

Lakeland Linder International Airport, Airport Master Plan Update

May 2019

Alternatives Working Paper

DRAFT



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5. Airport Development Plan

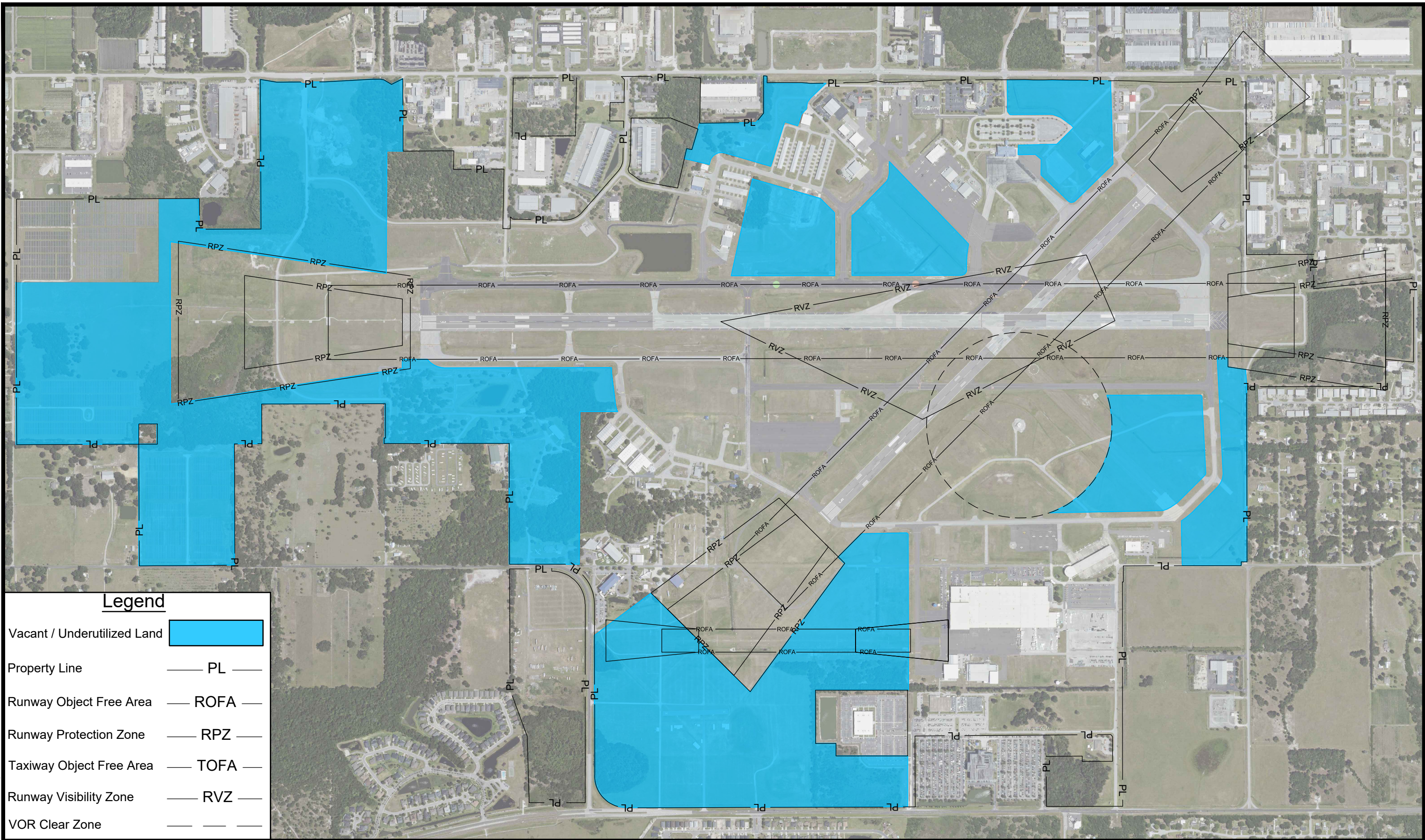
The primary objective of this chapter is to outline a logical development plan for Lakeland Linder International Airport, which meets the aviation needs over the planning period as well as satisfies the ultimate development goals of the Airport. The identification of alternatives was completed based on the information presented in the previous chapters of this AMP in conjunction with reasonable foresight into industry trends and associated facilities.

The alternatives were evaluated, and the result is a selected development plan. The alternatives and selected development plan is based on the general criteria outlined in **Table 5-1**.

Table 5-1 Evaluation Criteria for Selected Development Plan

Criteria	Description
Operational	Any selected development plan should be capable of meeting the Airport's facility needs as they have been identified for the planning period. Further, preferred plans must resolve any existing or future deficiencies as they relate to FAA design and safety criteria.
Environmental	Airport growth and expansion has the potential to impact the Airport's environs. The selected development plan should seek to minimize environmental impacts in the areas outside the Airport's boundaries. The selected development plan should also recognize sensitive environmental features that may be impacted by the development plan.
Feasibility	The selected development plan should be feasible and justifiable. Development should not exceed the identified demand, however, areas in which development above and beyond the demand can be feasibly accommodated without interfering with existing and future development must be identified. Development plans must meet the needs of the Airport and local government while meeting all FAA design standards and the vision of the local community. The selected development plan should proceed along a path that supports the area's long-term economic development and diversification objectives.
Cost	Identification of cost efficient and effective development is paramount during the planning process. Cost should be considered during the alternatives analysis process to meet the identified demand in a reasonable and responsible manner. The selected development plan must meet the needs of the Airport and community while minimizing excessive and unreasonable costs.
Sustainability	The four categories of sustainability should be referenced throughout all planning processes to ensure future airport development is completed in a method that promotes economic viability, operational efficiency, natural resource conservation, and social responsibility.

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5.1. Development Plans

As a preliminary guideline for the creation of airport development alternatives and plans, a conceptual on-airport vacant-land map was created to highlight the areas that are suitable for development throughout the planning period. Vacant land can best be defined as an area on which no significant improvements have been constructed or is currently not used for any purpose. The identification of vacant land is crucial at the beginning of the alternatives process to understand current developable land assets. The concept was created to protect approach/departure paths, safety areas, and Part 77 surfaces to ensure the continued safe operation of aircraft.

5.2. Airport Development Alternatives and Concepts

The airport development plan outlines the necessary development and facility requirements to meet the forecast demand and ensure competitiveness and financial viability, and to provide the Airport and surrounding community with the greatest overall benefit.

Alternatives have been developed independently for the airside and landside. Airside alternatives include development such as runways, taxiways, and navigational aids. Landside alternatives include development such as general aviation aprons and hangars, terminal apron and terminal building, MRO and Cargo, and access roads.

The following sections provide details on the airside and landside development alternatives.

5.2.1. Airside Alternatives

Airfield facilities are, by their nature, the focal point of an airport complex. Because of their role, and the fact that they physically dominate a great deal of the airport's property, airfield facility needs are often the most critical factor in the determination of viable airport development alternatives. The runway system requires the greatest commitment of land area and is often the greatest influence on the identification and development of other airport facilities.

The potential for physical expansion of an airport to accommodate airfield development is the primary factor that determines the airport's future capabilities. The runway and taxiway system directly affect the efficiency of aircraft movements both on the ground and in the surrounding terminal and regional airspace. It also dictates the types of aircraft that can be accommodated, which can directly affect the types of air service the Airport can handle. In addition, the efficiency of aircraft movements is also affected by local approach and departure procedures, which can be influenced by local restrictions due to noise, airspace congestion, or other considerations.

The previous airport master planning effort included airfield, airside, and landside developments necessary to meet the intended vision. These developments were re-assessed based on the current needs and vision for the future. Market conditions and specific needs continually evolve, requiring periodic updates to the development plan to best meet those needs.

5.2.1.1. Required and Recommended Airfield Improvements

The airfield's current configuration accommodates the existing aircraft fleet mix and traffic levels with use of two bi-directional runways, Runway 9-27 and Runway 5-23. The supporting taxiway and taxilane infrastructure play a large role in providing a safe and efficient environment for ground navigation. However, the airfield's fleet mix is estimated to change during the forecast period as outlined in the forecast of aviation activity. The previous chapters identified areas for improvement on the airfield to mitigate capacity issues while encouraging growth and promoting safety. These elements are discussed in detail in the following sections.

5.2.1.1.1. Runways

The existing Runway 9-27 is the Airport's primary runway and is 8,499 feet long by 150 feet wide. It is anticipated that this runway will continue to serve as the Airport's primary runway and accommodate most

corporate, commercial, and cargo aircraft. The runway length of 8,499 feet meets the existing demand. Based on the update forecast of aviation demand, operations by large jet aircraft are anticipated to increase causing continued growth in the critical aircraft and a need for increased runway length. A future 1,501-foot extension to Runway 9-27 will likely be warranted within the planning period, as Boeing 767-300 Freighter series aircraft (and similarly sized aircraft) are expected to frequent the Airport in greater numbers. It has been specified that the anticipated aircraft utilizing the Airport will be larger compared to the existing critical aircraft. This has been considered for the alternatives analysis and airfield infrastructure needed to accommodate it.

To accommodate the future runway length requirements, the development alternatives evaluated an easterly extension, westerly extension, and split east/west extension. In each alternative, an ultimate runway length of 10,000-feet was achieved, however, each alternative presented specific positives and negatives, except for a westerly extension.

Based on a reevaluation of the runway identification compared to changes to the magnetic declination, it has been determined that the primary runway, Runway 9-27, will need to be re-designated to Runway 10-28. Based on this information, the alternatives have integrated the future runway designation of Runway 10-28 and Runway 9-27 will hereinafter be referred to as Runway 10-28.

