CHAPTER 5.

ALTERNATIVES ANALYSIS

Introduction

This chapter presents future development concepts for Northern Colorado Regional Airport (FNL or Airport) that are supported by reasoning, an analysis of a range of alternatives, and development recommendations. This chapter describes the various factors and influences that form the basis for the Airport's long-term development program.

The alternatives developed in this chapter are based on existing conditions data collected as part of the inventory task in Chapter 2 – Inventory of Existing Conditions, the aviation activity and demand forecasts developed in Chapter 3 – Aviation Activity Forecasts, and the capacity analysis and facility requirements identified in Chapter 4 – Capacity Analysis and Facility Requirements. The recommendations included in this chapter are focused on airside, landside, and the passenger terminal area facilities needed to meet forecasted demand at FNL.

5.1 Assumptions

In collaboration with Airport leadership and community input received from the Planning and Development Subcommittee (PDSC) and during public meetings, the following basic assumptions have been established, which will be used to direct the alternatives analysis and future development of FNL.

Assumption 1: Recommended improvements must comply with local, state, and federal regulations. The Airport will be developed and operated in a manner that is consistent with local ordinances and codes, federal and state statutes, federal grant assurances, and Federal Aviation Administration (FAA) regulations.

Assumption 2: Role of the Airport. The Airport will continue to serve as a facility that accommodates all classes of general aviation and charter aircraft activity, as well as a limited amount of military activity. The Airport's role is anticipated to again support the return of commercial passenger service activity.

Assumption 3: Airfield design aircraft. The size and type of aircraft that utilize the Airport and the respective dimensional criteria; pavement strength; safety and object clearing setbacks; and safety criteria will be used as the basis for the future layout of Airport facilities.

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Runway 15/33: The Runway 15/33 design aircraft has been established as the Airbus A-320, which sets design standards related to airfield. The A320 is a runway design code C-III aircraft. The C-III designation is also appropriate because the Airport is heavily utilized by the business jet fleet, many of which have "C" and "D" approach speed and the new, larger business jets (i.e., the Gulfstream G-V, Canadair Global Express, and the Boeing Business Jet) which have category III wingspans.

Runway 6/24: This runway accommodates smaller general aviation aircraft (under 12,500 pounds). The "Design Aircraft" fleet is made up of the single engine piston-driven general aviation aircraft (e.g., the Beech Bonanza, Cessna 172, etc.) with approach speeds less than 121 knots and wingspans less than 49 feet. This design aircraft fleet indicates that this runway should be designed to meet runway design code B-I (small aircraft only) dimensional criteria.

Assumption 4: Runway approach, length and width requirements. FNL needs continued accommodation for safe and reliable aircraft operations. FNL's runway system should be developed with instrument approach guidance capabilities and adequate runway length and width to accommodate the forecast operations and design aircraft as safely as possible under most weather conditions.

Assumption 5: Efficient and targeted development. The plan for future airport development and redevelopment of existing facilities should strive to make most efficient use of the available area for aviation-related activities, including general aviation facilities and passenger terminal facilities. Aviation use areas should be developed with the highest and best use possible and consider vehicle and roadway access. Demand for a variety of improved general aviation facilities has been identified.

There is also a need to identify areas that are not required for future aeronautical development; they could instead be used for compatible non-aeronautical development to support the Airport's fiscal goals. Options related to the location of improved, relocated and expanded hangar facilities are examined in the alternative's analysis. Future development and redevelopment of existing facilities should be evaluated for the potential to result in operational impacts to the remote tower masts and visibility requirements.

Assumption 6: Continued use of Runway 6/24. While the Airport could choose to close Runway 6/24 in the future, this chapter assumes Runway 6/24 will be maintained as a crosswind runway and intermittent taxiway. Improvements to Runway 6/24 will be identified in the capital improvement plans; however, Runway 6/24 improvements are not currently eligible for FAA for Airport Improvement Program (AIP) funding. The runway has been identified as a supported runway for the remote air traffic control tower project.





Assumption 7: Air Carrier Passenger terminal requirements. The conclusion of the facility needs investigation related to the air carrier passenger terminal and its support facilities is that the existing terminal facilities are not adequate to accommodate the forecasted demand. There is a need to replace the terminal facilities in the vicinity and/or adjacent to the existing facilities to accommodate the anticipated return and forecasted growth of commercial service and to maximize use of existing aircraft and vehicle parking facilities.

