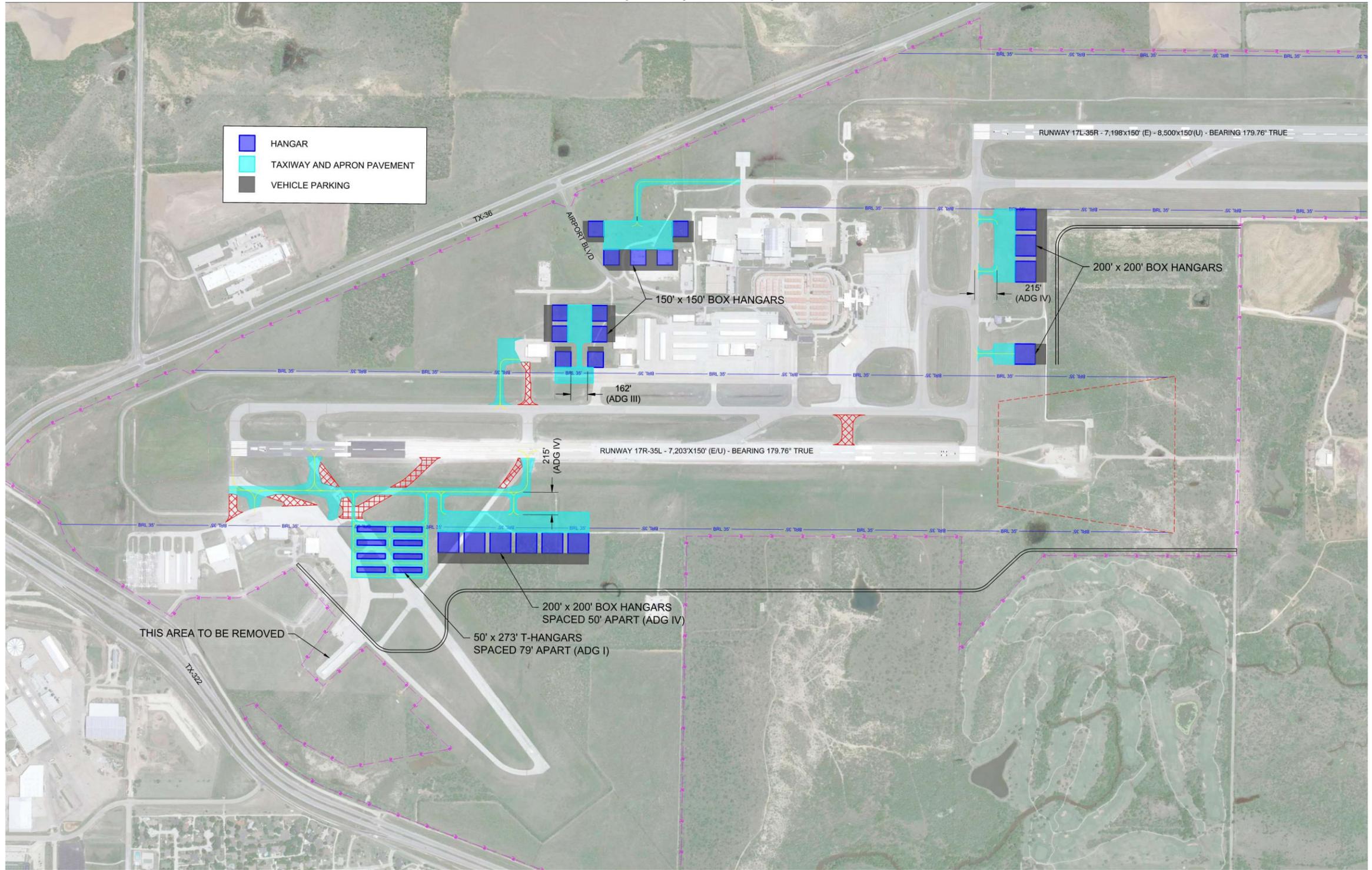
Alternative #5 includes development along the 17R-35L flightline and parallel Taxiway Romeo. It includes an apron for corporate hangar development and a separate t-hangar development area. Both hangar areas have access to Taxiway Romeo which will be developed when Runway 4/22 is decommissioned. An auto access road is included in Alternative #5 that connects Navajo Trail to Industrial Boulevard and allows for redevelopment of areas outside the access road for commercial or industrial use. This alternative received "green" ratings for its scalability, ability to accommodate additional expansion, environmental considerations, ability to meet facility requirements, and maximization of the area's ultimate development capacity. This alternative received a "yellow" rating related to the amount of non-revenue producing development required and its maximization of use of the existing Runway 4/22 infrastructure.