5.2.1.1.2. Taxiways

At present, required modifications to the taxiway infrastructure is to mitigate against high-risk and non-standard taxiway geometry. Primary modifications will mitigate wide expanses of taxiway pavement, improper runway entrances, and inadvisable runway crossings. Taxiway infrastructure is also proposed to support aeronautical development, and future runway infrastructure.

The following are recommended taxiway modifications:

- Taxiway P1: Existing Runway 10 end entrance is noted as non-standard airfield geometry as it is considered a to be a taxiway-runway interface that is wide expanse, or larger than standard, pavement. Wide expanses of pavement at taxiway intersections result in confusing pavement marking, lighting, and signage, leading to pilot disorientation and increased risk for incidents to occur. Wide pavements require placement of signs far from a pilot's range of vision and reduces the conspicuity of other visual cues. Under low visibility conditions, these visual cues can be missed as well. It is proposed that the pavement is reduced to the standard taxiway width.
- Taxiway A4/F: The placement of the Taxiway A4/ F crossing of Runway 10-28 is within the middle third of the runway. To reduce the frequency of runway crossings, and to eliminate the runway crossing option within the middle third of the runway, it is proposed to reconfigure this area.
- Taxiway C: The Runway 28 end entrance is noted as non-standard airfield geometry as it is considered a to be a taxiway-runway interface that is wide expanse, or larger than standard, pavement.. It is proposed that this taxiway entrance will be converted into a proper by-pass taxiway with appropriate geometry.
- Taxiway E: To open large portions of the airport property for aeronautical development, it is proposed to remove Taxiway E from the proposed Taxiway P extension down to the existing Taxiway E3 connector. This will allow for a large portion of the property to be available for future aeronautical development.

5.2.1.2. Other Airfield Improvements

Additional airfield improvements that have been identified by the Airport, Airport operational staff, tenants, or the technical advisory committee have been identified below. The airfield improvements that have been identified here were evaluated in the various alternatives.

- Relocation of the VOR to the southern portion of airport property;
- Construction of a parallel runway to increase the annual service volume (ASV) and meet the future demand outlined in the approved forecast – or – extension of Runway 5-23;
- Decommissioning of the crosswind runway;

- Realign perimeter road outside of RPZ where possible;
- Relocation of on-airport buildings to improve airfield efficiency and safety of operations;
- Shifting of Taxiway D to be in line with Taxiway P and provide a standard full-length parallel taxiway on the south side of Runway 10-28; and,
- Construction of run-up aprons at various key locations to allow for aircraft to bypass other aircraft that are performing run-up operations or awaiting air traffic clearance.

5.2.2. Alternative 1

Airfield Alternative 1 has been broken into three (3) variations, Alternative 1A, 1B, and 1C. Each of the variations have been outlined in the following sections. Alternatives 1B and 1C provide minor enhancements to the overall alternative presented in Alternative 1A.

5.2.2.1. Alternative 1A

Airfield Alternative 1 is depicted in **Figure 5-2**. Components of this alternative were proposed in the previous master plan and there was interest expressed in re-evaluating this alternative within this AMP effort. Specifically, the Runway 10-28 extension and the Runway 5-23 extension. Based on the new forecast, a reduction in the overall runway extension was warranted and the runway extensions identified in this alternative are less when compared to the previous AMP effort. This alternative proposes a 1,501-foot westward extension of Runway 10-28, resulting in a future 10,000-foot by 150-foot-wide runway. This would allow the proposed future critical aircraft to operate at the Airport in hot and rainy conditions. In conjunction with the runway extension, an Approach Lighting System (ALS) with Sequenced Flashers (ASLF) is proposed for future Cat II/III approach. For proper runway protective surface compliance, a tree clearing plan must be executed for all existing trees impacting the proposed protective surfaces. In addition, this alternative proposes a 1,995-foot southwestward extension of Runway 5-23, which would result in a future 7,000-foot by 150-foot-wide runway. The extension of the crosswind runway will allow for a larger fleet mix to operate at the airport on days where conditions warrant use of the crosswind runway, as well as providing critical infrastructure needed to meet the existing and future demand.

To accommodate both runway extensions and ensure enough supporting infrastructure is in place, it is proposed to extend the existing parallel taxiways to the future runway ends. Specifically, Taxiways A and P will be extended westward to the proposed Runway 10 end, while Taxiway B is proposed to be extended southwest to the proposed Runway 5 end. To enhance the operational efficiency of the airfield, it is proposed that Taxiway D be shifted to the north to be in line with Taxiway P, resulting in a standard full-length parallel taxiway. A partial-parallel taxiway for Runway 5-23 is proposed on the east side of the runway from the proposed Runway 5 end to intersect with the realigned Taxiway P. This will allow for improved access to the southeast section of the airport and reduce runway crossings by departing and arriving aircraft based in this sector of the airport. To accommodate the high number of aircraft based in the southeast sector of the airport and provide for additional future aeronautical development area, it is proposed to shift Taxiway E, between the future Taxiway P intersection and the intersection of Taxiway E3, to the west. In addition, this taxiway will support any aviation development constructed in the newly available land to the east. Taxiways will either be designed to TDG 5 or TDG 3 design standards depending on the existing or future critical aircraft anticipated in that area.

Additionally, run-up pads have been proposed around the airfield. These run-up pads provide a standing space for aircraft to perform engine run-up operations and for those awaiting air traffic clearance. The run-up pad permits aircraft that do not need to perform engine run-ups and those already cleared to move to their respective runway and bypass other aircraft. Run-up pads are most advantageous when located near runway ends. Three run-up pads have been proposed and each is designed to accommodate a Lockheed WP-3 Orion with the ability for traffic as large as ADG D-IV to bypass aircraft utilizing the run-up area. The proposed locations are on the east partial-parallel to Runway 5-23 near the Runway 5 end, south of the existing Runway 28 end, and south of the proposed Runway 10 end.

Two areas have been identified for future aeronautical development. These areas include approximately 51 acres south of the Taxiway P extension, and west of the new north-south taxiway perpendicular to Taxiway P. A second development area is located to the east of the proposed partial-parallel taxiway for the extended

Runway 5-23, and west of the existing Taxiway E1. This area has approximately 31 acres of developable land.

Key benefits of Alternative 1 include:

- Total Runway 10-28 length of 10,000 feet, which would accommodate the proposed future critical aircraft at max takeoff weight during all temperature conditions;
- Total Runway 5-23 length of 7,000 feet, which would increase usability by the existing and future fleet mix and increase the airports ASV;
- Dual parallel taxiways for Runway 10-28; and,
- Increased future aeronautical development areas.

Disadvantages of Alternative 1 include:

- Runway 5 extension results in decommissioning of turf runway;
- Runway 5 extension requires land acquisition and clearing within the bounds of the new RPZ;
- Runway 10 extension requires relocation of the existing airport perimeter road;
- Runway 10 extension results in impacts to wetlands west of the runway and minor impacts to the 100-year floodplain; and,
- Development has the potential impact to listed species habitat.

5.2.2.2. Alternative 1B

Alternative 1B is depicted in **Figure 5-3**. Alternative 1B is similar to Alternative 1, with the addition of a 2,501-foot clearway beginning at the existing Runway 10 end and extending to the west. The clearway is an area extending beyond the runway end which is 500 feet wide and has a slope of 80-feet horizontal for every 1-foot vertical (80:1). No objects are permitted to penetrate the clearway with the exception of the threshold lights no higher than 26-inches and located outboard of the runway centerline. The clearway provides additional takeoff run available (TORA) for departures on Runway 28. A clearway is a cost-effective method for increasing the allowable aircraft operating takeoff weight without increasing the runway length.

The clearway will allow for a TORA on Runway 28 of 11,000-feet before and after the proposed Runway 10 extension. After the proposed Runway 10 extension is completed, the total clearway length will be reduced to 1,000-feet from the new Runway 10 end, maintaining the 11,000-foot TORA. When a clearway is in place, the departure surface is relocated and begins at the end of the clearway (including elevation).

Key benefits of Alternative 1B include:

- Takeoff Run Available (TORA) increased to 11,000-feet for aircraft departing on Runway 28 with minimal development and financial resources required.

Disadvantages of Alternative 1A include:

- Only applies during a west flow operation and the predominant wind necessitates an easterly flow;
- Runway 10 extension results in impacts to wetlands west of the runway and minor impacts to the 100-year floodplain; and,
- Development has the potential to impact listed species habitat.

5.2.2.3. Alternative 1C

Alternative 1C is depicted in **Figure 5-4**. Alternative 1C is similar to Alternative 1A, with the addition of a 750-foot shift to the west of Runway 10-28. The shift of the runway allows for the entirety of the Runway 28 approach RPZ and Runway 10 departure RPZ to be on-airport, removing the incompatible land uses within the existing RPZ. The 750-foot shift will not impact the overall length of the runway.