Assumption 8: Remote tower requirements. The remote tower project has installed a mixture of permanent and temporary facilities. The Airport will most likely need to accommodate the existing three masts for the remote tower cameras. It is also possible that the decision is made to locate permanent remote tower facilities including the remote tower control room on airport property.

5.2 Development Goals

The following goals were established to accompany the assumptions described above and direct the Master Plan in establishing continuity in future airport development. These goals consider several categorical considerations relating to the needs of the Airport both in the short-term and long-term, including innovation, safety, noise, capital improvements, land use compatibility, financial and economic conditions, public interest and investment, and community recognition and awareness.

- Provide effective direction for the future development of the Airport through the preparation of a rational, reasonable, and implementable plan.
- Facilitate the 2018 Strategic Plan goal of regional collaboration recognizing FNL's role as a regional partner in transportation, tourism, training and marketing with its surrounding partners and communities.
- Provide for future development that can serve as a catalyst and center for innovation focused on aviation in accordance with the 2018 Strategic Plan.
- Provide recommendations for future development that will actively encourage private and public investments to ensure a strong economic platform for both on-airport development and compatible use within the AIA.
- Promote and capitalize on opportunities that will allow the Airport to enhance its fiscal self-sufficiency to the maximum extent possible, consistent with the Airport's inherent aviation purpose and the 2018 Strategic Plan.
- Analyze and recommend the operational requirements of the existing general aviation and commercial passenger service aircraft fleet and investigate the potential benefits of a runway extension and or widening.
- Implement innovative solutions to emerging technologies such as the support for electrically powered small aircraft for aviation flight training activities.
- Maximize the instrument approach capabilities associated with Runway 15/33 and protect for the Airport's ability to implement new and emerging navigational aid technology.

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- Plan and develop the Airport to be environmentally compatible with the community, while minimizing environmental impacts both on-airport and offairport.
- Avoid north facing hangars due to snow and ice removal challenges.
- Create an effective pavement management/capital management plan to be included in the Capital Improvement Plan (CIP) for financial sustainability and to support the offering of high-quality facilities at FNL.

5.3 Airfield Development Plan

Since the Airport does not require significant changes to the existing or planned airfield configuration or need a change to any Runway Design Code (RDC), this task is focused on confirming the existing airfield layout and incorporating any minor improvements that are necessary to meet current FAA design standards. Design standards to be considered in the evaluation of the airfield layout include runway/taxiway separation standards, runway safety area (RSA), runway and taxiway Object Free Areas (OFAs), Obstacle Free Zone (OFZ), FAR Part 77, Threshold Siting Surfaces (TSS), land uses in Runway Protection Zones, and additional runway separation standards such as distance to hold lines and distance to aircraft parking.

The location of the Building Restriction Line (BRL) at the Airport was also considered in this task. A standard BRL is typically set at 745 feet from runway centerline to allow for the construction of a 35-foot structure without the structure penetrating the imaginary FAR Part 77 transitional surface. The existing BRL is set at 1,007 feet from the runway centerline likely because of visibility requirements related to the intersecting runway configuration, before Runway 6/24 was shortened. Since existing development on the east side of Runway 15/33 is based off this BRL, alternatives to relocate the BRL were not developed in order to maintain consistency and operational safety with the existing development.

Additionally, all roads in the Runway Protection Zones (RPZs) are existing or off Airport property. The City of Loveland and Larimer County have jurisdiction over these roads and no intention of relocating them outside of the RPZs. While this existing condition is documented in the Master Plan Study, no alternatives analysis for RPZ land use were conducted.

Like the 2007 Master Plan Study, this airfield evaluation identifies a post planning period future parallel runway, as shown on the Airport's current ALP, as well as a long-term runway extension to Runway 15/33.



Airfield Recommendations

The airfield recommendations summarized in this section were developed to accommodate future airfield demand as described in **Chapter 3**. Since the Airport does not require significant changes to the existing or planned airfield configuration or the Runway Design Code (RDC), airfield recommendations are based on confirmation of the existing airfield layout and include minor improvements necessary to meet current FAA design standards.

Airside facilities include those, which are reserved for runway, taxiway and associated safety/object free areas; movement areas; protected or critical areas; and approach/departure surfaces.