### ***Preferred Aeronautical Facility Development Alternative***

Based on the aeronautical facility development alternatives evaluation analysis described above and discussion with the Master Plan Steering Committee (MPSC) and airport stakeholders, Alternative #5 was selected as the preferred development alternative.

The preferred aeronautical facility development alternative is shown in **Figure 5-77**.

Figure 5-77  
Aeronautical Facility Development Facility Alternative #5

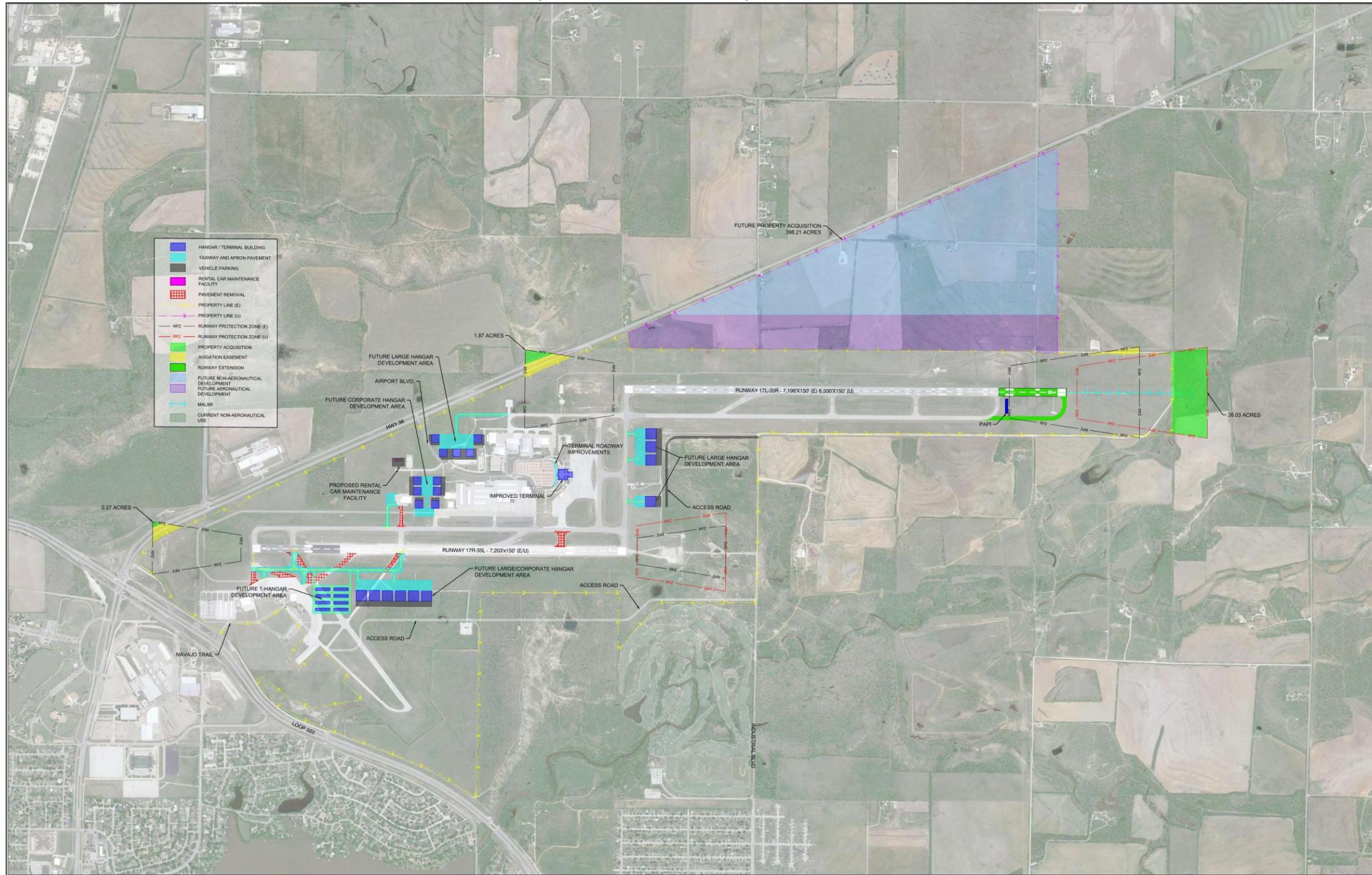


Source: Garver, 2018

## Composite Recommended Development Alternative

The composite recommended development Alternative shown in **Figure 5-78** shows a composite development plan that combines each of the preferred development alternatives. This development plan will serve as the basis for the ultimate development shown in the Airport Layout Plan.

Figure 5-78  
Composite Recommended Development Alternative



Source: Garver, 2018