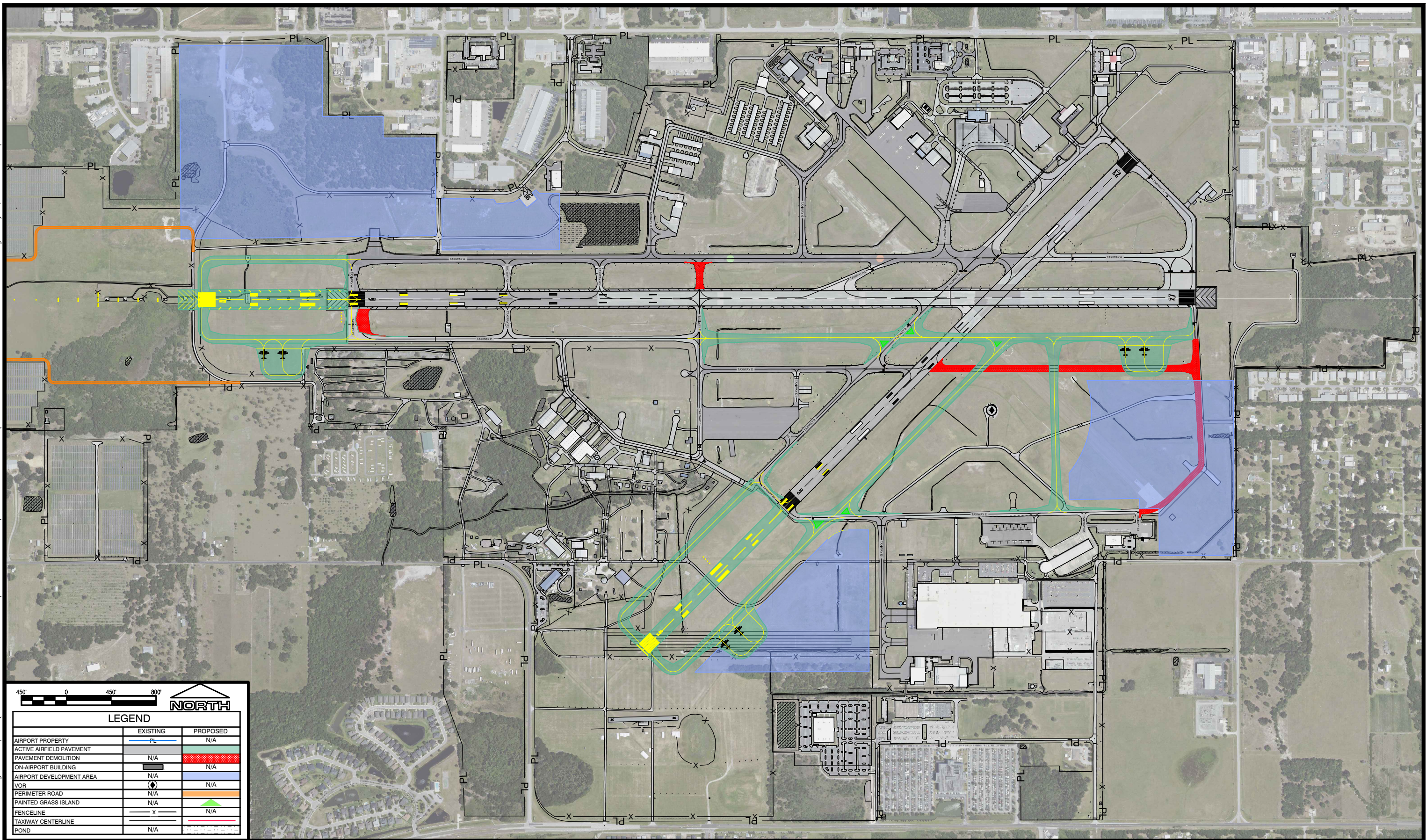
Key benefits of Alternative 1C include:

- All benefits identified for Alternative 1A.
- The approach and departure RPZ on the Runway 28 end will be on-airport, removing all incompatible land uses.
- The overall runway length will remain the same.

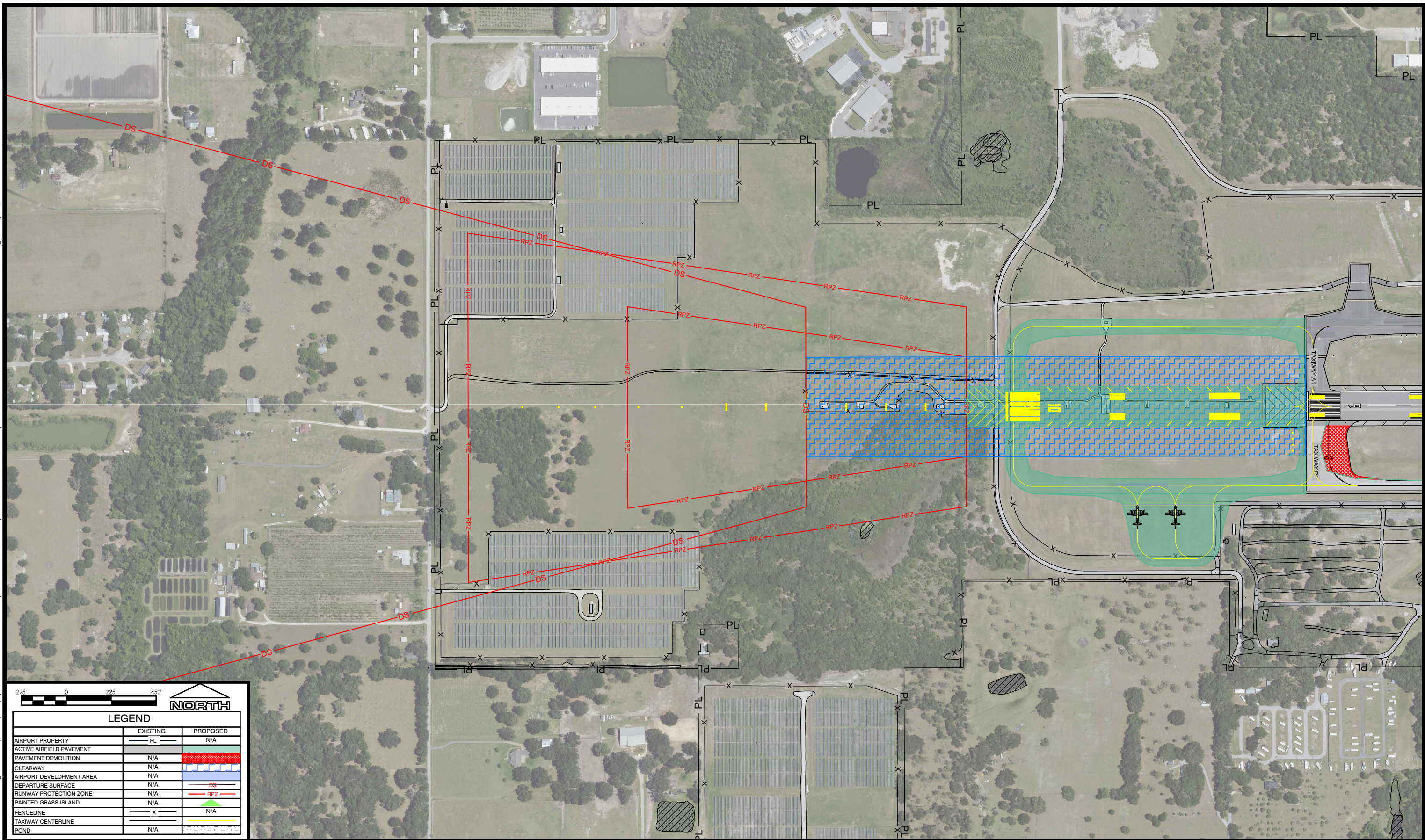
Disadvantages of Alternative 1C include:

- All disadvantages identified for Alternative 1A.
- By shifting the runway by 750-feet, the Runway 10 approach RPZ will go off airport property by approximately 600-feet and impact multiple residential areas and public roadways.
(Note: This impact is based on the 1,501-foot future extension of Runway 10)
- Removal of the runway pavement at the Runway 28 end will result in a “choke point” on the parallel taxiway accessing the Runway 28 end.
- Runway 10 extension results in impacts to wetlands west of the runway and minor impacts to the 100-year floodplain;
- Development has the potential to impact listed species habitat; and,
- Shift of Runway 10-28 poses potential for noise impacts to areas west of the airport.

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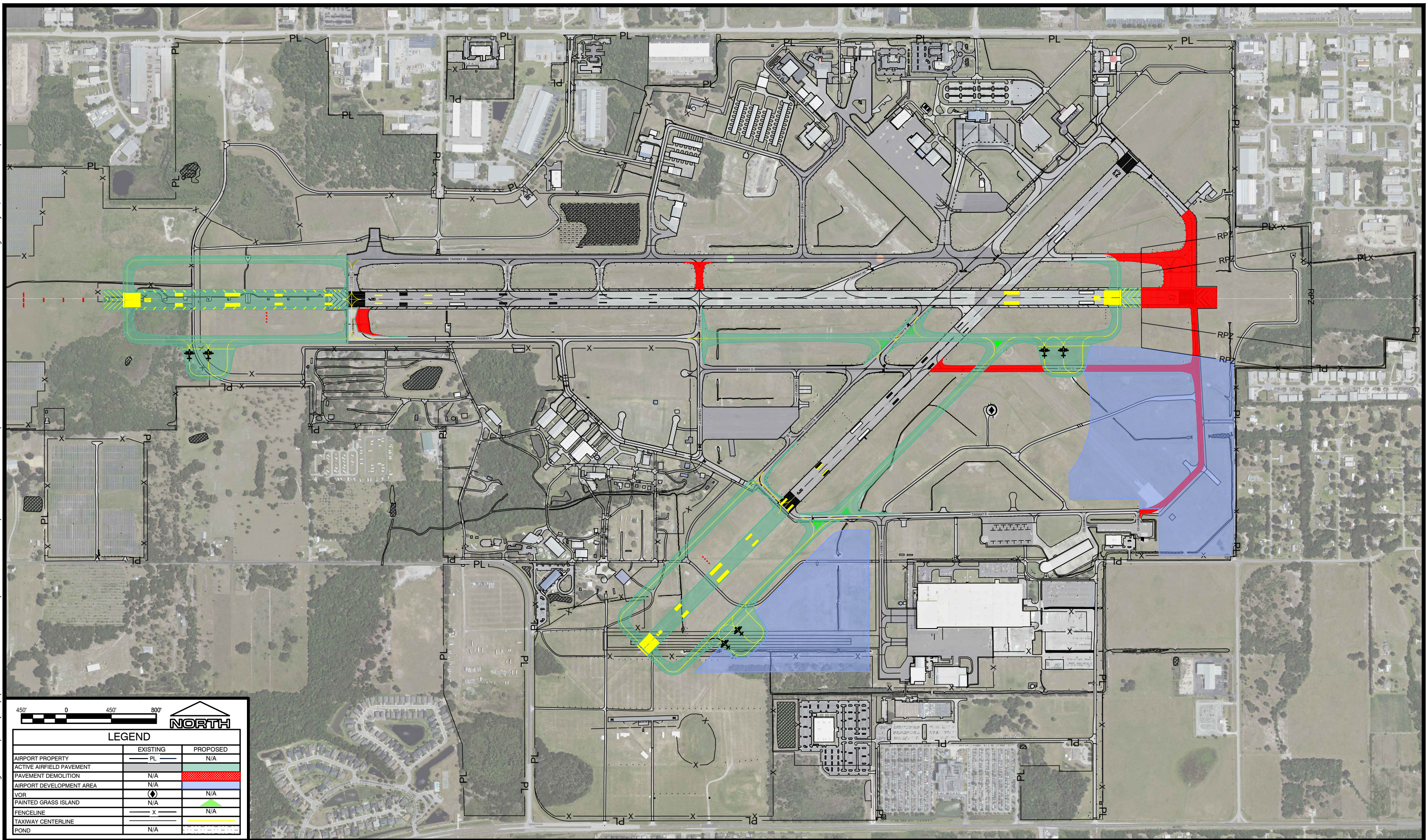
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Airside Alternative 1-B