Alternatives for a future parallel runway and a Runway 15/33 extension were analyzed in the 2007 Master Plan. Based on the current analysis of airfield facilities, FNL should continue to plan for a post-planning period future parallel runway as well as the 1,000-foot runway extension to Runway 15/33, both of which are shown on the Airport's current future ALP. From an environmental standpoint, both projects include large increases in airfield pavement and impervious surface and would likely require an Environmental Assessment level analysis in accordance with the National Environmental Policy Act (NEPA).

Table 5-1 provides a summary of the airfield recommendations described in this section, which are also illustrated in the table. Many of these recommendations were also included in the previous Airport Master Plan and are included on the current Airport Layout Plan (ALP) for FNL.

Airfield Facility	Required Improvement
Runway 15/33	 Widen to 150'* 1,000' takeoff only extension to the south* Extend taxiway A in association with Runway extension* Relocate Runway 33 departure RPZ
Parallel Runway 15R/33L	 Plan for future parallel runway * Plan for bypass taxiways at 15R and 33L Runway ends*
Runway 6/24	 Plan for parallel taxiways to TDG 2 standards*
Taxiway System	 Update fillets to meet current design standards
Airfield Visual Aids	 Install MALS at Runway end 15L*

Table 5-1: Airfield Recommendations Summary

SOURCE: Mead & Hunt, 2019.

NOTES: * Future facility recommendation is carried over from previous Airport Master Plan and illustrated on the current ALP.

TDG – Taxiway Design Group

Runway 15/33. The 2007 Master Plan evaluated and recommended widening and extending the primary runway; both recommendations remain valid. The 1,000 feet extension (for a total runway length of 9,500 feet) provides the runway length necessary for the A319/A320 aircraft and others (charters and large corporate aircraft) to operate without significant weight penalties.

It is recommended that the Airport widen Runway 15/33 from 100 feet to 150 feet to accommodate the current fleet mix and critical aircraft in accordance with FAA design standards. It is also recommended that the Airport consider an extension of Runway 15/33 by 1,000 feet to the south and use declared distances to minimize approach RPZ's extension onto non-Airport property. The extension will result in relocation of departure RPZ (500 x 1,700 x 1,010 feet), offset 200 feet from new runway end location. The new departure RPZ would stay within current Airport property boundary.

With the Runway 15/33 extension, Taxiway A should also be extended by 1,000 feet to accommodate the new Runway end 33 location. The Airport should consider constructing bypass taxiways, which provide flexibility for maneuvering aircraft, to access the relocated Runway end 33. A bypass taxiway allows one aircraft to access the runway even if another aircraft is holding short on the taxiway or conducting an engine runup on the taxiway.



Visual Aids. Visual aid recommendations include installing a medium intensity approach lighting system (MALS) unit at Runway 15 to support improved instrument approach capabilities (³/₄-mile visibility minimum) for Runway 15. The new lighting system will require a larger RPZ with dimensions of 1,000 x 1,700 x 1,510 feet.

It is recommended that the Airport maintain the following visual aids:

- Medium intensity approach lighting system with runway alignment indicator lights (MALSR) serving approached to Runway 33.
- Precision approach path indicators (PAPIs) and three-degree glide path serving Runways 15 and 33
- Runway 15/33 high intensity runway lighting system (HIRL).
- Runway 15 runway end identifier lights (REIL).
- Taxiway A medium intensity taxiway lighting (MITL) system.

Parallel Runway. The existing airfield configuration provides sufficient operational capacity to efficiently accommodate the forecasted operational demand over the next 20 years. Consequently, no additional runway facilities will likely be constructed at FNL during this planning period. However, based on the capacity analysis presented in the previous chapter, the Airport should be planning for additional runway capacity within the 20-year planning period based on projected future operations levels. It is recommended that the Airport continue to reserve space to construct a parallel runway in the long term to preserve the capability to accommodate future activity levels beyond the 20-year planning period.

When operations reach 164,000 (70% capacity), it is recommended that the Airport begin planning efforts for a parallel runway west of existing Runway 15/33. The new parallel runway would take on the designation of 15R/33L, while the existing Runway 15/33 will be designated Runway 15L/33R. Runway 15R/33L should be supported with a full TDG 2 parallel taxiway on the west side. The Airport should also consider implementing bypass taxiways at 15R and 33L Runway ends. Runway 15R/33L will have RPZ dimensions of 500 x 1000 x 700 feet. RPZs will be contained entirely within current airport boundary.