Figure
5-3

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Airside Alternative 1-C

Figure
5-4

5.2.3. Alternative 2

Alternative 2 is depicted in **Figure 5-5**. Alternative 2 proposes an extension of Runway 10-28 for a new total length of 10,000-feet. The extension would be split between each end of the runway, with a westward extension of 750.5-feet and an eastward extension of 750.5-feet, for a total extension of 1,501-feet. To enhance capacity and eliminate an existing high-activity runway intersection, it is proposed to realign Runway 5-23 to be parallel to Runway 10-28. The realigned runway will be designed to ADG C-III standards with a total length of 7,400-feet by 150-feet wide. The runway is proposed to have a non-precision approach on both ends with no lower than 3/4 statute mile visibility.

To enhance the operational efficiency of the airfield, it is proposed that Taxiway D be shifted to the north to be in line with Taxiway P, resulting in a standard parallel taxiway separation for the full-length of the runway. Taxiways A and P, the parallel taxiways to Runway 10-28, would subsequently be extended on each end of the runway to match the proposed extension. Realignment of Taxiway D and the extension of Taxiway P will also provide a mid-field parallel taxiway that serves both the existing Runway 10-28 and the proposed parallel runway. A full-length parallel taxiway to the realigned parallel runway is proposed on the south side of the runway. To support the south parallel runway, and open area for future aeronautical development, it is proposed to shift Taxiway E from the intersection of the proposed south parallel taxiway of the south parallel runway to the intersection of Taxiway E3 to the west to align with the end of the proposed south parallel runway. This will allow for aircraft to move from north to south or south to north on the airport, under air traffic guidance, without having to cross the south parallel runway. The existing Taxiway D pavement, to the greatest extent possible, will be repurposed for the realigned parallel runway. The taxiway pavement that is not encompassed by the proposed runway will be removed.

To accommodate the realigned south parallel runway, the VOR facility would need to be relocated. It is recommended that the VOR facility be relocated on the airfield to a location where it has proper clearance from all runways and taxiways, while enabling the greatest area possible for future airport development.

Two areas have been identified for future aeronautical development. One of the development areas is located where the existing Runway 23 end is located. With the realignment of Runway 23, approximately 60 acres of land would become available in the northeast corner of the airport. This area would be considered prime terminal area development as it has access to the existing terminal and terminal apron, airfield access via Taxiway B and A, as well as land side access via Drane Field Road. The second area is located to the southeast of the new proposed parallel runway. This area is approximately 31 acres and is opened up by removing a portion of Taxiway E.

Key benefits of Alternative 2 include:

- Total Runway 10-28 length of 10,000 feet, which would accommodate the proposed future critical aircraft at max takeoff weight during all temperature conditions;
- Realigned parallel runway will improve the airports ASV by removing the intersecting runways; and,
- Relocation of the VOR and realignment of Runway 5-23 opens over 60 acres of developable airport owned property.

Disadvantages of Alternative 2 include:

- Easterly portion of the extension of Runway 10-28 requires acquisition of property in the proposed RPZ;
- Realigned south parallel runway requires acquisition of property on the west side of the runway in the proposed RPZ;
- Existing tenant leaseholds will be impacted, and relocation will be required; and,
- Relocation of the VOR will be required prior to construction of the realigned parallel runway.
- Existing airport tenants/leaseholds would be required to be relocated;
- Extension of Runway 10-28 to the west and east impacts wetlands to the south and east of the runway;
- Relocation of the VOR impacts a known wetland and model aircraft flying area north of Pipkin Road (Section 4(f) Resource);
- Minor impacts to the 100-yr floodplain west and south of Runway 10; and,

- Development has the potential to impact listed species habitat.

5.2.4. Alternative 3

Alternative 3 is depicted in **Figure 5-6**. This alternative is similar to Alternative 1 in regard to the increase of total Runway 10-28 length up to 10,000-feet. However, in this alternative, it is proposed that the full 1,501-foot extension is completed to the east. To enhance capacity and draw smaller aircraft operations from the primary runway, it is proposed to develop a parallel runway to the primary. The parallel runway will be designed to ADG B-II standards with a total length of 3,900-feet and width of 75-feet. The Taxiway D pavement, to the greatest extent possible, will be converted and used for the construction of the parallel runway. The runway will be able to accommodate non-precision approaches with not lower than 1 statute mile visibility. This proposed runway can be upgraded to a C-III runway in the future by shifting the centerline south to ensure a 400-foot separation from the future parallel Taxiway P. The proposed full-length parallel taxiway to the south of the proposed parallel runway has been planned to ensure future growth is possible and minimum design standards can be attained without relocation.

To accommodate the proposed south parallel runway and taxiway complex, the VOR facility would need to be relocated. It is recommended that the VOR facility be relocated on the airfield to a location where it has proper clearance from all runways and taxiways, while enabling the greatest area possible for future airport development.

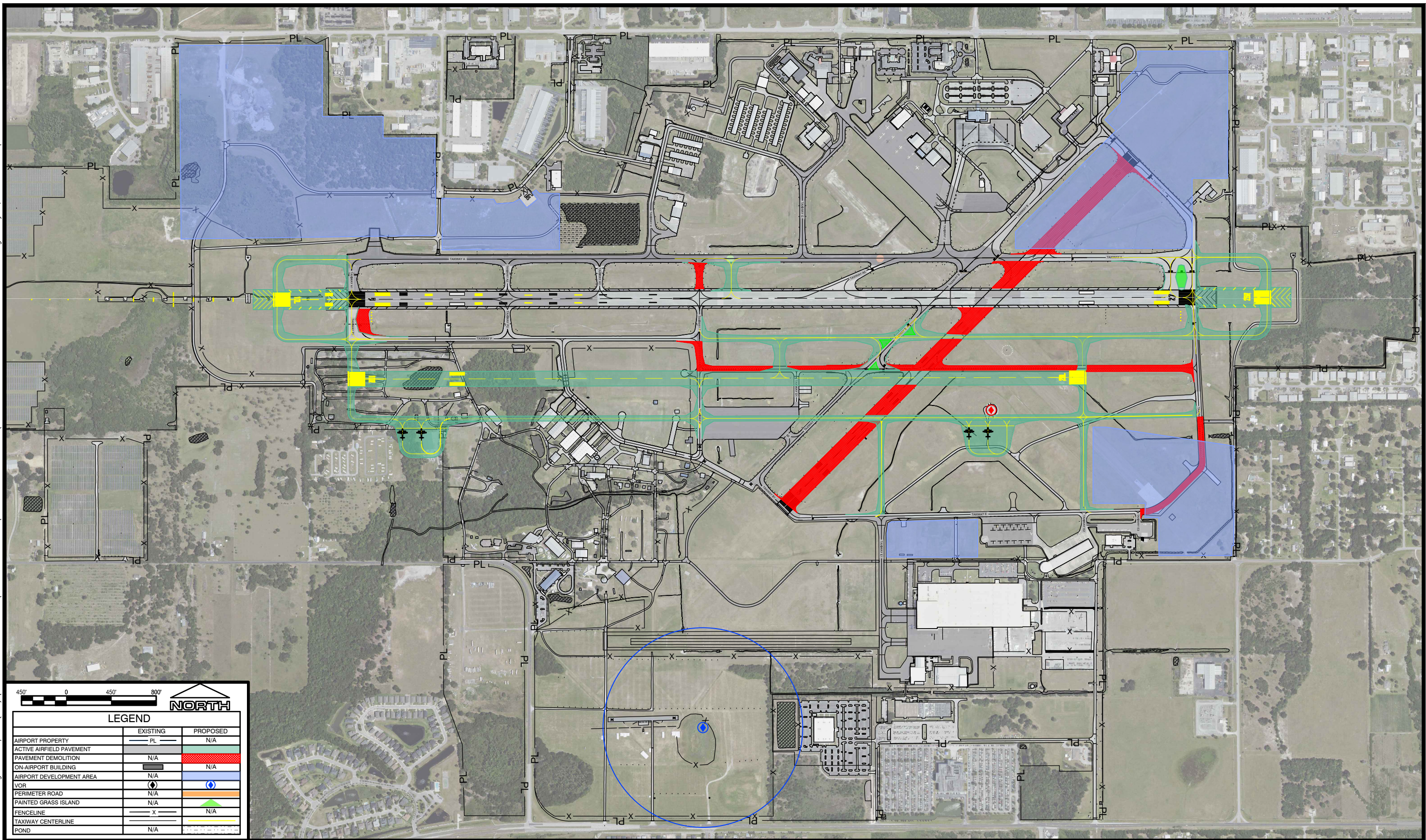
Key benefits of Alternative 3 include:

- Total Runway 10-28 length of 10,000 feet, which would accommodate the proposed future critical aircraft at max takeoff weight during all temperature conditions;
- Proposed parallel runway will improve the airports ASV by removing the intersecting runways and shifting smaller aircraft from the airport's primary runway; and,
- Relocation of the VOR opens over 60 acres of developable airport owned property.

Disadvantages of Alternative 3 include:

- Easterly extension of Runway 10-28 requires acquisition of property in the proposed RPZ; and,
- Relocation of the VOR will be required prior to construction of the parallel runway.
- Extension of Runway 28 to the east impact's wetlands, requires acquisition of right-of-way's, and has the potential for noise impacts east of the runway; and,
- Development has the potential to impact listed species habitat.

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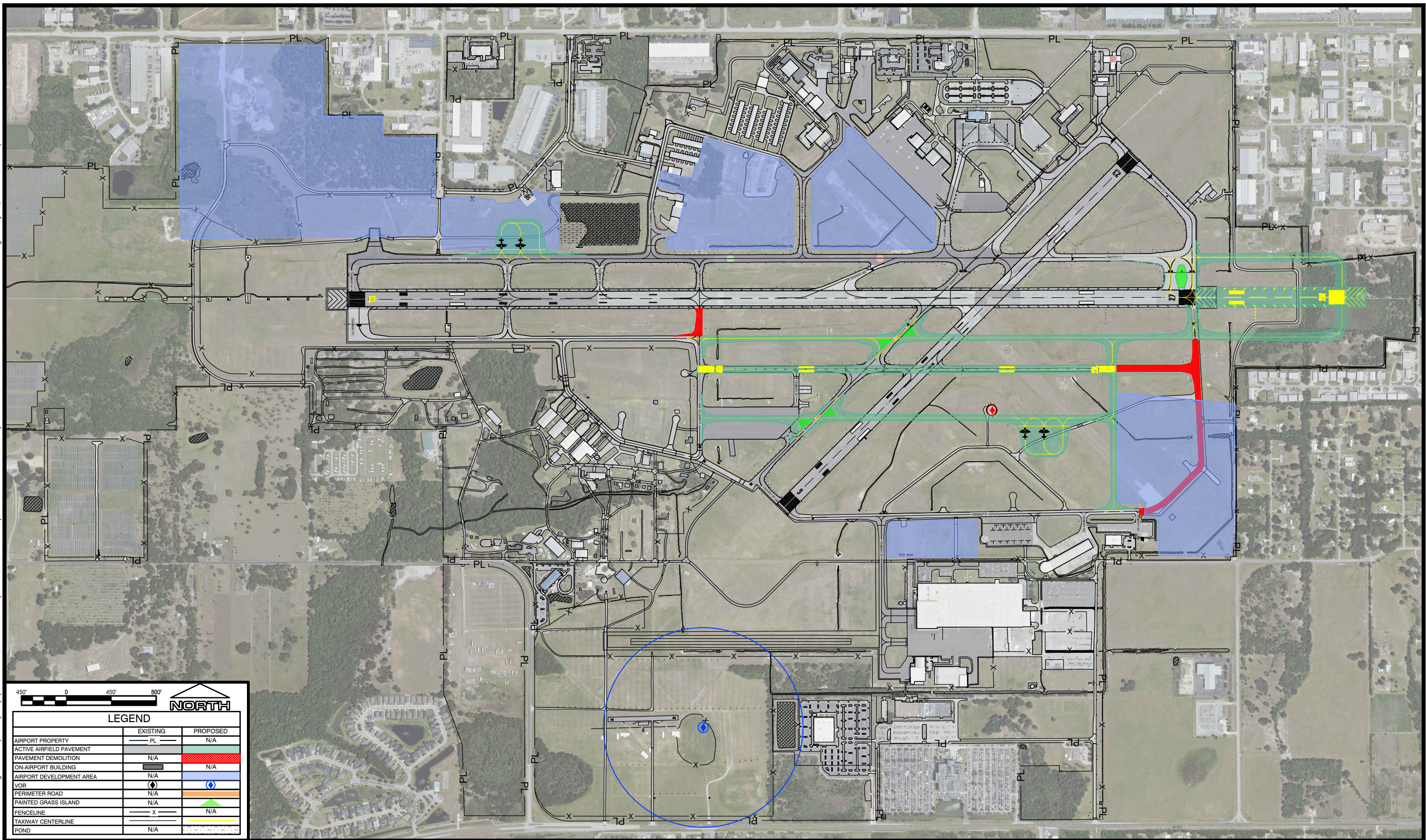
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Airside Alternative 2

Figure
5-5

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Airside Alternative 3

Figure
5-6

5.3. Landside Alternatives

Landside facilities form a critical backbone to the Airports efficient and effective operations. While airside facilities will usually drive the location and availability of developable land, landside facilities form the crucial interface between the airport and the surrounding community it serves. Ensuring that landside development compliments airside facilities without interfering with planned future airside development is paramount, as it has the potential to limit the opportunities for an airports future expansion should it be necessary.

5.3.1. Required and Recommended Landside Improvements

The airports existing development is decentralized and either located on the north or south sides of the runway complex. The predominant portion of the business aviation and general aviation facilities for itinerant and based aircraft are located on the north side of the airport and west of the existing terminal building. Aeronautical businesses and flight schools are located on the south side of the airport to the east of Runway 5-23.

Airport tenants play a key role in an airports vitality and its ability to be as self-sufficient as possible. Ensuring that future development is done in a compatible manner with airside facilities is paramount in ensuring the safety and efficiency of operations at the airport. The previous chapters identified areas for improvement that will be necessary to handle the forecast capacity while encouraging growth and promoting safety. These elements are discussed in detail in the following sections.

5.3.1.1. Terminal Area

The existing terminal/administrative building can handle up to two commuter size commercial service aircraft at any given time. Access roads and parking is available to the north of the terminal/administrative building. A rental car facility is located directly east of the terminal apron.

Identification of an area for future expansion of the terminal building, apron, and associated taxiway system, to accommodate commercial service and charter/air taxi service is necessary to ensure that the space is reserved and available.

5.3.1.2. Business Aviation Area

The existing business aviation area is located to the southwest of the existing terminal building and terminal apron. The Fixed Base Operator (FBO) is located on this apron, along with multiple hangars which are either managed by the FBO or for private use. A large apron space is available to the south of the FBO and hangars which serves itinerant traffic as well as those aircraft based at the airport that do not currently lease hangar space.

The potential for expansion of the FBO and itinerant apron is constrained by the terminal apron to the northeast and existing hangar buildings to the northwest. Existing and future demand outlined in the approved forecast indicates a need for increased itinerant apron space, as well as increased demand for large aircraft storage hangars. Relocation of the FBO buildings, and consolidation of the business aviation facilities, will ensure that adequate separation of activity types is achieved, and maximum efficiency of operations is realized.

5.3.1.3. General Aviation Facilities

The existing hangar capacity does not meet the existing demand. As outlined in the Demand Capacity Chapter, future aircraft storage needs exceed the available t-hangar and conventional hangar space that is available. An additional 74 t-hangar units and 310,307 square feet of conventional hangar space will be required within the planning period. Two t-hangars were recently constructed to accommodate the existing demand; however, future growth will necessitate continued expansion of the general aviation facilities.

Aircraft parking aprons for both based aircraft and itinerant aircraft, are not sufficient to meet the existing or future demand. Additional aircraft parking apron will be required to accommodate the demand. Over 100,000 square yards of aircraft parking apron will be required to meet the demand within the planning period.

5.3.1.4. MRO/Cargo and Other Commercial Development Area

Identification of future MRO/Cargo and other commercial development areas is critical in ensuring the airport continues to be as self-sufficient as possible and provides an environment for growth opportunities. Lakeland Linder International Airport is centrally located to serve the commercial needs of both the Orlando and Tampa metropolitan areas, and as such, has seen tremendous growth and demand over the past decade.

To align future MRO/cargo and commercial development areas with the future airfield development, proper planning and identification of areas which will not impact the airside facilities and safety areas is critical.

5.3.2. Alternative A

Terminal Alternative A is depicted in **Figure 5-7**. This alternative proposes relocation of the existing FBO building and FBO storage hangars located directly southwest of the terminal and terminal apron to the southwest between the itinerant apron, Taxiway A, and Taxiway G. This undeveloped area is well suited for consolidation of the business aviation facilities as it is located directly east of the existing general aviation hangars and provides ancillary services to the general aviation t-hangar tenants. Additionally, this area provides ample space for development and expansion of conventional storage hangars to meet the anticipated future demand. Additional t-hangar development has been identified on the west side of Taxiway G, south of the existing t-hangars. Improvements to the airport access roads will provide dual access points to Drane Field Road and separation of commercial users and general aviation users. Relocation of the FBO and FBO hangars allows for the future expansion of the terminal building and terminal apron to the west, reducing impacts to other facilities located between the terminal and Taxiway B.

Land has been identified within the terminal access road loop, providing prime future commercial development area with access by terminal users as well as hotel guests and visitors. Additionally, areas for future terminal parking and a consolidated rental car facility has been identified between Drane Field Road and the terminal access road loop.