Runway 6/24. Airport users have indicated that a crosswind runway is a desired component of the Airport's airside facilities. In consideration of input received and in recognition of the fact that federal matching funds for the extension, reconstruction, or improvement of the crosswind runway are not likely to be forthcoming for the foreseeable future, the retention of the existing runway alignment and length appears to represent the most appropriate master planning recommendation.





Runway 6/24 will continue to operate in its present configuration; however, increasing the width from 40 feet to 60 feet and constructing full parallel taxiways on the north and south of Runway 6/24 to TDG 2 standards to accommodate aircraft located in the through the fence area could be constructed when, and if, funding becomes available.

Taxiway System Geometry. The taxiway system is intended to allow for easy aircraft taxiing with minimal changes in aircraft speed on direct routes to and from the runways, terminal area, and aircraft parking areas. Key taxiway design considerations include:

- Provide each runway with a parallel taxiway or reserve ability to construct a future parallel taxiway.
- Design taxiways to provide as direct a route as possible.
- Provide bypass capability or multiple access points to runway ends.
- Ensure that taxiways meet the new design criteria outlined in FAA AC 150/5300-13A, Airport Design; including updated taxiway fillet design.
- Avoid direct access from runways to aircraft parking aprons.
- Avoid crossing runways to the extent possible.
- Avoid constructing taxiways off the ends of runways.
- •

FNL's present taxiway configuration can adequately serve the current and forecasted levels of operational activity. However, there are several additional landside facility design considerations that require an evaluation of alternatives. Several conditions have changed since the 2007 Master Plan, including the addition of the remote tower facilities and newly proposed developments such as the Northern Colorado Law Enforcement Training Center (NCLETC).



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Airfield

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Figure 5-1 **Recommendations**

Landside Alternatives

The landside alternatives described in this section account for on-Airport land use and landside constraints and opportunities in consideration of land rent potential, and existing and planned infrastructure and access (both airfield access and vehicle access). These landside alternatives were developed to accommodate forecasted demand and align with the airfield recommendations described in the previous section.

The alternatives reflect development on all appropriate on-Airport developable sites, in consideration of activity forecasts, operational scenarios, utility influences, off-airport development, land acquisition, site development projects and programs, regional roadway and other airport proposals and programs. The alternatives all include similar increases in impervious surface and the associated environmental impacts of the landside alternatives are likely to be very similar. Most development depicted on the landside alternative could likely be categorically excluded for detailed environmental analysis in accordance with NEPA. Airport property that is suitable and available for development/redevelopment has been divided into three landside sections for alternatives analysis that include the northeast, southeast and west areas.

Northeast Landside Alternative 1

Northeast Landside Alternative 1 reflects a hangar concept suited for larger general aviation aircraft parking. The hangar layout provides a mix of 150 feet by 150 feet and 100 feet by 100 feet box hangars to accommodate Airport Design Group (ADG) II aircraft. The layout also incorporates smaller 50 feet by 50 feet hangars to accommodate ADG I aircraft east of the ADG II hangars. The larger hangars have a clearance of 175 feet and are supported by vehicle access from extended Rockwell Avenue. Green areas are reserved for future undefined aeronautical development (20 acres total). A future parking apron is planned adjacent to the seven-acre aeronautical development area (development area with taxiway access). The purple area is reserved for a future commercial terminal building, parking, circulation, and development. Refined alternatives for the commercial terminal area are included later in this chapter.

Figure 5-2 illustrates Northeast Landside Alternative 1 improvements.

Vehicle access to this area does not currently exist but can be achieved either by an extension of Rockwell Avenue and/or through the planned Rickenbacker Road extending south from County Road 30. One additional consideration in Northeast Landside Alternative 1 is the area reserved for Runway 6/24. The wind coverage described in the previous chapter indicates this facility is not eligible for FAA funding. Should the Airport decide to close this runway in the future, an additional 47 acres of landside developable property would become available.

Positive Qualities.

- Provides a mix of medium and large hangars to accommodate future based aircraft.
- Reserves space for future undefined aeronautical development.
- Adequate landside access and vehicle parking rear of hangars.
- Provides for adequate aircraft parking apron expansion along Taxiway A with easy access to the primary runway.
- Reserves prime development space adjacent to aircraft parking apron.
- Multiple points of entry/exit with good landside access.