Key benefits of Alternative A include:

- Consolidated business aviation center and separation of aviation activities;
- Secondary landside access point for general aviation tenants; and,
- Future commercial development area.

Disadvantages of Alternative A include:

- High initial investment required for relocation of FBO and FBO hangars;
- Relocation and/or renegotiation of leaseholds may be required; and,
- Development has the potential to impact listed species habitat.

5.3.3. Alternative B

Terminal Alternative B is depicted in **Figure 5-8**. This alternative proposes expansion of the terminal building to the east, with additional terminal apron east and south of the existing apron. The existing FBO and FBO hangar would remain on the transient aircraft parking apron, with expansion of conventional hangars in the open field located south of the transient aircraft parking apron, north of Taxiway A, and east of Taxiway G. Additional conventional and t-hangar expansion would be located to the west of Taxiway G and north of Taxiway A.

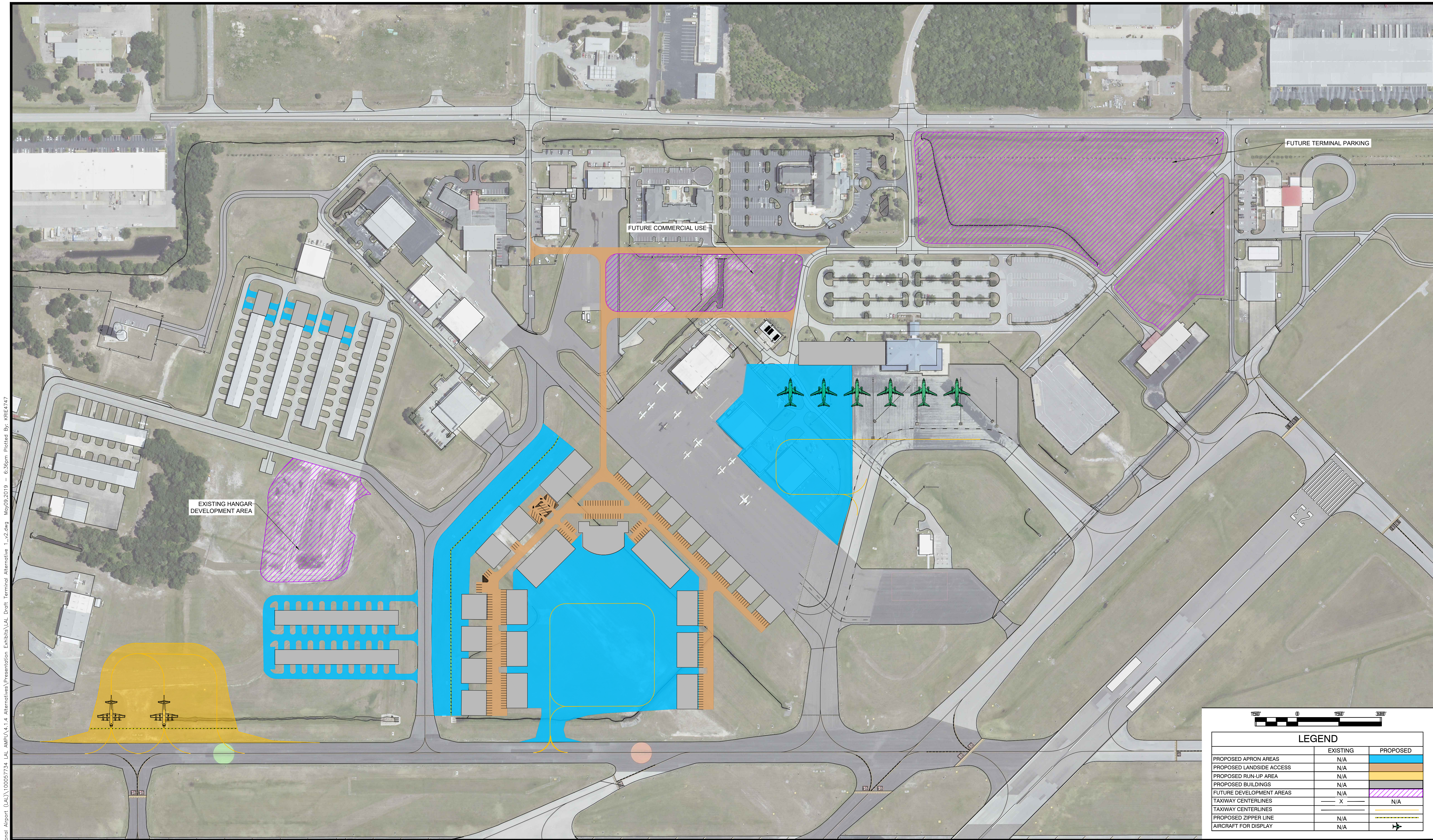
A secondary access point for general aviation users has been identified from the air traffic control tower access road, crossing Taxiway H, and looping south of the proposed t-hangars. In addition, access would be provided from the terminal access road loop to the expanded conventional hangar area. Expansion of the terminal access road loop would include designation of a commercial development area, as well as designating an area for future terminal parking and a consolidated rental car facility to the northeast of the terminal.

Key benefits of Alternative B include:

- Limited relocation of existing airport facilities;
- Landside access to hangar facilities, limiting vehicular traffic from taxiway and apron surfaces; and,
- Future commercial development area.

Disadvantages of Alternative B include:

- Limited future expansion opportunities if required for the terminal building and apron; and,
- Development has the potential to impact listed species habitat.



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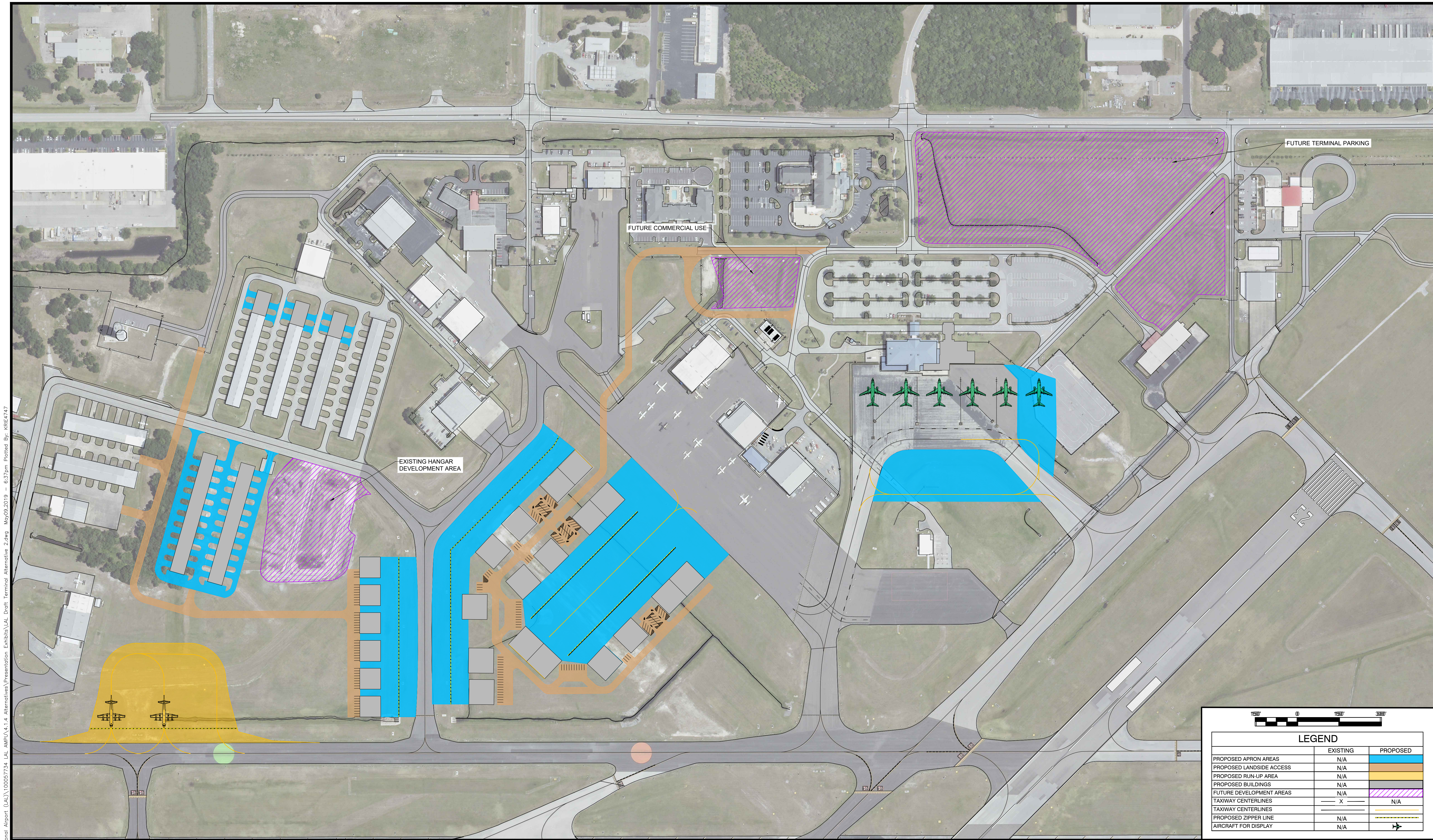
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Terminal Alternative A

Figure
5-7



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Terminal Alternative B

Figure
5-8

5.4. Alternatives Evaluation Criteria

The evaluation of the alternatives followed the criteria as found in FAA's AC 150/5070-6B, *Airport Master Plans* and included the following:

- Financial Feasibility
- Operational Performance
- Environmental Implications
- Best Planning Tenets

5.4.1. Financial Feasibility

This analysis considers the impacts of an alternative in relation to the Airport's economic viability as well as that of the surrounding community. Furthermore, the analysis provides consideration of the estimated development costs associated with the various alternatives, along with prospective funding sources. The following were assessed as a part of this analysis:

- **Development costs** – Includes anticipated costs of development and potential alternative funding sources. Alternative funding sources include those other than the City or the FAA, such as private business owners and/or developers.
- **Job creation** – The potential of each alternative to create employment and other economic development benefits for the Airport and immediate surrounding area.
- **Financial sustainability** – Anticipated opportunities for revenue generation through increased activity, new businesses, etc. to increase the Airport's ability to become more financially self-sufficient.

5.4.2. Operational Performance

An airport's ability to function as a system can be evaluated based on several factors:

- **Capacity** – The ability to accommodate future demand as determined in the facility requirements.
- **Capability** – The ability to meet airport design standards and ensure a safe operating environment.
- **Operational efficiency** – How well the alternatives work as a system to avoid delays, inefficiencies, airspace conflicts, etc. This also considers the coexistence of existing and future users.

5.4.3. Environmental Implications

As discussed in the Environmental Overview Chapter, there are several environmental resources that may be impacted to some degree resulting from airport development. To review the NEPA environmental categories associated with the Airport in detail, please refer to Chapter 3, Environmental Overview. The following are the Airport's identified environmental criteria:

- Air Quality
- Biological Resources (Including Fish, Wildlife, and Plants)
- Hazardous Materials, Solid Waste, and Pollution Prevention
- Land Use
- Noise and Noise-Compatible Land Use
- Climate
- Department of Transportation Act, Section 4(f)
- Historical, Architectural, Archaeological, and Cultural Resources
- Visual Effects (Including Light Emissions)
- Water Resources (Including Wetlands, Floodplains, Surface Waters, Groundwater, and Wild and Scenic Rivers)

5.4.4. Sustainability

The FAA is committed to making airports environmentally responsible with initiatives that affect facility operations, the aviation industry, and customers. Airports commonly follow the approach to sustainability codified by Airports Council International-North America, known as EONS, which take into account four key considerations when sustainability programs are designed and implemented:

- Economic Viability
- Operational Efficiency
- Natural Resource Conservation
- Social Responsibility

Furthermore, the Florida Department of Transportation Aviation and Spaceports Office developed the Airport Sustainability Guidebook to lead sustainability at Florida airports. At its core, the guidebook provides a basic structure for developing, implementing, and monitoring sustainability initiatives at airports.

5.4.5. Best Planning Practices

Several best planning tenets were selected to determine the most responsible and implementable alternative within this AMP. These include:

- Flexibility to accommodate unforeseen change (e.g., increases or decreases in activity levels, changes to fleet mix, new users, etc.).
- Technically feasible (e.g., considers site constraints and other limitations).
- Conforms to the County's goals.

5.5. Alternatives Evaluation Summary

The evaluation criteria described above were applied to each airside alternative based on the initial input from the Airport staff. **Table 1-2** contains a detailed summary of each alternative evaluation. Based on the overall assessment, each criterion was assigned a rating for comparison. The rating system is based on the Consumer Reports method.

Alternative's 1A, 1B, and 1C were evaluated independently based on the minor enhancements that variations B and C had on Alternative 1A. As a result of the evaluation summary, depicted in **Figure 5-9**, Alternative 1B scored the highest, followed by Alternative 1A. Alternatives 2 and 3 received the same score, while Alternative 1C scored the lowest.

Airside alternatives were evaluated based on similar criteria and are depicted in **Figure 5-10**. Terminal alternative A scored the highest, but only by one point over terminal alternative B. A no-change alternative was also evaluated as a baseline, incorporating ongoing projects at the airport with a no-change scenario for the future terminal area development. The no-change alternative scored the lowest. As a result of the evaluation summary, and discussions with the airport and technical advisory committee, the selected terminal alternative incorporates various design elements from both terminal alternatives A and B.

Figure 5-9 Airfield Alternatives Evaluation Matrix

Alternatives Evaluation Criteria						
Lakeland Linder International Airport						
● = 1 ◐ = 0 ○ = -1	Pref. Alt	A	Alt. 1 B	C	Alt. 2	Alt. 3
Financial Feasibility						
Development Costs	◐	◐	●	○	○	○
Job Creation	◐	◐	◐	◐	◐	◐
Financial Sustainability	●	●	●	◐	●	●
Operational Performance						
Capacity	●	●	●	◐	●	●
Capability	●	●	●	●	●	●
Operational Efficiency	●	●	●	○	●	●
Environmental						
Air Quality	◐	◐	◐	◐	◐	◐
Biological Resources	○	○	○	○	○	○
HazMat/Waste	◐	◐	◐	◐	◐	◐
Land Use	◐	◐	◐	○	○	○
Noise	◐	◐	◐	○	◐	○
Climate	◐	◐	◐	◐	◐	◐
DOT Section 4(f)	○	◐	◐	◐	○	◐
NHPA Section 106	◐	◐	◐	◐	◐	◐
Visual/Lighting Effects	◐	◐	◐	◐	◐	◐
Water Resources	○	○	○	○	○	○
Best Planning Practices						
Flexibility	●	●	●	●	●	●
Technically Feasible	◐	●	●	◐	◐	◐
Conforms to City's Goals	●	●	●	◐	◐	◐
Sustainability Goals						
Overall Support of Sustainability	●	●	●	◐	◐	◐
Evaluation						
Score	4	6	7	-4	0	0
Summary						
Ranking	---	2	1	5	3	3
Key	● = 1	This symbol represents a positive impact, an improvement or benefit, a lower anticipated cost, a higher level of flexibility, or a lower impact to the environment.				
	◐ = 0	This symbol represents maintaining a similar level or benefit, an average cost, an average level of flexibility, or average potential environmental impact.				
	○ = -1	This symbol represents an improvement that is not anticipated to meet the need, a higher cost, limited flexibility, and higher than normal environmental impacts.				

Figure 5-10 Terminal Alternatives Evaluation Matrix

Alternatives Evaluation Criteria				
Lakeland Linder International Airport				
 = 1  = 0  = -1	Pref. Alt	Alt. A	Alt. B	No Change
Financial Feasibility				
Development Costs				
Job Creation				
Financial Sustainability				
Operational Performance				
Capacity				
Capability				
Operational Efficiency				
Environmental				
Air Quality				
Biological Resources				
HazMat/Waste				
Land Use				
Noise				
Climate				
DOT Section 4(f)				
NHPA Section 106				
Visual/Lighting Effects				
Water Resources				
Best Planning Practices				
Flexibility				
Technically Feasible				
Conforms to City's Goals				
Sustainability Goals				
Overall Support of Sustainability				
Evaluation				
Score	8	7	6	-4
Summary				
Ranking	---	1	2	3
Key	 = 1	This symbol represents a positive impact, an improvement or benefit, a lower anticipated cost, a higher level of flexibility, or a lower impact to the environment.		
	 = 0	This symbol represents maintaining a similar level or benefit, an average cost, an average level of flexibility, or average potential environmental impact.		
	 = -1	This symbol represents an improvement that is not anticipated to meet the need, a higher cost, limited flexibility, and higher than normal environmental impacts.		

5.6. Preferred Development Alternatives

The following section presents the preferred development alternatives based on evaluation of the alternatives presented in this chapter.

5.6.1. Preferred Airfield Development Alternative

Figure 5-11 depicts the preferred airfield development alternative. The selected airfield development alternative is a combination of components of the development alternatives identified earlier in this chapter. Elements of each of the alternatives were combined to form the selected development alternative, which best meets the requirements outlined in the forecast of aviation activity as well as the facility requirements.

The selected development alternative incorporates the westerly extension of Runway 10-28, in conjunction with the establishment of a clearway for departure operations from Runway 28 as outlined in Alternative 1B. The clearway will initially be established at a length of 2,501-feet, allowing for a Takeoff Run Available (TORA) from Runway 28 of 11,000-feet. Once the runway is extended by 1,501-feet, to a new total length of 10,000-feet, the clearway will remain in place, beginning at the new threshold, but will be reduced to 1,000-feet, maintaining a TORA for Runway 28 of 11,000-feet. Prior to the extension of the runway, an ALSF is proposed to enable the airport to attain Cat II/III approach minimums required by existing and future users. The ALSF will be relocated as part of the runway extension.

In addition, construction of a 3,900-foot by 75-foot wide parallel runway to Runway 10-28, with an ARC B-II, will provide for adequate separation of the varied fleet mix currently and forecast to operate at the airport. Based on the approved forecast, the existing runway system will surpass 60 percent of the annual service volume (ASV) within five years. Prior to the end of the 20-year planning period, the ASV will approach 100 percent. Based on the current FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*, and Draft FAA Order 5090.5, *Formulation of the NPIAS and ACIP*, planning and design of the new parallel runway should begin within five years, with construction being complete within 10 to 15 years.

To alleviate existing complex taxiway geometry, improvements will be made to the Taxiway C intersection with Runway 28, as well as to Taxiway P1. Supporting taxiway infrastructure is necessary to ensure the safety and efficiency of operations in and around the airport. Parallel Taxiway P will be extended from the intersection of Taxiway F to Taxiway E, to create a full-length parallel taxiway to Runway 10-28 on the south side of the runway. A new parallel taxiway will be constructed on the south side of the new parallel runway, connecting between Taxiway F and the end of the runway, and continuing to Taxiway E. Taxiway E will be removed between the new southern parallel taxiway and Taxiway E1 to allow for future aeronautical development in the southeast corner of the airport.