Negative Qualities.

- Does not maximize the number of hangars that can be developed in this area.
- Significant taxiway and taxilane development would be required to accommodate hangars and development in this area.



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Figure 5-2 Northeast



Northeast Landside Alternative 2

Northeast Landside Alternative 2 is similar to Northeast Landside Alternative 1, but it reflects a hangar concept suited for smaller general aviation aircraft, primarily ADG I and Taxiway Design group (TDG) 2 aircraft. The hangar layout provides a mix of 75 feet by 75 feet and 50 feet by 50 feet box hangars, as well as nested T-hangars for smaller aircraft. This layout also incorporates a development area for pilot's lounge, restrooms and an aircraft washstand for tenant use. The green areas reserved for future undefined aeronautical development total 14 acres.



Figure 5-3 illustrates Northeast Landside Alternative 2 improvements.

Similar to Northeast Landside Alternative 1, vehicle access to this area does not currently exist but can be achieved either by an extension of Rockwell Avenue and/or through the planned Rickenbacker Road extending south from County Road 30.

Positive Qualities.

- Provides a diverse mix of aircraft storage hangars to accommodate aircraft of various sizes.
- Efficient layout that maximizes aircraft storage hangar capacity.
- Multiple points of entry/exit with good landside access.
- Provides for adequate aircraft parking apron expansion along Taxiway A with easy access to the primary runway.
- Reserves prime development space adjacent to aircraft parking apron.
- Reserves space for aeronautical development.

Negative Qualities.

- The number of hangars adjacent to the first taxilane could create congestion along the taxilane.
- Limited road access to some hangars.
- Potentially longer walking distance from parking to some hangars.



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NortheastFigure 5-3Alternative 2



Southeast Landside Alternative 1

Landside Alternative 1 shows replacement of FBO facilities and older T-hangars that are reaching the end of their useful life. New facilities indicated on the alternative include replacement FBO facilities, a community hangar and two corporate hangars. One goal of this proposed layout was also to avoid north facing hangars where possible. Vehicle parking is expanded to accommodate the new hangars Box hangars and T-hangars east of Grumman Taxilane are expanded to follow current hangar layout. Taxilane Piper is partially converted to a dual taxilane to allow for greater aircraft maneuverability. Infill development is implemented where applicable. Green undefined future aeronautical development areas total 21 acres. Blue aeronautical/non-aeronautical development area totals 4 acres. South portion of alternative shows three large corporate hangars. Parking apron is expanded to the south. **Figure 5-4** illustrates Southeast Landside Alternative 1 improvements.

Vehicle access to this area is available via Earhart Road. However, the City of Loveland and the Airport are planning for a connection road, Lindbergh Drive, along the east airport property line from the roundabout at Rocky Mountain Ave., extending north to Earhart Road. This future collector street Lindbergh Drive could potentially become the primary airport access to both the GA and commercial service development areas. It will initially be constructed as a twolane road, but space will be reserved to expand it to a four-lane road should additional capacity be necessary in the future.

One additional consideration in the Southeast area of the Airport is a potential roadway connection from the southeast side of the Airport to the west side of the Airport. Unfortunately, the only possible route for such a connection would be through the RPZ for Runway 33 which would require FAA coordination and possibly a future RPZ study.



Positive Qualities.

- Replaces older FBO and community hangars located on prime apron real estate.
- Provides for orderly expansion of smaller box hangars and T-hangars.
- Provides five large corporate style hangars.
- Includes efficient landside and vehicle access to all areas.
- Reserves adequate space for needed aircraft parking apron expansion.
- Maintains Grumman Taxilane through access to T-hangar area.

Negative Qualities.

- Large portion of this landside area has been leased out for private aeronautical development.
- Provides limited vehicle access to new Corporate hangars.





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SoutheastFigure 5-4Alternative 1



Southeast Landside Alternative 2

Southeast Landside Alternative 2 shows a reconfigured layout for the two corporate hangars that replace older T-hangars with the goal of avoiding north facing hangars. The hangar development that extends from Grumman Taxilane takes advantage of all available space. Aeronautical/non-aeronautical development area is 10 acres. **Figure 5-5** illustrates Southeast Landside Alternative 2 improvements.

Positive Qualities.