The VOR will be relocated to the southwest to meet the minimum separation requirements to the new parallel runway and southern parallel taxiway.

Implementation of this alternative will provide the airport and the airport users with long-term capacity for the anticipated growth outlined in the approved forecast. However, the need for additional improvements beyond the planning period have been analyzed based on the current and past growth rate of the airport. Ultimately, it is proposed for the south parallel runway to be widened and extended to meet ADG C-III design standards to accommodate the anticipated growth in operations. At the time the parallel runway is expanded, the crosswind runway would be decommissioned, opening large areas of land for aeronautical development, while improving the airports ASV by eliminating intersecting runways.

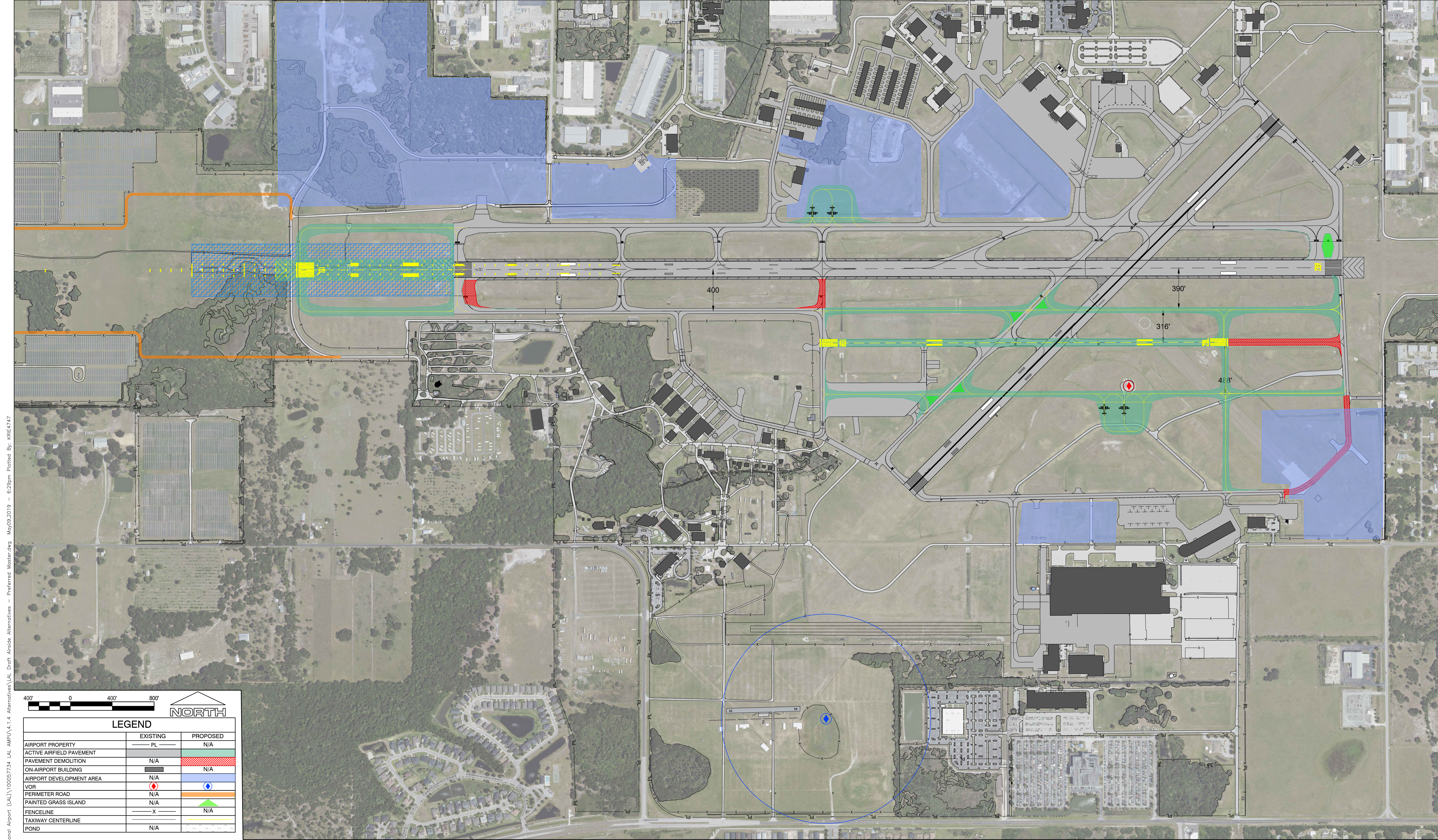
This alternative provides the capability to ensure the airport is as self-sustaining as possible, meets the needs of the current and future users, and continues to provide a significant economic impact to the local community and the overall region.

5.6.2. Preferred Terminal Development Alternative

Figure 5-12 depicts the preferred terminal development alternative. Similar to the selected airside development alternative, the selected terminal development alternative integrated the most preferred development from each of the alternatives. The selected terminal development alternative includes

relocation of the business aviation facilities to a centralized business aviation sector by relocating the FBO and FBO hangars nearby the terminal apron to the southwest. Additional hangar facilities are identified central to the relocated FBO facilities and apron. Additionally, an access road network is included, providing a dedicated access road for general aviation hangar facilities, removing the need for vehicular traffic on the aprons and taxiways. Relocation of the business aviation facilities allows for reservation of land for future expansion of the terminal building and terminal apron to the west and east of the existing terminal.

Land for future terminal support facilities such as terminal parking, rental car facilities, and commercial development, is identified to the northeast and northwest of the terminal. These facilities will enhance the efficiency of the terminal area, while improving the safety of operations by separating the commercial, business, and general aviation users. Capacity constraints which currently exist due to the proximity of the various user groups will be alleviated through the planned future development layout of the north terminal area.



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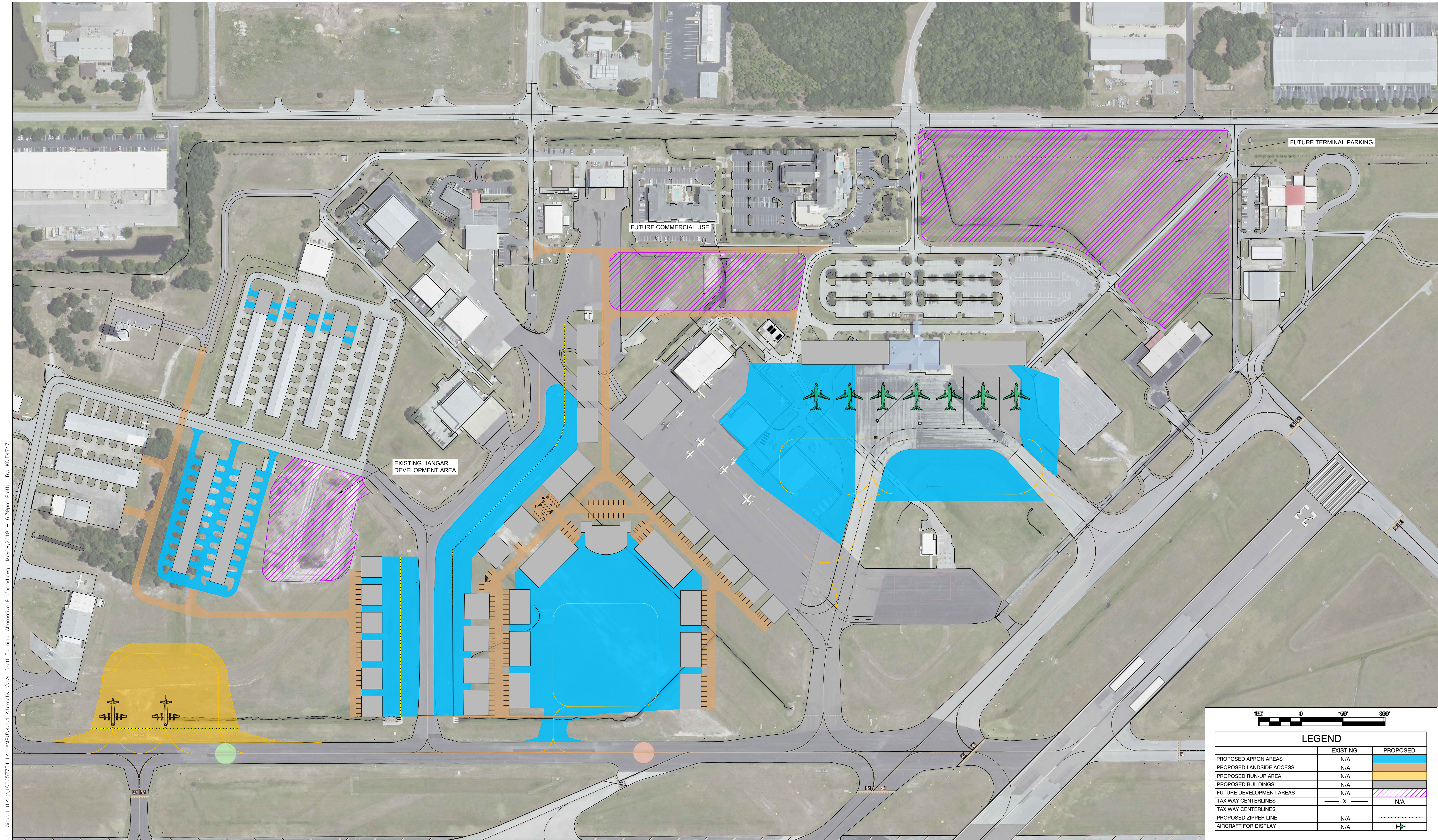
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PREFERRED AIRFIELD DEVELOPMENT
ALTERNATIVE

Figure
5-11



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Preferred Terminal
Development Alternative

Figure
5-12