- Replaces FBO and community hangars located on higher valued apron real estate that provides apron access for larger design group aircraft.
- Provides for orderly expansion of smaller box hangars and T-hangars.
- Provides two large corporate style hangars.
- Includes efficient landside and vehicle access to all areas.
- Reserves adequate space for needed aircraft parking apron expansion.

Negative Qualities.

- Closes a portion of Grumman Taxilane and requires a large number of aircraft to utilize a secondary taxilane to access the airfield.
- Large portion of this landside area has been leased out for private aeronautical development.



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SoutheastFigure 5-5Alternative 2



West Landside Alternative 1

West Landside Alternative 1 depicts the planned NCLETC facility on the west side of the Airport surrounded by future and long-term flexible aeronautical/nonaeronautical development. The NCLETC facility is planned to have several buildings and a vehicle training track. Given the amount of available land on the east side of the Airport, additional development on the west side is not likely in the short term. To maximize the flexibility to the Airport for how this area is developed, West Landside Alternative 1 depicts the 105 acres surrounding the NCLETC facility as either aeronautical or non-aeronautical future development. Figure 5-6 illustrates West Landside Alternative 1. Vehicle access to the westside of the Airport is also a consideration. While primary access could be provided around the NCLETC facility, the proximity of the railroad means that any secondary access to the parcel south of the NCLETC facility would either require a road crossing the tracks and/or a roadway connection from the east side of the Airport through the RPZ. Because of the access issues, the southern portion of west side may be better suited for some type of passive use, such as a solar array, which does not require a dedicated primary and secondary public access. One additional consideration on the west side is the reservation of space for future Runway 15R/33L or the future parallel runway. Should the Airport decide not to continue to reserve space for this facility, the Airport's long-term capacity would be restricted to approximately 205,000 annual operations. However, not reserving the space would also provide approximately 105 acres of additional flexible aeronautical or non-aeronautical developable property on the west side.

Positive Qualities.

- Reserves space for the post planning period future parallel runway, which enhances future airport capacity and the safety and efficiency of future airport operation.
- Provides flexibility for how the west side of the Airport is developed with either aeronautical or non-aeronautical development or a future mix of both.
- Simple vehicle access from adjacent Boyd Lake Avenue.

Negative Qualities.

- Roadway connection between southeast and west side of the Airport would have to pass through the existing RPZ, which may require an RPZ study.
- One of the potential access points would need to cross the railroad and the feasibility of an easement to provide access is currently unknown.



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West Figure 5-6 Alternative 1



West Landside Alternative 2

West Landside Alternative 2, illustrated in **Figure 5-7**, depicts the same development as in West Alternative 1 but does NOT include a reservation of space for future Runway 15R/33L. This essentially frees up an additional 105 acres of developable property for a total of 210 acres. However, not reserving space for future Runway 15R/33L significantly limits future airfield capacity.

Positive Qualities.

- Creates approximately 210 acres of developable property with standard 745 feet BRL.
- Wider connection between northwest and southwest development areas compared to Alternative 1.
- Provides flexibility for how the west side of the Airport is developed with either aeronautical or non-aeronautical development or a future mix of both.
- Simple vehicle access off Boyd Lake Avenue.

Negative Qualities.

- Restricts future airfield capacity to approximately 205,000 annual operations.
- Not constructing a future parallel runway could negatively affect future airport operational efficiency.
- Potentially limits future commercial service expansion due to lack of airfield capacity.
- Roadway connection between southeast and west side of the Airport would have to pass through the existing RPZ, which may require a RPZ study,
- One of potential access points would potentially need to cross the railroad tracks and the feasibility of an easement to provide access is currently unknown.

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West Figure 5-7 Alternative 2



5.4 Passenger Terminal Area Alternatives

The Airport recently conducted a future terminal site location study which confirmed that the existing terminal area or the area immediately north of the current passenger terminal facilities is the correct location for the terminal. This area has historically been reserved on the ALP for future terminal facilities. Planning level alternatives were developed for this area to show how the space might be configured in association with a future replacement terminal and the reinitiation of commercial service at FNL. Additional coordination with FAA will be necessary to determine the appropriate level of environmental impact analysis for development of this area and the construction of a replacement terminal building.

Terminal Area Alternative 1

In Alternative 1, the primary access to the Airport is along future Lindbergh Drive connecting to a roundabout and a future terminal loop road. Inside the loop road, space is reserved for short- and long-term vehicle parking and a potential cell phone waiting lot or ride share waiting lot. The area immediately east of the loop road is reserved as future innovation focused aeronautical/non-aeronautical uses and consists of approximately 16 acres, which would have direct taxiway access to Runway 6/24

This alternative also illustrates the potential location for a future single level replacement terminal located north of the existing terminal with that facility being converted into Airport Administration offices. Space is also reserved both north and south of the terminal to allow for easy expansion of the building should commercial service and enplanements exceed the forecasted demand within the 20-year planning period. **Figure 5-8** illustrates the Terminal Area Alternative 1.





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Terminal AreaFigure 5-8Alternative 1



Terminal Area Alternative 2

In Alternative 2, the primary access to the Airport is also anticipated to be future Lindbergh Drive connecting to a roundabout and a future terminal loop road. In this alternative, the loop road surrounds the entire parcel and space inside the loop road is reserved for future commercial air service support facilities. Such facilities might include a rental car quick turn and wash complex, expanded vehicle parking, remote valet parking, hotel, etc.

Terminal Area Alternative 2 illustrates the potential location for a future two-level or split-level replacement terminal located north of the existing terminal with that facility being converted into Airport Administration offices. The two-level terminal would also likely include passenger boarding bridges to enhance the airport experience for FNL passengers.

Space is also reserved both north and south of the terminal to allow for easy expansion of the building should commercial service and enplanements exceed the forecasted demand within the 20-year planning period. **Figure 5-9** illustrates the Terminal Area Alternative 2.



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Terminal AreaFigure 5-9Alternative 2



5.5 Passenger Terminal Building Alternatives

Renovation and/or expansion of the existing multi-building terminal facilities at FNL is not considered a feasible option and will not be evaluated in this chapter. Alternatively, two replacement terminal alternatives were developed to accommodate the return of commercial service at FNL in accordance with the terminal square footage program included in the previous chapter. These replacement alternatives include the following or variations of the following:

- Construct a new, single level terminal
- Construct a new, two-level terminal with passenger loading bridges

Requirements such as cost and future expansion may have greater weight over wayfinding and signage. Within this size facility, simple plans and intuitive paths are the norm. Over the long term, a facility planned for flexible meeting evolution in passenger handling and airline operations would be beneficial. Building an energy efficient building would be a baseline requirement in this environment.

Alternative 1: Terminal Layout - One Story Alternative

A single-level, single-gate terminal building plan was developed for the site to serve as an option for the Airport to consider. A floor plan for Alternative 1 is illustrated in **Figure 5-10**. As noted above, the single level building meets all criteria and program requirements for passenger and airline operations in a simple and efficient plan. Single level passenger terminals are also the most common at airports the size of FNL. It would also provide opportunities to design a unique environment and experience for the traveling public with vaulted ceilings, natural light, and views of the Rocky Mountains.

Planning for a terminal to fit this site is best accomplished within a linear building footprint oriented parallel to the terminal curbside and ramp apron. Traditional ticketing and baggage claim are located with ticketing first on the curb, a central main hall marking the primary entrance and exit from the building and linking ticketing to the baggage claim hall. The main hall also serves as a direct link the from curb to passenger security screening and the departures lounge for passengers who already have their boarding passes and aren't checking bags for the trip. The main hall also provides a place for well-wishers and visitors.

Passengers' progression through the terminal follows a known path, from security screening to the departures lounge and aircraft. Given the length of the security checkpoint, it is placed perpendicular to the main hall orientation. A perpendicular placement results in the passenger departures lounge located to one side of the device. Planning level costs for this terminal are estimated at approximately \$400 per square foot.

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Positive Qualities.

- All functions occur on a single level and within a simple, efficient layout, with minimal transitions to exterior grade level.
- No vertical circulation space requirements stairs, escalators, and elevators.
- Can accommodate jetways if desired.
- Lower building construction costs.
- Relatively easy to expand when compared to a multi-level building.
- Simple wayfinding and signage along a central spine.
- Single level plan allows for more open public area to be located under a high ceiling, adding volume, light, and atmosphere to the building design.
- Concession/restaurant space included post security in the hold room.

Negative Qualities.

- Expansion of departures lounge and baggage claim halls requires moving and rebuilding baggage claim.
- Expansion of security screening checkpoint requires taking over TSA Offices & Break Room (relocated to space adjacent to checked baggage inspection).
- Provides less space for ground handling operations and Ground Service Equipment (GSE) storage.







Terminal LayoutFigure 5-10One Story Alternative

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Alternative 2: Terminal Layout – Two Story Alternative

This alternative illustrates a two story, split-level terminal with security and hold room space located on the second level. **Figures 5-11** and **5-12** illustrate this option. A single-level non-secure public space and a two-story secure public and airline space layout combines advantages of both single-story and two-story schemes. Non-secure public space is at the same level as ground transportation access and terminal curb parking. Secure space, both public and airline ground support, function from upper and lower levels, respectively, providing more efficient operation. The aircraft boarding process is the same as at larger airports. Boarding bridges are high above the apron, allowing ground service crews space and visual access than bridges beginning at ramp level and extending up to the aircraft. Space underneath the passenger departures level is available for airline ground service operations and equipment storage and staging.

In planning for a two-story terminal, the security checkpoint is located at the second level, oriented along the length of the building axis in order to allow for departure lounge expansion in two directions from the central circulation core. Expansion of the checkpoint will require building out over the ticketing area or expanding the departures lounge onto the apron.

Vertical circulation also runs along the longer building axis with each element, with stairs, escalators and elevators separated to align with passengers departing and arriving from the lounge. As with the security checkpoint, an alternative layout with vertical circulation oriented perpendicular to the curb would also increase the depth of the building. Vertical circulation serves as access to the upper level and is planned to align with passenger flow from the ticket hall, to and from the main entrance, and to the baggage claim hall. As a central element in the building scheme, it provides an opportunity to develop a significant transition experience for Northern Colorado residents and visitors.

The upper level departures lounge is planned to accommodate two aircraft gates and a restaurant concession. The security checkpoint is planned for single departures with passengers arriving at the checkpoint over a period greater than one hour. Simultaneous departures or overlapping flights' passenger arrivals will require a second lane added to the checkpoint. Planned for the area above the ticket counters, this space can be built under the initial construction phase or added to the building at a later date.

Area underneath the second floor also provides space for building support systems and personnel, be it mechanical, electrical, IT, facilities maintenance, or services operations. Inbound and outbound baggage handling is also a part of this group, providing a secure, enclosed area for GSE storage and staging. Estimated planning level costs for this terminal are roughly \$500 per square foot.

Positive Qualities.

- Larger main hall for passengers and visitors to gather, with space for well-wishers and meeter/greeters at the first floor adjacent to the vertical circulation.
- Public and secure areas of the building are separate, providing more safety and security for passengers.
- Wayfinding and signage are straightforward along a central spine entrance to gate departures lounges is more visible.
- Upper level allows for better overall functional space allocation throughout the terminal.
- Upper level lounge preferred operation for passenger boarding bridges to anticipated design aircraft, with passengers walking down a lower decline vs walking up a steeper incline to the aircraft (under a single level plan).
- Upper level lounge allows for lounge expansion without impacting the lower level baggage claim hall.
- The lower level baggage claim hall can be expanded to accommodate an additional claim device without impacting the existing baggage claim area or secure departure lounge space.
- Area under second level is available for use by airlines for GSE storage and airport operations and maintenance, as well as easily accessible and secure mechanical, electrical/IT and plumbing spaces.
- Upper level lounge would allow high ceilings and dramatic mountain views.

Negative Qualities.

- More circulation space required to implement the scheme, including stairs, escalators and elevators.
- Two levels will require more building structure and envelope, resulting in higher construction costs, when compared to a single-level plan.







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5.6 Conceptual Development Plan (CDP)

The alternatives included in this chapter were developed, reviewed, and discussed in detail with airport management and the PDSC. This information was also presented at a public outreach meeting in Fort Collins in September of 2019. The CDP was also shared with planning commissions at Loveland, Fort Collins and Larimer County in late 2019.

Input from those meetings was incorporated and the PDSC eventually decided on preferred alternative selections and in addition to the airfield recommendations, the preferred alternative selections make up the updated Conceptual Development Plan (CDP) for the Airport. The CDP, which is essentially all existing and potential future facilities at FNL, is shown in **Figure 5-13**. The CDP will again be shared with the community via the Airport's website and through a final public open house in August 2020. Following incorporation of comments from that outreach, the Master Plan Study will be finalized.



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Conceptual Development Figure 5-13 Plan (CDP)

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